



Arizona Game and Fish Department

Sport Fish Stocking Program



Final Environmental Assessment

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Prepared by EcoPlan Associates, Inc.,
for the U.S. Fish and Wildlife Service and
the Arizona Game and Fish Department



SUMMARY OF CHANGES INCORPORATED INTO FINAL ENVIRONMENTAL ASSESSMENT

To simplify review of this Final Environmental Assessment (EA), the following paragraphs describe how the Final EA has changed compared with the public review Draft EA.

After review of public and agency comments received on the Draft EA, the U.S. Fish and Wildlife Service (FWS) Wildlife and Sport Fish Restoration Program and Arizona Ecological Services Office and the Arizona Game and Fish Department (AGFD) chose to modify the Proposed Action. The changes incorporated into this Final EA reflect these modifications, provide corrections to the document where warranted, and add clarification as requested in public and agency comments. The modified Proposed Action has been identified by the FWS as the “Selected Alternative.”

The modifications to the Proposed Action as described in the Final EA (Chapter 3) include the removal of one previously proposed stocking site (Fagen Tank) and the elimination and/or substitution of some species proposed for stocking at some sites. The following table identifies these modifications for those stocking sites affected. Based on the modifications, the total number of sites proposed for sport fish stocking would be 166 sites (compared with 167 sites in the Draft EA). A complete listing of the stocking sites and the species proposed with the Proposed Action is provided in Table E (Appendix A). These modifications to the Proposed Action and the associated analyses are reflected throughout the Final EA. No modifications were made to the other alternatives.

Modifications to Proposed Action

Stocking Site	Draft EA	Final EA
Fagen Tank (Santa Cruz River– Middle Santa Cruz)	Species proposed: bluegill sunfish, redear sunfish	No species proposed; stocking site eliminated from Proposed Action
Green Valley Lake (Verde River– Lower Verde River Complex)	Species proposed: rainbow trout, channel catfish	Species proposed: rainbow trout; stocking of channel catfish eliminated
Kinnikinick (Little Colorado River–Diablo Complex)	Species proposed: rainbow trout, brown trout, brook trout, cutthroat trout, Arctic grayling, channel catfish	Species proposed: rainbow trout, brown trout, brook trout, cutthroat trout, Arctic grayling; stocking of channel catfish eliminated
Morton (Little Colorado River–Diablo Complex)	Species proposed: rainbow trout, channel catfish	Species proposed: rainbow trout; stocking of channel catfish eliminated
Mud Tank (Little Colorado River–Diablo Complex)	Species proposed: rainbow trout, channel catfish	Species proposed: rainbow trout; stocking of channel catfish eliminated
Bass Tank (Bill Williams River–Santa Maria Complex)	Species proposed: bluegill sunfish, redear sunfish, largemouth bass	Species proposed: bluegill sunfish; redear sunfish; stocking of largemouth bass eliminated

Modifications to Proposed Action

Stocking Site	Draft EA	Final EA
Blue Tank (Bill Williams River–Santa Maria Complex)	Species proposed: bluegill sunfish, redear sunfish, largemouth bass	Species proposed: bluegill sunfish; redear sunfish; stocking of largemouth bass eliminated
Carter Tank (Bill Williams River–Burro Creek Complex)	Species proposed: channel catfish	Species proposed: bluegill sunfish, redear sunfish; stocking of channel catfish eliminated
Antelope Tank (Bill Williams River–Burro Creek Complex)	Species proposed: bluegill sunfish, redear sunfish, largemouth bass, channel catfish	Species proposed: bluegill sunfish; redear sunfish; stocking of largemouth bass and channel catfish eliminated
Bar 37 Tank (Bill Williams River–Burro Creek Complex)	Species proposed: bluegill sunfish, redear sunfish, largemouth bass, channel catfish	Species proposed: bluegill sunfish; redear sunfish; stocking of largemouth bass and channel catfish eliminated
Harman Tank (Bill Williams River–Burro Creek Complex)	Species proposed: channel catfish	Species proposed: bluegill sunfish; redear sunfish; stocking of channel catfish eliminated
Little Antelope Tank (Bill Williams River–Burro Creek Complex)	Species proposed: bluegill sunfish, redear sunfish, largemouth bass	Species proposed: bluegill sunfish; redear sunfish; stocking of largemouth bass eliminated
McElhaney Tank (Bill Williams River–Burro Creek Complex)	Species proposed: bluegill sunfish, redear sunfish, largemouth bass	Species proposed: bluegill sunfish; redear sunfish; stocking of largemouth bass eliminated
Stubbs Tank (Bill Williams River–Burro Creek Complex)	Species proposed: bluegill sunfish, redear sunfish, largemouth bass	Species proposed: bluegill sunfish; redear sunfish; stocking of largemouth bass eliminated
Swale Tank (Bill Williams River–Burro Creek Complex)	Species proposed: channel catfish	Species proposed: bluegill sunfish; redear sunfish; stocking of channel catfish eliminated

The draft Biological Conference Opinion was revised to address the previously noted modifications to the Proposed Action. As a result, the analysis summary for Endangered Species Act (ESA) consultation species was revised accordingly in the Final EA (Chapter 4, Section 7 Consultation Species Site-specific Analysis Summaries). The effects determinations of the consultation species did not change as a result of these modifications. For some non-consultation special status species, however, modifications to the Proposed Action would result in changes in the effects determinations at some locations. These changes are reflected in the Final EA (Chapter 4, Tables 2, 7–18, 21, and 30, and Appendixes A (Table E), K, L, and M).

The Final EA incorporates a discussion of the effects of large wildfires in spring 2011 on listed and candidate species considered in the National Environmental Policy Act process. This discussion includes a summary of the measures used by the U.S. Department of Agriculture

Forest Service through its Burned Area Emergency Response Program to ameliorate such impacts (Chapter 4, Section 7 Consultation Species Area-wide Analysis Summary).

Language in the Draft EA related to hatchery impacts has been modified in the Final EA (Section 4.1.4, Effects of Hatchery Operations and Maintenance) to reflect the recent amendment to the ESA Section 7 Intra-Service Consultation on hatchery operations and maintenance, and to provide a more detailed analysis of the potential related effects on consultation and non-consultation special status species.

The Conservation and Mitigation Program, included in the Draft EA as Appendix P, has been revised to provide additional detail and clarification: refining key definitions, linking the measures to existing species recovery plans (where available), and adding timelines for the initiation of projects and reporting requirements. Chapter 5.0 of the Final EA contains this revised document, which reflects mandatory mitigation/conservation actions and additional conservation measures that may be implemented as funding allows.

Sections 7.2 and 7.3 of the Final EA document the public and agency outreach on the availability of the Draft EA. A summary of the public and agency comments received on the Draft EA and responses to these comments prepared by the FWS and the AGFD is included in the Final EA in Appendix P.

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ACRONYMS AND ABBREVIATIONS

AAC	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
AESO	Arizona Ecological Services Office (FWS)
AFS	American Fisheries Society
AGFD	Arizona Game and Fish Department
AGFD Commission	Arizona Game and Fish Department Commission
AISAC	Arizona Invasive Species Advisory Council
ARS	Arizona Revised Statute
ASNF	Apache-Sitgreaves National Forests
AUD	angler use day
BA	Biological Assessment
BAER	Burned Area Emergency Response
BCO	Biological and Conference Opinion
BCR	Bird Conservation Region
BGEPA	Bald and Golden Eagle Protection Act
BLM	U.S. Department of the Interior Bureau of Land Management
BMPs	Best Management Practices
BO	Biological Opinion
CAMP	Conservation and Mitigation Program
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO ₂	carbon dioxide
DPS	Distinct Population Segment
EA	Environmental Assessment
ESA	Endangered Species Act
FIN	Fishing in the Neighborhood
Fisheries Commission	U.S. Commission of Fish and Fisheries
FS	U.S. Department of Agriculture Forest Service
FWS	U.S. Department of the Interior Fish and Wildlife Service
HACCP	Hazard Analysis and Critical Control Points
HDMS	Heritage Data Management System
HUC	Hydrologic Unit Code
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act of 1969
O&M	operations and maintenance
PAC	Protected Activity Center
Reclamation	U.S. Department of the Interior Bureau of Reclamation
SFRA	Sport Fish Restoration Act
USGS	U.S. Department of the Interior U.S. Geological Survey
WSCA	Wildlife of Special Concern in Arizona
WSFR	Wildlife and Sport Fish Restoration Program (FWS)

1.0 INTRODUCTION

The U.S. Fish and Wildlife Service (FWS) Wildlife and Sport Fish Restoration Program (WSFR) proposes to continue to provide funding for the Arizona Game and Fish Department (AGFD) Sport Fish Stocking Program under the Dingell-Johnson Sport Fish Restoration Act of August 9, 1950, as amended (U.S. Code Title 16) (SFRA). The AGFD, the applicant, proposes to continue its Sport Fish Stocking Program for a 10-year period (September 1, 2011 to August 31, 2021) by continuing to operate AGFD hatcheries and stock sport fish¹ in selected rivers, streams, lakes, reservoirs, ponds, and tanks in the state. The Sport Fish Stocking Program includes operations and maintenance of five AGFD fish hatcheries that rear and supply a majority of the fish used in the stocking program, the acquisition of fish from outside sources, and the stocking of those fish into waters of the state of Arizona.

SFRA directs the FWS to provide federal aid to states for the “fish restoration and management projects designed for the restoration and management of all species of fish that have material value in connection with sport or recreation in the marine and/or fresh waters of the United States.” Code of Federal Regulations (CFR) Title 50, Part 80.5(b)(1) directs the Fish and Wildlife service to use SFRA funds in “Restoring, conserving, managing, and enhancing sport fish, and providing for public use and benefit from these resources.” U.S. Code Title 16 also states “The Secretary of the Interior is authorized and directed to cooperate with the States through their respective State fish and game departments in fish restoration and management projects.” With the provision of federal funding, the AGFD Sport Fish Stocking Program is subject to compliance with the National Environmental Policy Act of 1969 (NEPA), as well as other applicable environmental laws and regulations. The FWS is the lead federal agency responsible for NEPA compliance; the AGFD is the cooperating agency.

This Environmental Assessment (EA) has been prepared in accordance with NEPA, Council on Environmental Quality (CEQ) regulations (CFR Title 40, Parts 1500–1508), CEQ guidance on the appropriate use of mitigation and monitoring and the appropriate use of mitigated findings of no significant impact (Federal Register 2011), U.S. Department of the Interior Regulations (CFR Title 43, Part 46), the FWS NEPA Reference Handbook updated October 1998 (FWS 1998a), and the FWS NEPA Guidance to States Participating in the Federal Aid Program updated in October 2000 (FWS 2000).

1.1 Applicable Funding

The WSFR program is part of the FWS and has the authority to approve grants and provide SFRA funds to states for sport fish management and restoration, and other activities. Funds distributed to the states under SFRA are derived from a 10 percent excise tax on certain items of sport fishing tackle; a 3 percent excise tax on fish finders and electric trolling motors; import duties on fishing tackle, yachts, and pleasure craft; a portion of motorboat fuel tax revenues and small engine fuel taxes; and interest earned on the account. Non-federal matching funding sources for the AGFD Sport Fish Stocking Program include revenues from the sale of fishing

¹ As used throughout this EA, sport fish is defined as aquatic, gill-breathing, vertebrate animals bearing paired fins and having material value for sport or recreation.

licenses and trout stamps, wildlife conservation funds, Heritage Program (Arizona state lottery) funds, contract funding from municipalities for urban fishing waters, and private donations.

1.2 Purpose and Need

SFRA directs the FWS to provide federal aid to states for the management and restoration of fish having material value in connection with sport or recreation in the marine and/or fresh waters of the United States. To fulfill this legislative mandate, the FWS proposes to fund, in part, the AGFD Sport Fish Stocking Program.

The purpose of the proposed activity is to meet the current and future need and demand for angling opportunities through the continued use of SFRA funds to rear sport fish at AGFD hatcheries, acquire sport fish from outside sources, and stock sport fish into selected waters of Arizona, thereby fulfilling the SFRA legislative mandate and continuing to support the AGFD Mission.

In Arizona, hundreds of thousands of residents and non-residents take advantage of recreational fishing opportunities each year. Based on 2006 numbers, there were 4,156,000 angler use days (AUDs)² of fishing in Arizona, with a total annual economic impact of \$1.3 billion (Southwick Associates 2007). The AGFD estimated a resident demand of 6 million AUDs through 2012, with some growth anticipated in nonresident demand (AGFD 2008). Demand for angling opportunities in Arizona is anticipated to further increase given current trends in population growth and projected growth models, especially for those areas in close proximity to urban area boundaries.

1.3 Proposed Action

The WSFR proposes to fund, in part, the AGFD Sport Fish Stocking Program, including operations and maintenance of AGFD fish hatcheries that rear and supply a majority of the fish used in the stocking program, the acquisition of fish from outside sources, and the stocking of those fish into waters of the state of Arizona to provide opportunities for recreational fishing. The Proposed Action would include a total of 166 stocking sites: 62 with a cold-water fishery objective, 22 with a warm-water fishery objective, and 82 with a cold- and warm-water fishery objective (Section 3.2 describes the Proposed Action in detail).

The Proposed Action would incorporate the Sport Fish Stocking Conservation and Mitigation Program (CAMP), which would be implemented to avoid, reduce, offset, or otherwise minimize environmental impacts associated with the Proposed Action. The CAMP is included in its entirety in Chapter 5.0.

1.4 Decision to Be Made

The responsible official for this EA is the FWS Regional Director, Region 2. This official must decide whether to approve a grant of SFRA funds to the AGFD for the continued implementation of the Sport Fish Stocking Program.

² An AUD is one angler fishing one day, regardless of the length of time spent that day.

1.5 Scoping

The FWS and the AGFD sought early involvement and consultation with federal, state, and local governmental agencies, Native American tribes, interested community organizations, and the public at large as part of an agency and public scoping process. The scoping outreach is described in Chapter 7.0.

1.5.1 Agency Responses to Scoping

Responses to the scoping process were received from the following agencies: the U.S. Department of Agriculture Forest Service (FS) Apache-Sitgreaves National Forests (ASNF) and Coconino National Forest, the U.S. Department of the Interior Bureau of Reclamation (Reclamation) Phoenix Area Office and Upper Colorado Regional Office, the National Park Service Grand Canyon National Park and Glen Canyon National Recreation Area, and the Pima County Office of Conservation Science and Environmental Policy.

The agency scoping comments received concerned one primary overarching issue—the impacts of nonnative fish stocking on the survival and recovery of native fish, amphibians, and semi-aquatic reptiles. Competition between native and nonnative species, predation of native species by nonnative species, and genetic alteration/hybridization were cited as some of the potential effects of nonnative fish stocking. Other potential effects noted were the escapement of nonnative fish to unintended water bodies and the introduction/movement of diseases, parasites, and other undesirable organisms. Examples of undesirable organisms cited include crayfish, Asiatic clams, mud snails, and other nonnative organisms, including plants (e.g., *Salvinia*).

Agencies offered suggestions related to their concerns: to emphasize native sport fish management over nonnative sport fish management, to expand the management of native aquatic species in isolation from nonnative species, to devote entire drainages or subdrainages to the exclusive management of natives, and to construct fish barriers and remove nonnative fishes to restore native assemblages of aquatic species. To address the issue of the escapement of stocked fish, one agency suggested that stocked fish could be tagged and monitored for any escapement from suspect waters.

Some agency responses recommended that fish stocking activities strike a balance between recreational opportunities and other resource needs. Agencies also noted that fish stocking should be consistent with adaptive management and existing conservation plans. The Glen Canyon Dam Adaptive Management Program strategic plan and the Pima County draft Multi-Species Conservation Plan were examples cited.

1.5.2 Public Responses to Scoping

Approximately 130 responses were received related to this proposed activity from members of the public during the early scoping process. A large number of responses stated general support for the sport fish stocking program, while a few responses included no real statement of support or opposition. Comments in support referenced the social/recreational importance of fishing; the importance of fish stocking in the urban lakes to families, inner city youth, and anyone without access to rural fishing areas; and the importance of fishing to the local economy and state revenues.

Public comments in opposition to the sport fish stocking program focused on the impacts of nonnative fish stocking on the survival and recovery of native fish, amphibians, and semi-aquatic reptiles, similar to the concerns noted in the agency responses. Specific objection was stated regarding the stocking of nonnative fishes in habitats occupied by, or designated for management of, state special status species or federally listed species, including any stocking that would conflict with threatened and endangered species recovery actions. Competition between native and nonnative species, predation of native species by nonnative species, and increasing predator diversity were cited as some of the potential effects of nonnative fish stocking. Other potential effects noted were the escapement of nonnative fish to unintended water bodies, and the introduction/movement of diseases, parasites, and other undesirable organisms. A few responses requested that consideration be given to the potential cumulative effects of climate change on imperiled species, including the effects of stream flow reductions and increases in water temperatures on native aquatic wildlife.

Some letters did not explicitly state support or opposition but asked for disclosure or discussion of information on self-sustainable fish populations, particular fish species to be stocked or transferred between waters, temperature thresholds and predation effects on seasonal stocking of cool-water fish, water quality trends, implications of a No Action alternative, funding sources, funding allocations and expenditures, use of funding to stock a specific area, and use of revenues collected from sales taxes on fishing equipment on sport fish versus non-sport fish stocking and habitat restoration. Many of the responses included specific suggestions or questions such as those related to fishing regulations and enforcement, species and sizes stocked, stocking locations, stocking levels, license fees, site management, stocking schedule, sources for fish, seasonal closures, conservation of native fish, and the aquatic wildlife stocking permit program.

The input received during the scoping process was important in the development of alternatives. Along with the results of the preliminary analysis, scoping input was used to focus the environmental analysis of the Proposed Action and its alternatives.

1.6 Public Comment on the Draft EA

The Draft EA was released on March 10, 2011, for a 60-day comment period. Sections 7.2 and 7.3 of the Final EA document the public and agency outreach on the availability of the Draft EA.

Five hundred and seventy-seven comments, some representing agencies, organizations, and clubs, were received (letter, fax, or emails) during the Draft EA comment period. Of those comments, 376 specifically commented in support of stocking at one site, La Paz County Park Lagoon, which hosts popular fishing clinics for kids. Substantive comments concerned (1) adequacy of mitigation program, (2) sufficiency of the range of alternatives, (3) disagreements over biological conclusions, and (4) requests to not stock at certain places or not to stock specific species because of possible impacts to native species. There were many comments in support of maintaining existing or expanding angling opportunities citing economic and recreational benefits and impacts to local communities dependent on angling. The WSFR and the AGDF prepared a Response to Comment document, which is appended to this Final EA in Appendix P. A detailed summary of the public and agency comments received on the Draft EA and responses to these comments, prepared by the FWS and the AGFD, are included in the Final EA in Appendix P.

As with the scoping comments, a large number of responses on the Draft EA stated support for the Sport Fish Stocking Program. Those in support generally focused on economic, social, and recreational benefits. Many noted the importance of stocking to the state's economy, local revenues, business income, and jobs. Many noted that the Proposed Action would support the economy of the state and that the Reduced Stocking Alternative would negatively affect the economy.

Other comments in support noted that fishing brings enjoyment, gives people an opportunity to be outdoors, and is a great activity for families. Some stated their support for the Proposed Action because it fosters environmental education and stewardship.

Some comments were site-specific; others were related to the program as a whole. A large number of responders (376) commented solely on the stocking of one specific site—La Paz County Park Lagoon—because it supports the annual Take a Kid Fishing program.

Some comments stated that the Proposed Action supports the continued variety of opportunity and availability of angling experiences in Arizona. Some comments were related to the importance of a specific stocking site or a particular species. Some noted that sport fishing at a number of lakes and streams is dependent on stocking.

2.0 BACKGROUND

The AGFD is the principal state agency responsible for the management and protection of wildlife resources and their habitats in Arizona, including fisheries. For many years, the AGFD and other agencies have supplemented recreational angling³ opportunities by stocking state waters with sport fish species. The following two sections provide a brief history of fish hatcheries and stocking practices in Arizona and an overview of the existing AGFD Sport Fish Stocking Program and its components based on recent years of operation.

2.1 History of Fish Hatcheries and Stocking Practices in Arizona

The history of legally stocking fish across the landscape dates to 1872, when the U.S. Commission of Fish and Fisheries (Fisheries Commission) was tasked by Congress to supplement declining “native stocks of coastal and lake food fish through fish propagation” and the National Fish Hatchery System was formed (FWS 2010a). Federal hatcheries were created that same year and operated in most states (Stein 2010). The Fisheries Commission was renamed the U.S. Bureau of Fisheries in 1903 and, as the federal hatchery system grew, fish were transported and stocked across the country using fish cars via the railroad system (1871–1933).

In 1913, the Arizona Legislature created an agency called the Department of State Game Warden. Its name was subsequently changed to the Arizona Game and Fish Commission. The State of Arizona enacted legislation to manage fish in state waters, and in 1922, began construction of the first state-operated fish hatchery. Since the 1920s, the AGFD has been rearing and stocking fish in Arizona to compensate for the limited opportunities provided by native sport fisheries.

In 1940, the FWS was created, and the Bureau of Fisheries merged with it. Stocking programs continued and increased to offset the decline of fish resulting from the creation of dams and other federal water projects (FWS 2010b).

In August 1950, the Dingell-Johnson Federal Aid to Fisheries Act (original name) was signed into law (Public Law 81-681) to provide federal funds to states for fisheries restoration and management programs. Subsequent amendments authorized funding for aquatic education, wetlands restoration, and boating safety. The excise taxes that had been collected on fishing tackle and equipment were then earmarked and put into a special account for apportionment to the states for sport fish restoration programs, effective July 1, 1951. The SFRA became a cooperative effort between the FWS and state fish and wildlife agencies to invest anglers’ tax dollars in state sport fishing development projects. As a result, stocking efforts and the development of fishery management programs, including but not limited to hatcheries, expanded and intensified due to the availability of funds. Stocking records in Arizona from federal and state-operated hatcheries were sparse in early years due to the initial lack of stipulations for types of projects and the lack of clarity for reporting requirements under the SFRA.

In Arizona during the 1940s, emphasis on raising and stocking fish shifted to cold-water species, primarily trout (Bassett et al. 1998) to increase fishing opportunities. The availability of SFRA

³ Fishing with a hook and line and usually a rod.

funds and continued growing demand for fishing prompted the creation of a lake development program within the AGFD in the 1950s, 1960s, and early 1970s and instigated the creation of many lakes within the state. The creation of these lakes greatly increased the number of stockings and the number of species stocked during this period. Most of these lakes provided substantial recreational opportunities to the public as well as food on their tables. Threadfin shad were initially harvested from the lower Colorado River to stock in warm-water lakes as a forage base for bass and crappie populations. Trout stockings in Arizona and across the western United States were most numerous in the 1960s for several reasons: increased funding, the improvement of existing hatcheries, the creation of new hatcheries, and improved propagation techniques (Schade and Bonar 2005), as well as growth in human population and recreational interest.

The greatest number of new introductions of fish species (authorized and unauthorized) occurred between 1940 and 1960 (Figure 1). The AGFD and the Fisheries Commission/FWS were responsible for stocking the majority of nonnative fish into the state during this period, primarily for human consumption (Appendix A, Tables A and B). Sixty-five species of nonnative fish have been introduced into Arizona through a variety of pathways, primarily by these authorized stockings. Of these, 19 species (30 percent) were likely unauthorized or unintentional introductions, primarily from releases of baitfish and fish from aquaria or ornamental ponds (Appendix A, Table C). Six of the 19 species are considered sport fish and were stocked primarily between 1937 and 1950 when fish were stocked across North America to provide food.

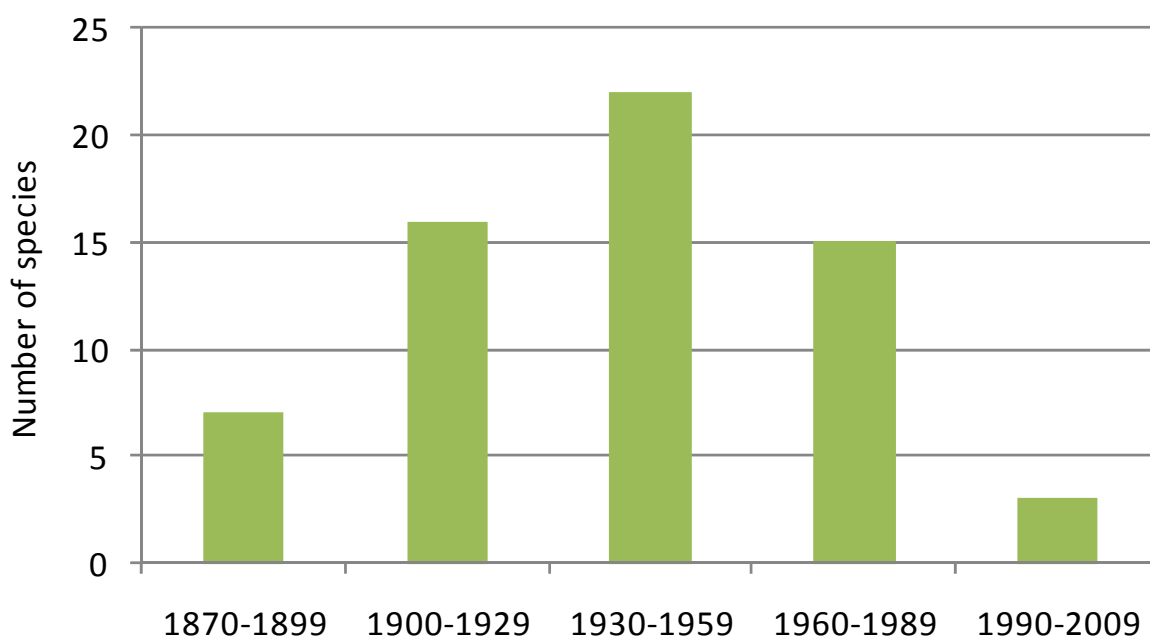


Figure 1. The number of fish first introduced in Arizona, including authorized and unauthorized introductions, using data from the U.S. Commission of Fish and Fisheries, newspaper records, and AGFD stocking records.

The number of new species introduced for the first time into Arizona waters decreased after 1960, particularly after 1990, perhaps based on a few developments such as the adoption of baitfish regulations in 1976, the enactment of the Endangered Species Act (ESA) in 1973, and the incorporation of native fish work into the AGFD beginning in the 1960s and 1970s. Another contributing factor may be that most of the likely suitable or potentially suitable species of sport fish had been introduced across the landscape by that time. More specifically, the introduction of fish from aquaria or ornamental pond releases, as well as from baitfish releases of fish not approved for use as bait in Arizona, has been substantially reduced since 1960. Between 1990 and 2010, only three fish species (i.e., gizzard shad, inland silverside, and alligator gar) were newly documented in Arizona; none of these species introductions was attributed to fish stocking by the AGFD.

The AGFD created a database in 1985 that stores a comprehensive record of sport fish stockings conducted by the AGFD since the mid-1950s and a portion of those conducted by the FWS.

2.2 Existing AGFD Sport Fish Stocking Program Overview

The mission of the AGFD is to conserve, enhance, and restore Arizona's diverse wildlife resources and habitats through aggressive protection and management programs, and to provide wildlife resources and safe watercraft and off-highway vehicle recreation for the enjoyment, appreciation, and use by present and future generations. Achieving this mission requires the AGFD to balance the needs of native species that are not pursued for sport by the recreating public with the public demand for recreational opportunities. The AGFD also recognizes that the ability to continue to provide sport fishing opportunities is closely tied to the continued conservation of native aquatic species. To balance these needs, the AGFD has implemented (and continues to implement) wildlife conservation actions targeted to federally listed and other sensitive species. Actions include planning, statewide species monitoring, implementation of recovery and conservation projects, assistance to other organizations and individuals in wildlife conservation, and funding for conservation activities through the Heritage Fund Program and the Wildlife Conservation Fund Program. Appendix A, Table D lists conservation actions that have been implemented by the AGFD or for which the agency has been involved that target consultation and other special status species considered in this EA.

The following overview of the existing AGFD Sport Fish Stocking Program is provided as background to the reviewer and outlines the general approach that would be used if either of the action alternatives described in Chapter 3 is implemented.

2.2.1 Statutory and Regulatory Authority

Authority to manage and regulate wildlife, including fish, in Arizona is provided under Arizona Revised Statute (ARS Title 17). Pertinent to the AGFD Sport Fish Stocking Program, ARS Title 17 outlines AGFD and Arizona Game and Fish Commission (AGFD Commission) roles and responsibilities related to funding, the taking, handling, and management of wildlife (including regulations and licenses), fish hatching, and fish culture.

2.2.2 AGFD Sport Fish Program Goals and Objectives

The goals for the AGFD Sport Fish Program as approved by the AGFD Commission are to (1) maintain, manage, and enhance the quality, abundance, availability, and diversity of sport

fish opportunities while contributing to the conservation of Arizona's native fishes; (2) develop integrated, watershed-based fisheries management approaches for watersheds and identify reaches or zones for management for sport fishes and native fishes; (3) increase public awareness of Arizona's sport fishing resources and opportunities; and (4) develop and implement actions to increase angler recruitment and retention.

The objectives of the AGFD Sport Fish Program are to (1) annually provide sport fishing opportunities to accommodate 1.6 million cold-water and 4.4 million warm-water AUDs by 2012 and (2) achieve a 10 percent increase in satisfaction rating among Arizona's angling public by 2012. The AGFD Sport Fish Stocking Program plays an integral role in the ability of the AGFD to meet Sport Fish Program goals and objectives.

2.2.3 AGFD Sport Fish Stocking Program Approach

Water bodies in the state are managed by the AGFD under various management approaches and objectives. In general, AGFD manages sport fishing resources as cold-water fisheries (supporting cold-water species of fish), warm-water fisheries (supporting warm-water species of fish), or both. These terms refer to the temperature tolerances of stocked species, with cold-water species identified as trout and Arctic grayling, and warm-water species as largemouth bass, channel catfish, bluegill and redear sunfish, and others.⁴

A number of water bodies, including urban lakes, can be managed as warm-water fisheries year-round and as seasonal cold-water fisheries in winter months. AGFD stocking activities fall into four basic categories:

- *Regularly Planned*—Stocking at regular intervals to support intensive fisheries or to augment fisheries with insufficient production
- *Opportunistic*—Stocking in response to unique or seasonal opportunities (e.g., stocking to support fishing clinics or special events, taking advantage of favorable environmental conditions, augmentation to compensate for a temporary decrease in production or a temporary increase in angling demand)
- *Catastrophic*—Augmentation of an existing fishery in response to full or partial loss due to a catastrophic event such as an algae bloom or lethal water temperatures
- *New Fishery*—Establishment of a new fishery with the intent for it to be self-sustaining

Stocking management approaches for cold-water and warm-water fisheries can be grouped into three categories:

- *Put-and-Take*—An approach used for intensive use (high use) fisheries. Fish are stocked into waters at catchable size (adults, usually in excess of 1 year in age; 9.5 inches or longer for trout), with a short duration between release and capture by anglers (typically, a few days to 4 weeks). The goal is to enhance stocks on a regular basis exclusively for the capture and removal of fish by anglers.

⁴ Walleye and perch are considered cool-water species. For ease of presentation in this EA, walleye and perch have been grouped with the warm-water species.

- *Put-Grow-and-Take*—Fish are stocked into waters as juveniles (subcatchables and fingerlings) to grow on natural food. Adults are captured later by anglers. The approach is dependent on the natural productivity of the water body and the ability of a given species of fish to survive all seasons (due to water temperature, water availability, etc.).
- *Sustained Yield*—The catch and harvest by anglers (fishing pressure) occurs over time without decreasing the ability of the fish population to support the continuation of this level of yield. Stocking, if needed, occurs infrequently and at low levels.

2.2.4 Program Components

The following sections describe the fish sources used by the AGFD, the sport fish stocking subprograms under which the existing program is managed, and an additional sport fish stocking subprogram to be incorporated into the action alternatives, if implemented.

Fish Sources

The AGFD obtains fish for its sport fish stocking program from two primary sources: existing AGFD-operated fish hatcheries and contract vendors (commercial sources). The AGFD sometimes receives fish from other federal or state facilities (outside Arizona).

AGFD Hatcheries

There are currently six AGFD-operated hatcheries in Arizona, though historically (1920s through 1950s) there were many more small-scale hatchery operations. Five of AGFD's six hatcheries supply fish for the AGFD Sport Fish Stocking Program; the sixth facility, the Bubbling Ponds Hatchery, is primarily a native fish facility supported by state funding. AGFD hatcheries supply more than 80 percent of the fish stocked under the existing AGFD Sport Fish Stocking Program:

- *Tonto Creek Hatchery*—East of Payson, Gila County
- *Silver Creek Hatchery*—East of Show Low, Navajo County
- *Canyon Creek Hatchery*—Southwest of Heber, northeast Gila County
- *Sterling Springs Hatchery*—Oak Creek Canyon, Coconino County
- *Page Springs Hatchery*—Page Springs, northeast Yavapai County

The AGFD acquires eggs from vendors for fish production in its hatcheries.

Contract Vendors

Because AGFD-operated hatcheries are currently operating at maximum production capacities and primarily produce trout species, additional fish are supplied through contract vendors. Contracted fish are primarily warm-water species; however, some trout are also purchased. The Urban Sport Fish Stocking Subprogram is the primary recipient of contract-purchased fish, accepting 89 percent of all contract-purchased fish, according to AGFD stocking records. However, if funding is available, several waters within the Statewide Sport Fish Stocking Subprogram may be stocked with fish supplied by vendors to increase statewide fishing opportunities. Stocked warm-water fish create a different and/or seasonal opportunity when rainbow trout cannot be stocked and, at several waters, provide opportunity during warmer

months. Fish purchased from contract vendors must meet strict health certification requirements (Section 2.2.6).

AGFD Sport Fish Stocking Subprograms

As part of the existing program, AGFD stocking sites are managed under two subprograms: the Statewide Sport Fish Stocking Subprogram and the Urban Sport Fish Stocking Subprogram. The AGFD is proposing to add a third category—the Fishing in the Neighborhood (FIN) Subprogram.

Statewide Sport Fish Stocking Subprogram

The Statewide Sport Fish Stocking Subprogram includes waters to be stocked across the state. Some of these waters (e.g., Tempe Town Lake and Watson Lake) fall within urban areas (within municipal boundaries). The identification of suitable stocking sites and the stocking regime (species, quantities, and timing/season) at particular sites are based on water quality, quantity, and consistency; existing aquatic communities; species biology; impacts to native species; angler use and access; fish availability; partnership commitments and needs; and social demand.

The majority of fish stocked in the Statewide Sport Fish Stocking Subprogram are cold-water species, including rainbow, Apache, brook, cutthroat, and brown trout. These stocked trout comprise the majority of the angler trout catch in Arizona, with naturally reproducing or wild trout being only a minor component of total angling opportunity. In most Arizona cold-water streams, natural trout production is insufficient to meet angling needs. Trout generally will reproduce in streams if adequate spawning conditions are present; however, most Arizona streams have marginal spawning conditions. Trout generally do not reproduce in Arizona lakes. Arizona has limited opportunities for native sport fish angling due to the lack of suitable species, with only three native sport species occurring (Apache trout, Gila trout, and roundtail chub). The demand for recreational angling cannot be met alone by stocking these three native sport species.

In contrast to the cold-water species, most of the warm-water species in the state—especially those in the larger impoundments such as Roosevelt Lake—come from natural reproduction. Only 0.8 percent of fish stocked in the Statewide Sport Fish Stocking Subprogram are warm-water species. For the Statewide Sport Fish Stocking Subprogram waters, the majority of AUDs related to warm-water fishes is maintained through natural reproduction and recruitment of sport fish populations and not by the stocking program. The timing and frequency of stocking, as well as the number of fish stocked, varies by geographic area and fishery type.

Urban Sport Fish Stocking Subprogram

The current Urban Sport Fish Stocking Subprogram includes designated lakes in urban cities/communities. These lakes are all in municipal public parks and urban recreation areas and provide convenient, affordable, and accessible fishing for anglers of all ages and abilities.

These lakes are intensively stocked 20–24 times per year with trout, catfish, and bluegill sunfish. Other fish species would be stocked opportunistically. Fishing clinics and educational programs are held at urban lakes. These events emphasize youth participation, which represents 25 percent of the subprogram participation.

Proposed Fishing in the Neighborhood Subprogram

In support of its goal for recruitment and retention of anglers in Arizona, the AGFD is proposing to implement the new FIN Subprogram with 15 proposed waters. The aim of FIN is to recruit new anglers and retain existing anglers by targeted activities at established lakes in urban areas designated as part of this subprogram. These activities include (1) fishing derbies and similar events, (2) supplemental stockings to augment low natural reproduction and increase fishing success, and (3) stockings to restart the fish population after a catastrophic event (e.g., golden algae kills) or lake draining. The level of angling use at FIN Subprogram lakes is moderate to high compared with Urban Sport Fish Stocking Subprogram lakes, where angling use is extremely high and intensive. In consideration of this difference, the stockings under the FIN Subprogram would generally be less frequent and less intensive.

2.2.5 Rules and Regulations

Under the authority provided by ARS Title 17, the AGFD Commission enacts orders, rules, and regulations related to wildlife and fisheries management in the state. These regulations are published in summary form every 2 years in the Fishing Regulations booklet, available free of charge at all AGFD offices, on-line via the AGFD website, authorized fishing licensed vendors, and often at stores or facilities near popular angling locations (e.g., marina stores). A summary follows of current rules and regulations that potentially reduce or eliminate interrelated impacts to native species and the aquatic ecosystems in general caused by sport fish stockings: incidental catch and possession of threatened and endangered species, transmission of diseases, transport and introduction of live sport fish by the public, and use and introduction of baitfish or other organisms.

Incidental Catch and Possession of Listed Species of Fish

As identified in AGFD Commission rule R12-4-406 and as summarized in the AGFD Fishing Regulations, all native fish, including federally listed, candidate, and proposed species per the ESA, except those designated as sport fish (i.e., Apache trout, Gila trout, and roundtail chub), are protected statewide, are illegal to possess and, if caught, should immediately be released alive and unharmed.

Transmission of Diseases

Regulations that address potential transmission of fish diseases are identified at R12-4-410 for aquatic wildlife stocking permit holders and at R12-4-411 for live bait dealer's license holders and require originating facilities to be able to demonstrate, through annual fish health inspections, that they are free of restricted fish diseases and their causative agents. Operational protocols and procedures (outside the current rules and regulations) that address potential transmission of diseases are discussed in the following sections.

Transport and Introduction of Live Sport Fish by the Public

R12-4-405 prohibits the importing, purchasing, and transporting of live wildlife without an Arizona license or permit. The transport and introduction of fish or other organisms to Arizona waters is prohibited, except as expressly authorized (e.g., licensed aquaculture) (ARS, Title 17, Section 17-306 and R12-4-402). R12-4-315 prohibits the transport of live fish from Arizona waters, except as allowed under R12-4-316, which is described in the following section.

Use and Transport of Live Baitfish and Other Organisms

R12-4-316 governs possession, transportation, importation, and use of live baitfish, crayfish, and waterdogs. Baitfish may be purchased at authorized dealers or captured and used on-site where legal to do so. Not all waters of Arizona are open to all bait species; the AGFD has designated specific areas for use of certain species of baitfish. Baitfish are not allowed at any site in Apache, Cochise, Coconino, Navajo, or Pima counties. In the other counties, the use of baitfish is allowed at specific sites. The species currently permitted for use in Arizona are fathead minnow, mosquitofish, red shiner, threadfin shad, golden shiners, goldfish, sunfish, carp, and tilapia. Other than using baitfish for fishing as allowed, it is illegal to release live baitfish into any Arizona waters. These restrictions assist in protecting native and sport species and their habitat from the introduction of new nonnative species or diseases that may be carried by those species.

2.2.6 Fish Health and Best Management Practices

This section describes the operational protocols used in the AGFD Sport Fish Stocking Program, specifically those related to hatcheries and stocking operations. AGFD fish health inspections follow established American Fisheries Society (AFS) Blue Book procedures for the detection and identification of certain finfish and shellfish pathogens (AFS 2007). Samples for routine hatchery inspections are collected once per calendar year, and samples for diagnostic cases at the hatcheries are collected as needed, such as when there is unusual mortality or a suspected fish health concern.

Certain pathogens are considered reportable to the World Organization for Animal Health, including epizootic haematopoietic necrosis, infectious haematopoietic necrosis, spring viraemia of carp, viral haemorrhagic septicaemia, infectious pancreatic necrosis, infectious salmon anaemia, epizootic ulcerative syndrome, bacterial kidney disease (*Renibacterium salmoninarum*), Gyrodactylosis (*Gyrodactylus salaris*), and red sea bream iridoviral disease. None of these reportable pathogens has been discovered at AGFD hatcheries.

To assess AGFD hatcheries, the AGFD Fish Health Lab conducts testing for viruses, bacteria, and parasites. Inspections are conducted annually at all state hatcheries. These hatchery inspections include tissue necropsies and use microscopy to check for internal and external parasites per AFS Blue Book procedures. For virology and bacteriology, AGFD protocols use cell culture and biochemical testing per AFS Blue Book procedures. If samples show positive symptoms, tissue samples are sent to a qualified laboratory equipped to run detailed histology and/or molecular testing. If any reportable pathogens or pathogens of concern were to be detected, the fish testing positive would not be stocked, and treatment and disinfection options would be considered once final testing results were available.

In natural resource work, equipment and/or organisms are often moved from one location to another. The specific equipment or organism being moved is called the target. Targets include fish for stocking to meet recreational demands or conservation requirements. Fish stocking may require the use of equipment such as trucks, sampling tools/gear such as nets or traps, and people. Transporting targets provides a potential vector for the spread of nontarget organisms that could potentially invade new habitats. Nontarget organisms are the plants, animals, diseases, pathogens, and parasites that are not intended to be moved.

The management of potential pathways to control the movement of nontarget organisms has been standard business practice with the food production industry and the military for decades and is known as Hazard Analysis and Critical Control Points (HACCP). Within the past 5–10 years, HACCP processes have been designed specifically for natural resource applications, such as hatchery operations. HACCP planning is a management tool that provides a structured method to identify risks by applying detailed focus on procedures.⁵

Three hatchery activity areas warrant development and practice of HACCP procedures for hatchery operations:

- Products (i.e., fish or eggs) coming into a hatchery,
- Products (i.e., fish) leaving a hatchery, and
- Equipment being transferred between facilities.

Currently, AGFD hatcheries maintain no brood stock for egg production. Trout eggs are obtained from external sources, and the AGFD requires that the facility of origin have current documentation that fish have been certified free of bacteria, viruses, and parasites. Though contract facilities are currently not subject to the HACCPs or Best Management Practices (BMPs) or operational protocols of AGFD hatcheries, the AGFD plans to coordinate with vendors to require HACCPs or BMPs or protocols in the near future for all contract facilities. Moreover, the AGFD treats/disinfects imported fish eggs upon arrival. The AGFD hatcheries have developed HACCP plans to cover fish distribution as well as equipment transfers (<http://haccp-nrm.org/liststateplans.asp?State=AZ>). Each hatchery facility has a HACCP plan because each facility is unique (water source, infrastructure, risks/hazards present, etc.) and each has slightly different means of operations. HACCP plans were developed using guidance provided by the FWS (2004) and focus on the three previously mentioned hatchery activity areas.

The HACCPs cover a broad range of organisms (i.e., vertebrates, invertebrates, plants, and other organisms) rather than listing species-specific threats. The AGFD provides training to hatchery staff and field resource managers with the specific goal to maintain and implement HACCP plans and associated procedures for all essential risk-bearing hatchery activities. HACCP plans focus efforts on “Critical Control Points” to control nontarget organisms. Detection of nontarget organisms can occur during a number of operational/procedural steps. For example, detection can occur while inspecting spring water sources, cleaning raceways, feeding and observing fish, conducting fish health assessments, monitoring water quality and quantity, removing mortalities, inventory and/or harvesting of fish, and transferring fish among rearing units. The procedures provide opportunities to detect nontarget organisms and fish disease. Should a nontarget organism or fish health issue of concern be discovered, it would be investigated to determine the source and analyze the threat to the hatchery. Thereafter, options would be reviewed to determine the best approach to address and/or remove the nontarget organism or threat.

⁵ Additional information is available at <http://haccp-nrm.org/>.

With the exception of the Silver Creek Hatchery, all AGFD hatcheries have secure water sources protected by spring boxes or other exclusionary devices, such as fencing or underground pipes. The Silver Creek Hatchery water source is proposed to be renovated in 2011 and protected by pipe and earthen encasement.

Water discharged from AGFD hatcheries must be in compliance with provisions of the federal Clean Water Act and State Water Quality Standards (Arizona Administrative Code [AAC] Title 18, Chapter 11, Article 1). The Clean Water Act gives the Environmental Protection Agency the authority to set effluent limits on an industrywide and water quality basis that ensures protection of the receiving water(s). The Arizona Department of Environmental Quality (ADEQ) has primacy and administers this program in Arizona. The AGFD holds ADEQ permits for Page Springs Hatchery, Canyon Creek Hatchery, and Tonto Creek Hatchery. Silver Creek Hatchery and Sterling Springs Hatchery do not have discharge permits because they are currently exempt under CFR Title 40, Part 122, which does not require discharge permits for cold-water facilities that produce less than 9,090 harvest weight (approximately 20,000 pounds) of aquatic animals per year and feed less than 2,272 kilograms (approximately 5,000 pounds) of food during the calendar month of maximum feeding. Water-quality testing frequency is established by the ADEQ and generally is required on a monthly basis.

The permit system is used to protect the designated beneficial uses of waters through numeric and narrative water quality standards. The beneficial uses for Arizona waters include:

- Aquatics and wildlife (cold water)
- Aquatics and wildlife (warm water)
- Fish consumption
- Full-body contact
- Partial-body contact
- Drinking water source
- Agricultural irrigation
- Agricultural livestock watering

All state hatchery facilities are in compliance with permit requirements. Designated beneficial uses are supported at all waters where permitted hatchery operations occur. To ensure adequate water quality, BMPs were developed in 2004–2005 for all hatchery facilities and address facility operations, water source, treatment systems, cleaning procedures, maintenance procedures, solids controls, material storage, structural maintenance, recordkeeping, and training of staff. BMPs are updated, as needed, due to changes in operational procedures or new infrastructure, such as clarifiers. Examples of BMPs include minimum frequencies for inspecting and/or cleaning tanks or raceway screens, storing chemicals away from rearing units, and harvesting protocols.

3.0 ALTERNATIVES

This chapter describes the range of reasonable alternatives considered in detail for the project—the Proposed Action, an additional action alternative that represents the proposed activity at a reduced level (i.e., Reduced Stocking Alternative), and No Action. Two additional alternative concepts were initially considered for the proposed activity but were eliminated from detailed study (Section 3.5).

3.1 Development of Alternatives

The missions of the FWS and the AGFD include mandates related to the provision of sport fishing opportunities as well as the conservation of native fish and wildlife resources. Consideration was given to both mandates in the development of sport fish stocking alternatives for this EA.

From the 1920s (when the AGFD began rearing and stocking fish) to the present, the AGFD has provided or enhanced recreational angling opportunities by stocking state waters with sport fish species reared at hatcheries or purchased from commercial suppliers. Historically, the AGFD Sport Fish Stocking Program was considerably different than it is today (Section 2.1). A turning point in the stocking program occurred in the early 1990s, when a number of previously stocked sites and species were eliminated from the stocking program in response to conservation concerns, viability, environmental variability, economics, and cost benefit. At roughly the same time, the AGFD began to expand the stocking of urban lakes and ponds. The dual mandates of the AGFD played a notable role in bringing about the changes in the stocking program over the past 15–20 years. The existing stocking program reflects these changes and formed the basis for the development of the Proposed Action. In consideration of agency and public comments received during the scoping process, three additional action alternatives were developed (Sections 3.3 and 3.5). As is customary in a NEPA process, the No Action alternative was also considered (Section 3.4).

3.2 Proposed Action

The FWS proposes to fund, in part, the AGFD Sport Fish Stocking Program, including operations and maintenance of five AGFD fish hatcheries that rear and supply a majority of the fish used in the stocking program, the acquisition of fish from outside sources, and the stocking of those fish into 166 waters of the state of Arizona to provide opportunities for recreational fishing. The Proposed Action incorporates the Sport Fish Stocking CAMP.

For the Proposed Action, the current AGFD stocking program was used as a baseline, and potential new angling opportunities were added for the agency's consideration. The expanded list was then modified by removing several sites and some species based on stocking feasibility. During subsequent analysis and ESA Section 7 consultation with the FWS Arizona Ecological Services Office (AESO), two additional sites were removed from the Proposed Action. Mormon Lake and Stoneman Lake were removed to eliminate potential impacts on the Northern leopard frog at these sites and because these lakes are not expected to provide substantial recreational opportunity due to repeated and prolonged drying. To further reduce potential impacts on native aquatic species, channel catfish and largemouth bass were removed from the species proposed for stocking in Mormon Lodge Pond.

Subsequent to the Draft EA public comment period, the Proposed Action was further modified to eliminate Fagen Tank from the list of proposed stocking sites. At that time, at 14 of the proposed stocking sites, the species proposed for stocking were modified (i.e., channel catfish and/or largemouth bass were eliminated from the list of species to be stocked, and at three sites these species were replaced with bluegill and redear sunfish). This EA describes and analyzes the modified version of the Proposed Action. This modified Proposed Action is now the Selected Alternative.

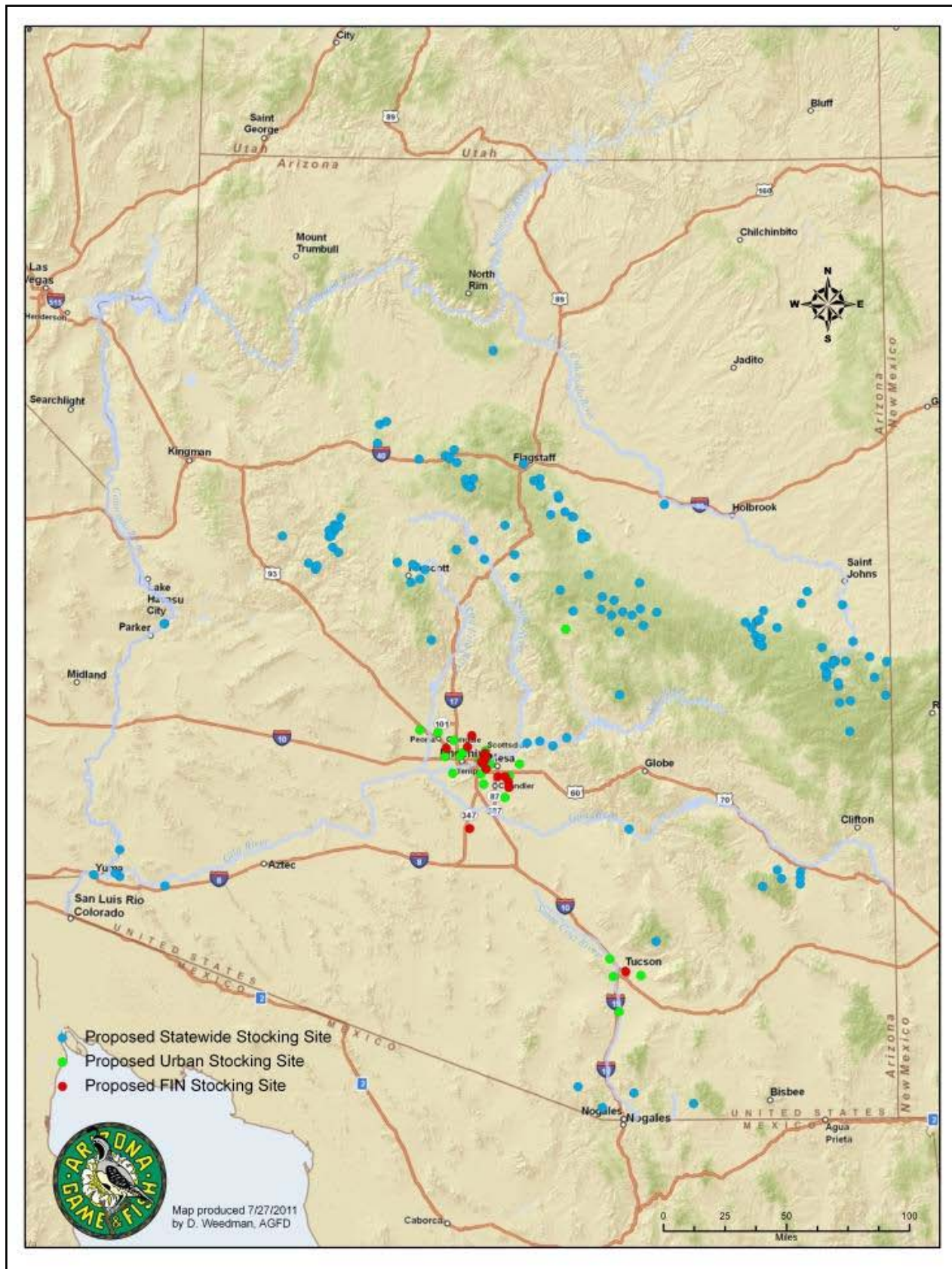
The Proposed Action would continue the rearing of fish at the five existing previously referenced AGFD hatcheries (Section 2.2.4). Fish for stocking would be supplied primarily from the existing AGFD hatcheries and commercial vendors, with some fish supplied by federal or other state (outside Arizona) hatcheries. The transfer of fish between waters would not be part of the Proposed Action.

3.2.1 Sport Fish Stocking

Table E (Appendix A) presents the AGFD Proposed Action (as modified) and includes all sport fish stockings for which it is currently seeking environmental approval. This table identifies the sites that would be included, the species that would be stocked at each site, and the associated management objective (i.e., cold-water fishery, warm-water fishery, or cold- and warm-water fishery). Twenty-two of the stocking sites proposed have not been stocked in recent years by the AGFD. Based on available records, 11 of these have been stocked at some time in the past; the other 11 have never been stocked. Table E (Appendix A) identifies these sites. At some high-use angling sites, the Proposed Action would also allow for stocking of specific sport fish species (as identified by site in Table E) in response to catastrophic events, such as toxic algae blooms or lethal water temperatures that have resulted in a full or partial loss of a fishery, or to support fishing clinics, etc.

Under the Proposed Action, the actual number of sites and species stocked in a given year would fluctuate due to demand, opportunity, environmental conditions, fish supply, or other variables. Some sites would receive regular stockings annually, some would be stocked less frequently (e.g., every 2 or 3 years), and other sites and some species may be stocked to provide additional opportunity if and when environmental conditions or fish supplies allow. Some species, as noted in Table E (Appendix A), would only be stocked if needed in response to a partial or complete loss of the fishery due to catastrophic events. All of these sites and species (regularly stocked and others) have been included in the NEPA process and are being analyzed through the ESA consultation process. Under the Proposed Action, the sites and species stocked in any given year would be the same as, or a subset of, those identified in Table E (Appendix A).

The Proposed Action, as modified, would include a total of 166 stocking sites: 62 with a cold-water fishery objective, 22 with a warm-water fishery objective, and 82 with a cold- and warm-water fishery objective. A total of 130 of these sites would be managed under the AGFD Statewide Sport Fish Stocking Subprogram (22 of which are in urban areas), 21 of the sites would be managed under the AGFD Urban Sport Fish Stocking Subprogram, and 15 of the sites would be managed under the proposed AGFD FIN Subprogram (Section 2.2.4). Table E (Appendix A) identifies the subprogram under which each site would be managed. Figure 2 depicts the statewide, urban, and FIN stocking sites that would compose the Proposed Action.



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Figure 2. Stocking sites under Proposed Action.

Eighteen fish species would be used for stocking under the Proposed Action (Table 1). The approach to stocking under the Proposed Action, including BMPs and fisheries management, would be consistent with that of the existing program (Section 2.2).

Table 1. Species stocked under the Proposed Action and the Reduced Stocking Alternative.

Common Name	Scientific Name	Alternatives Applicable
Apache trout	<i>Oncorhynchus apache</i>	Proposed Action (PA), Reduced Stocking Alternative (RSA)
Arctic grayling	<i>Thymallus arcticus</i>	PA, RSA
Black crappie	<i>Pomoxis nigromaculatus</i>	PA, RSA
Bluegill sunfish	<i>Lepomis macrochirus</i>	PA, RSA
Brook trout	<i>Salvelinus fontinalis</i>	PA, RSA
Brown trout	<i>Salmo trutta</i>	PA, RSA
Channel catfish	<i>Ictalurus punctatus</i>	PA, RSA
Cutthroat trout	<i>Oncorhynchus clarkii</i>	PA, RSA
Gila trout	<i>Oncorhynchus gilae</i>	PA, RSA
Largemouth bass	<i>Micropterus salmoides</i>	PA, RSA
Rainbow trout	<i>Oncorhynchus mykiss</i>	PA, RSA
Redear sunfish	<i>Lepomis microlophus</i>	PA, RSA
Smallmouth bass	<i>Micropterus dolomieu</i>	PA, RSA
Threadfin shad	<i>Dorosoma petenense</i>	PA
Walleye	<i>Sander vitreus</i>	PA, RSA
White amur (grass carp)	<i>Ctenopharyngodon idella</i>	PA, RSA
White crappie	<i>Pomoxis annularis</i>	PA, RSA
Yellow perch	<i>Perca flavescens</i>	PA, RSA

Fish are generally transported to the stocking site in fiberglass or aluminum tanks mounted on large trucks or trailers. Stocking trucks use existing roadways to gain access to stocking sites. Other methods include the use of horses, backpack cans, all-terrain vehicles, or helicopters to stock remote locations not accessible by an existing road. No new roadways or associated disturbances are created for the stocking activities.

3.2.2 Proposed Hatchery Operations and Maintenance

Hatchery production goals and objectives for trout would be established by AGFD Regional Fish Program Managers to support site-specific fishery management goals based on angler demand and productivity and/or capacity of receiving waters. As with the current program, trout production at the five AGFD hatchery facilities would include the culture of five salmonid species (rainbow trout, brown trout, cutthroat trout, Apache trout, and brook trout).

Hatchery operations would include rearing fish from egg or fry stage to advanced sizes (fingerling, subcatchable, or catchable). This would include, but would not be limited to, incubating eggs, feeding, removing mortalities, medicating or conducting therapeutic treatments as needed; disinfecting equipment, rearing units, and/or vehicles; cleaning rearing units and equipment; collecting and disposing of waste from sludge basins; segregating, sample-counting, and transferring fish among rearing units or facilities; acquiring featured sport fish species; operating motor vehicles; holding captive broodstock for propagation; site security, administrative support, procuring supplies and equipment, staff training, fish health diagnostics,

and facility certification; continued implementation and periodic review of HACCP plans; and public visitation, recording information/data, monitoring/measuring water quality and quantity, and monitoring for invasive species or nontarget organisms.

Hatchery operation (fish rearing and transport) would be guided by the principles of fish hatchery management included in guidance from the AFS (2001) and the FWS (1982), as well as the principles of HACCP planning for natural resource pathways from the FWS National Conservation Training Center (FWS 2004).

Hatchery maintenance could include, but would not be limited to, conducting repairs and/or maintenance and/or modifications on vehicles, buildings, storage units, employee residences, water collection and conveyance structures, rearing units, support equipment, septic facilities, fencing and predator barriers, gates, roadways, communications equipment, and parking areas. It could also include groundskeeping, snow removal, painting, trash/waste removal, and procuring needed equipment, supplies, and services.

3.2.3 Sport Fish Stocking Conservation and Mitigation Program

As part of the Proposed Action, the AGFD would implement mitigation measures to avoid, reduce, or otherwise minimize environmental impacts associated with the Proposed Action. The Sport Fish Stocking Conservation and Mitigation Program (Chapter 5) would be enacted to minimize and offset impacts of the action over 10 years. Measures under the CAMP would include:

- Implementation of substantial mitigation measures, as identified in the CAMP, including removal of stressors from aquatic systems and watershed planning.
- Implementation of substantial mitigation measures targeting draft Biological and Conference Opinion (BCO) (FWS 2011a) species, as identified in Chapter 5.0, including transition to production and stocking of triploid rainbow trout and securing or establishing populations and other actions.
- Implementation of additional conservation measures identified in Chapter 5.0 as funding allows.

Mitigation and conservation measures employ a watershed management approach that would benefit native aquatic communities in general.

3.3 Reduced Stocking Alternative

With the Reduced Stocking Alternative, the FWS would fund, in part, the AGFD Sport Fish Stocking Program at a reduced number of stocking sites. This alternative includes operations and maintenance of five AGFD fish hatcheries that rear and supply a majority of the fish used in the stocking program, the acquisition of fish from outside sources, and the stocking of those fish into 101 waters of the state of Arizona to provide opportunities for recreational fishing.

A number of comments received during the agency and public scoping process relayed concern about the effects of nonnative fish stocking on native fish and other aquatic species, including effects on federally listed threatened, endangered, and candidate species. The Reduced Stocking Alternative was developed in response to these concerns. The intent was to analyze an alternative

that would reduce or minimize the potential for impacts to these sensitive species. This alternative would propose stocking at fewer sites than the Proposed Action. The Reduced Stocking Alternative would continue the rearing of fish at the five existing previously referenced AGFD hatcheries, as described under the Proposed Action (Section 3.2.2). Fish for stocking would be supplied primarily from the existing AGFD hatcheries and commercial vendors, with some fish supplied by federal or other state (outside Arizona) hatcheries. As with the Proposed Action, the transfer of fish between waters would not be part of this action.

3.3.1 Sport Fish Stocking

To create a Reduced Stocking Alternative, some of the sites in the initial Proposed Action—prior to its modification—were eliminated. The eliminated sites were those that could result in the stocking of sport fish into waters known to support one or more threatened, endangered, or candidate species of fish, amphibians, or semi-aquatic reptiles (i.e., garter snakes). Inclusion of these sites would have the potential to result in the greatest likelihood of exposure between the stocked species and threatened, endangered, and/or candidate species of fish, amphibians, or semi-aquatic reptiles. Sites were also eliminated where stocking had a potential to result in overlap of species with threatened, endangered, and/or candidate species of fish, amphibians, or semi-aquatic reptiles from movement of the stocked species out of the stocking area or the protected species into the stocking area.⁶ As a result of the screening process, 65 of the sites from the Proposed Action (as modified) would be eliminated under the Reduced Stocking Alternative. With the Reduced Stocking Alternative, only stocking sites were eliminated; species were not selectively removed from sites. Table E (Appendix A) identifies the sites that would be stocked under the Reduced Stocking Alternative. Figure 3 depicts the statewide, urban, and FIN stocking sites included in the Reduced Stocking Alternative. For easy comparison, the Proposed Action sites that would not be stocked as part of this alternative are depicted with a different symbol.

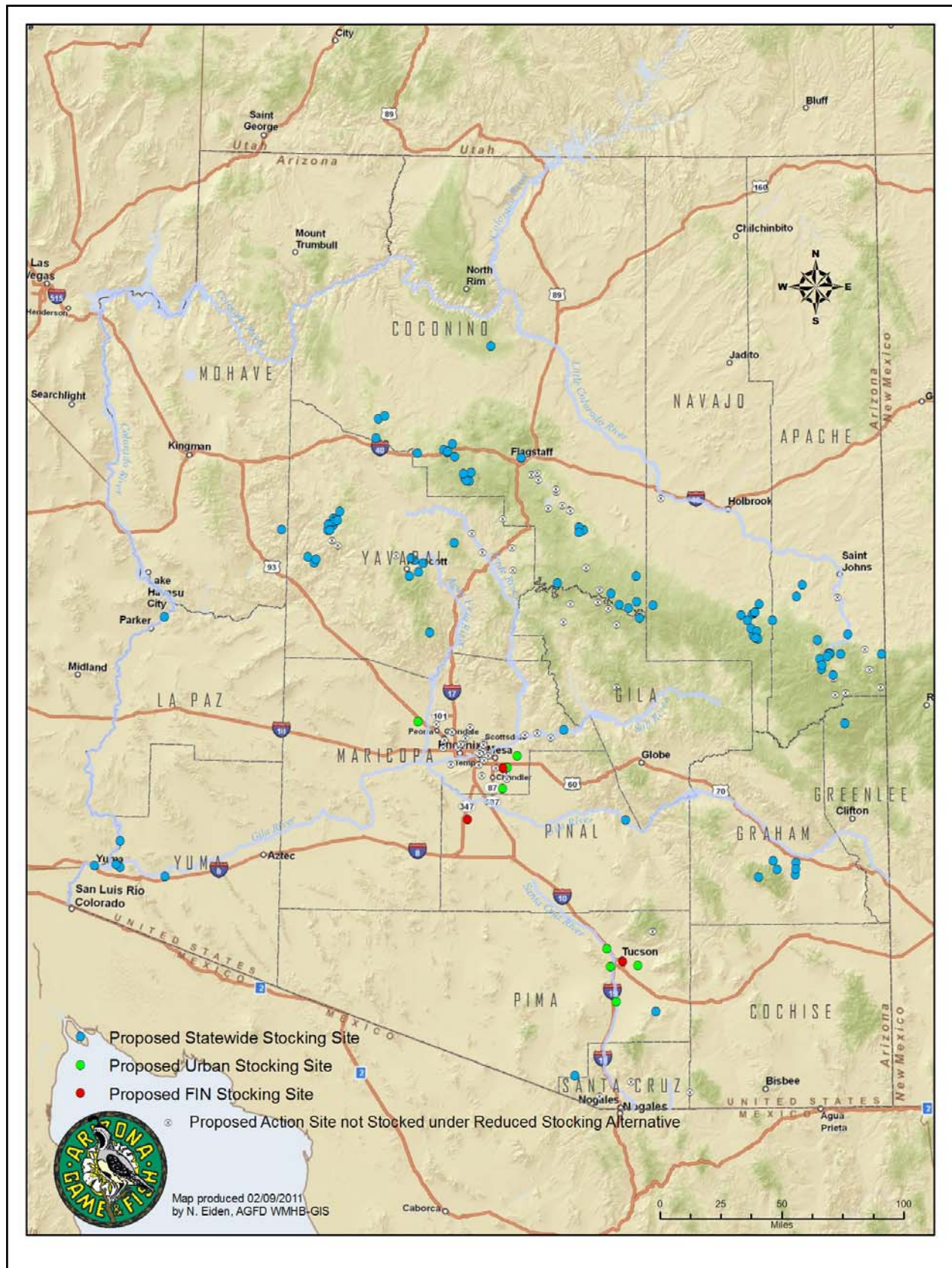
Under the Reduced Stocking Alternative, 101 sites would be stocked: 32 with a cold-water fishery objective, 20 with a warm-water fishery objective, and 49 with a cold- and warm-water fishery objective. The Statewide Sport Fish Stocking Subprogram would account for 90 of these sites; eight would be part of the Urban Sport Fish Stocking Subprogram, and three would be included in the proposed FIN Subprogram.

Seventeen fish species would be used for stocking under the Reduced Stocking Alternative, as noted in Table 1.

3.3.2 Proposed Hatchery Operations and Maintenance

Hatchery operations and maintenance for the Reduced Stocking Alternative would be the same as that described for the Proposed Action (Section 3.2.2).

⁶ The selection of stocking sites to be included in the Reduced Stocking Alternative was based on information in the Biological Assessment. The development of this alternative preceded the issuance of the draft BCO.



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Figure 3. Stocking sites under Reduced Stocking Alternative.

3.3.3 Sport Fish Stocking Conservation and Mitigation Program

If the Reduced Stocking Alternative is selected, reinitiation of Section 7 consultation would be necessary to determine required mitigation measures, based on the reduced impacts. It is likely that the funding available and the resultant mitigation and conservation measures would be reduced from what is identified in the Sport Fish Stocking CAMP associated with the Proposed Action.

3.4 No Action

A No Action alternative is customarily used in an environmental document to provide the baseline or benchmark for comparison of environmental effects of the action alternatives. There are two common interpretations of No Action: “no change” from current management and “no implementation” of the proposed activity. The No Action alternative in this EA represents a condition where the proposed activity would not be implemented. This interpretation was selected over the “no change” interpretation because a “no stocking” alternative would provide a broader range of alternatives for comparison. Furthermore, no federal funding would likely result in no stocking by the AGFD.

Under the No Action alternative, the FWS would not approve use of SFRA funding by the AGFD for stocking of sport fish. As a result, this alternative assumes that the AGFD would not engage in the stocking of sport fish, including Apache and Gila trout stocked for recreation, in Arizona. The federal funding would be used elsewhere by the AGFD. Under this alternative, the existing fish hatcheries used for the sport fish stocking program (Section 2.2.4) could be idled or decommissioned (i.e., operations terminated, fish removed, and equipment relocated), used for other federal aid-eligible projects, or sold to reimburse SFRA funds.

Table 2 compares the primary components of the alternatives and the current AGFD Sport Fish Stocking Program (i.e., existing condition). The fiscal year 2009/2010 approved stocking program is used in this table to represent the existing condition.

Table 2. Comparison of alternatives and AGFD current sport fish stocking program.

Characteristics/ Components	Existing Condition/ Current Program*	Alternatives Under Consideration		
		Proposed Action (PA)	Reduced Stocking Alternative (RSA)	No Action
Total stocking sites	134	166	101	None
Statewide sites	113	130	90	None
Urban sites	21	21	8	None
FIN sites	None	15	3	None
Number of species stocked	22	18	17	None
Catastrophic stockings	Not included in current program	Included in PA	Included in RSA but at fewer sites than PA	Not included

*Values used for the current program reflect approved stockings for fiscal year 2009/2010.

3.5 Alternatives Considered But Eliminated

3.5.1 Expanded Stocking Alternative

Many comments received during the scoping process in support of sport fish stocking referenced the social/recreational and economic importance of fishing. Many of the responses stated support for a more “robust” stocking program than the existing program or Proposed Action and suggested additional sites be stocked. The concept of an expanded stocking alternative (more

reminiscent of pre-1990 stocking intensities) was considered to address this public input. This expanded alternative would provide maximal recreational opportunity by stocking many more sites around the state than are being stocked under the current AGFD Sport Fish Stocking Program or would be stocked under the Proposed Action or the Reduced Stocking Alternative. The expanded stocking alternative would incorporate those sites included in the Proposed Action as well as sites that have been stocked historically by the AGFD (based on available records) but are no longer being stocked. The review of available records identified 219 sites (not including those on Indian reservations) that were stocked historically but are no longer stocked. Combining the 166 sites of the Proposed Action with these 219 “additional” sites results in an expanded stocking alternative of up to 385 sites.

In consideration of the costs and benefits of appropriate conservation measures, legal requirements (e.g., the ESA), native fish population viability, and return on investment (recreationally and economically), this expanded stocking alternative was not considered feasible and prudent and was eliminated from further consideration.

3.5.2 *Minimal Stocking Alternative*

The Minimal Stocking Alternative was developed in an attempt to eliminate the potential for effects on consultation and other special status aquatic and semi-aquatic species. Compared with the Reduced Stocking Alternative, however, the Minimal Stocking Alternative would eliminate all stocking sites with any potential effects on these species, including sites considered to have only low potential effects. Stocking locations with low potential effects are those where exposure of consultation and other special status aquatic and semi-aquatic species to stocked fish would be limited in probability or probable exposure, would have limited potential biological impacts to other special status species, and would not likely result in population declines. This alternative would eliminate 148 of the 166 stocking sites in the Proposed Action. Stocking would occur only at the remaining 18 sites. This alternative was eliminated from further consideration because it does not meet the purpose and need for the project, which is to meet the current and future need and demand for angling opportunities in Arizona.

4.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The resources identified during agency and public scoping and preliminary analysis and incorporated into this chapter are biological resources, recreation, and socioeconomics. A number of resources and issues were eliminated from further analysis because the proposed activity would have minimal or no effects on them. Resources eliminated from further analysis are listed in alphabetical order in Table 3, with rationale for their elimination.

Table 3. Resources and issues eliminated from further analysis.

Resource Issue	Rationale for Elimination
Access	The alternatives would not affect public or private access.
Aesthetics	The alternatives would not result in any ground disturbance or change in landscape characteristics and, therefore, would not affect aesthetics.
Air quality	Air quality impacts of the action alternatives are limited to vehicle emissions associated with stocking truck operation, and indirectly from anglers' vehicles traveling to and from stocking sites. These effects are below de minimis levels and do not differ substantially among the alternatives.
Coastal zone and coastal wetlands	All stocking sites are located within the state of Arizona and do not occur in or adjacent to coastal areas.
Cultural resources	The proposed project is not considered to be an undertaking under Section 106 of the National Historic Preservation Act because it would have no potential to affect cultural resources.
Energy/mineral resources	The alternatives would not affect energy or mineral resources.
Farmland	The alternatives would not affect farmlands.
Floodplain effects	Stocking sites are generally located within floodplain areas. The alternatives would not result in any ground disturbance within designated floodplains.
Greenhouse gases/climate change	The CEQ has proposed an annual reference threshold of 25,000 metric tons of direct carbon dioxide (CO ₂)–equivalent greenhouse gas emissions as a useful indicator for agencies to consider when analyzing potential action-specific greenhouse gas emissions in NEPA documents (CEQ 2010). ⁷ The primary source for the generation of greenhouse gas emissions with the AGFD Sport Fish Stocking Program would be the operation of motor vehicles to transport fish and support hatchery operations and management, less than 200 metric tons per year of CO ₂ -equivalent greenhouse gas emissions. The annual emission of CO ₂ -equivalent greenhouse gases from the alternatives would be substantially below the threshold proposed by the CEQ as relevant to the decision-making process. The alternatives would be considered to have little to no effect on climate change. Refer to Chapter 6.0 for cumulative effects of the alternatives and climate change on federally listed, candidate, potential candidate, and other special status aquatic and semi-aquatic species.

⁷ Executive Order 13514 directs federal agencies to promote pollution prevention and reduce emissions of greenhouse gases from actions under their control.

Table 3. Resources and issues eliminated from further analysis.

Resource Issue	Rationale for Elimination
International effects	All stocking activities would be restricted to the state of Arizona. Sport fish stocked into the lower reaches of the Colorado River have the potential to cross into Mexico. However, there is only one open stocking site on the lower Colorado River, and most flow in the river is diverted before the international border, making the likelihood that stocked fish would travel to the border unlikely. There is only one proposed stocking site (Parker Canyon Lake) upstream of the Santa Cruz River before it enters Mexico. Most of the drainage downstream of this site to the international border is ephemeral and would not sustain fish species proposed for stocking. Furthermore, flows from this drainage are intercepted by agricultural fields before its confluence with the Santa Cruz River in Mexico.
Land use	The alternatives would not affect land use.
Public use	The alternatives would not affect public use patterns, except as they relate to recreational opportunities. These effects are described in the Recreation portion of Section 4.2.3.
Vegetation	Impacts to vegetation are analyzed in the context of other special status plant species in Section 4.1. Effects on other vegetation resources were not identified as an issue during scoping or preliminary analysis and are not considered further.
Water quality	Potential water quality effects from the action alternatives are minimal and are addressed through the issuance of Arizona Pollutant Discharge Elimination System permits administered by the Arizona Department of Environmental Quality and the U.S. Environmental Protection Agency. Refer to Sections 2.2.4 and 3.2 for more detail on hatchery operations and maintenance.
Wetlands	The alternatives would not result in the placement of dredged or fill material in wetlands. Indirect effects of stocking include trampling by anglers and disturbance/soil compaction by vehicles but would be expected to be limited in extent and would not represent a change from current conditions.
Wild and Scenic Rivers	Designated Wild and Scenic Rivers in the state are limited to 16.8 miles of Fossil Creek from the confluence of Sand Rock and Calf Pen canyons to its confluence with the Verde River and 40.5 miles of the Verde River from near Beasley Flat to the confluence of Red Creek. Several proposed stocking sites are below Beasley Flats on the Verde River; however, the alternatives would not involve any ground disturbance. Recreational opportunities created by stocking generally do not conflict with management directives for Wild and Scenic Rivers.
Wilderness areas	The alternatives do not include stocking sites within designated wilderness areas.
Wildlife resources	Impacts to wildlife resources are described in the context of Section 7 consultation and other special status species in Section 4.1. Effects on other wildlife resources were not identified as an issue during scoping or preliminary analysis and are not considered further.

4.1 Biological Resources—Consultation and Other Special Status Species

The action alternatives considered have the potential to affect consultation species (federally listed threatened and endangered species and their designated or proposed critical habitat, candidate species, and proposed candidate species considered in the ESA Section 7 consultation) and other special status species (sensitive species and species of special or conservation concern). Scoping and preliminary analysis identified potential effects on aquatic and semi-aquatic species, as well as terrestrial species associated with aquatic, wetland, and/or riparian habitats. A primary

issue identified is the potential effect of the AGFD Sport Fish Stocking Program on native fish fauna, either directly through predation, competition, or hybridization or indirectly through the introduction of diseases, parasites, and other nontarget organisms, as well as reduced access to habitats/resources and/or indirectly through changes in trophic (food-web) structure.⁸ Most of these types of effects may also apply to amphibians and semi-aquatic reptiles. Potential effects on terrestrial species relate primarily to the indirect effects of angler activity/access at or near stocking sites (e.g., noise disturbance, trampling of habitat, fishing debris) or the effects of sport fish stocking on available food resources (e.g., providing forage for piscivorous [fish-eating] birds such as bald eagles and ospreys).

Effects on consultation species are summarized from the draft BCO (FWS 2011a). Due to the number of stocking sites and species involved, the analysis of environmental consequences for all other special status species is organized by functional groupings of species that are anticipated to experience the same or similar effects. Due to their identification as the main group of concern during scoping, effects on other special status aquatic and semi-aquatic species are also summarized by individual stocking sites and species. Other contextual factors that influence the occurrence or intensity of effects on certain species or functional groups are also discussed.

The analysis of impacts on consultation and other special status species differs between the ESA and NEPA. The terms used within both acts are not synonymous. The ESA looks at effects of an action and how they would contribute to jeopardy of the species as a whole, as defined within the act. A Biological Assessment (BA) and subsequent BCO evaluate impacts to individuals and populations of the species. In contrast, the NEPA analysis standard is that of significance to the human environment and evaluates any impacts (for a range of alternatives) that would affect it.

FWS lists of endangered, threatened, and candidate species for all Arizona counties were reviewed by representatives of the AGFD and the FWS to determine which listed species should be evaluated in the ESA Section 7 consultation and this NEPA process. The WSFR and the AGFD (as a designated Non-federal Representative⁹), in cooperation with the AESO, have prepared a BA that evaluates the potential impacts of the Proposed Action (FWS 2011b). The AESO has provided the WSFR and the AGFD with a draft BCO. This EA includes the findings of the draft BCO and incorporates as mitigation those conservation measures that AGFD commits to implement, as well as reasonable and prudent measures and associated terms and conditions required by the draft BCO. At the end of the formal consultation period, the AESO will issue a final BCO.

4.1.1 Regulatory Setting

Consultation and other special status species are those species that have status under, and are protected by, federal and/or state laws, regulations, and policies.

⁸ A complex of interrelated food chains in an ecological community. Also called food cycle.

⁹ A designated Non-federal Representative refers to a person, agency, or organization designated by the federal agency as its representative to conduct informal consultation and/or to prepare a BA (50 CFR 402.08).

Federal Endangered Species Act

The ESA protects species that are endangered or threatened throughout all or a significant portion of their range and designated critical habitat. Section 9 of the ESA prohibits the “take” of endangered species and most threatened species without federal authorization. “Take” is defined as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in such conduct.” “Harm” is defined to mean an act that actually kills or injures fish or wildlife. Harm is further defined by the FWS to include significant habitat modifications or degradations that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering.

Take may include significant habitat modification or degradation that results in the death or injury of fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering. Section 7 of the ESA requires federal agencies to consult with the FWS or the National Marine Fisheries Service, or both, before performing any action (including actions such as funding a program or issuing a permit) that may affect listed species or critical habitat. The incidental take (death or injury incidental to otherwise lawful activities and not the purpose of such activities) of listed species can be authorized under Section 7 or Section 10 of the ESA. Because the WSFR program of the FWS has the federal action of contributing funding to the stocking program, WSFR representatives initiated an intra-agency Section 7 consultation with the AESO (FWS), in cooperation with AGFD, as an applicant and non-federal representative, for the effects of that stocking program on threatened and endangered species and their critical habitat. Four candidate species and two likely candidate species were included in the Section 7 consultation due to the potential for their listing in the next 10 years, the lifespan of the consultation.

Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) protects all migratory birds and their parts (including eggs, nests, and feathers) and prohibits the capture, pursuit, hunting, and killing of migratory birds. The FWS maintains a listing of bird species protected under the MBTA, which includes most bird species (including non-migratory species) and excludes only a relatively small number of introduced exotic species.

Fish and Wildlife Conservation Act

The Fish and Wildlife Conservation Act authorizes financial and technical assistance to the states for the development, revision, and implementation of conservation plans and programs for nongame fish and wildlife. An amendment approved in 1988 mandates the FWS to “identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973.” To comply with this mandate, the FWS publishes lists of Birds of Conservation Concern, by region, that identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent the highest conservation priorities. This is a subset of the species listed under the MBTA.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) protects bald and golden eagles by prohibiting, except under certain specified conditions, the take, possession, and commerce of

such birds. A new permit program is being established to provide a regulatory permitting mechanism for limited take of these species when associated with other lawful activities. A take permit under the BGEPA would be required if an activity results in agitation or bothering of an eagle or alteration of areas around eagle nest sites outside the breeding season that would interfere with breeding, feeding, or sheltering.

Other Federal and State Regulations or Policies

Sensitive Species

The FS and the U.S. Department of the Interior Bureau of Land Management (BLM) maintain lists of species considered sensitive when occurring on public lands. These species are not legally protected under the ESA, but these agencies require that these species be analyzed as part of the NEPA process when projects occur on public lands and require FS or BLM approval or authorization.

Wildlife of Special Concern in Arizona

The AGFD maintains a list of Wildlife of Special Concern in Arizona (WSCA), based on the 1988 threatened native wildlife in Arizona list developed by the Nongame Branch of the AGFD. This list includes those species whose occurrences in Arizona are or may be in jeopardy or with known or perceived threats or population declines, as described by the AGFD listing of WSCA. This designated list does not provide legal protection under the ESA or state law against take of these species or modification of their habitat.

Protected Native Plants

The Arizona Department of Agriculture administers the Arizona Native Plant Law. The law categorizes certain plant species as Highly Safeguarded, Salvage Restricted, Salvage Assessed, and Harvest Restricted, and regulates their collection, transport, transplantation, and destruction.

4.1.2 Analysis Approach

The analysis of effects of the Proposed Action on consultation species is based on determinations of jeopardy and adverse modification of critical habitat made in the draft BCO. These determinations take into account the status of each species across its geographic range.

The analysis of effects from the Proposed Action and the other alternatives on other special status species is conducted at one or more of three spatial scales of resolution: individual stocking site, subcatchment, and regional scale. These represent a range of geographic scales at which direct effects generally have the most potential to occur (stocking site) to those where potential effects are progressively more separated in time and space (i.e., indirect effects) from proposed stocking activities (subcatchment and regional).

For the purpose of the analysis on other special status species, a stocking site for reservoirs, lakes, and ponds is defined as the entire water body and for streams is defined as the physical reach where stocking is proposed. For this NEPA analysis, subcatchments are defined as the U.S. Department of the Interior U.S. Geological Survey (USGS) Hydrologic Unit Code (HUC) 10 subwatersheds that surround individual stocking sites and the HUC 12 level subwatersheds downstream of those stocking sites to the confluence of a major water body that supports a self-sustaining community of several nonnative aquatic species (e.g., lower Salt River, Alamo Lake,

Colorado River, and middle Gila River). Few individuals, if any, would be expected to reach these downstream locations due to the long distances from the stocking locations and intervening habitat and stream conditions that often are not conducive to stocked fish survival (e.g., high drops over waterfalls, high water temperatures, and poor water quality during flooding events). The potential addition of a few individuals would not substantially add to existing populations of nonnative species or substantially contribute the natural recruitment in these large systems, and, therefore, would not substantially add to effects on native species downstream of these major water bodies. The smaller-scale HUC 12 subwatersheds were used rather than a larger-scale HUC because any stocked fish transported downstream from stocking locations would not likely be able to move upstream into headwater areas of tributaries due to the limited hydrological connection between the mainstem channels and headwater areas. Analyzing effects beyond an intervening major water body that supports nonnative species (such as Alamo Lake) would not be biologically meaningful because the established nonnative species would be more likely to reach other special status species than stocked fish from the proposed stocking sites. Effects of stocking on other special status species outside the defined subcatchments would be minimal because movement of stocked fish would diminish over long distances and additional contribution of stocked species to the existing nonnative species assemblage of downstream major water bodies would be negligible.

Figure 4 shows the location and extent of subcatchments in the state (portions of subcatchments on tribal lands are not shown). Maps of the individual subcatchments and the stocking sites within them under the Proposed Action and the Reduced Stocking Alternative are provided in Appendix B.

The regional scale is all of the waters of Arizona, and this level of analysis is mostly appropriate when considering the potential transfer or dispersal of disease and nontarget organisms (e.g., New Zealand mud snails, quagga mussels).

To facilitate analysis, other special status species are organized into functional groups that are based on taxonomy and the types of effects on which the species are susceptible. Species within each functional group may generally experience the same types of potential effects due to similarities in life history traits. The spatial scale at which effects may occur varies based on the characteristics of the group. For example, native fishes, amphibians, semi-aquatic reptiles, and aquatic invertebrates are grouped together because they are generally susceptible to direct and indirect effects across multiple spatial scales. Riparian plants, non-piscivorous riparian or aquatic nesting birds, terrestrial riparian invertebrates, and ground-dwelling riparian mammals and reptiles are grouped together because these species are generally susceptible only to localized indirect effects (habitat alterations or disturbance by angler activity). Piscivorous riparian and aquatic nesting birds are grouped separately because these species may experience some direct beneficial effects from stocking activities as well as some indirect negative effects. Differential effects on functional groups of species, relevant spatial scales of analysis, and consideration of relevant contextual factors are described in greater detail under environmental consequences (Section 4.1.4).

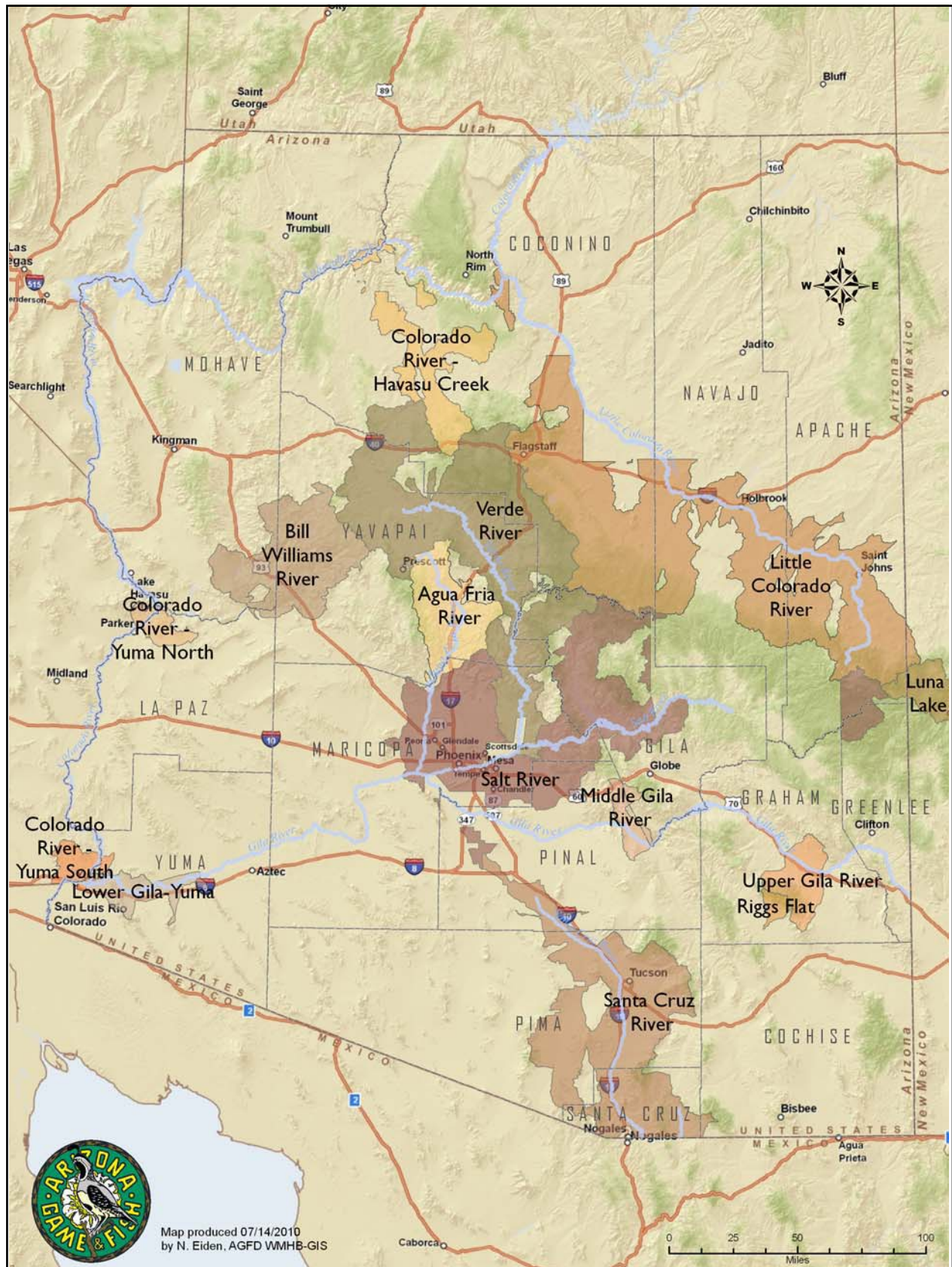


Figure 4. Location and extent of subcatchments in Arizona.

4.1.3 Affected Environment

This section describes the existing conditions in the action area relevant to biological resources—in this case, consultation and other special status species—and past actions that have influenced the present condition. The action area refers to the area that would be affected by the three alternatives. This section serves as the environmental baseline against which the environmental effects of the alternatives are compared under Environmental Consequences. Consultation and other special status species evaluated in greater detail and those eliminated from further analysis are identified. Due to the number of consultation and other special status species considered, detailed life history descriptions of each species are not included, but the habitats with which they are associated are summarized in table format based on available sources, which are incorporated by reference.

Description of the Action Area

The action area encompasses the geographic extent of the state of Arizona and a variety of water bodies, including streams, rivers, natural ponds and lakes, and impoundments, including urban lakes. The Proposed Action includes a total of 14 subcatchments and 166 individual stocking sites. The BA prepared for the project (FWS 2011b) provides detailed descriptions of stocking sites, including physical geography, site characteristics, landownership/management status, historic and current water body management, hydrologic connectivity between stocking sites, potential for fish movement, and descriptions of the existing aquatic communities. Table F (Appendix C) summarizes the elevational range and general vegetation types of each subcatchment and of each individual stocking site. Vegetation types are based on a generalized classification for Arizona (Brown 1994) at the biome level and represent the predominant types within which the subcatchments and sites occur (not the riparian, wetland, or aquatic plant communities that may immediately surround individual stocking sites).

Present Condition and Effects of Past Actions

The present condition of aquatic, riparian, and wetland habitats within the action area has been notably influenced by the actions of the European immigrants over the past 100 to 150 years. Historic changes to waterways in the region include a period of arroyo formation or cutting between 1865 and 1915. Prior to 1865, streams were described as supporting high water tables, abundant river bed marshes (cienegas), tall grasses, beaver ponds, and fish habitat (Vogt 2003). During the ensuing period, arroyo cutting resulted in broad, incised channels bordered by high, barren cut banks, drying of stream channels, draining of cienegas, and associated changes in flora and fauna (Minckley and Marsh 2009, Vogt 2003). The timing and widespread occurrence of arroyo cutting in the western United States and evidence for its occurrence prior to settlement of the region by western Europeans suggest that it was caused primarily by climate change (cycles of relatively wet periods followed by drought), though human activities such as livestock grazing and beaver trapping are thought to have contributed to or exacerbated this phenomenon (Minckley and Marsh 2009, Vogt 2003). Woodcutting in upland areas for mine timbers and smelter fuels and cutting of riparian forests for riverboat fuel are also thought to have altered stream channels and associated riparian communities (Minckley and Marsh 2009).

Other human activities that have affected aquatic environments in the recent past include damming of streams and rivers and pumping of groundwater. With increasing human population growth in the region, reservoirs were created to control flooding and to provide water storage and

delivery for agricultural irrigation and domestic water supplies. This resulted in the elimination of stream habitats, blocking of fish migration routes, and disruption of ecological connectivity between stream reaches upstream and downstream of reservoirs. Groundwater pumping for agricultural, domestic, and other purposes has lowered water tables and dried springs, negatively affecting native fish fauna through loss of habitat (Minckley et al. 1991).

Introduction, establishment, and management of nonnative species have affected aquatic communities in the action area. The history of fish stocking in Arizona is summarized in Chapter 2.0. Management of the sport fish program has changed over the past several decades, partly to address impacts to native fish and other aquatic and semi-aquatic species. As described in Section 2.1, new introductions of species into Arizona have decreased since about 1960 and have been substantially curtailed or eliminated since 1990. Since 1994, the scope of sport fish stocking in Arizona has generally been reduced to address considerations such as effects on native species, suitability of stocking sites based on water availability and quality, availability of fish for stocking, and funding constraints. Section 2.2 describes the current AGFD Sport Fish Stocking Program.

Other management activities that affected aquatic communities included the introduction of bait and other species such as threadfin shad, fathead minnow, bullfrog, crayfish, and mosquitofish. Aquatic habitats were also influenced, and continue to be affected, by unauthorized introductions of sport and baitfish such as golden shiner and the incidental introduction and spread of other aquatic invasive animals such as the Asian snail, Asiatic clam, quagga mussel, and aquatic invasive plants such as giant salvinia and Brazilian parrotfeather.

Recreational activities not strictly related to sport fishing, such as boating, hiking, camping, and off-highway vehicle use, have likely contributed to some level of effects on aquatic habitats in the past (e.g., spread of aquatic invasive species) and may contribute to past and current indirect (e.g., habitat disturbance) effects on terrestrial species associated with aquatic, riparian, or wetland habitats.

The published and grey literature describing the effects of introduction of nonnative aquatic species on native aquatic species in the western/southwestern United States is extensive and presents a compelling case for the negative effects of such interactions on the current status of the native aquatic fauna. Concomitant with changes in habitat availability and quality resulting from human development of cienegas, streams, and rivers for anthropogenic purposes (Miller 1961, Minckley and Deacon 1968, Moyle 2002), the deliberate or inadvertent introduction of nonnative fish, amphibians, and invertebrates (crayfish, snails, clams) is responsible for considerable declines and extirpations of native fish species in the Colorado River Basin, including Arizona (ANS Task Force 1994, Carlson and Muth 1989, Clarkson et al. 2005, Courtenay 1993, Deacon et al. 1964, Marsh and Pacey 2005, Miller 1961, Miller et al. 1989, Minckley et al. 1991, Moyle et al. 1986, Olden and Poff 2005). Nonnative aquatic species now dominate much of the aquatic habitats found in Arizona and have been recorded in 142 of the 166 stocking sites considered in the Proposed Action. Habitat losses and resident nonnative aquatic species constitute primary stressors influencing consultation and other special status species.

Of 36 native fish species known or thought to have occurred in Arizona, 20 are currently listed as threatened or endangered and one is extinct. Eight of the listed species no longer occur as wild populations in the state but survive elsewhere. Of the remaining 15 native fish species, 13 have been designated as special status species by the AGFD and/or federal land management agencies, including three that are considered candidates for listing. Only two native fish species (striped mullet and machete, both marine/estuarine species found only in the lower reaches of the Colorado River) do not have special status designation at this time (AGFD 2009, FWS 2011c). There are currently two listed, two candidate, and seven other special status amphibian species and two candidate and two other special status semi-aquatic reptiles in the state (AGFD 2010).

Species Analyzed and Those Eliminated from Further Analysis

As noted previously, the FWS lists of endangered, threatened, proposed, and candidate species for all Arizona counties were reviewed by representatives of the AGFD and the FWS to determine which listed species should be evaluated. FWS made the final determination on which species to include in the Section 7 consultation and the BCO. For other special status species (those not listed under the ESA or identified as candidate species), the statewide list from the Heritage Data Management System (HDMS) was reviewed to identify species potentially affected by the alternatives. Species initially identified for analysis were those associated with aquatic, wetland, and/or riparian habitats. This list was further refined by reviewing species abstract information and distribution maps to identify those species known to occur near proposed stocking locations, in the subcatchment (downstream or upstream) where stocking is proposed, and/or in areas of access/use through recreational angling. The primary source used to determine other special status species distribution included the AGFD HDMS (AGFD 2010). HDMS records data were supplemented with other available databases, including the Nongame and Endangered Wildlife Program's Fisheries Database and the Ranid Frog Database, as well as Lower Colorado River Basin Aquatic Geographic Applications for Planning Analysis Project information. In some cases, the HDMS data were supplemented with recent records of other special status species (primarily aquatic and semi-aquatic species) known to occur at or near stocking sites that had not yet been entered into the HDMS database.

To identify migratory birds, the FWS 2008 lists of Birds of Conservation Concern (FWS 2008a) were reviewed. Three Bird Conservation Regions (BCRs) cover the state of Arizona: BCR 16 (Southern Rockies/Colorado Plateau), BCR 33 (Sonoran and Mojave deserts), and BCR 34 (Sierra Madre Occidental). Species associated with aquatic, wetland, and/or riparian habitats and known to breed near proposed stocking locations, downstream or upstream of where stocking is proposed, and/or in areas of access/use through recreational angling were identified as potentially affected by the alternatives under consideration. Because the HDMS does not track these species, the Arizona Breeding Bird Atlas (Corman and Wise-Gervais 2005) was used to determine the approximate distribution of these species. Four riparian-associated passerine species were identified for further analysis: Bell's vireo, Lucy's warbler, yellow warbler, and veery. The remainder of the species on these lists were eliminated from further analysis because (1) they do not typically nest in aquatic/wetland/riparian habitats, (2) they are transient species that do not breed regularly in the state, or (3) their known breeding distribution does not overlap stocking sites, upstream and downstream areas, or areas affected by angling activity/access.

Table G (Appendix D) lists consultation and other special status species identified for further analysis, their status designation, and general habitat characteristics. Table H (Appendix E) lists

consultation and other special status species eliminated from further analysis and the rationale for their elimination.

4.1.4 Environmental Consequences

This section describes the direct and indirect environmental effects of each alternative on consultation species and other special status species. Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the actions but are farther removed in distance and occur later in time. Indirect effects must be reasonably foreseeable (i.e., likely to occur within the 10-year duration of the project). Cumulative effects on consultation and other special status species are discussed in Chapter 6.0.

Effects of Hatchery Operations and Maintenance

Potential effects of hatchery operations and maintenance (O&M) on special status species were considered with regard to (1) effects on water quality and introduction of diseases and nontarget organisms, (2) noise and disturbance, and (3) escapement of hatchery fish into downstream water bodies. Effects of hatchery O&M on listed and candidate species were evaluated in a separate Section 7 consultation. No listed or candidate species have been recorded within 2 miles¹⁰ of the Canyon Creek, Silver Springs, or Tonto Creek fish hatcheries. Roundtail chub, Page springsnail, yellow-billed cuckoo, and Northern Mexican garter snake, all candidate species, have been recorded within 2 miles of the Page Springs Hatchery. The Sterling Springs Hatchery occurs within the boundary of a Protected Activity Center (PAC) for the threatened Mexican spotted owl.

The analysis that follows pertains to the Proposed Action. Under the Reduced Stocking Alternative, all five hatcheries would continue to operate and, therefore, effects would be the same as under the Proposed Action. Under the No Action alternative, these hatcheries could be idled or decommissioned (i.e., operations terminated, fish removed, and equipment relocated), used for other federal aid-eligible projects, or sold to reimburse SFRA funds and, therefore, would not affect consultation or other special status species.

Water Quality and Introduction of Disease and Nontarget Organisms

Effects on water quality and effects related to the introduction of diseases and nontarget organisms are discussed in Section 2.2.6. Based on water quality permitting requirements and implementation of BMPs (including HACCPs), hatchery O&M would not result in adverse changes in water quality or in the spread of disease or nontarget organisms under the Proposed Action or the Reduced Stocking Alternative. HACCPs developed for each of the five hatcheries can be reviewed at <http://haccp-nrm.org/liststateplans.asp?State=AZ>. The Page Springs Hatchery (where roundtail chub and Page springsnail have been recorded within 2 miles), is regulated under Arizona Permit AZ00121245 and is subject to effluent standards for the maintenance of all designated uses, including Aquatic and Wildlife. This hatchery also operates under a Candidate

¹⁰ Two miles is the AGFD standard used for this type of activity (i.e., O&M of existing facilities). This distance was used instead of the 5-mile radius around stocking sites because activities associated with hatchery O&M are mostly restricted to the hatchery grounds themselves.

Conservation Agreement with Assurances for Page springsnail, and all O&M activities would be consistent with this agreement.

Noise and Disturbance

Noise and disturbance related to hatchery O&M may result from human presence and activity (hatchery workers and visitors), vehicular traffic to and from hatcheries, and operation of heavy equipment or vehicles involved in maintenance or repair activities. Noise-related disturbance would primarily affect terrestrial species, such as birds nesting in the vicinity. Because these hatcheries have been in existence and operation for a number of decades, neither the Proposed Action nor the Reduced Stocking Alternative would result in new noise disturbance effects. Hatchery O&M may result in displacement of individuals or avoidance of the immediately surrounding areas but would be unlikely to affect the population status, or jeopardize the continued existence, of any consultation species.

A candidate yellow-billed cuckoo was recorded in 2004 in the vicinity of the Page Springs Hatchery, but no nesting was recorded. At the Sterling Springs Hatchery, O&M activities could result in disturbance of Mexican spotted owls at the nest site or in roosting or foraging areas within the PAC during the breeding season. However, activity associated with this one-person operation and the limited number of tours inside the hatchery and around the raceways would not cause a large disturbance effect and would not adversely affect primary constituent elements, key habitat components, and/or restricted and protected habitat for the Mexican spotted owl. Moreover, the hatchery sits immediately adjacent to State Highway 89 and is subject to significant road noise from vehicular traffic. Because the hatchery has been in operation since the 1920s, there would be no new disturbance in the PAC from hatchery O&M. O&M activities at the Page Springs Hatchery could impact individuals of the Northern Mexican garter snake through direct mortality or habitat disturbance. These impacts would be minimized through continued implementation of measures to protect this species and its habitat. BMPs were developed in March 2010 to address snake impacts on hatchery property and included low vehicle speed limits, maintenance of minimal water levels in fallow ponds, and restraint of pet animals on the hatchery grounds.

Fish Escapement

Hatchery O&M has the potential to result in the incidental release or escapement of hatchery fish into downstream waters. Several BMPs are in place that prevent or severely limit the risk of hatchery fish escapement, including screening of raceways and outflow retention areas (two sets of screens) and routine monitoring of outflow retention areas for escaped fish (fish escaping through the first set of screens). Rainbow trout make up most of the AGFD hatchery sport fish production (averaged 88 percent from 2007 through 2009) and within 3 years of the start of this project, all rainbow trout reared at these facilities will be sterile triploid. As such, any escaped rainbow trout after that time would not reproduce and would not further add to naturally reproducing populations. The risk of incidental release is low, and if it were to occur, only low numbers of fish would escape. The extent to which this potential escapement could affect listed species in receiving waters is discussed in the following paragraphs for each of the five AGFD hatcheries that supply fish for the AGFD Sport Fish Stocking Program. The consultation on hatchery O&M (FWS 2010c) as amended by the FWS in 2011 (FWS 2011d), was conducted separately from the draft BCO (FWS 2011a).

Canyon Creek Hatchery

The Canyon Creek Hatchery is on the upper reaches of Canyon Creek, which is a tributary of the Salt River. This hatchery currently produces rainbow and cutthroat trout, and has the potential to produce brown trout, brook trout, Apache trout, and Arctic grayling.

Escapement or incidental release of hatchery fish would result in the addition of relatively few fish to a reach that would already be stocked with rainbow trout. In addition, nonnative trout are already present, with brown trout and possibly rainbow trout already being established in this reach. Downstream of the hatchery, the creek becomes too warm in the summer to support trout or grayling near the upper reservation boundary (about 5 miles downstream of the hatchery; the confluence of the Salt River is approximately an additional 32 miles downstream). The AGFD regularly surveys Canyon Creek, and cutthroat trout have never been detected, indicating that they either have not escaped or, if they did, have not established populations. Brook trout were stocked into Canyon Creek in 1935 and 1967 but have not been detected in Canyon Creek during routine fishery surveys, indicating that brook trout did not maintain a reproducing population and therefore would not likely establish reproducing populations into the future if escapement were to occur. Apache trout would not likely establish populations due to the established populations of nonnative trout. As such, it is unlikely that escaped Apache, cutthroat, or brook trout would establish populations in Tonto Creek. Brown and rainbow trout could survive and reproduce, but the small numbers of escaped trout would be unlikely to substantially contribute to the already established trout populations.

Roundtail chub may be present downstream in lower Canyon Creek but are not present in Canyon Creek in the immediate vicinity of the hatchery. It is unknown whether chub maintain a population in Canyon Creek on the Fort Apache Indian Reservation because results from surveys on the Fort Apache Indian Reservation are proprietary to the tribe and are not available for consideration. The most recent records, in 1988, for roundtail chub from Canyon Creek are from the lower end of the creek near the confluence with the Salt River, but the current status of the population is unknown (Voeltz 2002). A few roundtail chub were recently collected in the Salt River downstream from the confluence with Canyon Creek (Evans 2009). Roundtail chub have not been collected during recent AGFD surveys of upper Canyon Creek and have not been reported by anglers either incidentally or during creel surveys from upper Canyon Creek (upstream of the reservation boundary). The population of roundtail chub in the Salt River near the confluence with Canyon Creek has been heavily impacted by the spread of channel catfish and flathead catfish (Voeltz 2002).

Because of adherence to hatchery BMPs, which prevent or minimize hatchery escapement, trout or grayling escaping would be a rare event and, if it did happen, would be in low numbers. In addition, due to the long distance involved for the trout or grayling to move into possibly occupied roundtail chub habitat (more than 37 miles to known locations, though it may be closer if chub are present in lower Canyon Creek on the reservation) and warm water downstream of the upper reservation boundary, it would be unlikely for any escaped fish to reach roundtail chub-occupied areas. Therefore, effects to roundtail chub are unlikely. No other listed species are known from Canyon Creek.

Sonora sucker and longfin dace are found downstream in the Salt River, and effects to these species are not likely due to the reasons described for roundtail chub. Speckled dace and desert

sucker are found immediately downstream of the hatchery. These two species are abundant in this reach based on AGFD survey data. despite the stocking of rainbow trout since 1933 and brown trout since 1948. Escapement or incidental release of hatchery fish would not substantially change trout populations in Canyon Creek and, therefore, any effects to desert sucker and speckled dace would be minor.

Silver Creek Hatchery

The Silver Creek Hatchery is at the headwater spring of Silver Creek. This hatchery currently raises rainbow and Apache trout, and has the potential to produce brown, cutthroat, or brook trout.

Escapement of hatchery fish would result in the addition of relatively few fish to a reach that would already be stocked as part of the statewide stocking program. Silver Creek, downstream of the hatchery, does not support trout reproduction, likely due to warm-water temperatures, though the stream reach immediately downstream of the hatchery supports year-round survival of stocked Apache and rainbow trout.

Little Colorado spinedace are found in lower Silver Creek near its confluence with the Little Colorado River (more than 35 miles downstream of the hatchery). Stocked trout would not be able to survive the warm summer temperatures at the locations where Little Colorado spinedace are known to occur. It might be possible for escaped trout to reach this location in the cooler seasons, when the water temperatures would allow for survival downstream, but this would be unlikely. Because of adherence to hatchery BMPs that prevent or minimize hatchery escapement, trout escaping would be a rare event and, if it did happen, would be in low numbers. Furthermore, the intervening reservoir downstream from Silver Creek Hatchery (White Mountain Lake) would likely serve as a population sink for escaped trout before they were capable of reaching the areas occupied by Little Colorado spinedace. It is possible for escaped trout that make it into White Mountain Lake to spill out and continue downstream in Silver Creek, but this is unlikely. Thus, the intervening reservoir further reduces the potential for escaped trout to reach the Little Colorado spinedace. Therefore, effects to spinedace from escaped trout from the Silver Creek Fish Hatchery are unlikely.

Little Colorado River suckers are known from approximately 25 miles downstream of the hatchery, and effects to this species are not likely due to the reasons described for the Little Colorado spinedace. Speckled dace and bluehead suckers are known from immediately downstream of the hatchery. Escapement of hatchery fish would result in the addition of relatively few fish to this reach, where trout would not be able to reproduce due to warm-water temperatures, based on AGFD survey data. Any effects to speckled dace and bluehead sucker would be minor.

Tonto Creek Hatchery

The Tonto Creek Hatchery is on upper Tonto Creek. This hatchery currently raises rainbow, brook, and Apache trout and has the potential to produce brown and cutthroat trout.

Escapement of hatchery fish would result in the addition of relatively few fish to a reach that would already be stocked with rainbow trout as part of the statewide stocking program (some natural reproduction also occurs) and inhabited by an established population of brown trout.

Hatchery production will shift to only triploid rainbow trout by 2013, eliminating reproduction by stocked/escaped rainbow trout. Rainbow trout have been historically, and are currently, stocked in Tonto Creek downstream of the hatchery and tributaries. During several surveys, few rainbow trout have been documented downstream of Bear Flat Campground, and only one has been documented downstream of Hell's Gate. These results indicate that stocked fish do not move far downstream. Behavior of any escaped fish would likely be similar. Therefore, it is unlikely that any trout escaping from the hatchery would go far downstream.

Apache trout have not been detected during fishery surveys conducted in 2005 and 2008 in Tonto Creek, indicating that they have not escaped from the hatchery nor have they established populations. Brook trout were stocked into Tonto Creek from 1936 through 1986 but have not been detected in Tonto Creek during routine fishery surveys since 1984, indicating that brook trout did not maintain a reproducing population and therefore would not likely establish reproducing populations into the future if escapement were to occur. Cutthroat trout were raised periodically at the Tonto Creek Hatchery from 1978 through 2007 and have not been detected in downstream areas during monitoring, also indicating that they either did not escape or did not establish populations if they did. As such, it is unlikely that escaped Apache, cutthroat, or brook trout would establish populations in Tonto Creek. Brown trout could survive and reproduce, but the small numbers of escaped trout would be unlikely to substantially contribute to the already established trout populations.

Chiricahua leopard frogs are believed to have been extirpated from the upper Tonto Creek watershed but have been reestablished at two sites on tributaries to upper Tonto Creek (about 3 miles downstream from the hatchery). The two reestablishment sites are separated by at least 1 mile of ephemeral streambed from the perennial reach of Tonto Creek. The candidate species headwater chub are known from the Tonto Creek approximately 9 miles downstream from the hatchery and tributary Haigler Creek (farther downstream), and Northern Mexican garter snakes are known from the middle and lower Tonto Creek (about 29 miles downstream from the hatchery). Trout escaped from the hatchery are not likely to affect these three listed species because of the distance between the hatchery and the listed species occurrences. Because of adherence to hatchery BMPs that prevent or minimize hatchery escapement, trout escaping would be a rare event and, if it did happen, would be in low numbers. Therefore, effects to these listed species are unlikely.

Speckled dace and Sonora suckers are known from approximately 10 miles downstream of the hatchery, and effects to these species are not likely due to the reasons described for headwater chub. Longfin dace and desert suckers are known from immediately downstream of the hatchery. Escapement of hatchery fish would result in the addition of relatively few fish to a reach that would already be stocked with rainbow trout with limited reproduction and inhabited by an established population of brown trout. Escapement or incidental release of hatchery fish would not substantially change trout populations in Tonto Creek, and any effects to longfin dace and desert sucker would be minor.

Page Springs Hatchery

The Page Springs Hatchery is along the lower reaches of Oak Creek, a tributary of the Verde River. This hatchery currently raises rainbow and brown trout and has the potential to raise Apache, brook, and cutthroat trout.

Oak Creek downstream of Page Springs Hatchery is too warm for summer survival of trout, and any trout escaping the hatchery could persist through the cool season but would not last through the summer. Water temperatures in upper Oak Creek are cooler, and established brown trout and rainbow trout are present (these areas are approximately 20 miles upstream from the hatchery). Any escaped trout would not be expected to reach upper Oak Creek due to the distance, but if they did, with the exception of rainbow trout, which will be converted to triploid by 2013, they potentially could reproduce. However, already established populations of brown trout in upper Oak Creek and smallmouth bass in the vicinity of the hatchery would likely prey on or outcompete the Apache, brook, and cutthroat trout. Brown trout would have the potential to reproduce in this upstream area and add to this established population, but the small (if any) numbers of escaping trout that would make it upstream would not have a meaningful effect on the established population of brown trout.

Endangered Gila chubs are known from Spring Creek, a tributary of the lower Oak Creek (approximately 4 miles downstream from the hatchery), and razorback suckers are stocked into the Verde River (the Verde River is approximately 17 miles downstream from the hatchery). Candidate Northern Mexican garter snakes are known from Oak Creek in the immediate vicinity of the hatchery, and roundtail chub may be present upstream of the hatchery in Oak Creek. Escaped trout would not likely establish any new populations or substantially contribute to existing nonnative trout populations in upper Oak Creek and would not survive the warm summer temperatures of middle and lower Oak Creek. Because of adherence to hatchery BMPs that prevent or minimize hatchery escapement, trout escaping would be a rare event and, if it did happen, would be in low numbers. Therefore, effects to these listed species are unlikely.

Speckled dace, desert sucker, Sonora sucker, and longfin dace occupy the reach immediately downstream of the hatchery. Escapement of fish from the Page Springs Hatchery would result in the addition of relatively few fish to a reach that would not support reproduction of trout, and any effects to these four species would be minor.

Sterling Springs Hatchery

This hatchery is in the upper reach of Oak Creek, a tributary of the Verde River. Sterling Springs Hatchery is primarily an egg-hatching facility where eggs are received, incubated, hatched, and grown to a large enough size to be stocked (fingerling and subcatchable) or transferred to one of the other four hatcheries. Currently, Sterling Springs Hatchery hatches rainbow and brown trout, both of which occur as naturally reproducing populations in the upper reaches of Oak Creek. Sterling Springs Hatchery has historically also produced Apache, cutthroat, and brook trout, and may do so again in the future.

Escapement of fish from the Sterling Springs Hatchery would result in the addition of relatively few fish to a reach that is already inhabited by naturally reproducing brown and rainbow trout. Fish potentially escaping from Sterling Springs Hatchery would be small and would be prone to predation by native and nonnative species already in Oak Creek. Hatchery production will shift to only triploid rainbow trout by 2013, eliminating reproduction by stocked/escaped rainbow trout. Any Apache, cutthroat, or brook trout that survived would have to compete with the existing brown trout, which would likely outcompete and prey on these other trout species. Furthermore, with the exception of three Apache trout in 1996, these species have not been detected during fish surveys of Oak Creek, despite being raised historically at this hatchery; the

three Apache trout in 1996 may have been a misidentification. These surveys indicate that these species did not escape the hatchery or, if they did, they did not establish populations. The low number of brown trout that could potentially survive could reproduce and add to the existing population but would not be expected to substantially augment or increase the numbers of brown trout in the stream.

Endangered Gila chub are known from Spring Creek, a tributary of the lower Oak Creek (about 37 miles downstream from the hatchery), and razorback suckers are stocked into the Verde River (the Verde River is about 50 miles downstream from the hatchery). Candidate Northern Mexican garter snakes are known from lower Oak Creek, and candidate roundtail chub may be present in middle Oak Creek (about 15 miles downstream from the hatchery). Escaped trout would not likely establish any new populations or substantially contribute to existing nonnative trout populations in upper Oak Creek and would not survive the warm summer temperatures of middle and lower Oak Creek. Because of adherence to hatchery BMPs, which prevent or minimize hatchery escapement, trout escaping would be a rare event and, if it did happen, would be in low numbers. Therefore, effects to these listed species are unlikely.

Longfin dace occupy downstream areas of Oak Creek about 50 miles downstream of the hatchery, and effects to these species are not likely due to the reasons described for Gila chub. Speckled dace occupy Oak Creek immediately downstream of the hatchery, and Sonora suckers and desert suckers occupy areas farther downstream in upper Oak Creek. Escapement or incidental release of hatchery fish would not substantially change trout populations in upper Oak Creek and, therefore, any effects to speckled dace, desert sucker, and Sonora sucker would be minor.

Stocking Effects on Consultation Species

Potential effects on consultation species from stocking were analyzed in the BA (FWS 2011b) and the draft BCO (FWS 2011a). The BA provided information to FWS AESO to aid development of the draft BCO, including spill history for impoundments, water connectivity between stocking sites and consultation species, aquatic communities present at stocking sites, survey data, distance between stocking sites and known occurrences of consultation species, and potential impacts.

The analyses of effects on consultation species were conducted on two different scales: the area-wide scale and a species site-specific scale. The area-wide scale had a wider perspective and focused on the indirect, interrelated, and interdependent effects of the Proposed Action that are difficult to evaluate on a site-by-site basis. This analysis addressed three general areas: inadvertent transport of unwanted aquatic organisms either directly through stocking actions or from persons legally pursuing stocked sport fish; illegal movement of unwanted aquatic organisms that could be associated with the stocking actions; and physical effects on aquatic or riparian habitat from anglers pursuing stocked sport fish. The species site-specific scale evaluated effects attributable to the proposed stocking of sport fish into the stocking sites relative to the presence of consultation species at or near those sites and how that stocking would affect those species. It also addressed site-specific effects on species from anglers accessing the stocking sites. The analysis took into consideration the environmental baseline, which includes the presence, at many of the stocking sites, of nonnative fishes and other introduced taxa such as crayfish, which act as stressors on aquatic and semi-aquatic consultation species as well as

aquatic communities in general. The environmental baseline, cumulative effects (effects due to future non-federal actions reasonably certain to occur), and the area-wide and site-specific effects of the action were collectively evaluated to determine if a consultation species would be jeopardized or critical habitat would be adversely modified.

The following information was summarized by drawing from the draft BCO (FWS 2011a) and the BA (FWS 2011b). The conclusions were based on implementation of the project as proposed (Proposed Action), including mitigation measures. The extent to which potential adverse effects would occur varies by species and by stocking site based on existing conditions, fish species proposed for stocking, and other factors. The draft BCO does not evaluate the Reduced Stocking Alternative or the No Action alternative. For a number of species included in the consultation, the draft BCO concurred with findings of “Not Likely to Adversely Affect” (Table 4). Appendix J provides rationale for the effect findings on these species, which are not discussed further in this document. Information about these species can be found at the FWS AESO website: <http://www.fws.gov/southwest/es/arizona/reading.htm>.

Table 4. Consultation species for which the draft BCO made a finding of “Not Likely to Adversely Affect.”

Consultation Species	Status
Arizona treefrog Huachuca/Canelo Distinct Population Segment	C
Colorado pikeminnow	E, S, WSCA
Desert pupfish	E*, WSCA
Mexican spotted owl	T*, WSCA
Mexican wolf	E, WSCA
Page springsnail	C, S
Quitobaquito pupfish	E*, WSCA
Sonora chub	T*, WSCA
Sonoyta mud turtle	C
Three Forks springsnail	C, S
Woundfin	E*, WSCA
Yellow-billed cuckoo	C, S, WSCA
Yuma clapper rail	E, WSCA

* = Proposed or Designated Critical Habitat

C = FWS Candidate

E = FWS Endangered

S = USFS and/or BLM Sensitive

T = FWS Threatened

WSCA = Wildlife of Special Concern in Arizona

Section 7 Consultation Species Area-wide Analysis Summary

This section summarizes the area-wide analysis for consultation species completed in the draft BCO (FWS 2011a).

The continuing introduction and spread of unwanted aquatic species via the routes described in the draft BCO analysis are threats to all consultation species, whether from the Proposed Action or from cumulative effects. The environmental baseline contains substantial adverse effects from the introduction of these nonnative species, and those effects would continue into the future.

Conservation programs in place to address the impacts of unwanted aquatic organisms on native species provide benefits to native species through establishment of secure populations and other

directed activities. Mitigation measures that are part of the Proposed Action (Chapter 5) would first address the effects of the proposed sport fish stocking, and, through reductions of stressors, would reduce the baseline effects on consultation species. Improved public outreach on the dangers of illegal transport may also assist in reducing the scope of the problem.

During spring 2011, Arizona experienced a number of large wildfires that may substantially affect listed and candidate species considered in this NEPA process. Direct effects of the wildfires included loss of the vegetation component of habitat for riparian species, and aquatic species may have been affected by heat if fires burned adjacent to occupied streams, ponds, or springs. More important for aquatic species is the threat of post-fire runoff from the burned watersheds, where there is no longer any vegetation to catch and hold ash and sediment from eroding off the slopes and into stream courses. Ash mixed with water is toxic, and heavy sediment loads can clog gills and impair breathing as well as fill in pools, cover riffles, and otherwise degrade habitat. These types of changes to the habitat will continue until the watershed can revegetate, and even then, damage to the streams may persist for several years post-fire.

The FS, through its Burned Area Emergency Response (BAER) program, works to ameliorate such impacts through placement of straw bundles or other means to slow runoff and capture sediment, and seeding burned areas to encourage regrowth of grasses and forbs where the seedbank in the soil may have been lost to heat from the fire. Long-term restoration of riparian and aquatic habitats affected by wildfire requires the combined efforts of multiple agencies working together. Some areas can be restored quickly; others may take several years of ongoing effort. Consultation species likely affected by the spring 2011 fires are:

- Monument Fire: Arizona treefrog, Huachuca Distinct Population Segment (DPS), Chiricahua leopard frog
- Murphy Fire: Chiricahua leopard frog, Sonora chub
- Wallow Fire: Apache trout, Chiricahua leopard frog, Gila chub, Little Colorado spinedace, loach minnow, New Mexico meadow jumping mouse, Northern Mexican garter snake, narrow headed garter snake, roundtail chub, Southwestern willow flycatcher, Three Forks springsnail

Once effects to these species from these fires have been assessed by the AESO and the AGFD, the WSFR will request reinitiation if a change in status of the species warrants it.

The Proposed Action is not likely to jeopardize the continued existence of any consultation species or result in destruction or adverse modification of designated or proposed critical habitat for the following reasons:

- Sufficient operational protocols would be in place to reduce/minimize the risk of inadvertent transport of unwanted aquatic organisms via stocking operations associated with the Proposed Action.
- For other legal importations of aquatic species, though the operational protocols are not quite as effective, commitments to improve oversight of these routes that are part of the Proposed Action would contribute to reducing the risks below current levels.

- For inadvertent transport of unwanted aquatic organisms, operational protocols for AGFD field employees and existing public education programs would contribute to reducing risks below current levels.
- For incremental effects associated with deliberate transport of unwanted aquatic organisms, these actions are already illegal under Arizona law and regulation. The AGFD provides educational materials in the Fishing Regulations booklet concerning those laws and, as part of the Proposed Action, the display of those topics in the booklet would be improved to provide easier access for the public. Other programs to educate the public are ongoing, and additional efforts to expand those programs are part of the Proposed Action. Because the members of the public most likely to engage in illegal transport are likely aware that it is illegal, continuing enforcement will be required. This level of illegal activity would not be expected to increase substantially over the 10-year period covered by this consultation because the Proposed Action is primarily the ongoing stocking of existing sites and species, with relatively few new species or locations. If the current rate of illegal transport continues, there will be additional adverse effects on consultation species. The jeopardy analysis considered these additional effects in context with species status and determined that the Proposed Action would be unlikely to result in jeopardy.
- The Proposed Action contains mitigation measures that include the reduction of stressors in their habitats. Some of the stressors to be addressed would be unwanted aquatic organisms, and removal of these at specific sites would improve the status of the consultation species.
- The Proposed Action contains mitigation measures, including information and education outreach intended to reduce effects.
- Ongoing conservation efforts are continuing to benefit the baseline status of many of the consultation species.

Section 7 Consultation Species Site-specific Analysis Summaries

This section summarizes the species site-specific analysis for consultation species completed in the draft BCO (FWS 2011a).

Apache Trout (Threatened)

Under the Proposed Action, there would be no jeopardy to Apache trout. Apache trout may be affected by stocking in the following complexes¹¹ and stocking sites: Black River Complex (Ackre Lake, Big Lake, and the East Fork and the West Fork of the Black River) and Little Colorado River (Becker Lake, White Mountain Reservoir, Mexican Hay Lake, Lee Valley Lake, Bunch Reservoir, River Reservoir, Tunnel Reservoir, Little Colorado River Greer, Little Colorado River, Sheep's Crossing, Little Ortega Lake, Silver Creek, Show Low Lake, and Fool Hollow Lake). The following considerations factored into the determination of effects on the Apache trout:

- The stocking of Apache trout for recreational fishing was included as a compatible action that contributes to the conservation of the species in the 1975 downlisting rule (FWS 1975).
- Recreational fishing populations of Apache trout are, with one exception, separate from the recovery populations that are the primary conservation focus for the species. In that one instance, the effects of recreational fishing on the recovery population would not be substantial enough to degrade the conservation value of that population.
- There would be a risk of contamination by nonnative fish species of recovery populations when such species are stocked below the barriers in recovery streams. Barrier failure is well documented and currently exists at two streams near stocking sites. Contamination by nonnative fish following barrier failure would have a short-term impact on the Apache trout in those streams but would not permanently degrade the sites or prevent recovery.
- Apache trout from the recovery populations are not the source of fish for the recreational populations; therefore, there would be no additional pressure on recovery streams to produce fish for recreational purposes. All recreational fish are bred in hatcheries that, on occasion, provide fish for recovery streams; however, production capacity would be adequate to meet both needs.
- The addition of new stocked warm-water and cold-water sport fish species to sites where Apache trout would be stocked for recreational purposes would not result in additional adverse effects on the species because these Apache trout would not be expected to establish populations in the stocking sites.
- Restoration efforts for Apache trout recovery populations affected by the Wallow Fire are anticipated to occur under ongoing recovery programs. The loss of Apache trout from streams designated for sport fishing is not a significant loss for the species because these sites do not contribute to recovery, and stocking under the Proposed Action would replace individuals lost to post-fire flooding.

Under the Reduced Stocking Alternative, three stocking locations in the Black River Complex that could affect Apache trout would be eliminated: Big Lake, East Fork of the Black River, and the West Fork of the Black River. All other sites that may affect Apache trout would be stocked with this alternative.

¹¹ A complex is a grouping of stocking sites that are hydrologically connected. Appendix A, Table E lists complexes and subcatchments within which proposed stocking sites occur.

Bonytail Chub (Endangered) and Critical Habitat

There would be no jeopardy to the bonytail chub and no adverse modification to critical habitat under the Proposed Action. Bonytail chub may be affected by the Proposed Action in stocking sites along the lower Colorado River (La Paz County Park Pond, La Paz County Park Lagoon, Hidden Shores Golf Course, and Yuma West Wetlands), the lower Gila River (Fortuna Pond, Redondo/Yuma Lake, and Wellton Golf Course), and the lower Salt River (Apache Lake, Canyon Lake, Saguaro Lake, Salt River Lower, Phoenix Urban and Special Urban Lakes, and Tempe Town Lake). The following considerations factored into the determination of effects on the bonytail chub:

- Stocking into the La Paz County Park Lagoon would provide limited opportunity for adverse effects on bonytail chub through competition for food and space with stocked fish. The length of exposure would be low, the number of bonytail chub potentially exposed to the stocked fish would be low due to the block net and narrow (two-week) stocking period, and the amount of competition would be low. The overall significance to the bonytail chub in the Parker Strip area of the Colorado River would be low.
- No effects on bonytail chub are anticipated from stockings at Hidden Shores, La Paz County Park Pond, or Yuma West Wetlands because these sites are not connected to the river, and fish stocked there would not reach the river. Therefore, there would be no additional effects due to these sites.
- It is highly unlikely that any bonytail chub stocked into the Colorado River would access the river at the confluence of the Gila River and encounter a stocked fish or its progeny derived from Fortuna Pond. With the exception of rainbow trout, all species proposed for stocking into Fortuna Pond maintain robust, self-sustaining populations in the Colorado River below Laguna Dam, and the additive effect of any fish from Fortuna Pond to the extant populations of nonnative fish would be minor. No effects on bonytail chub are anticipated from proposed stockings at Redondo Lake and Wellton Golf Course pond because these sites are not connected to the Gila River. Therefore, there would be no additional effects from stocking of these sites.

Under the Reduced Stocking Alternative, five statewide stocking locations (La Paz County Park Lagoon in the Lower Colorado, Canyon Lake, Saguaro Lake, Salt River Lower, and Tempe Town Lake) and 24 of the Phoenix Urban and Special Urban Lakes that could affect the bonytail chub or critical habitat would be eliminated.

Chiricahua Leopard Frog (Threatened)

Under the Proposed Action, there would be no jeopardy to the Chiricahua leopard frog. The Chiricahua leopard frog may be affected by stocking in the following complexes and stocking sites: Luna Lake (Luna Lake), Black River (Ackre Lake, Big Lake, and East Fork and the West Fork of the Black River), Lower Verde River (East Verde River Fork), Santa Cruz River (Parker Canyon Lake and Peña Blanca Lake), and Tonto Creek (Christopher Creek, Haigler Creek, and Tonto Creek). The following considerations factored into the determination of effects on the Chiricahua leopard frog:

- Adverse effects on natural Chiricahua leopard frog populations in the San Francisco River and tributaries near Reserve, New Mexico, would be unlikely. Information suggests that the rainbow trout populations may be self-sustaining or rely on inflow from nearer populations.
- Adverse effects on Chiricahua leopard frogs in reestablishment and natural populations in the Black River, East Verde River, Tonto Creek, and Parker Canyon Lake could occur if dispersing Chiricahua leopard frogs move out of the secure habitats and into stream reaches containing stocked trout species or, in the case of Parker Canyon Lake, channel catfish and sunfish. Successful establishment of populations in secure reestablishment sites would lead to larger number of Chiricahua leopard frogs leaving the area to locate new habitats, with a concomitant increase in potentially adverse interactions with stocked fish or other dangers. However, these losses would not impinge on the success of the reintroduced population in the secure area, so these effects would not be meaningful.
- Adverse effects on the metapopulation around Peña Blanca Lake from the stocking of rainbow trout would not likely be sufficient to eliminate Chiricahua leopard frogs from the lake because the trout are not present through the entire Chiricahua leopard frog breeding season and the amount of cover in the lake provides protection for egg masses and tadpoles.
- The risks of contamination of Chiricahua leopard frog sites with chytrid fungus, waterdogs, and other nonnative aquatic species, diseases, or parasites due to stocking actions and angler pursuit of stocked sport fish would exist, and procedures to reduce the risk would not entirely eliminate it. For the sites considered in this analysis, under the current environmental baseline, this risk would not be substantial, except at Peña Blanca Lake, where a metapopulation may be forming in the watershed. Additional consideration of these issues is provided in the area-wide analysis in the draft BCO.
- Effects to proposed critical habitat would only be likely to occur at Peña Blanca Lake and would not be likely to substantially reduce the conservation value of that unit. The conservation value of the Peña Blanca Lake portion of that unit may have already been compromised by approval to stock warm-water sport fish at the site. Under the conservation measures included in the 2011 Biological Opinion (BO #22410-2010-F-0330) on that stocking, the remainder of the proposed critical habitat unit would be monitored for nonnative species presence and management actions taken as needed. The stocking of rainbow trout into the lake would have no additive risk to critical habitat physical and biological factors found in the rest of the unit over that resulting from the previous consultation.

Under the Reduced Stocking Alternative, the following stocking sites that could affect the Chiricahua leopard frog would be eliminated: Big Lake and the East Fork and the West Fork of

the Black River; Luna Lake; Parker Canyon Lake and Peña Blanca Lake; and Christopher Creek, Haigler Creek, and Tonto Creek.

Gila Chub (Endangered) and Critical Habitat

There would be no jeopardy for the Gila chub and no adverse modifications to critical habitat under the Proposed Action. Gila chub may be affected by stocking in the following complexes and sites: Agua Fria River (Fain Lake and Lynx Lake), Big Chino Wash (Granite Basin Lake), Middle Verde River (Oak Creek and Wet Beaver Creek), and Santa Cruz River (Rose Canyon Lake). The following considerations factored into the determination of effects on the Gila chub:

- In all cases, stocked sport fish would have to leave the stocking area to access occupied habitats of the Gila chub. It is not anticipated that the number of such fish accessing occupied habitat over the 10-year period covered by this consultation would represent a significant effect on the status of the Gila chub populations. The movement of stocked sport fish to occupied Gila chub habitats in the Agua Fria drainage would likely be a very rare event, and effects on Gila chub in the vulnerable Silver Creek population would be additive to that from existing nonnative species present. Rainbow trout in Oak Creek and Wet Beaver Creek would be more likely to reach occupied habitats in Spring Creek and Red Tank Draw; however, they would not persist in these areas due to high temperatures, so their effect on young Gila chub would be of limited duration and not sufficient to affect recruitment, particularly because such events may not occur every year. Trout from Rose Canyon Lake would also be very rare in Gila chub habitat in Bear Canyon and Sabino Canyon, and the sites accessed are not where the main body of the population exists in Sabino Creek, which would not be affected.
- Spills from Granite Basin Lake could introduce largemouth bass to the limited habitat present in Williamson Valley Wash. Largemouth bass have not been documented at the site, and the likelihood of largemouth bass reaching the site would be low. If largemouth bass were to reach the occupied habitat, there could be significant adverse effects on Gila chub. However, this potential for loss of this population due to the Proposed Action would be limited due to the exposure potential as described.
- Gila chub could be exposed to stocked sport fish if they move out of occupied habitats into areas where the sport fish may be found. This would be most likely to occur in Oak Creek and Wet Beaver Creek, where the stocking site is proximal to the occupied habitats. The effects of trout on Gila chub would be limited in duration and, though trout are predators on fish, the additive contribution of this predation over that which occurs in these streams due to warm-water fish, frog, and crayfish predation would not be sufficient to alter the recruitment potential for Gila chub in these streams. Gila chub that move out of the Agua Fria tributary habitats would be at risk of exposure during the limited time stocked sport fish could be present; however, the additive predation on young Gila chub would not be sufficient to alter the recruitment potential in the Agua Fria River.
- The limited potential for the short-term presence of stocked sport fish in Gila chub critical habitats at Red Tank Draw, Sabino Creek, and Spring Creek would be unlikely to substantially alter conditions such that the critical habitat could no longer function to provide conservation benefits to the species. The invasion events would likely be few, with few fish involved, and would be of short duration due to summer temperatures that would eliminate the trout. Rainbow trout would not establish populations in these critical habitat units, so additional

substantial effects on the existing condition would not occur, therefore not compromising the ability of these critical habitat units to support conservation of the species. The potential invasion of the Williamson Valley Wash critical habitat unit by largemouth bass could alter conditions there sufficiently to reduce or eliminate its conservation value. The level of uncertainty about the potential for this invasion to occur does not allow for a definitive statement on the result of stocking in Granite Basin Lake and the ability of the Williamson Valley Wash critical habitat unit to meet its conservation role for the species. However, there is no current information to suggest that sport fish stocking in Granite Basin Lake would substantially reduce the conservation value of this unit of critical habitat due to the limited opportunity for nonnative species to reach this critical habitat unit.

- The Proposed Action would not result in additional effects from stocked sport fish that are not already part of the environmental baseline. These effects would be expected to continue at their current level over the 10-year period covered by this consultation.

The following sites would not be stocked under the Reduced Stocking Alternative: Granite Basin Lake in the Big Chino Wash Complex, Oak Creek and Wet Beaver Creek in the Middle Verde River subcatchment, and Rose Canyon Lake in the Santa Cruz River subcatchment.

Gila Topminnow (Endangered)

Under the Proposed Action, there would be no jeopardy to the Gila topminnow. Gila topminnow may be affected in the following complexes and stocking sites: Agua Fria River (Fain Lake and Lynx Lake), Lower Salt River (Canyon Lake and Saguaro Lake), Middle Verde River (Verde River Middle), Lower Verde River (East Verde River), and Upper Santa Cruz (Parker Canyon Lake, Patagonia Lake, and Peña Blanca Lake). The following considerations factored into the determination of effects on the Gila topminnow:

- Conservation populations are all isolated from proposed stocked sport fish moving upstream into occupied habitat. Though there would be a risk to any Gila topminnow that moves downstream from the secure habitat to be exposed to a stocked sport fish or its progeny, that risk would be low. Furthermore, Gila topminnow that move out of the secure habitat cannot reaccess the habitat and are assumed lost to the conservation population. This loss is not likely important to the stability and success of the conservation population.
- The risks of exposure to stocked sport fish or their progeny at the three stocking sites with natural Gila topminnow populations nearby would be low at Parker Canyon Lake, and somewhat more likely for Peña Blanca Lake and Patagonia Lake. The seasonality of rainbow trout stocking at these two lakes, and the physical conditions at the Gila topminnow-occupied sites during the period of exposure, would limit the potential for adverse interactions. Particularly below Patagonia Lake, there would be opportunity for exposure to Gila topminnow from escaped rainbow trout. The number of such potential encounters would likely be low and would not result in substantial adverse effects on the Gila topminnow populations.

Under the Reduced Stocking Alternative, Gila topminnow could be affected from stocking only in the Agua Fria River Complex. All other stocking sites that could affect Gila topminnow would be eliminated with this alternative.

Gila Trout (Threatened)

There would be no jeopardy to Gila trout under the Proposed Action. Gila trout may be affected by stocking in the following subcatchments and stocking sites: Agua Fria River drainage (Fain and Lynx lakes) and the Upper Gila River drainage (Frye Mesa Lake). The following considerations factored into the determination of effects on the Gila trout:

- The Grapevine Creek and Frye Creek conservation populations were created to meet recovery goals for the Gila trout and, as such, their success or failure does not factor into any jeopardy determination.
- The potential for adverse effects on the conservation populations that could influence the successful establishment of the populations would be very low because stocked nonnative fish species would be very unlikely to move into the reintroduction areas to adversely affect the Gila trout.
- The number of Gila trout lost to the conservation populations through downstream movement is considered in the planning for the reintroductions and is not considered meaningful to the population status. Gila trout dispersing to the Agua Fria River from Grapevine Creek would not persist in the river due to summer temperatures and flow conditions. Gila trout from the Frye Creek conservation population that disperse downstream to Frye Mesa Lake become part of the 4(d) rule fishable population along with the Gila trout stocked into the lake for that purpose. Establishing the conservation populations is a significant benefit to the species even if small numbers are lost downstream.

Under the Reduced Stocking Alternative, all three stocking locations that may affect Gila trout would be stocked.

Headwater Chub (Candidate)

There would be no jeopardy to headwater chub under the Proposed Action. Headwater chub may be affected by stocking in the Lower Verde River Complex (East Verde River and Green Valley Lake) and the Tonto Creek Complex (Christopher Creek, Haigler Creek, and Tonto Creek). The following considerations factored into the determination of effects on the headwater chub:

- The overall status of the headwater chub is not clearly understood. Recent survey data for most populations in Arizona are significantly lacking; however, some recent (post-2008) survey and anecdotal information exists to assist in reviewing the status in those streams. Trends in New Mexico show declines in those populations. The assignment of recently discovered populations in the East Verde River drainage and the Verde River drainage to headwater chub has not been verified by genetic and morphometric evaluations.
- The Proposed Action could affect five of the 23 extant occupied streams for headwater chub. All of these proposed stocking sites involving headwater chub would be continuing sites, not new ones, so there would be continuing adverse effects but no additional effects.
- The Proposed Action would directly affect headwater chub in the East Verde River (including lower Ellison Creek) and Webber Creek as rainbow trout would be stocked into the occupied habitat. Effects would be related to increased competition for food and pool habitats and potential predation on juvenile headwater chub. These occupied areas are currently rated as “unstable-threatened,” but recent anecdotal information indicates headwater chub are common

with multiple age classes in the stocking reach, which may warrant a change in rating to “stable-threatened.” The magnitude of the effects of stocked rainbow trout on headwater chub is unclear; however, recent information indicates the species is maintaining a recruiting population in the presence of wild and stocked rainbow trout.

- Indirect effects could occur in Tonto Creek, Haigler Creek, and possibly Marsh Creek if rainbow trout move out of the proposed stocking sites into these occupied streams. Effects would be related to increased competition for food and pool habitats, and potential predation on juvenile headwater chub. Tonto Creek is currently rated “unstable-threatened,” and the other sites are rated “stable-threatened.” Surveys in Tonto Creek documented few rainbow trout present and multiple age classes of headwater chub. The number of stocked rainbow trout that would move out of the stocking sites is unknown; however, due to angling pressure at the stocking sites, it may not be a large number, and effects would not be substantial. Recent information indicates the species is maintaining a recruiting population in the presence of wild and stocked rainbow trout.
- Effects from stocking rainbow trout at Green Valley Lake would be unlikely due to isolation of the Pine Creek and The Gorge occupied areas from the East Verde River and the limited amount of time any rainbow trout could be present in the system if they did escape from the lake.
- The transition to triploid rainbow trout by 2013 would eliminate any augmentation of the wild rainbow trout populations that may have occurred in the past in the East Verde River, Tonto Creek, or Haigler Creek.
- The renovation of Fossil Creek provided significant on-the-ground conservation for headwater chub that may be lost if the newly discovered smallmouth bass cannot be eliminated. Surveys in Arizona and New Mexico provide documentation of populations, and genetics work enables identification of populations of the species.
- Angler bycatch of headwater chub, particularly at the East Verde River proposed stocking site, could result in some mortality to captured individuals. Data on hooking mortality are unavailable; however, the level of mortality is likely insufficient to cause declines in the overall number of headwater chub present at the proposed stocking site. Additional angler education efforts are included in the conservation measures that are part of the Proposed Action.
- The AGFD would secure three existing populations or establish three new populations (or a combination thereof) in areas without nonnative fish species as a conservation measure as part of the Proposed Action.

Under the Reduced Stocking Alternative, none of the five sites potentially affecting headwater chubs would be stocked, and there would be no effects on the species.

Humpback Chub (Endangered) and Critical Habitat

Under the Proposed Action, there would be no jeopardy to the humpback chub and no adverse modification to critical habitat. The humpback chub and/or designated critical habitat may be affected by stocking in the following complexes and stocking sites: Havasu Creek (Cataract Lake, City Reservoir, Dogtown Reservoir, Santa Fe Tank, and Kaibab Lake)

Canyon Diablo (Mud Tank, Kinnikinick Lake, Morton Lake, and Frances Short Pond), Schoen's (Woodland Lake, Rainbow Lake, Show Low Lake, Fool Hollow Lake, and Scott's Reservoir), and White Mountain (Silver Creek and Little Mormon Lake). The following considerations factored into the determination of effects on the humpback chub:

- For the Havasu Creek stocking sites, it would be unlikely that any individuals of the stocked species, particularly channel catfish, could access the humpback chub habitats alive after being transported by flood waters. The spill potential from the stocking sites, the distances involved, and the physical conditions encountered, when considered together, lead to a very low risk of exposure of humpback chub to these fish. This low potential for exposure also leads to the determination that critical habitat physical and biological factors related to competition and predation would not be affected to the extent that the conservation value of the Colorado River Marble and Grand Canyon critical habitat reach would be diminished.
- For the Canyon Diablo stocking sites, it would be unlikely that any individuals of the stocked species, particularly channel catfish, could access the humpback chub habitats alive after being transported by flood waters. The spill potential from the stocking sites, the distances involved, and the physical conditions encountered, when considered together, lead to a very low risk of exposure of humpback chub to these fish.
- For the White Mountain stocking sites, it is possible that individuals of the stocked species, particularly channel catfish, could access the humpback chub habitats alive after being transported by flood waters. There is connectivity between the Little Mormon Lake stocking site and the Little Colorado River via White Mountain Reservoir for channel catfish if reproduction occurs in Little Mormon Lake. The grate on the outflow would prevent stocked adult channel catfish from escaping, but not juvenile catfish, which would only be present if reproduction occurs at this site. Channel catfish maintain a reproducing population in White Mountain Lake, and any channel catfish exiting the lake to Silver Creek would most likely come from that population and not the stocking sites. Channel catfish are a significant predator on young humpback chub, and the connectivity from these stocking sites is directly into the area above Chute Falls, where recent translocations of small humpback chub have been undertaken to extend the area of the population and improve survivorship. The number of channel catfish in that reach of the Little Colorado River is not known; however, augmentation of those numbers would likely be deleterious to the chub. Stocking channel catfish into Little Mormon and Whipple lakes would not have any measurable effect on existing channel catfish populations in this drainage.
- For the Schoen's stocking sites, it is unlikely that any individuals of the stocked species, particularly channel catfish, could access humpback chub habitats after being transported by flood waters to the flood pool at Schoen's Dam. The manner of release for water behind the dam does not facilitate downstream passage of bottom-dwelling fish such as channel catfish.
- For the Little Colorado River critical habitat reach, nonnative fishes, including channel catfish, entering the upper end of the critical habitat reach via Little Colorado River inflows are an identified concern for critical habitat factors related to competition and predation. The number of such fish derived from the stocking locations and not from established reproducing populations of channel catfish in Lyman Lake, Lower Chevelon Creek, and Clear Creek Reservoir or washes draining into the Little Colorado River from the north that may access the Little Colorado River below Grand Falls cannot be determined. However, the sites listed are on

the Little Colorado River itself and are more likely to be the sources of any channel catfish that reach the critical habitat than the stocking sites. Therefore, the value of Little Colorado River critical habitat as a contributor to conservation of the humpback chub would not be impaired by the Proposed Action.

- The Proposed Action would not result in additional effects from stocked sport fish that are not already part of the environmental baseline. These effects are expected to continue at their current level over the 10-year period covered by this consultation.

Under the Reduced Stocking Alternative, three stocking locations that could affect humpback chub and critical habitat would be eliminated: Mud Tank, Kinnikinick Lake, and Morton Lake in the Canyon Diablo Complex. These sites have a low risk of exposure to humpback chub. All other sites that may affect humpback chub and/or critical habitat would be stocked.

Little Colorado Spinedace (Threatened) and Critical Habitat

There would be no jeopardy to the Little Colorado spinedace and no adverse modification to critical habitat under the Proposed Action. Little Colorado spinedace and/or critical habitat may be affected by stocking in the following complexes and stocking sites: Chevelon Creek (Chevelon Canyon Lake, Long Tom Tank, Willow Springs Lake, and Woods Canyon Lake), Clear Creek (Bear Canyon, C.C. Cragin Reservoir, Knoll Lake, and Clear Creek Reservoir), Little Colorado River above Lyman (Hulsey Lake, Lyman Reservoir, and Nelson Reservoir), Schoen's (Fool Hollow Lake, Rainbow Lake, Mountain Meadow Recreational Complex, Scott's Reservoir, Show Low Creek, Show Low Lake, and Woodland Lake), West Fork of the Little Colorado River (Bunch Reservoir, Lee Valley Lake, Little Colorado River Greer, Little Colorado River-Sheep's Crossing, Mexican Hay Lake, River Reservoir, Tunnel Reservoir, and White Mountain Reservoir) and White Mountain (Silver Creek and Little Mormon Lake). The following considerations factored into the determination of effects on the Little Colorado spinedace:

- The overall status of the natural populations of spinedace is declining and likely will continue to decline over the 10-year period covered by this consultation. Loss of habitat from continuing water development combined with the ongoing drought is a substantial threat to all populations, as is the increasing expansion of nonnative fish species in the range of the spinedace. However, the Proposed Action does not create an additional burden of adverse effects above and beyond what is already in the environmental baseline. This is because the three sites that are most likely to have adverse effects on spinedace (C.C. Cragin Reservoir, Knoll Lake, and Nelson Reservoir) already operate under restrictions in a 1995 BO (FWS 1995), as modified in 2001 (FWS 2001) that have substantially reduced the potential for adverse effects. These three sites would continue to be operated under those restrictions, with modified creel requirements, under the 1995 BO.
- Effects to spinedace from stocking in Chevelon Creek, Schoen's, West Fork of the Little Colorado River, and White Mountain complexes would be very limited due to distance, connectivity with occupied spinedace habitat, and other physical conditions. Stocking actions for warm-water sport fish in these complexes would not add any new species to the drainage, and connectivity between the sites and occupied spinedace habitat is limited, which reduces the opportunity for stocked sport fish to reach spinedace habitats.

- The Proposed Action would include the transition from normal rainbow trout to triploid rainbow trout over the next 4 or 5 years. These fish are bred to be sterile, so any survivors that remain after the fishing season are not likely to establish or augment a reproducing population. This would reduce the continuing potential for establishing rainbow trout in areas where they are currently not established.
- The critical habitat reaches above and below C.C. Cragin Reservoir and below Nelson Reservoir would, through continuation of the 2001 stocking restrictions, not be degraded by rainbow trout escaping from these reservoirs. The critical habitat would not experience a decline in functionality or its conservation value to the species due to the Proposed Action. Critical habitat in Lower Chevelon Creek would not be affected by the Proposed Action.
- The Proposed Action would not result in additional effects from stocked sport fish that are not already part of the environmental baseline. These effects are expected to continue at their current level over the 10-year period covered by this consultation.

Under the Reduced Stocking Alternative, the following sites would not be stocked: C.C. Cragin Reservoir, Knoll Lake, and Clear Creek Reservoir in the Clear Creek Complex, and Hulsey Lake, Lyman Reservoir, and Nelson Reservoir in the Little Colorado River above Lyman Complex.

Loach Minnow (Threatened) and Critical Habitat

Under the Proposed Action, there would be no jeopardy to the loach minnow and no adverse modification to critical habitat. Loach minnow and/or designated critical habitat may be affected by stocking in the following complexes and stocking sites: Black River (Ackre Lake, Big Lake, Crescent Lake, East Fork of the Black River, and West Fork of the Black River), Luna Lake (Luna Lake), Middle Verde River (Verde River Middle, Oak Creek, and Wet Beaver Creek), Granite Creek (Goldwater Lake, Watson Lake, and Willow Springs Reservoir), and Lower Verde River (Green Valley Lake). The following considerations factored into the determination of effects on the loach minnow:

- The size of the loach minnow population in the Black River is low, and occupied habitat has not been documented within the stocking reach. The number of stocked trout leaving the stocking reach to invade occupied loach minnow habitat would likely be low over the period covered by this consultation, based on available information that shows most stocked trout in the East Fork of the Black River do not move far from the stocking reach and have a limited persistence due to angler removal and low post-stocking survival. Stocked fish from Big Lake or Crescent Lake also are unlikely to move out of those sites during winter flooding due to the placement of the weir. The distances involved for Apache trout or Arctic grayling from Ackre Lake to reach occupied habitat in the East Fork of the Black River are such that any effects from that stocking would be unlikely.
- The effects on critical habitat in the Black River would be limited due to the primary stocking of native Apache trout rather than rainbow trout, and only triploid rainbow trout, which would not support the recruiting population. Though stocking high numbers would affect some critical habitat factors, this effect would be of short duration due to the practice of stocking trout into pools (and not riffles where competition for food with loach minnow could occur), angler removal of stocked trout, and low post-stocking survival. The trout would be stocked

multiple times over a season; therefore, numbers would repeatedly increase and decrease over the season, but the effect on critical habitat would not be substantial due to the reasons already discussed.

- The loach minnow populations that could be affected by stocked trout leaving Luna Lake are more than 26 miles downstream in the mainstem San Francisco River as well on two of its tributaries. Though Luna Lake can spill every year, and trout move out of the lake during that time and when water is released for agricultural use in the vicinity of the town of Luna, the number of such fish likely to reach occupied loach minnow habitat would likely be very low. Further, the use of triploid rainbow trout under the Proposed Action would essentially eliminate the potential for any escaped rainbow trout to support recruitment in the wild trout populations. If that support has been an important factor for these wild trout populations, then the Proposed Action could reduce nonnative issues of concern to critical habitat.
- The effects from escaped trout from Luna Lake would be similarly limited in scope. The number of rainbow trout entering critical habitat would not be sufficient to reduce the existing conservation value of the critical habitat units for loach minnow or preclude improvements through removal of other nonnative species. Any effects would be of short duration, and no meaningful change in the forage base for loach minnow would occur.
- The effects on the Verde River proposed critical habitat units would be minimal given the temporary nature of the presence of rainbow trout and the very limited potential for bluegill, black crappie, or channel catfish from the stocking sites to affect extant fish populations in the Verde River.
- The Proposed Action would not result in additional effects from stocked sport fish that are not already part of the environmental baseline. These effects would be expected to continue at their current level over the 10-year period covered by this consultation.
- The Proposed Action contains significant conservation actions to address effects of the action and to improve the baseline status of the species.

Under the Reduced Stocking Alternative, loach minnow would not be affected, and critical habitat may be affected from stocking in the Granite Creek Complex. All other stocking sites that could lead to effects on loach minnow and/or critical habitat would be eliminated with this alternative.

Narrow-headed Garter Snake (Potential Candidate)

The Proposed Action would not be likely to jeopardize the continued existence of the narrow-headed garter snake. The narrow-headed garter snake may be affected by stocking in the following complexes and stocking sites: Black River (Ackre Lake, Big Lake, Crescent Lake, and East Fork and the West Fork of the Black River), Canyon Creek (Canyon Creek), Granite Creek (Goldwater Lake, Watson Lake, and Willow Creek Reservoir), Lower Verde River (East Verde River and Green Valley Lake), Middle Verde River (Dead Horse Lake, Verde River Middle, Oak Creek, West Clear Creek, and Wet Beaver Creek), and Tonto Creek (Christopher Creek, Haigler Creek, and Tonto Creek). The following considerations factored into the determination of effects on the narrow-headed garter snake:

- The Proposed Action, through intentional killing of narrow-headed garter snakes by anglers along Oak Creek, could have continuing adverse effects on a population weakened by other causes such as nonnative predation on narrow-headed garter snakes and an altered or diminished prey base. The population remains robust at locations away from heavy visitor use; however, long-term monitoring is needed to document changes to population viability.
- The number of rainbow trout or cutthroat trout that access narrow-headed garter snake habitats in the San Francisco River, Tularosa River, and Negrito Creek are likely to be small and persistence limited. Trout are predators on fish species that support narrow-headed garter snake populations; however, the magnitude of the contribution of trout from Luna Lake would be very limited.
- Most of the sport fish stockings proposed are rainbow trout. Though rainbow trout are predators on small fish, they constitute a smaller risk to the native prey base of the narrow-headed garter snake than the warm-water species that are extant in those areas. Juvenile trout are also likely to provide a prey base for narrow-headed garter snakes in some areas.
- The Proposed Action would not result in additional effects from stocked sport fish that are not already part of the environmental baseline. These effects would be expected to continue at their current level over the 10-year period covered by this consultation.
- The Proposed Action contains a significant conservation effort for the narrow-headed garter snake that would work to offset the effects of the action and provide additional conservation benefit.

The following sites would not be stocked under the Reduced Stocking Alternative: Big Lake, East Fork and West Fork of the Black River, East Verde River, Green Valley Lake, Dead Horse Lake, Verde River Middle, Oak Creek, West Clear Creek, Wet Beaver Creek, Tonto Creek, Christopher Creek, and Haigler Creek.

Northern Mexican Garter Snake (Candidate)

Under the Proposed Action, there would be no jeopardy to the Northern Mexican garter snake. Northern Mexican garter snakes may be affected in the following complexes and sites: Black River (Ackre Lake, Big Lake, Crescent Lake, East Fork of the Black River, and West Fork of the Black River), Granite Creek (Goldwater Lake, Watson Lake, and Willow Creek Reservoir), Lower Verde River (East Verde River), Middle Verde River (Verde River Middle, Oak Creek, West Clear Creek, and Wet Beaver Creek), Upper Santa Cruz (Parker Canyon Lake), Middle Santa Cruz (Arivaca Lake), Schoen's (Mountain Meadow Recreational Complex, Rainbow Lake,

Scott's Reservoir, Show Low Creek, Show Low Lake, and Woodland Lake), White Mountain (Little Mormon Lake, Long Lake, Sponseller Lake, and Whipple Lake), and Tonto Creek (Christopher Creek, Haigler Creek, and Tonto Creek). The following considerations factored into the determination of effects on the Northern Mexican garter snake:

- The Proposed Action, through intentional mortality of Northern Mexican garter snakes by anglers along Oak Creek would not, based on existing population data, have substantial effects on the Oak Creek hatcheries population.
- Conservation actions for the Northern Mexican garter snake in the Santa Cruz/San Rafael Valley through the draft San Rafael Habitat Conservation Plan may assist in maintaining or expanding that population, and efforts in the vicinity of Parker Canyon Lake may also provide additional support for the small population in Scotia Canyon. Funding for Northern Mexican garter snake work on Arizona State Parks land is lacking, but few ongoing activities are adverse to the Northern Mexican garter snake population.
- Most of the proposed sport fish stockings considered in this analysis are rainbow trout. Though rainbow trout are predators on small fish and frogs, they constitute a smaller risk to the native prey base of Northern Mexican garter snake than the warm-water species that are extant in those areas. The two warm-water stocking sites in southern Arizona (Arivaca Lake and Parker Canyon Lake) are not likely to support reproducing Northern Mexican garter snake populations, even without proposed stocking, due to the presence of other nonnative species, including bullfrogs and crayfish.
- The spread of diseases that can affect Northern Mexican garter snake's native frog prey base through legal and illegal use of nonnative tiger salamanders or bait fish is not connected to the Proposed Action. Largemouth bass are not proposed for stocking at any site in the Santa Cruz River subcatchment under the Proposed Action (the warm-water stocking at Pena Blanca Lake is not part of the action under this consultation), though they maintain self-sustaining populations at Arivaca Lake, Parker Canyon Lake, and Patagonia Lake. Native frog populations are not present at these lakes, so there would be limited opportunity for direct exposure to any tiger salamanders released into these lakes. There would be a continuing risk to native frog populations from release of nonnative tiger salamanders into occupied native frog habitats away from these lakes; however, given the distribution of occupied habitats relative to these sites, that risk would be limited in scope.
- The Proposed Action would not result in additional effects from stocked sport fish that are not already part of the environmental baseline. These effects would be expected to continue at their current level over the 10-year period covered by this consultation.
- Conservation measures included in the Proposed Action would have benefits to Northern Mexican garter snake that would assist in offsetting the effects of the Proposed Action.

Under the Reduced Stocking Alternative, the Northern Mexican garter snake could be affected by stocking in the following complexes: Black River (only two of the five stocking sites in the Proposed Action), Granite Creek, Middle Santa Cruz, Schoen's, and White Mountain. All other sites in the Middle Verde River, Lower Verde River, Upper Santa Cruz, and Tonto Creek complexes, and three sites in the Black River Complex that could affect Northern Mexican garter snake, would not be stocked under this alternative.

Mount Graham Red Squirrel (Endangered)

Under the Proposed Action, there would be no jeopardy to the Mount Graham red squirrel. The Mount Graham red squirrel may be affected from stocking at Riggs Flat Lake. The following considerations factored into the determination of effects on the Mount Graham red squirrel:

- Stocking truck and angler access related to the Proposed Action would compose a portion of the existing estimated road traffic on Swift Trail. This amount of road traffic was documented and discussed in extant BOs (FWS 1988 and 2008b) as a level not likely to jeopardize the red squirrel. Only eight red squirrels have been documented as road kills since the subspecies was listed in 1987.
- Based on annual fall surveys, red squirrel numbers in the vicinity of Riggs Flat Lake do not appear to be adversely affected by the presence of recreationists, including anglers, at the recreation site.
- The risk of human-caused wildfire related to stocking truck or angler access or the actions of anglers while using Riggs Flat Lake is of concern. However, FS management of the recreational site contains measures to reduce the risk of human-caused wildfires originating at the site. The one wildfire in the vicinity of the lake was started by an undefined human cause in a steep area south of the lake and off an established trail.

Riggs Flat Lake would be stocked under the Reduced Stocking Alternative, and the potential effects on the Mount Graham red squirrel would not be different from those of the Proposed Action.

Northern Leopard Frog (Potential Candidate)

Under the Proposed Action, there would be no jeopardy to the Northern leopard frog. The Northern leopard frog may be affected in the following complexes and stocking sites: Black Canyon Lake (Black Canyon Lake), Canyon Diablo (Ashurst Lake, Coconino Lake, Kinnikinick Lake, Morton Lake, and Mud Tank), Little Colorado River above Lyman (Lyman Reservoir), Upper Little Colorado River (Concho Lake), Walnut Creek (Marshall Lake, Mormon Lodge Pond, Lower Lake Mary, and Upper Lake Mary), West Fork of the Little Colorado River (Lee Valley Lake, Mexican Hay Lake, White Mountain Reservoir, Little Colorado River Greer, Little Colorado River Sheep's Crossing, Bunch Reservoir, Tunnel Reservoir, and River Reservoir), and Luna Lake (Luna Lake). The following considerations factored into the determination of effects on the Northern leopard frog:

- Though proposed stocking in the Canyon Diablo and Walnut Creek complexes could have substantial adverse effects on Northern leopard frog populations extant in that area, the elimination of the Mormon Lake stocking site and stocking channel catfish in all but two sites would provide a substantial area for Northern leopard frog persistence in the drainage. Continuation of the stocking program with the warm-water species would likely reduce the opportunities for Northern leopard frog population maintenance and expansion in the action area, which would affect distribution of the species in Arizona.
- The only functioning metapopulation in Arizona at and around Stoneman Lake, south and west of the action area, would not be affected by the stocking program because that site was dropped from the Proposed Action.

- Effects on Northern leopard frogs at Lyman Lake from stocked rainbow trout would likely be limited because conditions in the lake to support stocking may not occur over the term of this consultation, and few rainbow trout may access occupied habitats.
- There would be additional effects on Northern leopard frogs due to new stocking sites or species included in the Proposed Action. These additional effects would not substantially increase the total level of effects from that carried forward by the continuing stocking actions in the Proposed Action.
- The Proposed Action contains substantial conservation measures to improve the status of Northern leopard frog in Arizona.

Under the Reduced Stocking Alternative, the Northern leopard frog could be affected in the Black Canyon Lake, Upper Little Colorado River, and West Fork of the Little Colorado River complexes. All other sites that could affect Northern leopard frog would not be stocked under this alternative.

New Mexico Jumping Mouse (Candidate)

There would be no jeopardy to the New Mexico jumping mouse under the Proposed Action. The New Mexico jumping mouse may be affected in the following complexes and stocking sites: Black River (Big Lake, East Fork of the Black River, and West Fork of the Black River) and West Fork of the Little Colorado River (Little Colorado River Greer, Little Colorado River–Sheep’s Crossing, and Lee Valley Lake). The following considerations factored into the determination of effects on the New Mexico jumping mouse:

- The status of the jumping mouse across its range shows evidence of continuing declines, and recent survey data for Arizona supports data from New Mexico in this respect. The number of new populations found is fewer than the number of historical populations that may have been extirpated; however, complete surveys of all potential habitats have not been initiated, so additional populations may be present. Active interest in management of the jumping mouse on the ASNF, particularly to eliminate effects from livestock grazing, provides considerable benefit for jumping mice habitats in the excluded areas. Efforts in New Mexico to address threats and provide conservation through the recovery plan have had limited success to date. Jumping mouse populations in Arizona were affected by the Wallow Fire, and their status is currently unknown, as is the status of their habitat after post-fire runoff events began to occur. The limited data available do not indicate that occupied habitats were entirely destroyed by the fire, and the amount of damage from runoff occurring in the next year or so while stabilizing vegetation returns to burned areas is unknown. The ASNF is, through the BAER program, working to stabilize areas of important wildlife habitat and reduce runoff damage.
- The continuation of sport fish stocking under the Proposed Action would perpetuate the habitat degradation occurring at the stocking sites at the West Fork of the Black River and along the West Fork of the Little Colorado River, and this would not support the conservation of the species. The jumping mouse population at the lower East Fork of the Little Colorado River appears to be robust; however, only one survey has ever been done there, the amount and extent of habitat is not recorded, and the amount of human use in the habitat is unknown. This area may contain the last jumping mouse population in this portion of the Little Colorado River drainage, and it was affected to some level by the Wallow Fire. The other population in the

drainage, on Nutrioso Creek, is small, and the habitat extent is unrecorded. Continuing effects of human use at the East Fork of the Little Colorado River could, over the near term, reduce the quality of that habitat as continuing use along the West Fork has done to date. With the expansion of housing at Greer, additional recreational pressures on the area are likely to continue.

- Two of the three robust jumping mouse populations not affected by the Proposed Action would also not be at significant risk from recreation. However, the upper San Francisco River population is near the town of Alpine and may be affected by continued growth in that area. The Wallow Fire burned near this area, and it is unknown whether past fuel reductions in the area that kept the fire from burning Alpine also protected the jumping mouse habitat. The Campbell Blue Creek population is more remote and likely has fewer recreational pressures, but it was also affected by the Wallow Fire. The Three Forks site does not have recreational use due to the closure; however, it may have some effects from the Wallow Fire that could affect habitat and population size. The continuing degradation at occupied habitats affected by the stocking actions would reduce the total viability of the Arizona portion of the range; however, the affected populations are not supporting the species distribution in Arizona.
- Conservation measures for protection of jumping mouse habitat on AGFD-owned lands in the Black River would provide conservation benefits to the species over the long term.

Under the Reduced Stocking Alternative, the New Mexico jumping mouse could be affected in the West Fork Little Colorado River Complex. The Black River Complex stocking sites would not be stocked under this alternative.

Razorback Sucker (Endangered) and Critical Habitat

There would be no jeopardy to the razorback sucker and no adverse modification to critical habitat under the Proposed Action. The razorback sucker may be affected by stocking in the following subcatchments and stocking sites: Colorado River–Yuma North and South (La Paz County Park Lagoon, La Paz County Pond, Hidden Shores Golf Course, and Yuma West Wetlands), Lower Gila River (Fortuna Pond, Redondo/Yuma Lake, and Wellton Golf Course), Verde River (Oak Creek, Wet Beaver Creek, West Clear Creek, and Green Valley Lake), and Salt River (Salt River Lower and Phoenix Urban and Special Urban Lakes). The following considerations factored into the determination of effects on the razorback sucker:

- Stocking into the La Paz County Park Lagoon would provide limited opportunity for adverse effects on razorback suckers through competition for food and space with stocked fish and predation on larval razorback suckers by stocked fish. The length of exposure would be low, the number of razorback suckers potentially exposed to the stocked fish would be low, and the amount of competition would be low. The overall significance to the razorback sucker in the Parker Strip area of the Colorado River would be low. No effects on razorback suckers are anticipated from stocking at Hidden Shores, La Paz County Park Pond, or Yuma West Wetlands because these sites are not connected to the river, and fish stocked there would not reach the river.
- It is highly unlikely that any razorback sucker stocked into the Colorado River would access the river at the confluence of the Gila River and encounter a stocked fish or its progeny derived from Fortuna Pond. With the exception of rainbow trout, all species proposed for stocking into

Fortuna Pond maintain robust, self-sustaining populations in the Colorado River below Laguna Dam, and the additive effect of any fish from Fortuna Pond to the extant populations of nonnative fish would be minor. No effects on razorback suckers are anticipated from stockings at Redondo Lake and Wellton Golf Course pond because these sites are not connected to the Gila River.

- For the Middle and Lower Verde River, based on current knowledge of the location of stocked razorback suckers in relation to the stocking locations, there would be limited opportunity for overlap between razorback suckers and rainbow trout to allow for competition for food and space or potential predation by rainbow trout on larval razorback suckers.
- The Proposed Action would not increase populations of nonnative fish populations in the Parker-Imperial or Verde River critical habitat reaches. The small number of stocked fish likely to remain in the Parker-Imperial reach after the barrier net is removed would be inconsequential to the existing populations of these species in the river. The small number of stocked sport fish that could access the Upper Verde River reach would not be likely to lead to the establishment of these species in the area, and the effect of the small number of individuals that would likely move into the area from the Granite Creek stocking sites would not alter the existing predator and competitor community currently present. The stocking of rainbow trout into the Middle and Lower Verde River would have the temporary effect of increasing the biomass in the reach and introducing a “new” species to the reach. However, because this species would only be temporarily present, would have a limited effect on the physical habitat and biological environment, and would not be expected to establish in the stocking reaches, the effects would be minor. In no case would the effect of sport fish stocking reduce the value for conservation for the razorback sucker of any affected critical habitat reach.
- The Proposed Action would not result in additional effects from stocked sport fish that are not already part of the environmental baseline. These effects would be expected to continue at their current level over the 10-year period covered by this consultation.

Under the Reduced Stocking Alternative, one stocking location in the Colorado River–Yuma North subcatchment (La Paz County Park Lagoon) would not be stocked, while in the Lower Salt River subcatchment, the Salt River Lower and 24 of the Phoenix Urban and Special Urban Lakes would not be stocked (the remaining six urban sites are closed systems). All other sites that may affect the razorback sucker or its critical habitat would be stocked.

Roundtail Chub (Candidate)

There would be no jeopardy to the roundtail chub under the Proposed Action. The roundtail chub may be affected by stocking in the following subcatchments and stocking sites: Salt River (Canyon Creek, Workman Creek, Salt River Lakes, Salt River Lower, Tempe Town Lake, and Phoenix Urban and Special Urban Lakes), Verde River (Goldwater Lake, Watson Lake, Willow Creek Reservoir, Oak Creek, Wet Beaver Creek, Verde River Middle, West Clear Creek, East Verde River, and Green Valley Lake), Clear Creek Reservoir, and the Bill Williams River (Granite Mountain Tank #1, Granite Mountain Tank #2, Bass Tank, Blue Tank, Carter Tank, Antelope Tank, Bar 37 Tank, Harman Tank, Harmon Tank #2, Little Antelope Tank, McElhaney Tank, Stubbs Tank, and Swale Tank). The roundtail chub may also be affected by stocking in the following complexes: Black River (Ackre Lake, Big Lake, Crescent Lake, and the East Fork and the West Fork of the Black River), Chevelon Creek (Chevelon Canyon Lake,

Long Tom, Willow Springs, and Woods Canyon Lake), and Clear Creek (Bear Canyon Lake, C.C. Cragin, and Knoll Lake). The following considerations factored into the determination of effects on the roundtail chub:

- The overall status of the roundtail chub is not clearly understood. Across Arizona, 31 of 40 historically known waters in five discrete major river basins still contain roundtail chub, and one is considered stable-secure. Determination of status categories was most recently done in 2009 for the 12-month finding (FWS 2009a). However, the supporting data are qualitative, non-standardized, and in some cases, very limited. Though this is the best available information, and it was used consistently across the sites, considerable unknowns remain about the status of the species in these occupied waters. Roundtail chub in these waters may be persisting at varying levels in the face of ongoing physical and biological threats, but a number of them are in small habitats where stochastic events may result in extirpation. The recent genetic data indicate that though many sites are isolated, the genome in the most at-risk sites on the Verde River is part of a connected population with considerable resilience, as documented by recruitment events after spring floods. Despite these uncertainties, the overall status of the DPS does not point to extinction in the next 10 years.
- The Proposed Action could affect 17 of the 31 known waters occupied by roundtail chub, including five currently considered “stable-threatened” and 11 currently considered “unstable-threatened” in the 12-month finding. Rainbow trout are the only sport fish proposed for stocking into occupied roundtail chub habitats (six of the 17 affected waters). An evaluation of the magnitude of the effect of these proposed stockings on the roundtail chub present is complicated by the presence of wild populations of nonnative fish that are also more effective potential predators and competitors. At the other stocking sites, a mix of cold- and warm-water sport fish are proposed for stocking, and the connectivity between stocking sites and occupied habitats is possible at varying levels of likelihood, so effects would not likely occur often. The elimination of stocking channel catfish and largemouth bass at the stocking sites in the Bill Williams River drainage (except for Coors Lake, which is a closed system) would provide additional protection from these species becoming established in the system.
- The Proposed Action would not result in additional effects from stocked sport fish that are not already part of the environmental baseline in the occupied waters. These effects would be expected to continue at their current level over the 10-year period covered by this consultation, so there would be no meaningful increase in effects.
- The conservation measure to only stock triploid rainbow trout would significantly reduce the likelihood that stocked rainbow trout would contribute to self-sustaining populations of rainbow trout in roundtail chub habitats.
- The implementation of the Statewide Conservation Agreement (AGFD 2006a) has provided conservation actions for the roundtail chub. Two new waters, Ash Creek and Roundtree Canyon, were stocked with roundtail chub under the agreement, and other actions are listed under the range-wide status of the species. Other conservation measures under the Gila River Basin Native Fishes Program have also benefited roundtail chub.
- Significant conservation measures to improve the overall status of the roundtail chub are included in the conservation plan that would be implemented as part of the Proposed Action, and these would adequately offset the adverse effects of the Proposed Action.

Under the Reduced Stocking Alternative, the following stocking sites would be eliminated: the East Fork and the West Fork of the Black River, Workman Creek, Canyon Lake, Saguaro Lake, Tempe Town Lake, and 24 Phoenix Urban and Special Urban Lakes in the Salt River subcatchment; Oak Creek and Wet Beaver Creek in the Verde River subcatchment; West Clear Creek, East Verde River, and Green Valley Lake in the Middle Verde River subcatchment; C.C. Cragin Reservoir, Knoll Lake, and Clear Creek Reservoir in the Little Colorado River subcatchment; and Bass Tank and Blue Tank in the Bill Williams River subcatchment.

Sonoran Tiger Salamander (Endangered)

There would be no jeopardy to the Sonoran tiger salamander under the Proposed Action. The Sonoran tiger salamander may be affected by stocking at one site, Parker Canyon Lake, in the Santa Cruz River subcatchment. The following considerations factored into the determination of effects on the Sonoran tiger salamander:

- Direct effects on individual salamanders from exposure to stocked fish species or their progeny would be limited by the inability of stocked sport fish to reach occupied salamander habitats and the low number of salamander populations within close proximity to the stocking site where salamanders could move overland into the stocking site.
- Survey information through 2006 of 139 tanks documented only four tanks containing one or more of four nonnative fish species in salamander habitats. It is unclear if illegal movement of fish species is an ongoing activity; however, the low number of compromised habitats indicates that if it occurs, the level is likely low.
- Hatchery and operational protocols would reduce the risk of inadvertent introduction of unwanted aquatic species (including diseases or parasites) via stocking events. This would reduce the risk for adverse effects from these organisms to occur in the salamander population but would not entirely eliminate them.
- The risk of disease transfer and hybridization through illegal use of waterdogs at Parker Canyon Lake would not affect the other portion of the occupied habitats in the San Rafael Valley and currently is of limited extent near Parker Canyon Lake (primarily in tanks along Highway 83).
- Mitigation measures to address the risks from introduction of nonnative tiger salamanders are included under the Proposed Action.

Under the Reduced Stocking Alternative, Parker Canyon Lake would not be stocked, and there would be no effects on the Sonoran tiger salamander.

Spikedace (Threatened) and Critical Habitat

Under the Proposed Action, there would be no jeopardy to the spikedace and no adverse modification of critical habitat. Spikedace and/or designated (and proposed) critical habitat may be affected by stocking in the following complexes and stocking sites: Luna Lake (Luna Lake), Middle Verde River (Verde River Middle, Oak Creek, and Wet Beaver Creek), Granite Creek (Goldwater Lake, Watson Lake, and Willow Springs Reservoir), Lower Verde River (Green Valley Lake), and Tonto Creek (Tonto Creek, Christopher Creek, and Haigler Creek). The following considerations factored into the determination of effects on the spikedace:

- For the upper Verde River, the low number of documented individuals of stocked sport fish species in spikedace habitat, combined with the low number of spikedace present, would likely result in limited opportunities for competition and predation. Furthermore, because the species proposed for stocking are already present in the Granite Creek drainage, and survey information over 20 years has not documented many individuals of bluegill (3) or largemouth bass (19) and no black crappie, it is likely that these species would, based on the limited opportunity for them to access the upper Verde River from Granite Creek, establish populations in the time frame covered by this consultation. Though there could be some predation and competition between spikedace and any escaped sport fish, the magnitude or frequency of such events would be unlikely to have a meaningful effect on the size or distribution of the spikedace population in the upper Verde River.
- The ability of the spikedace population in the San Francisco River to establish a self-sustaining population would not likely be substantially impacted by the Proposed Action at Luna Lake. It would be unlikely that any rainbow trout from Luna Lake would reach proposed critical habitat. However, any that did could affect critical habitat, and while they are present, they would use space and some of the available food base provided by the critical habitat that could reduce the amount of resources available to the spikedace. The transition to triploid rainbow trout would essentially eliminate any support from stocking in Luna Lake to maintain wild trout populations within the critical habitat. The conservation value of critical habitat could be improved if such support is removed from the wild trout populations and they decline as a result.
- Proposed critical habitat in the upper Verde River would not be significantly altered by the occasional presence of individuals of stocked sport fish species in the critical habitat that could result in competition between spikedace and the stocked sport fish for resources such as food and shelter. This infrequent circumstance would not preclude restoration of full functionality of the critical habitat due to the infrequency of occurrence and the lack of persistence of the stocked sport fish in the critical habitat. Though escaped fish may not persist, while they were present they would affect critical habitat and would use space and some of the available food base provided by the critical habitat that would reduce the amount of resources available to the spikedace. This effect would be minor and would not alter the ability of the critical habitat to provide for survival and conservation of the spikedace.
- Minor effects to critical habitat in the Verde River below Tapco Diversion proposed critical habitat units could occur from the presence of stocked rainbow trout. The presence of these trout would be additive to the existing nonnative fish community. However, rainbow trout would not persist in most of the units, and their additive effect on the ability of the proposed critical habitat to provide for survival and conservation of the spikedace would be minor.

- Effects to proposed critical habitat units in Tonto Creek would be unlikely due to the short time any rainbow trout would likely be present in the units.
- The proposed action would not result in additional effects from stocked sport fish that are not already part of the environmental baseline. These effects would be expected to continue at their current level over the 10-year period covered by this consultation.

Under the Reduced Stocking Alternative, spokedace and critical habitat could be affected by stocking in the Granite Creek Complex. All other sites that would potentially affect spokedace and/or critical habitat would be eliminated from this alternative.

Southwestern Willow Flycatcher (Endangered)

There would be no jeopardy to the Southwestern willow flycatcher under the Proposed Action. The Southwestern willow flycatcher may be affected in the following complexes and stocking sites: Little Colorado River above Lyman (Nelson Reservoir), the West Fork of the Little Colorado River (Little Colorado River Greer and Little Colorado River–Sheep’s Crossing), and Middle Verde River (Verde River Middle). The following considerations factored into the determination of effects on the Southwestern willow flycatcher:

- Adverse effects on the Southwestern willow flycatcher and critical habitat at the Middle Verde River would be unlikely due to season of use and limited access to the river within the critical habitat reach.
- Adverse effects on the Southwestern willow flycatcher at Nelson Reservoir would be unlikely because the species is apparently not present; however, if it is present, the area likely used is not where anglers would be accessing the lake.
- Anglers would be unlikely to access the River Reservoir nesting areas, so flycatchers there would not likely be disturbed. Flycatchers attempting to set up territories near Greer could be disturbed by anglers accessing the habitat. The amount of this potential disturbance is unknown but would not likely preclude use of the wider habitat area where angler access would not be occurring.
- The amount of critical habitat potentially degraded by angler access would be approximately 15 percent of the total. Recreational use of all types has had effects on these areas in the past, and effects will continue in the future. The ability of the critical habitat at the West Fork of the Little Colorado River to provide physical and biological factors at the time of designation compared with the present time may or may not have declined substantially; however, the Proposed Action may not allow habitat components to improve in some specific locations. This would not appreciably diminish the value of the entire critical habitat unit for survival or conservation of the species. The overall area would likely continue to provide critical habitat physical and biological factors, so the conservation value of the habitat as a whole would be maintained.
- Effects on critical habitat physical and biological factors in Tonto Creek proposed critical habitat units would be unlikely due to the short time any rainbow trout would likely be present in the units.

Under the Reduced Stocking Alternative, the Southwestern willow flycatcher may be affected by stocking in the West Fork Little Colorado River Complex. All other sites (those in the Little Colorado River above Lyman and Middle Verde River complexes) that may affect the Southwestern willow flycatcher would not be stocked under this alternative.

Stocking Effects on Other Special Status Species

Stocking effects on aquatic and semi-aquatic species were identified as a primary issue during project scoping. Therefore, other special status species within this functional grouping (i.e., native fish, amphibians, and aquatic invertebrates) were further analyzed by species, by site, and by subcatchment. Distinct methodologies were used to analyze effects on native fish, amphibians, and aquatic invertebrates (Appendix F), and these are summarized in the following paragraphs.

For the remaining (non-aquatic) functional groups, the analysis was based on the occurrence of species records within 5 miles, as recorded in the HDMS database and adapted from the Arizona Comprehensive Wildlife Conservation Strategy threat matrix (AGFD 2006b). Five miles was used because it is the standard distance that the AGFD HDMS uses to evaluate potential impacts to other special status species with this type of project. The HDMS is part of a global network of more than 80 natural heritage programs and conservation data centers. The information comes from published and unpublished reports, data collected by cooperating agencies, museum and herbarium collections, the scientific and academic communities, the Federal Register, and many other sources.

The HDMS represents the most comprehensive information currently available for assessing the occurrence of other special status species. However, there are several important considerations with regard to the use of HDMS data and other records in assessing environmental consequences. First, the recorded occurrence of a particular species within 5 miles of a stocking site or in the subcatchment does not mean that suitable habitat occurs at the stocking site or that this species would be impacted by stocking activities (though the analysis conservatively assumes that the potential exists). Second, the occurrence data do not reflect the total potential distribution of a species' occupied or potential habitat on the landscape, only where this species was observed and recorded.

Tables I through K (Appendixes G through I) list the number of other special status species in these remaining (non-aquatic) functional groups recorded within 5 miles of a stocking site and within a subcatchment. The data were filtered to include only records from 1986 to present to eliminate older records that may no longer be indicative of current species presence or habitat suitability. The data presented in these tables provide an initial comparison among the stocking sites and subcatchments of the number of species that could potentially be subjected to the effects of stocking.

Environmental consequences of the alternatives on other special status species vary by functional group, site characteristics, species composition, species stocked, and other factors. Table 5 identifies the relevant spatial scale of analysis and summarizes potential effects for each functional group. The impacts presented in this table are general in nature, without consideration for variability in site characteristics, species composition, stocking species, etc. The functional groups are listed in order of potential intensity of effects and range from those most prone to

direct and indirect effects across a wide range of spatial scales (i.e., aquatic and semi-aquatic species), those primarily subject to indirect effects on a local scale (terrestrial riparian species), and those subject to a mix of beneficial and negative effects, whether direct or indirect, on a local to regional scale (i.e., fish-eating birds).

Table 5. Summary of potential effects on other special status species functional groups.

Functional Group	Summary of Potential Effects
Native fish, amphibians, and aquatic invertebrates	Because they are associated with aquatic habitats, potential effects on species in this functional group can occur at a range of spatial scales from individual stocking sites to the subcatchment and regional levels. The potential for effects is highest at and near the stocking sites where stocked fish or other special status species have the greatest potential to interact. Though less likely, potential effects on these species can also occur in other portions of the subcatchment through dispersal of stocked sport fish out of stocking sites or movement of other special status species into stocking sites along perennial waterways or through intermittent or ephemeral waterways during flood events. Other special status species in this functional group can also be affected on all spatial scales, including the regional level, through illegal translocation of stocked fish to more distant waters or incidental transport of diseases, parasites, or other introduced species (e.g., transfer of quagga mussels by recreational boats between distant waters in the state). Potential direct impacts from stocking of nonnative sport fish species include predation on eggs, young, and adults, and competition for food and space (i.e., restricted habitat use, reduced activity rates, and changes in trophic position and feeding behavior). Proposed conversion of rainbow trout stockings to triploids (sterile individuals) would prevent these stocked species from establishing new populations or reproductively contributing to existing established populations but would not eliminate potential predation or competition effects. The conversion would occur within 3 years of implementation of the Proposed Action. Effects from stocking non-triploid trout during that period may occur and have been considered. Indirect effects may include introduction of parasites and diseases; introduction of other nonnatives such as crayfish; changes in invertebrate trophic structure (food-web); genetic isolation between subpopulations or meta-populations due to restricted dispersal/movement; and disturbance from angler activity on breeding sites, habitat, food sources, or water quality.
Riparian plants, non-piscivorous riparian/aquatic nesting birds, terrestrial riparian invertebrates, and ground-dwelling riparian mammals and reptiles	These species are potentially subject to indirect effects on a localized (stocking site and vicinity) scale. Fish stocking would not directly affect these species, but angling activities/access could indirectly affect them through disturbance. Stocking may result in indirect impacts to plants and the species that depend on them for habitat as a result of trampling by anglers attempting to access fishing areas, associated soil erosion, and disturbance favoring weedy plant species, transport of weedy species propagules by anglers, and some fragmentation of plant populations. Human presence/disturbance from angling may result in bird flushing from nests or altering their foraging patterns and trampling of vegetation that provides nesting cover. Angling activity also results in potential entanglement or ingestion of discarded fishing debris by birds.

Table 5. Summary of potential effects on other special status species functional groups.

Functional Group	Summary of Potential Effects
Piscivorous riparian/aquatic nesting birds	These species may experience some beneficial effects mixed with indirect adverse effects. These may occur on a localized (stocking site and vicinity) and a more widespread scale (subcatchment or regional) because many of these species use multiple sites. Stocking may benefit species in this taxonomic group by providing or supplementing food resources and potentially enhancing survival and/or reproductive success. Stocking may also result in disturbance of nesting birds from human presence (anglers) and potential entanglement/ingestion of discarded fishing debris by birds.

Stocking Effects on Other Special Status Native Fishes, Amphibians, and Aquatic Invertebrates

Effects of the alternatives on other special status species in this functional group were analyzed in detail for each site and each species. Based on species occurrence records, 13 species are found within the stocking subcatchments: seven native fish species, one frog species, one toad species, and four species of aquatic invertebrates.

Distinct analysis methods were developed for each of the following groups of other special status species: native fishes, frogs, toads, and aquatic invertebrates (Appendix F). The potential for stocked fish to come into contact with other special status species (exposure) was analyzed for each stocking location based on hydrological connectivity (open vs. closed systems) and species occurrence (recorded occurrence within subcatchment or at stocking site). If exposure was possible, the likelihood of exposure was evaluated based on the nature of hydrological connections between the stocking location and other special status species–occupied areas, presence of physical barriers or management strategies that limit or preclude movement, the movement and persistence potential of stocked fish based on their biology, and the movement potential of other special status species based on their biology.

For the special status fish and amphibian species, the nature of the interactions with stocked fish (i.e., what would happen if exposure were to occur) was evaluated by considering whether other special status species are abundant despite past stocking and/or occurrence of stocked species, potential survival and reproduction of stocked species based on habitat factors and survey data, and the extent to which stocked fish already occur at the stocking site or in the subcatchment. For special status fishes, the predatory nature of stocked species (Table 6) on fish was also considered in analyzing effects. Species of sport fish proposed for stocking, with the exception of threadfin shad and white amur, exhibit some range of fish predation. For the purposes of identifying magnitude of predation risk, species proposed for stocking are categorized into two groups: those that are less predacious (predatory) and those that are more predacious based on literature cited in the BA (FWS 2011b). Other species of nonnative fish may exist as resident populations at or near the stocking sites that have higher or lower predation rates than those species proposed for stocking (e.g. flathead catfish or green sunfish).

Table 6. General predatory nature of fish species proposed for stocking.

Less-predacious Species Proposed for Stocking	More-predacious Species Proposed for Stocking
Apache trout	Black crappie
Arctic grayling	Brown trout
Bluegill	Channel catfish
Brook trout	Largemouth bass
Cutthroat trout	Smallmouth bass
Gila trout	Walleye
Rainbow trout	White crappie
Redear sunfish	Yellow perch

White amur and threadfin shad are also proposed for stocking, but these species do not consume fish prey; therefore, they are not listed in this table.

Based on these methodologies, the magnitude of effects on each species at each stocking site was rated as “High,” “Moderate,” “Low,” or “No Effect.” The definitions follow.¹²

- **High**—Stocking locations predicted to have exposure that was highly probable and the potential biological impacts to other special status species would be expected to be substantial. Actions at these stocking sites could result in long-term population declines of other special status species in a localized area or at a watershed level.
- **Moderate**—Stocking locations predicted to have exposure that was more limited in probability or to have exposure that was highly probable but in conjunction with potential biological impacts to other special status species that were not substantial. Actions at these sites, when analyzed at a site-specific level, could impact individuals of other special status species or even cause temporary and/or localized population declines but would not likely result in long-term population declines at a watershed level. However, individual sites, when considered together with other stocking sites in the same watershed that had “Moderate” outcomes, could have more substantial impacts and result in long-term population declines of other special status species in a localized area or at a watershed level.
- **Low**—Stocking locations predicted to have exposure that was limited in probability or probable exposure but in conjunction with limited potential biological impacts to other special status species. Actions at these sites could impact individuals of other special status species but would not likely result in population declines of other special status species even when considered with other stocking sites within the same watershed that had “Low” outcomes.
- **No Effect**—Stocking locations predicted to have no potential exposure or an extremely low probability of exposure. Actions at these sites would not impact individuals or populations of other special status species.

Detailed analyses of the other special status species at the site level is shown in Tables L–P (Appendixes K–O). Tables 7–18 summarize the effects of the Proposed Action and the Reduced Stocking Alternative on other species status fish, amphibian, and aquatic invertebrate species.

¹² The nature of interactions between stocked species and native fish species and lowland leopard frog are not fully understood, can be site-specific, and is a topic in need of further research. However, many of the uncertainties that exist are not easily answered by research and may never be fully understood. In cases where adequate information was not available to determine the nature of the interactions, the higher effects call was chosen to describe the effects on the other special status species.

The No Action alternative would have no effect on other special status species in this functional group and is not included in these tables.

Table 7. Summary of effects within each subcatchment to longfin dace resulting from the alternatives.

Subcatchment Name	Number of Sites in Proposed Action	Number of Sites in Reduced Stocking Alternative	Summary of Impacts to Longfin Dace from Proposed Action	Summary of Impacts to Longfin Dace from Reduced Stocking Alternative
Havasu Creek	6	6	6 NE	6 NE
Yuma North	2	1	2 NE	1 NE
Yuma South	2	2	2 NE	2 NE
Little Colorado River	51	36	51 NE	36 NE
Riggs Flat	1	1	1 NE	1 NE
Upper Gila	5	5	5 NE	5 NE
Kearny	1	1	1 Low	1 Low
Luna	1	0	1 Low	0 stocking sites
Lower Gila	3	3	3 NE	3 NE
Agua Fria	3	3	1 NE; 2 Low	1 NE; 2 Low
Salt River	45	10	36 NE; 4 Low; 5 Mod	8 NE; 2 Low
Santa Cruz	10	7	7 NE; 2 Low; 1 Mod	7 NE
Verde	22	14	6 NE; 12 Low; 4 Mod	5 NE; 9 Low
Bill Williams	14	12	1 NE; 13 Low	1 NE; 9 Low; 2 Mod
Statewide Summary	166	101	121 NE; 35 Low; 10 Mod	76 NE; 23 Low; 2 Mod

Mod = Moderate, NE = No Effect

Table 8. Summary of effects within each subcatchment to speckled dace resulting from the alternatives.

Subcatchment Name	Number of Sites in Proposed Action	Number of Sites in Reduced Stocking Alternative	Summary of Impacts to Speckled Dace from Proposed Action	Summary of Impacts to Speckled Dace from Reduced Stocking Alternative
Havasu Creek	6	6	6 NE	6 NE
Yuma North	2	1	2 NE	1 NE
Yuma South	2	2	2 NE	2 NE
Little Colorado River	51	36	26 NE; 15 Low; 10 Mod	17 NE; 10 Low; 9 Mod
Riggs Flat	1	1	1 NE	1 NE
Upper Gila	5	5	5 NE	5 NE
Kearny	1	1	1 NE	1 NE
Luna	1	0	1 Mod	0 stocking sites
Lower Gila	3	3	3 NE	3 NE
Agua Fria	3	3	1 NE; 2 Low	1 NE; 2 Low
Salt River	45	10	31 NE; 12 Low; 2 Mod	6 NE; 4 Low
Santa Cruz	10	7	7 NE; 3 Low	7 NE
Verde	22	14	6 NE; 14 Low; 2 Mod	5 NE; 9 Low
Bill Williams	14	12	5 NE; 9 Low	3 NE; 7 Low; 2 Mod
Statewide Summary	166	101	96 NE; 55 Low; 15 Mod	58 NE; 32 Low; 11 Mod

Mod = Moderate, NE = No Effect

Table 9. Summary of effects within each subcatchment to Sonora sucker resulting from the alternatives.

Subcatchment Name	Number of Sites in Proposed Action	Number of Sites in Reduced Stocking Alternative	Summary of Impacts to Sonora Sucker from Proposed Action	Summary of Impacts to Sonora Sucker from Reduced Stocking Alternative
Havasu Creek	6	6	6 NE	6 NE
Yuma North	2	1	2 NE	1 NE
Yuma South	2	2	2 NE	2 NE
Little Colorado River	51	36	51 NE	36 NE
Riggs Flat	1	1	1 NE	1 NE
Upper Gila	5	5	5 NE	5 NE
Kearny	1	1	1 Low	1 Low
Luna	1	0	1 Low	0 stocking sites
Lower Gila	3	3	3 NE	3 NE
Agua Fria	3	3	3 NE	3 NE
Salt River	45	10	45 Low	10 Low
Santa Cruz	10	6	7 NE; 3 Low	7 NE
Verde	22	14	6 NE; 12 Low; 4 Mod	5 NE; 9 Low
Bill Williams	14	12	1 NE; 13 Low	1 NE; 9 Low; 2 Mod
Statewide Summary	166	100	87 NE; 75 Low; 4 Mod	70 NE; 29 Low; 2 Mod

Mod = Moderate, NE = No Effect

Table 10. Summary of effects within each subcatchment to desert sucker resulting from the alternatives.

Subcatchment Name	Number of Sites in Proposed Action	Number of Sites in Reduced Stocking Alternative	Summary of Impacts to Desert Sucker from Proposed Action	Summary of Impacts to Desert Sucker from Reduced Stocking Alternative
Havasu Creek	6	6	6 NE	6 NE
Yuma North	2	1	2 NE	1 NE
Yuma South	2	2	2 NE	2 NE
Little Colorado River	51	36	51 NE	36 NE
Riggs Flat	1	1	1 NE	1 NE
Upper Gila	5	5	5 NE	5 NE
Kearny	1	1	1 Low	1 Low
Luna	1	0	1 Mod	0 stocking sites
Lower Gila	3	3	3 NE	3 NE
Agua Fria	3	3	1 NE; 2 Low	1 NE; 2 Low
Salt River	45	10	45 Low	10 Low
Santa Cruz	10	7	7 NE; 3 Low	7 NE
Verde	22	14	6 NE; 12 Low; 4 Mod	5 NE; 9 Low
Bill Williams	14	12	1 NE; 13 Low	1 NE; 9 Low; 2 Mod
Statewide Summary	166	101	85 NE; 76 Low; 5 Mod	68 NE; 31 Low; 2 Mod

Mod = Moderate, NE = No Effect

Table 11. Summary of effects within each subcatchment to Little Colorado sucker resulting from the alternatives.

Subcatchment Name	Number of Sites in Proposed Action	Number of Sites in Reduced Stocking Alternative	Summary of Impacts to Little Colorado Sucker from Proposed Action	Summary of Impacts to Little Colorado Sucker from Reduced Stocking Alternative
Havasu Creek	6	6	6 NE	6 NE
Yuma North	2	1	2 NE	1 NE
Yuma South	2	2	2 NE	2 NE
Little Colorado River	51	36	28 NE; 13 Low; 10 Mod	19 NE; 10 Low; 7 Mod
Riggs Flat	1	1	1 NE	1 NE
Upper Gila	5	5	5 NE	5 NE
Kearny	1	1	1 NE	1 NE
Luna	1	0	1 NE	0
Lower Gila	3	3	3 NE	3 NE
Agua Fria	3	3	3 NE	3 NE
Salt River	45	10	45 NE	10 NE
Santa Cruz	11	7	11 NE	7 NE
Verde	22	14	22 NE	14 NE
Bill Williams	14	12	14 NE	12 NE
Statewide Summary	166	101	143 NE; 13 Low; 10 Mod	84 NE; 10 Low; 7 Mod

Mod = Moderate, NE = No Effect

Table 12. Summary of effects within each subcatchment to bluehead sucker resulting from the alternatives.

Subcatchment Name	Number of Sites in Proposed Action	Number of Sites in Reduced Stocking Alternative	Summary of Impacts to Bluehead Sucker from Proposed Action	Summary of Impacts to Bluehead Sucker from Reduced Stocking Alternative
Havasu Creek	6	6	6 NE	6 NE
Yuma North	2	1	2 NE	1 NE
Yuma South	2	2	2 NE	2 NE
Little Colorado River	51	36	25 NE; 18 Low; 8 Mod	16 NE; 13 Low; 7 Mod
Riggs Flat	1	1	1 NE	1 NE
Upper Gila	5	5	5 NE	5 NE
Kearny	1	1	1 NE	1 NE
Luna	1	0	1 NE	0
Lower Gila	3	3	3 NE	3 NE
Agua Fria	3	3	3 NE	3 NE
Salt River	45	10	45 NE	10 NE
Santa Cruz	10	7	10 NE	7 NE
Verde	22	14	22 NE	14 NE
Bill Williams	14	12	14 NE	12 NE
Statewide Summary	166	101	140 NE; 18 Low; 18 Mod	81 NE; 13 Low; 7 Mod

Mod = Moderate, NE = No Effect

Table 13. Summary of effects within each subcatchment to lowland leopard frog resulting from the alternatives.

Subcatchment Name	Number of Sites in Proposed Action	Number of Sites in Reduced Stocking Alternative	Summary of Impacts to Lowland Leopard Frog from Proposed Action	Summary of Impacts to Lowland Leopard Frog from Reduced Stocking Alternative
Havasu Creek	6	6	6 NE	6 NE
Yuma North	2	1	2 NE	1 NE
Yuma South	2	2	2 NE	2 NE
Little Colorado River	51	36	51 NE	36 NE
Riggs Flat	1	1	1 NE	1 NE
Upper Gila	5	5	5 NE	5 NE
Kearny	1	1	1 NE	1 NE
Luna	1	0	1 NE	0
Lower Gila	3	3	3 NE	3 NE
Agua Fria	3	3	1 NE; 2 Low	1 NE; 2 Low
Salt River	45	10	38 NE; 5 Low; 2 Mod	9 NE; 1 Low
Santa Cruz	10	7	4 NE; 5 Low; 1 Mod	4 NE; 3 Low
Verde	22	14	14 NE; 4 Low; 2 Mod; 2 High	13 NE; 1 Low
Bill Williams	14	12	1 NE; 11 Low; 2 High	1 NE; 7 Low; 2 Mod; 2 High
Statewide Summary	166	101	130 NE; 27 Low; 5 Mod; 4 High	83 NE; 14 Low; 2 Mod; 2 High

Mod = Moderate, NE = No Effect

The nature of interactions between nonnative sport fish and the Western narrow-mouthed toad is not known, but it is assumed that nonnative sport fish could prey upon Western narrow-mouthed toads if they came into contact with each other. Though the Western narrow-mouthed toad might use perennial waters such as the stocking locations for breeding, the importance of perennial habitats and the degree to which perennial waters contribute to adult recruitment is not known. Ephemeral waters provide an environment with reduced natural predators, such as predatory insects (Dayton and Fitzgerald 2001) that would be present in perennial waters. Therefore, this EA analyzes exposure potential of the Western narrow-mouthed toad to stocked fish. However, it should be noted that this exposure and the resulting effects on Western narrow-mouthed toads may not be biologically meaningful to the overall Arizona population of the species due the species reliance on ephemeral waterways and the limited ability of stocked fish to reach many of these types of waterways.

Table 14. Summary of exposure within each subcatchment to Western narrow-mouthed toad resulting from the alternatives.

Subcatchment Name	Number of Sites in Proposed Action	Number of Sites in Reduced Stocking Alternative	Summary of Impacts to Western Narrow-mouthed Toad from Proposed Action	Summary of Impacts to Western Narrow-mouthed Toad from Reduced Stocking Alternative
Havasu Creek	6	6	6 NE	6 NE
Yuma North	2	1	2 NE	1 NE
Yuma South	2	2	2 NE	2 NE
Little Colorado River	51	36	52 NE	36 NE
Riggs Flat	1	1	1 NE	1 NE
Upper Gila	5	5	5 NE	5 NE
Kearny	1	1	1 NE	1 NE
Luna	1	0	1 NE	0
Lower Gila	3	3	3 NE	3 NE
Agua Fria	3	3	3 NE	3 NE
Salt River	45	10	45 NE	10 NE
Santa Cruz	10		3 Low; 1 Mod; 2 High; 4 NE	2 Low; 1 Mod; 1 High; 3 NE
Verde	22	14	23 NE	14 NE
Bill Williams	14	12	14 NE	12 NE
Statewide Summary	166	101	160 NE; 3 Low; 1 Mod; 2 High	97 NE; 2 Low; 1 Mod; 1 High

Mod = Moderate, NE = No Exposure

The nature of interactions between nonnative sport fish and other special status aquatic and semi-aquatic invertebrate species is largely unknown due to limited scientific studies of these invertebrate species and the difficulty in conducting research on these small and cryptic species that are often found in only low abundance. For this reason, only the exposure potential of aquatic and semi-aquatic other special status invertebrate species to stocked fish was analyzed. It was assumed that if exposure were to happen there would be some unknown level of negative effect.

Table 15. Summary of exposure within each subcatchment to California floater resulting from the alternatives.

Subcatchment Name	Number of Sites in Proposed Action	Number of Sites in Reduced Stocking Alternative	Summary of Impacts to California Floater from Proposed Action	Summary of Impacts to California Floater from Reduced Stocking Alternative
Havasu Creek	6	6	6 NE	6 NE
Yuma North	2	1	2 NE	1 NE
Yuma South	2	2	2 NE	2 NE
Little Colorado River	51	36	25 NE; 23 Low; 2 Mod; 1 High	15 NE; 18 Low; 2 Mod; 1 High
Riggs Flat	1	1	1 NE	1 NE
Upper Gila	5	5	5 NE	5 NE
Kearny	1	1	1 NE	1 NE
Luna	1	0	1 NE	0
Lower Gila	3	3	3 NE	3 NE
Agua Fria	3	3	3 NE	3 NE
Salt River	45	10	40 NE; 3 Low; 1 Mod; 1 High	8 NE; 2 Low
Santa Cruz	10	7	10 NE	7 NE
Verde	22	14	22 NE	14 NE
Bill Williams	14	12	14 NE	12 NE
Statewide Summary	166	101	135 NE; 26 Low; 3 Mod; 2 High	78 NE; 20 Low; 2 Mod; 1 High

Mod = Moderate, NE = No Exposure

Table 16. Summary of exposure within each subcatchment to White Mountain water penny beetle resulting from the alternatives.

Subcatchment Name	Number of Sites in Proposed Action	Number of Sites in Reduced Stocking Alternative	Summary of Impacts to White Mountain Water Penny Beetle from Proposed Action	Summary of Impacts to White Mountain Water Penny Beetle from Reduced Stocking Alternative
Havasu Creek	6	6	6 NE	6 NE
Yuma North	2	1	2 NE	1 NE
Yuma South	2	2	2 NE	2 NE
Little Colorado River	51	36	39 NE; 12 Low	27 NE; 9 Low
Riggs Flat	1	1	1 NE	1 NE
Upper Gila	5	5	5 NE	5 NE
Kearny	1	1	1 NE	1 NE
Luna	1	0	1 NE	0
Lower Gila	3	3	3 NE	3 NE
Agua Fria	3	3	3 NE	3 NE
Salt River	45	10	40 NE; 3 Low; 2 High	8 NE; 2 Low
Santa Cruz	10	7	10 NE	7 NE
Verde	22	14	22 NE	14 NE
Bill Williams	14	12	14 NE	12 NE
Statewide Summary	166	101	149 NE; 15 Low; 2 High	90 NE; 11 Low

Mod = Moderate, NE = No Exposure

Table 17. Summary of exposure within each subcatchment to Page Springs caddisfly resulting from the alternatives.

Subcatchment Name	Number of Sites in Proposed Action	Number of Sites in Reduced Stocking Alternative	Summary of Impacts to Page Springs Micro Caddisfly from Proposed Action	Summary of Impacts to Page Springs Caddisfly from Reduced Stocking Alternative
Havasu Creek	6	6	6 NE	6 NE
Yuma North	2	1	2 NE	1 NE
Yuma South	2	2	2 NE	2 NE
Little Colorado River	51	36	51 NE	36 NE
Riggs Flat	1	1	1 NE	1 NE
Upper Gila	5	5	5 NE	5 NE
Kearny	1	1	1 NE	1 NE
Luna	1	0	1 NE	0
Lower Gila	3	3	3 NE	3 NE
Agua Fria	3	3	3 NE	3 NE
Salt River	45	10	45 NE	10 NE
Santa Cruz	10	7	10 NE	7 NE
Verde	22	14	20 NE; 1 Low; 1 High	14 NE
Bill Williams	14	12	14 NE	12 NE
Statewide Summary	166	101	164 NE; 1 Low; 1 High	101 NE

NE = No Exposure

Table 18. Summary of exposure within each subcatchment to Balmorhea saddle-case caddisfly resulting from the alternatives.

Subcatchment Name	Number of Sites in Proposed Action	Number of Sites in Reduced Stocking Alternative	Summary of Impacts to Balmorhea Saddle-case Caddisfly from Proposed Action	Summary of Impacts to Balmorhea Saddle-case Caddisfly from Reduced Stocking Alternative
Havasu Creek	6	6	6 NE	6 NE
Yuma North	2	1	2 NE	1 NE
Yuma South	2	2	2 NE	2 NE
Little Colorado River	51	36	51 NE	36 NE
Riggs Flat	1	1	1 NE	1 NE
Upper Gila	5	5	5 NE	5 NE
Kearny	1	1	1 NE	1 NE
Luna	1	0	1 NE	0
Lower Gila	3	3	3 NE	3 NE
Agua Fria	3	3	3 NE	3 NE
Salt River	45	10	45 NE	10 NE
Santa Cruz	10	7	10 NE	7 NE
Verde	22	14	20 NE; 1 Low; 1 High	14 NE
Bill Williams	14	12	14 NE	12 NE
Statewide Summary	166	101	164 NE; 1 Low; 1 High	101 NE

NE = No Exposure

Potential indirect effects of stocking to aquatic and semi-aquatic other special status species include the introduction of parasites and diseases and other nontarget species (e.g., crayfish, bullfrogs), changes in invertebrate community structure (food-web), and habitat disturbance from angler activity (Dunham et al. 2004, Fernandez and Rosen 1996, Finlay and Vredenburg 2007,

Kiesecker and Blaustein 1998, Kiesecker et al. 2001, Maezono and Miyashita 2003, Matthews et al. 2002, Minckley 1996, Robinson et al. 1997, Rosen and Schwalbe 1988, Stone et al. 2007).

The AGFD considers the potential for introduction of parasites and diseases under the Proposed Action to be relatively low because the potential risk of spreading pathogens through the AGFD hatchery stocking program is greatly reduced through recurrent fish health inspections, strict HACCP plans, and BMPs (Section 2.2.6). The potential for spread of the amphibian disease *Batrachochytrium dendrobatidis* as a result of fish stocking activities is considered low based on the life cycle of this organism and the HACCPs and operational protocols that are employed by the AGFD (FWS 2011b). Stocked fish or eggs from contract vendors and from federal or out-of-state hatcheries require health certifications from the facility of origin, are required to be free of bacteria, viruses, and parasites. Deliveries of fish from outside sources are refused at delivery if an AGFD visual inspection identifies the presence of nontarget organisms or evidence of disease. Though contract facilities are currently not subject to the HACCPs or BMPs or operation protocols of AGFD hatcheries, the AGFD plans to coordinate with vendors to require HACCPs in the near future for all contract facilities.

The Proposed Action and the Reduced Stocking Alternative could indirectly result in the introduction of other nontarget species, including invasive aquatic invertebrates and plants. Zebra mussels, quagga mussels, and New Zealand mudsnails can be incidentally introduced on the hulls of boats, on vehicles, and on fishing equipment. Zebra and quagga mussels have the potential to affect special status aquatic and semi-aquatic species by altering the aquatic community through the removal of phytoplankton, leading to food web changes; changing water clarity, resulting in proliferation of some aquatic plants; and increasing acidity of the water by expelling waste. New Zealand mudsnails compete with native mollusks for food and space (Arizona Invasive Species Advisory Council [AISAC] 2010). Giant salvinia has been documented along the Lower Colorado River in Arizona and California and can be spread by boats. Thick mats of giant salvinia reduce oxygen content, degrade water quality for fish and other aquatic organisms, and may alter aquatic system food-chain dynamics (ANS Task Force 2002).

Stocking of certain waters may encourage angler activity and indirectly increase the spread of these invasive species to other waters, primarily via boats. The AGFD has an active aquatic invasive species prevention program that includes regulations, outreach, and enforcement. This program is in part as a result of Arizona House Bill 2157, which gives the AGFD the ability to identify (1) a list of aquatic invasive species for Arizona, (2) a list of waters where aquatic invasive species are present or suspected, and (3) mandatory conditions on the movement of watercraft, vehicles, conveyances, or other equipment from listed waters where aquatic invasive species are present. Boat use attributable to angling activity represents only a portion of all of the recreational boating use of these waters and, therefore, the totality of effects from invasive species would only be partly attributable to sport fish stocking. Most of the concern regarding movement of quagga mussels and, to a lesser extent, other aquatic invasive species is with boats that have been moored for long periods of time, rather than day-use recreationist watercraft. The Reduced Stocking Alternative would have a reduced potential to contribute to the spread of aquatic invasive species because stocking would occur at 101 sites, compared with 166 sites under the Proposed Action.

Sport fish stocking could also indirectly result in the spread of introduced bait species, such as crayfish, shiners, mosquitofish, bullfrogs, and nonnative tiger salamanders that can indirectly impact other special status species through predation, competition, or disease transfer (Carpenter and McIvor 1999, Carpenter and Mueller 2008, Douglas et al. 1994). The AGFD regulates the use of bait species to prevent unwanted introductions into new waters through restrictions on bait collection, transportation between waters, species that may be used (varies by water and, at some waters, no live baitfish, crayfish, or salamanders are allowed; bullfrogs are not allowed as live bait anywhere in the state), and certification requirements for bait vendors. Despite regulations and enforcement, sport fish stocking may still result in the incidental spread of bait species by anglers (Ludwig and Leitch 1996). By providing sport fishing opportunities at more sites, the Proposed Action would have a higher potential for incidental spread of baitfish compared with the Reduced Stocking Alternative.

Stocking of sport fish could result in changes in the trophic structure of aquatic habitats. Competition with special status aquatic and semi-aquatic species and predation are discussed under direct effects. Stocked sport fish may also indirectly affect the availability of prey species and may reduce or control populations of other nonnatives, such as bullfrogs and crayfish, through predation. For example, once largemouth bass reach a certain size, their predation rates on crayfish may increase, and they may control crayfish (Maezono and Mayashita 2003, Marks et al. 2009). Effects on trophic structure from sport fish stocking would have the potential to occur at more sites under the Proposed Action than the Reduced Stocking Alternative.

The Proposed Action may result in habitat disturbance or other related indirect effects from angler activity. Wading activities may result in temporary changes in water quality, such as increases in turbidity and siltation, but these conditions would be localized and generally temporary in nature. Stocking of sites would result in use by anglers, who impact riparian habitats by trampling vegetation and polluting water with debris. The extent to which indirect effects of this type can be attributed to angling activity are limited because most of the stocking sites experience various other recreational uses, such as boating, swimming, hiking, camping, picnicking, and off-road vehicle travel. The Proposed Action would provide sport fishing opportunities at more sites than the Reduced Stocking Alternative. However, under the latter, sites not stocked would continue to be subject to indirect effects from other recreational uses.

Stocking Effects on Other Special Status Riparian Plants, Non-piscivorous Riparian/Aquatic Nesting Birds, Terrestrial Riparian Invertebrates, and Ground-dwelling Riparian Mammals and Reptiles

Tables 19–21 compare the number of sites under the Proposed Action and the Reduced Stocking Alternative with records within 5 miles of other special status riparian plants, non-piscivorous riparian/aquatic nesting birds, terrestrial riparian invertebrates, and ground-dwelling riparian mammals and reptiles, respectively. The No Action alternative would result in no stocking at any sites and is not included in these tables.

Table 19. Number of stocking sites with records of other special status riparian plant species under the Proposed Action and the Reduced Stocking Alternative.

Common Name	No. of Sites Under Proposed Action with Records Within 5 Miles	No. of Sites Under Reduced Stocking Alternative with Records Within 5 Miles
Blumer's dock	29	18
Goodding's onion	14	10
Slender bog orchid	12	11
Yellow lady's slipper	10	9
Arizona willow	8	7
A sedge	6	3
Boreal bog orchid	6	6
White Mountains clover	6	2
Arizona alum root	3	3
White mandarin, twisted stalk	3	3
Crenulate moonwort	2	2
Arizona giant sedge	1	0
Lemmon's stevia	1	0
Texas purple spike	1	0
Thurber's bog orchid	1	0
Weeping muhly	1	0
Aravaipa wood fern	0 (subcatchment level only)	0 (subcatchment level only)
Whisk fern	0 (subcatchment level only)	0 (subcatchment level only)
Lemmon lily	0 (subcatchment level only)	0 (subcatchment level only)
Alcove bog orchid	0	0

No direct effects on other special status species of riparian plants or non-piscivorous riparian aquatic nesting birds are anticipated under the Proposed Action or the Reduced Stocking Alternative. Species in these taxonomic groups are subject primarily to indirect effects related to habitat disturbance from angling activity.

Other special status riparian plants would be potentially affected by trampling from anglers attempting to access fishing areas and associated soil erosion, disturbance favoring weedy plant species, transport of weedy species propagules, and some fragmentation of plant populations. Under the Proposed Action, stocking would occur at 36 of the proposed stocking sites where one or more other special status riparian plant species have been recorded within 5 miles. Under the Reduced Stocking Alternative, stocking would occur at 22 sites where one or more other special status riparian plant species have been recorded within 5 miles. Potential indirect effects from angling would occur only if individuals or populations of other special status plant species occur in the direct vicinity of the stocking sites and would only occur in areas anglers use to access fishing locations. Any effects from anglers would represent only a proportion of all recreation-related impacts at these sites.

Table 20. Number of stocking sites with records of other special status non-piscivorous aquatic/riparian nesting bird species under the Proposed Action and the Reduced Stocking Alternative.

Common Name	No. of Sites Under Proposed Action with Records Within 5 Miles	No. of Sites Under Reduced Stocking Alternative with Records Within 5 Miles
American redstart	9	9
Black-bellied whistling duck	7	4
Pine grosbeak	6	5
Elegant trogon	2	2
Northern gray hawk	2	2
California black rail	1	1
Rose-throated becard	1	1
Tropical kingbird	1	1

Potential indirect effects of stocking on other special status non-piscivorous riparian/aquatic nesting birds include disturbance of nesting habitat and individuals through human presence (anglers), which could result in bird flushing from nests or altering their foraging patterns. These types of effects have been documented for yellow-billed cuckoos and Mexican spotted owls (Haltermann 2010, Hedwall 2009, Swarthout and Steidl 2003). Angler activity may also result in trampling of vegetation, attraction of predators or nest parasites, and mortality of nestling or adult birds from entanglement with monofilament fishing line and ingestion of other fishing debris.

Under the Proposed Action, stocking would occur at 25 of the proposed stocking sites where one or more other special status non-piscivorous riparian or aquatic nesting bird species have been recorded within 5 miles. Under the Reduced Stocking Alternative, stocking would occur at 21 sites where one or more other special status non-piscivorous riparian or aquatic nesting bird species have been recorded within 5 miles. Potential indirect effects from angling would occur only if individuals or populations of other special status non-piscivorous riparian or aquatic nesting bird species occur in the direct vicinity of the stocking sites and would only occur in areas anglers use to access fishing locations. Any effects from anglers would represent only a proportion of all recreation-related impacts at these sites.

Table 21. Number of stocking sites with records of other special status terrestrial riparian invertebrates and ground-dwelling riparian mammals and reptiles for the Proposed Action and the Reduced Stocking Alternative.

Common Name	No. of Sites Under Proposed Action with Records Within 5 Miles	No. of Sites Under Reduced Stocking Alternative with Records Within 5 Miles
Maricopa tiger beetle	4	2
American water shrew	7	6
Giant spotted whiptail	5	5
Arizona shrew	0	0
Redback whiptail	0	0

No direct effects on terrestrial riparian invertebrates or special status ground-dwelling riparian mammals and reptiles are anticipated under the Proposed Action or the Reduced Stocking Alternative. Species in these taxonomic groups are subject primarily to indirect effects related to competition for resources and habitat disturbance from angling activity.

Sport fish stocking may indirectly impact terrestrial riparian invertebrates and ground-dwelling riparian mammals and reptiles as a result of angler activity that disrupts breeding or foraging and/or results in changes in riparian plant community composition and cover through trampling, erosion, and introduction and proliferation of weedy plant species. Under the Proposed Action, stocking would occur at four sites where one special status terrestrial riparian invertebrate species has been recorded and 13 sites where one or more other special status ground-dwelling riparian mammals or reptiles have been recorded within 5 miles. Under the Reduced Stocking Alternative, stocking would occur at two sites where one special status terrestrial riparian invertebrate species has been recorded and at 11 sites where one or more other special status ground-dwelling riparian mammals or reptiles have been recorded within 5 miles. Potential indirect effects from angling would occur only if individuals or populations of species in these taxonomic groups occur in the direct vicinity of the stocking sites and would only occur in areas anglers use to fish or access fishing locations. Any effects from anglers would represent only a proportion of all recreation-related impacts at these sites.

Stocking Effects on Other Special Status Piscivorous Riparian or Aquatic Nesting Birds

Table 22 compares the number of sites under the Proposed Action and the Reduced Stocking Alternative with records within 5 miles of other special status piscivorous riparian or aquatic nesting birds. Five miles was used because it is the standard distance that the AGFD HDMS uses to evaluate potential impacts to other special status species with this type of project. Though species in this functional group regularly foray well beyond 5 miles, the occurrence data at a minimum indicate that a particular stocking site or its vicinity is visited. The No Action alternative would result in no stocking at any sites and is not included in this table.

Table 22. Number of stocking sites with records of other special status piscivorous riparian or aquatic nesting bird species under the Proposed Action and the Reduced Stocking Alternative.

Common Name	No. of Sites Under Proposed Action with Records Within 5 Miles	No. of Sites Under Reduced Stocking Alternative with Records Within 5 Miles
Bald eagle	85	52
Osprey	30	21
Common black-hawk	18	6
Golden eagle	17	15
Belted kingfisher	14	14
Great egret	4	4
Least bittern	1	1
Snowy egret	1	1

Sport fish stocking may have four effects on this taxonomic group: (1) augmentation of prey base, (2) disturbance, (3) entanglement/ingestion of fishing line and tackle, and (4) decreased diversity of the natural prey base.

Augmentation of the prey base—Sport fish stocking may benefit species in this taxonomic group by enhancing forage availability and potentially enhancing survival and reproductive success. These effects would be dependent on the foraging behavior of individual species and the degree of overlap between the presence of stocked fish and piscivorous birds. Of the species in these taxonomic groups, bald eagles and ospreys would likely benefit most from stocking of catchable fish, while other species may benefit from stocking of subcatchables. About 70 percent of the diet of bald eagles in Arizona consists of fish, including native and nonnative species (Hunt 1998). Common fish prey items for bald eagles in Arizona are native Sonora and desert suckers and nonnative channel and flathead catfish; common carp; largemouth, smallmouth, yellow, and white bass; rainbow trout; and black crappie (FWS 2011b). Resident bald eagles in Arizona are joined by eagles from other regions in winter, when they frequent reservoirs and other water bodies in the northern and eastern portions of the state (Hunt 1998). Osprey feed almost exclusively on fish. Their diet includes a variety of species, and most fish taken range from 4 to 12 inches in length (Dodd and Vahle 1998).

Bald eagles and ospreys are most likely to benefit from stocking during the breeding season, when the care of young requires additional food resources, and after fledging, when young birds range widely (regionally) in search of food. Because a large proportion of stocking activities under the Proposed Action and the Reduced Stocking Alternative represent put-and-take, benefits to eagles and ospreys are temporary in nature but would overlap at least a portion of the breeding season for these species. Most of the stocking activities under these alternatives would be unlikely to substantially benefit eagles or ospreys outside the breeding season due to low retention/survival of stocked fish during the winter months. Whether stocking would benefit species in this taxonomic group is dependent on species, location, and site-specific conditions.

Disturbance—Indirect effects from sport fish stocking are primarily related to disturbance of nesting birds through angler activity. Disturbance by humans is listed as a factor for the bald eagle, and the osprey (Anthony et al. 1994, Dodd and Vahle 1998, Grubb and King 1991, Hunt 1998, Knight and Knight 1984) is cited as a management factor for the belted kingfisher and the common black-hawk (AGFD 2007a, 2005) and would be anticipated to affect the other bird species in this taxonomic group as well. Angling activity represents only a portion of all recreational and other human uses that would have the potential to impact these species.

The timing of the fish stockings, the locations of stockings, and the type of angler access to a stocking site (e.g., along a stream versus at a dock) can determine the likelihood of angler disturbance to this taxonomic group.

Studies have documented that human activities can alter wintering bald eagle behavior (Buehler et al. 1991, Knight and Knight 1984, Stalmaster and Kaiser 1998, Stalmaster and Newman 1978, Steenhof 1978). In general, bald eagle use of a wintering area declines as the amount of human disturbance rises. Stalmaster and Kaiser (1998) observed that foot traffic was more disturbing to foraging bald eagles than the presence of a boat.

Recreational activity, including angling, may have a varying level of effects on nesting bald eagles, depending on visibility, duration, noise levels, extent of the area affected by the activity, prior experiences with humans, and tolerance of the pair (FWS 2007a). Human activity can be a factor in abandonment of the nest by breeding adults, death of nestlings due to insufficient adult

foraging success, heat stress, hypothermia, or predation on eaglets if eagles are kept away from the nest. Having said this, the portion of contribution from anglers to any of these effects is not known. There is an entire suite of recreational activities at many stocking sites that also may impact eagles.

Entanglement/Ingestion of Fishing Line and Tackle—Another indirect impact from sport fish stocking is the entanglement of nestling birds by discarded monofilament line, lures, and other fishing-related debris. This has been documented to affect nestling and adult bald eagles (Beatty 2009, Hunt 1998) and may also affect other species in this functional group (Rattner et al. 2008). Fishing line and tackle are a common threat to bald eagles in Arizona, most often due to entanglement but occasionally due to ingestion or other means. Most instances involve bald eagles catching dead fish with fishing material attached or collecting dead birds that died of entanglement. Nestlings have frequently become entangled in fishing line. A Monofilament Recovery Program was established in 2002 by the AGFD to help reduce and remove fishing line from the shores of Arizona's lakes and rivers by offering recycling bins in many major angling spots and at boat ramps. This program is anticipated to reduce but not eliminate these types of impacts to bald eagles and other species in this functional group and would continue under the Proposed Action and the Reduced Stocking Alternative (FWS 2011b). Nesting and nestling bald eagles have become entangled in fishing line and tackle, but it has not been detected occurring to non-breeding/wintering bald eagles (Driscoll et al. 2006). An osprey was found dead entangled in fishing line at its nest near Greer Lakes, Arizona (Beatty 2009).

In Arizona, lead fishing weights have periodically been detected in bald eagle nests, along with fishing line and tackle. Though lead poisoning through ingesting lead weights from fishing line has not been detected yet in Arizona, it has been reported for other waterbirds that can be prey for bald eagles (Lahner and Franson 2009, Perry 1994, Rattner et al. 2008). One Arizona eaglet required treatment for lead poisoning (Jacobson et al. 2006), and though it is unknown how this nestling consumed lead, the most likely candidates are lead ammunition or fishing tackle associated with prey.

Decreased Diversity of Native Prey Base—Historically, eagles likely foraged on native fish species in Arizona rivers/creeks (in addition to other prey such as waterfowl or mammals). Beginning with the settlement by Anglo-Americans in the early 1800s and continuing through today, construction of dams and the introduction of a diverse array of nonindigenous fish have altered habitats and fish assemblages such that most foraging opportunity by nesting and wintering eagles is on constructed reservoirs, stock tanks, or in riverine systems with available fish. Alteration of fish populations have occurred over a long period of time, but native fish species that bald eagles and other species in this taxonomic group have been reliant upon for reproductive success still persist in some areas.

Under the Proposed Action, a total of 104 sites would be stocked where other special status piscivorous riparian or aquatic nesting birds have been recorded within 5 miles. A total of 88 of these sites have records of bald eagles or ospreys within 5 miles. The Reduced Stocking Alternative would stock 62 sites where other special status piscivorous riparian or aquatic nesting birds have been recorded within 5 miles. A total of 53 of these sites have records of bald eagles or ospreys within 5 miles.

Comparison of Environmental Consequences by Alternative

A table at the end of this chapter summarizes environmental consequences related to biological resources, recreation, and socioeconomics by alternative (Table 30).

4.2 Recreation and Socioeconomics

The Recreation and Socioeconomics sections focus on sport fishing recreation and associated economic benefits/impacts, in consideration of the nature of the proposed activity and the agency and public input received during scoping.

4.2.1 Regulatory Setting and Associated Approach

Title VI of the Civil Rights Act of 1964 ensures that individuals are not excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, or national origin. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, directs that federal programs, policies, and activities not have disproportionately high and adverse human health and environmental effects on minority and low-income populations. For a Title VI/Environmental Justice evaluation, a protected population exists when minority or low-income individuals represent a meaningfully high percentage of the total population in the defined “area of interest.”

For this action, the individuals affected would be anglers and individuals whose economic interests rely on angler spending (e.g., owners and employees of bait and tackle shops). Demographic data are needed to characterize this affected population with regard to the presence of minority or low-income individuals. Three sources of demographic data provided the best information available for this analysis: the U.S. Census Bureau (2000), 2005 AGFD creel survey¹³, and 2006 FWS national survey of fishing, hunting, and wildlife-associated recreation (FWS 2008c). The AGFD creel survey and the FWS national survey collected information on angler level of income, race, and ethnicity. The 2005 AGFD creel survey provides data on the use of lakes in the Urban Sport Fish Stocking Subprogram. The 2006 FWS survey provides data for the state as a whole, and the percentages reported from this survey include anglers and hunters. The angler population represents approximately 85 percent of this combined angler and hunter survey population. Neither have information on individuals with economic interests tied to angler spending.

Data from these surveys indicate that 42 percent of urban anglers and 38 percent of the combined angler and hunter population in the state, respectively, belong to minority racial or ethnic groups. These percentages are similar to, and only slightly higher than, the U.S. Census comparison population for the state of Arizona as a whole (36 percent) and, therefore, do not represent protected populations. Eighteen percent of urban anglers and 11 percent of the combined angler and hunter population in the state, respectively, are considered low income (defined as less than \$20,000 per year). These percentages are only slightly higher than, or lower than, the Arizona comparison population (14 percent) and, therefore, do not represent protected populations. None

¹³ A creel survey, also known as a catch assessment survey, involves interviews with anglers at a given fishing site, including inspections of individual catches.

of the alternatives have the potential to have a disproportionately high or adverse impact on a protected population.

It is assumed that anglers who rely on fish harvest for food are more likely to be low income compared with the remainder of the angling population. It is unknown what percentage of anglers rely on fish harvest for food.

4.2.2 *Affected Environment*

The current AGFD Sport Fish Stocking Program provides a variety of recreational fishing opportunities across the state, including warm-water and cold-water habitats, a range of settings from urban lakes to rural streams and lakes, and various stocking management approaches (e.g., put-and-take, put-grow-and-take, and sustained yield), and fisheries management approaches. The AGFD sport fish goals to maintain the quality, abundance, availability, and diversity of sport fishing opportunities, increase public awareness of sport fishing opportunities, and increase angler recruitment and retention are supported by sport fish stocking activities. The AGFD projects a resident demand for sport fish of 4.4 million warm-water AUDs and 1.6 million cold-water AUDs in 2012 (AGFD 2008).

The three alternatives under consideration have the potential to affect recreation and associated socioeconomics throughout the state. The existing AGFD Sport Fish Stocking Program contributes to state revenues and local economies through the sale of fishing licenses and the revenues generated from recreational sport fishing, including the sale of boats, fishing equipment, fuel, accommodations, food, etc.

According to a report by Southwick Associates (2007), in 2006 there were 422,000 total anglers and 4,156,000 AUDs of fishing in Arizona, with a total economic impact of \$1.3 billion. Angling activities supported 14,729 jobs in 2006, with approximately \$445 million in salaries, wages, and business earnings. Federal tax revenues from angling activities in 2006 totaled almost \$99 million, and state and local tax revenues totaled approximately \$79 million. Though this report provides AUD and economic information for the entire state of Arizona in 2006, it does not provide county-level or site-specific data. Therefore, more specific information was needed for the purpose of comparing impacts between alternatives.

For analysis purposes in this section, information on the number of anglers and the economic impact of recreational fishing on a county- and site-specific level was obtained from a survey of fishing activities in 2001 and the associated analyses of the survey results (Pringle 2004, Silberman 2003). The results of this survey are used to approximate existing conditions and analyze the relative benefits associated with each alternative. Because the AUD and dollar amounts from these data are 2001 numbers, not 2010, they are intended to be an approximation of current conditions for use in comparing the relative alternative impacts, rather than an exact accounting of current conditions. Data are not available for all existing and proposed stocking sites; therefore, direct comparisons of the alternatives can only be made for sites with these data. The analysis of alternatives only reflects the information available and does not make assumptions about impacts for sites without data.

No recent user surveys have been developed that would fully characterize the ongoing angling activity at stocking sites occurring across the state. The most recent survey with site-specific data

available is from 2001, when the AGFD collected data about angler use of fishing sites throughout the state. It is important to note that the total number of anglers and the total economic impact (including multipliers for ripple effect) were higher in 2006 (422,000 anglers and \$1.35 billion) compared with 2001 (379,080 anglers and \$1.16 billion). To characterize the use of AGFD stocking sites, however, data from the 2001 survey were used.

The 2001 survey of angler use collected data for 148 fishing sites. Survey results indicated that a total of 5.3 million AUDs were spent on waters in Arizona (Silberman 2003).

Ninety-six of the 148 individual fishing sites in the 2001 survey are included in the sport fish stocking sites in the current AGFD Sport Fish Stocking Program. These 96 sites form the basis from which the existing stocking environment is characterized and provide a reference for comparing the three alternatives under consideration.

Because some level of angling would occur without stocking, of the total AUDs reported in the 2001 survey, only those associated with stocking were included in this analysis. Based on the 2001 survey, AUDs were categorized into two groups: trout and non-trout. If only trout would be stocked at a given site under the Proposed Action, only the AUDs associated with trout were included in this analysis. Likewise, AUDs associated with non-trout angling were included in the analyses only if species other than trout would be stocked at that site. Table 23 details the resultant number of 2001 AUDs associated with stocking at the 95 sites that coincide with the current AGFD Sport Fish Stocking Program.

Table 23. 2001 Angler User Days (AUDs) associated with stocking, by stocking location.

Stocking Site	County	2001 AUD
Becker Lake*	Apache	9,258
Big Lake	Apache	124,576
Black River—East Fork	Apache	33,334
Black River—West Fork	Apache	20,546
Concho Lake	Apache	9,268
Crescent Lake	Apache	19,981
Hulsey Lake	Apache	800
Lee Valley Lake	Apache	11,468
Little Colorado River at Sheep's Crossing	Apache	7,511
Little Colorado River at Greer	Apache	16,691
Luna Lake	Apache	24,600
Lyman Reservoir	Apache	6,319
Nelson Reservoir	Apache	14,395
Pratt Lake	Apache	254
White Mountain Lake	Apache	77
Parker Canyon Lake	Cochise	28,584
Ashurst Lake	Coconino	57,669
Bear Canyon Lake	Coconino	19,266
Blue Ridge Reservoir	Coconino	16,828
Cataract Lake*	Coconino	6,214
Chevelon Lake	Coconino	9,062
City Reservoir*	Coconino	127
Dogtown Reservoir*	Coconino	18,356
Elk Tank	Coconino	714
JD Dam	Coconino	2,140

Table 23. 2001 Angler User Days (AUDs) associated with stocking, by stocking location.

Stocking Site	County	2001 AUD
Kaibab Lake*	Coconino	12,272
Kearny Lake*	Coconino	3,071
Kinnikinick Lake	Coconino	12,852
Knoll Lake	Coconino	15,938
Lake Mary (lower)	Coconino	9,493
Lake Mary (upper)	Coconino	38,121
Long Lake	Coconino	16,261
Marshall Lake	Coconino	381
Oak Creek*	Coconino	30,423
Perkins Tank	Coconino	2,402
Santa Fe Tank*	Coconino	330
Soldier Lake	Coconino	175
Stone Dam	Coconino	465
Whitehorse Lake	Coconino	10,373
Willow Springs Lake	Coconino	53,423
Woods Canyon Lake	Coconino	67,832
Canyon Creek	Gila	13,437
Christopher Creek	Gila	10,865
East Verde River	Gila	11,668
Green Valley Lake*	Gila	19,494
Haigler Creek	Gila	1,777
Tonto Creek	Gila	10,110
Workman Creek	Gila	808
Cluff Ranch Ponds	Graham	3,688
Riggs Flat Lake	Graham	6,586
Roper Lake	Graham	5,909
Alvord Lake*	Maricopa	46,500
Apache Lake	Maricopa	157,974
Canyon Lake	Maricopa	184,874
Chaparral Lake*	Maricopa	21,600
Cortez Lake*	Maricopa	34,800
Desert Breeze Lake*	Maricopa	26,000
Desert West Lake*	Maricopa	32,900
Encanto Lake*	Maricopa	22,300
Evelyn Hallman Pond*	Maricopa	15,800
Kiwanis Lake*	Maricopa	37,300
Papago Ponds*	Maricopa	22,700
Red Mountain Lake*	Maricopa	40,600
Rio Vista Pond*	Maricopa	23,600
Riverview Lake*	Maricopa	28,300
Saguaro Lake	Maricopa	216,714
Salt River (below Saguaro)	Maricopa	38,664
Steele Indian School Pond*	Maricopa	13,900
Surprise Lake*	Maricopa	35,600
Tempe Town Lake*	Maricopa	297
Black Canyon Lake	Navajo	16,101
Clear Creek Reservoir	Navajo	1,493
Fool Hollow Lake*	Navajo	28,433
Rainbow Lake	Navajo	17,289
Scott's Reservoir	Navajo	4,860
Show Low Lake	Navajo	44,714

Table 23. 2001 Angler User Days (AUDs) associated with stocking, by stocking location.

Stocking Site	County	2001 AUD
Silver Creek	Navajo	3,167
Woodland Lake*	Navajo	18,550
Arivaca Lake	Pima	22,936
Rose Canyon Lake	Pima	6,097
Patagonia Lake	Santa Cruz	10,246
Peña Blanca Lake	Santa Cruz	6,637
Coors Lake	Yavapai	1,881
Deadhorse Lake*	Yavapai	19,512
Fain Lake*	Yavapai	12,589
Goldwater Lake	Yavapai	7,230
Granite Basin Lake	Yavapai	1,167
Horse Thief Basin Lake	Yavapai	163
Lynx Lake	Yavapai	28,234
Mingus Lake	Yavapai	4,346
Verde River (Cottonwood area)*	Yavapai	22,971
Watson Lake*	Yavapai	4,196
West Clear Creek	Yavapai	2,834
Wet Beaver Creek	Yavapai	5,992
Fortuna Pond	Yuma	35,288

Source: Pringle (2004)

* Sites located in urban areas (managed under statewide, urban, or FIN subprograms)

The total number of annual AUDs associated with stocking for the 95 sites is 2,143,541 (Table 23). These 95 sites represent 64 percent of the total sites surveyed (95/148) and contribute 40 percent of the total AUDs for the state (2.1 million/5.3 million).

The AUD data from the foregoing table were aggregated by county and are shown in Figure 5. A majority (47 percent) of the AUDs occur in Maricopa County, followed by Coconino County with 19 percent, and Apache County with 14 percent. The remaining counties each have 6 percent or less of the survey AUDs.

Silberman (2003) used the 2001 survey results to develop estimates of economic values associated with fishing and hunting in Arizona. Survey data were used as input for an economic model of the state that generated estimates of total economic values consisting of direct, indirect, and induced¹⁴ components. According to the analysis, resident and non-resident fishing expenditures amounted to \$831.5 million in 2001 for the state of Arizona as a whole. This number includes \$416 million in food, transportation, and other logistical expenses, and \$415.5 million on equipment. Hunting (with total expenditures of \$126.5 million in 2001) and fishing activities combined provided \$58.2 million in state tax revenue and supported 17,190 full- and part-time jobs.

¹⁴ Indirect and induced effects, collectively referred to as secondary effects, result from circulation of the initial spending through the local economy and are captured by the multipliers.

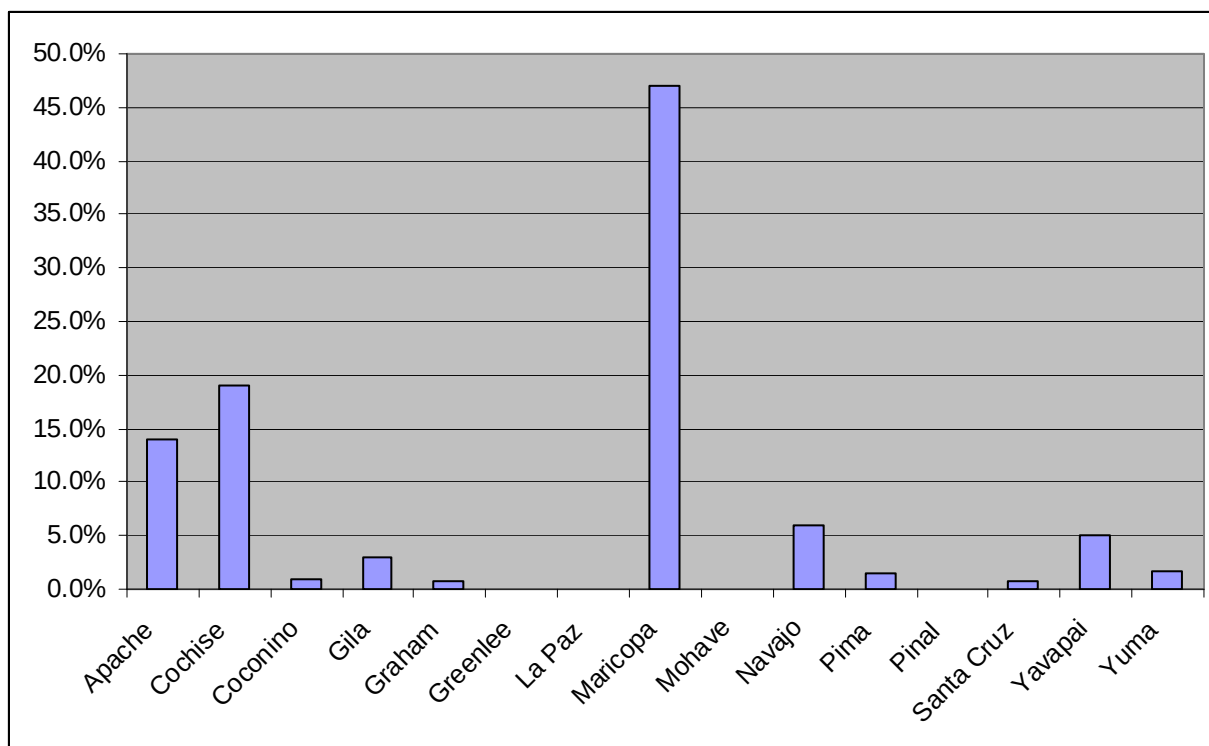


Figure 5. Percentage distribution of AUDs, by county, 2001 survey.

The economic impacts of fishing in 2001 were also calculated at the county level. Because the state tax revenues and employment figures are a combination of fishing and hunting expenditures, total hunting expenditures have also been included to provide a relative comparison and thus an idea of the proportionate impact these two activities have on the state tax revenues and employment numbers. Maricopa County generates the largest portion of annual AUDs, fishing expenditures, state tax revenues, and employment (Table 24).

The economic importance of fishing expenditures increases to \$1.16 billion in 2001 when the full effects (direct, indirect, and induced) are taken into account, as shown in Table 25. Silberman (2003) used total AUDs to estimate total fishing expenditures by county. For the purpose of the EA analysis, the total AUD value is divided into the total multiplier¹⁵ value of fishing importance to calculate an average dollar expenditure per AUD in each county. This average is used to determine an approximate dollar expenditure for the AUDs at the stocking sites with 2001 data (Table 25) and is used in the Environmental Consequences section to estimate relative differences between the three alternatives under consideration.

¹⁵ The multiplier reflects the sum of expenditures, the indirect or secondary effects generated from the expenditures, and the induced impact from the salaries and wages paid by the directly and indirectly impacted industries.

Table 24. Annual economic impacts of fishing by Arizona County.

County	Total AUD	Fishing Expenditures (million dollars)			Hunting Expenditures (million dollars)	Fishing and Hunting Combined	
		Trip-related Spending	Equipment Spending	Total Spending	Total Spending	State Tax Revenue (million dollars)	Full- and Part-time Jobs
Apache	648,111	\$37.0	\$23.3	\$60.3	\$2.5	\$3.4	1,010
Cochise	33,499	\$3.3	\$3.4	\$6.7	\$6.0	\$0.66	194
Coconino	913,928	\$58.0	\$31.2	\$89.2	\$12.0	\$6.0	1,860
Gila	413,374	\$25.4	\$8.8	\$34.2	\$5.2	\$1.8	769
Graham	37,552	\$2.5	\$1.4	\$3.9	\$3.4	\$0.4	124
Greenlee	1,479	\$0.4	\$0.2	\$0.6	\$1.9	\$0.04	20
La Paz	234,332	\$15.9	\$0.5	\$16.4	\$1.4	\$0.8	232
Maricopa	1,190,296	\$124.4	\$242.5	\$366.9	\$42.2	\$21.1	5,382
Mohave	804,679	\$57.3	\$17.2	\$74.5	\$5.4	\$3.9	1,682
Navajo	223,606	\$15.5	\$13.4	\$28.9	\$4.4	\$1.3	543
Pima	153,893	\$22.7	\$44.2	\$66.9	\$17.6	\$5.4	1,187
Pinal	24,802	\$6.9	\$6.3	\$13.2	\$6.8	\$0.9	296
Santa Cruz	108,574	\$6.4	\$4.8	\$11.2	\$2.7	\$0.9	216
Yavapai	276,407	\$19.9	\$10.4	\$30.3	\$9.7	\$2.3	811
Yuma	238,175	\$20.5	\$8.0	\$28.5	\$5.7	\$1.8	689

Source: Silberman (2003)

Table 25. Annual economic value of Angler User Days (AUDs) by county and for Arizona as a whole.

County	Direct Fishing Expenditures (million dollars)	County Multiplier	Total Value of Fishing Expenditures ¹ (million dollars)	Survey AUD	Average Value of AUD (dollars/AUD)
Apache	\$60.2	1.15	\$69.2	648,111	\$107
Cochise	\$6.7	1.20	\$8.0	33,499	\$240
Coconino	\$89.2	1.23	\$109.7	913,928	\$120
Gila	\$34.2	1.19	\$40.7	413,374	\$98
Graham	\$3.9	1.19	\$4.6	37,552	\$124
Greenlee	\$0.7	1.08	\$0.8	1,479	\$511
La Paz	\$16.4	1.17	\$19.2	234,332	\$82
Maricopa	\$366.8	1.26	\$462.2	1,190,296	\$388
Mohave	\$74.5	1.24	\$92.4	804,679	\$115
Navajo	\$29.0	1.15	\$33.4	223,606	\$149
Pima	\$66.9	1.24	\$83.0	153,893	\$539
Pinal	\$13.1	1.15	\$15.1	24,802	\$607
Santa Cruz	\$11.1	1.20	\$13.3	108,574	\$123
Yavapai	\$30.2	1.25	\$37.8	276,407	\$137
Yuma	\$28.4	1.23	\$34.9	238,175	\$147
Arizona ²	\$831.5	1.40	\$1,164.1	5,302,707	\$220

Source: Silberman (2003)

¹ Includes direct, indirect, and induced values in 2001 dollars² Summing the county level economic values results in a total less than the economic value for the state as a whole because the state value includes additional economic linkages not present at the county level

4.2.3 Environmental Consequences

Each of the alternatives under consideration was assessed to identify potential direct and indirect effects on recreation and socioeconomics. In addition to a qualitative comparison of the alternatives, data from the previously outlined survey of fishing activities and associated analyses were considered as the basis for the quantitative impact comparison of the alternatives included in this section of the EA.

Recreation

Proposed Action

Of the three alternatives under consideration, the Proposed Action would stock sport fish at the greatest number of stocking sites distributed across the state, thereby accommodating the highest level of angler demand and providing the most comprehensive range of angling opportunities/locations. With the Proposed Action, impacts on recreation and socioeconomics would be direct and indirect and primarily beneficial in nature. The degree of benefit to recreation and socioeconomics from stocking would vary across the state.

Similar to the current stocking program, the proposed stocking of 166 sites would continue to provide a variety of recreational opportunities for fishing across the state, including warm-water and cold-water fisheries, multiple species of fish, a range of settings from lakes in urban areas to rural streams and lakes, and various stocking management approaches (e.g., put-and-take, put-grow-and take, and sustained yield) and fisheries management approaches.

The Proposed Action includes the stocking of 58 lakes in urban areas (21 lakes in the Urban Sport Fish Stocking Subprogram, 15 in the FIN Subprogram, and 22 in the Statewide Sport Fish Stocking Subprogram) and 108 sites at other locations throughout the state. The majority (31) of the lakes in urban areas included in the Proposed Action are in the Phoenix Metro area, followed in density by the city of Williams, with six lakes. The remaining 21 lakes in urban areas are located in 12 cities or towns of various population sizes across Arizona, including Tucson, Show Low, Yuma, and Pinetop. These lakes may provide the only fishing opportunities for anglers resident in each urban area who have no access to more remote locations in Arizona.

The Phoenix Metro lakes in particular have a high frequency of use by anglers. Nineteen of 35 waters in Maricopa County have AUD data available; 15 of these are in the Phoenix metro area. The 19 waters in Maricopa County had more than 1 million AUD in 2001, the largest proportionate share of AUDs in the state, while the subset of 15 urban lakes in Maricopa County had more than 400,000 AUDs in 2001. The remaining four waters with data in Maricopa County are within an hour of the main urban center and are easily accessible for anglers with access to a personal vehicle. Maricopa County would be expected to continue to have the highest angler use demand due to the high urban population in the county.

Lakes in urban areas are also commonly used for angler education courses, including outdoor skills education for youth. Stockings are conducted specifically in support of these events. The Proposed Action would enhance opportunities for youth outdoor recreation, encouraging adolescents to spend time outdoors in nature, and supporting angler recruitment. From an economic standpoint, angler recruitment and retention contribute to future license sales and other angling expenditures.

AUD data are available for 95 (57.2 percent) of the 166 stocking locations included in the Proposed Action. Though these numbers cannot be extrapolated to the remaining 71 stocking locations, data for these 95 waters provide an indication of the use of stocked sites by anglers and a relative basis for comparison with the other alternatives. Table 26 provides the number of sites in the Proposed Action for each county, the number of sites for which AUD data are available, and the total annual AUDs associated with stocking for the sites with data in each county.

Implementation of the Proposed Action would not preclude other types of recreation from occurring at all waters (stocked or not stocked), such as swimming, boating, hiking, and wildlife watching.

The Proposed Action would satisfy the proposed activity's purpose and need to meet the current and anticipated need and demand for recreational fishing opportunities in the state. Of the three alternatives, beneficial effects on fishing recreation with the Proposed Action would be notably greater than the Reduced Stocking Alternative and substantially greater than the No Action alternative.

Table 26. Stocking locations and annual Angler User Days (AUDs) by county for Proposed Action.

County	Number of Sites in Proposed Action	Number of Proposed Sites with AUD Data	Total AUD Associated with Stocking for Sites with Data
Apache	22	15	299,078
Cochise	1	1	28,584
Coconino	38	25	404,188
Gila	7	7	68,159
Graham	6	3	16,183
Greenlee	1	0	No data
La Paz	2	0	No data
Maricopa	35	19	1,000,423
Mohave	1	0	No data
Navajo	13	8	134,607
Pima	7	2	29,033
Pinal	1	0	No data
Santa Cruz	2	2	16,883
Yavapai	25	12	111,115
Yuma	5	1	35,288
Total	166	95	2,143,541

Source: Pringle (2004)

Reduced Stocking Alternative

Under the Reduced Stocking Alternative, sport fish would be stocked by the AGFD at 101 sites—a statewide reduction of approximately 40 percent (65 less sites) compared with the Proposed Action. However, for those 101 sites proposed with the Reduced Stocking Alternative, stocking levels, frequencies, and species would be the same as the Proposed Action. The level of benefit to recreation and socioeconomics from stocking would vary across the state.

The continuation of the sport fish stocking activities by the AGFD under the Reduced Stocking Alternative would have a beneficial effect on fishing recreation in the state by providing and

enhancing a range of fishing opportunities in rural and urban locations, but to a much lesser extent than the Proposed Action or the existing condition.

The 65 sites from the Proposed Action that would not be included in the Reduced Stocking Alternative are not uniformly distributed across the state or from one county to another. Some number of stocking sites would be eliminated from a majority of the counties in the state, but to varying degrees. The exceptions are Yuma and Graham counties, which would have an identical stocking program to that of the Proposed Action. In Cochise and Santa Cruz counties, however, there would be no stocking sites with the Reduced Stocking Alternative, compared with one site and two sites, respectively, with the Proposed Action. The associated county is identified for each stocking site in Table E (Appendix A).

With regard to these 101 stocking sites, the recreational benefits of stocking would be essentially the same as those of the Proposed Action; however, at the 65 sites that would no longer be stocked, the consequences of the Reduced Stocking Alternative on recreation would be notably different than the Proposed Action and would vary by site.

As a direct impact of the Reduced Stocking Alternative, in the fisheries that would no longer be stocked the overall number of sport fish available to provide angling opportunity would be expected to decrease; however, the level of reduction would be dependent on the degree of sustainability of the specific fishery. Influences on sustainability after cessation of stocking at a specific site could include the quantity of remaining sport fish (residual stocked fish and naturally reproducing fish), the species of sport fish previously stocked as well as species of naturally reproducing fish remaining, habitat suitability for sport fish spawning (reproduction), balance of natural fish reproduction to fish harvest by anglers, species habitat requirements (e.g., cold-water versus warm-water fishery), accessibility for anglers, angler demand, and fishery management.

Though some level of angling activity would be expected to continue at the 65 sites no longer stocked with sport fish, the reduction in sport fish populations at these sites could indirectly affect angler interest and, consequently, shift angler use patterns as disinterested anglers seek fishing opportunities in other locations across the state or outside of the state. Potential changes in angler interest and satisfaction as a result of this alternative would be expected to vary from site to site, or county to county. A summary of some of the key considerations that would likely affect fish population sustainability and angler satisfaction follows.

According to the AGFD, for more popular angling sites that have been stocked historically by the AGFD and managed as put-and-take fisheries, much of the sport fish population is fished out a relatively short time after fish are stocked. The elimination of future stockings at these sites would be expected to result in a decline in sport fish numbers. As a consequence of declining fish numbers, angler catch rates would be expected to decline, and angler dissatisfaction would be expected to increase. Angler satisfaction could also be affected by angler expectation. For example, anglers may be dissatisfied with a catch rate if it is notably lower than what they experienced in the past when the site was stocked. As angler catch rates decline at a given site, an increasing number of anglers that would have otherwise fished there would be expected to seek fishing opportunities at other sites instead. As AUDs decrease at the sites no longer stocked,

other sites, especially those that would be stocked under this alternative, could experience an increase in AUDs.

In areas of the state with limited fishing sites, the increase in angler use at stocked sites as a result of the Reduced Stocking Alternative could be substantial. With substantial increases in angler use at a given site, the fish population and angler catch rates could be negatively affected, and the AGFD stocking regime could prove to be insufficient to keep up with angler demand. Furthermore, with limited space for angling, some sites may not be able to accommodate new anglers.

A number of water bodies, including lakes in urban areas, may be managed as warm-water fisheries year-round and as seasonal cold-water fisheries in winter months. Cold-water fish species have lower temperature tolerances than warm-water species, and in these dual fisheries, cold-water species are stocked with the intent that they will be fished-out under a put-and-take approach as the warming water becomes intolerable. Depending on water temperatures, the presence of cold-water fish at some of these dual sites (e.g., lakes in the Phoenix Metro urban area) would be eliminated if stocking were to cease with the Reduced Stocking Alternative. As a consequence, those anglers who sought cold-water fish at these sites would have to shift to another site or sites to pursue cold-water fish, resulting in reductions in AUDs at these sites. This decline in angler use could be permanent.

Some warm-water fisheries are managed primarily as sustained-yield fisheries. Warm-water species can typically live and thrive in habitats that vary seasonally between warm- and cold-water temperatures. For these reasons, some of these warm-water fisheries, in general, would be less affected by the elimination of stocking than cold-water fisheries, and consequently, angler use at these sites would be less likely to be affected. Notable exceptions are the lakes in the more intensively stocked Urban Sport Fish Stocking Subprogram because, without stocking, it is unlikely that any self-sustaining populations would sustain the high angler demand/harvest rates typical of, and expected at, these sites.

Even for self-sustaining fisheries, however, partial or total loss of a fishery population can occur due to catastrophic events such as algae blooms and fires (fires can result in massive ash flows to streams or lakes). For the sites not stocked with the Reduced Stocking Alternative, the restoration of a fish population in response to such events (as proposed under the Proposed Action for some sites) would be precluded and, in some cases, the associated fishery could be lost permanently. For example, Saguaro Lake and Canyon Lake have self-sustaining warm-water fish populations of channel catfish, largemouth and smallmouth bass, and black crappie. Under the Proposed Action, these species are proposed for stocking only in response to a catastrophic event. These sites are not included in the Reduced Stocking Alternative; therefore, the total loss of one of these fisheries as a result of a catastrophic event would be permanent and would have a substantial effect on recreational angling due to the high number of AUDs associated with these lakes. Similarly, a partial loss of sport fish could take several years to correct without stocking and would result in substantial effects on recreational angling opportunity and satisfaction.

The Reduced Stocking Alternative would enhance opportunities for youth outdoor recreation, encourage adolescents to spend time outdoors in nature, and support angler recruitment. Compared with the Proposed Action, however, the opportunities for outdoor skills education

with the Reduced Stocking Alternative would be more limited due to elimination of a number of stocking sites in or near densely populated urban areas.

For the Reduced Stocking Alternative, AUD data are available for 48 out of 101 stocking sites, 47.5 percent (compared with 57.2 percent with the Proposed Action). Though these data cannot be extrapolated to the remaining 53 stocking sites in this alternative, they provide an indication of the use of stocked sites by anglers and a relative basis for comparison of the Reduced Stocking Alternative with the Proposed Action. Because the percentage of available angler use data for the Reduced Stocking Alternative is 10 percent less than for the Proposed Action, some level of bias may be introduced that may overstate the difference in economic value between the two action alternatives. Table 27 provides the number of sites in the Reduced Stocking Alternative for each county, the number of these sites for which AUD data are available, and the total annual AUDs associated with stocking for the sites with data in each county.

Table 27. Stocking locations and annual Angler User Days (AUDs) by county for the Reduced Stocking Alternative.

County	Number of Sites in Reduced Stocking Alternative	Number of Proposed Sites with AUD Data	Total AUD Associated with Stocking for Sites with Data
Apache	15	8	74,508
Cochise	0	0	0
Coconino	26	17	222,483
Gila	1	1	13,437
Graham	6	3	16,183
Greenlee	1	0	No data
La Paz	1	0	No data
Maricopa	7	3	234,174
Mohave	1	0	No data
Navajo	12	7	133,114
Pima	7	1	22,936
Pinal	1	0	No data
Santa Cruz	0	0	0
Yavapai	18	7	58,639
Yuma	5	1	35,288
Total	101	48	810,762

Source: Pringle (2004)

The Reduced Stocking Alternative would reduce the amount of stocking in urban areas by 50 percent compared with the Proposed Action, for a total of 29 sites in urban areas (eight in the Urban Sport Fish Stocking Subprogram; three in the FIN Subprogram; and 18 in the Statewide Sport Fish Stocking Subprogram). The Reduced Stocking Alternative includes six lakes each in the Phoenix Metro and Williams areas. The remaining 17 waters in urban areas are located in nine cities or towns of various population sizes across Arizona, including Tucson, Show Low, Yuma, and Pinetop. Under this alternative, stocking would not occur in Tempe Town Lake or in the urban areas of Cottonwood, Sedona, or Payson.

The greatest drop in stocking locations under the Reduced Stocking Alternative compared with the Proposed Action would be in Maricopa County, where stocking sites would be reduced from 35 to seven. Three of the seven remaining sites have data available. Two of these are lakes in an urban area (Phoenix Metro) stocked under the Urban Sport Fish Stocking Subprogram. These

two lakes had approximately 76,000 combined AUDs associated with stocking in 2001. The third site with data is Apache Lake, which had 157,974 AUDs associated with stocking for the same period. The expected total annual AUDs in Maricopa County decreases from 1,000,423 under the Proposed Action to 234,174 under the Reduced Stocking Alternative. These numbers indicate a dramatic decrease in the number of stocking locations and in the number of expected AUDs. With the elimination of stocking at 25 lakes (81 percent) in urban areas in Maricopa County under the Reduced Stocking Alternative compared with the Proposed Action, it would be expected that the availability of fishing opportunities in this high-density area would also dramatically decrease. The reduction in the stocking sites in the Phoenix Metro and other urban areas under the Reduced Stocking Alternative would also be expected to impact angler education courses, including youth education, which is concentrated at urban lakes.

As with the Proposed Action, implementation of the Reduced Stocking Alternative would not preclude other types of recreation from occurring at all waters (stocked or not stocked), such as swimming, boating, hiking, and wildlife watching.

Though the Reduced Stocking Alternative would provide some support to AGFD's efforts to meet the current and anticipated future need/demand for recreational fishing opportunities, the level of stocking and the resultant decrease in quality and diversity of recreational fishing opportunities associated with this alternative would represent a notable decrease from the existing condition. For this reason, the Reduced Stocking Alternative would not fully satisfy the project's purpose and need. With 65 less stocking sites, the beneficial effects of the Reduced Stocking Alternative to fishing recreation would be notably less than the Proposed Action.

No Action

Under the No Action alternative, the AGFD would not continue to stock sport fish. The No Action alternative would represent a reduction in stocking sites of 166 less sites than the Proposed Action and 101 less sites than the Reduced Stocking Alternative.

As described for the 65 eliminated stocking sites under the Reduced Stocking Alternative, the overall number of sport fish (stocked or naturally occurring) would be expected to decrease with the No Action alternative, but to an even greater degree. As with the Reduced Stocking Alternative, the level of reduction would be dependent on the degree of sustainability of each specific fishery. In the short term, some previously stocked fish populations would persist, providing angling opportunities. Ultimately, however, angler demand would be solely reliant on self-sustaining fish populations, limiting the number of viable angling sites and the diversity of fishing opportunities dispersed across the state.

Some level of angling activity would be expected to continue at some of the current stocking sites despite the cessation of stocking activities under the No Action alternative, based on records of fish species known to be, or likely to be, self-sustaining. The reduction in the size of sport fish populations at these sites or, in some cases, the elimination of these populations entirely, could directly affect angler interest and, consequently, shift angler use patterns across the state as anglers seek fishing opportunities in other locations. Potential changes in angler interest and satisfaction as a result of this alternative would be expected to vary by site. Even for self-sustaining fisheries, however, partial or total loss of a fishery population can occur due to catastrophic events. Because the No Action alternative represents no stocking, the restoration of

a fish population in response to such events would be precluded and, in some cases, the fishery could be lost permanently.

With the least diversity of fishing opportunities and the lowest number of viable fishing sites of the alternatives, the No Action alternative would be expected to negatively affect angler recruitment, interest, use, and satisfaction, and consequently, total AUDs for the state. With the elimination of all stocking activities, programs that enhance opportunities for outdoor recreation for youth and support angler recruitment would also be severely limited. With no sport fish stocking, the No Action alternative would provide little to no support to the fulfillment of AGFD sport fish goals.

As with the other alternatives, the No Action alternative would not preclude other types of recreation from occurring at all waters, such as swimming, boating, hiking, and wildlife watching.

This alternative would provide no support for AGFD efforts to meet the current and anticipated future need/demand for recreational fishing opportunities. Considering the existing condition as the baseline, the No Action alternative would result in a substantial decrease in the quality and diversity of recreational fishing opportunities across the state. For these reasons, the No Action alternative would not be expected to satisfy the project's purpose and need. The No Action alternative would be expected to generate substantially less recreational fishing opportunities than the current AGFD Sport Fish Stocking Program, the Proposed Action, or even the Reduced Stocking Alternative.

Socioeconomics

Proposed Action

To estimate the annual economic value of the Proposed Action compared with the other alternatives, the average dollar expenditure per AUD in each county, as developed by Silberman (2003), was multiplied by the total number of AUDs associated with stocking for the 95 sites in this alternative with data, resulting in an estimate of the economic importance of stocking in each county, based on the 2001 survey. The economic values are expressed in terms of 2001 dollars (Table 28). This table provides an estimate of \$542.5 million for the annual economic benefit associated with the 95 stocking locations with available data from the 2001 survey.

The economic impacts computed in this section are not intended to represent absolute values, but represent relative values and are intended only for assessing the relative impacts among the alternatives. The Proposed Action would have the greatest number of stocking locations of the three alternatives carried forward in this EA. With the greatest number of stocking sites of the alternatives, the Proposed Action would be expected to have the highest number of AUDs and associated expenditures and, consequently, the most beneficial impact to local economies.

Table 28. Approximate annual economic impact of Angler User Days (AUDs) for sites with data in Proposed Action.

County	Number of Proposed Sites with AUD Data	AUDs Associated with Stocking for Sites with Data	Average Dollar Expenditure per AUD	Estimated Economic Value of Total AUD for Sites with Data (million dollars)
Apache	15	299,078	\$107	\$32.0
Cochise	1	28,584	\$240	\$6.9
Coconino	25	404,188	\$120	\$48.5
Gila	7	68,159	\$98	\$6.7
Graham	3	16,183	\$124	\$2.0
Greenlee	0	No data	\$511	No data
La Paz	0	No data	\$82	No data
Maricopa	19	1,000,423	\$388	\$388.2
Mohave	0	No data	\$115	No data
Navajo	8	134,607	\$149	\$20.1
Pima	2	29,033	\$539	\$15.6
Pinal	0	No data	\$607	No data
Santa Cruz	2	16,883	\$123	\$2.1
Yavapai	12	111,115	\$137	\$15.2
Yuma	1	35,288	\$147	\$5.2
Total Sites*	95	2,143,541		\$542.5

Sources: Pringle (2004), Silberman (2003)

* Values represent a total of only those sites in the Proposed Action with data. These values do not include the sites without data nor do these reflect the estimated economic value for the state as a whole.

State tax revenues and fishing license sales would also be expected to be higher in this alternative than the Reduced Stocking Alternative or the No Action alternative. Higher expenditures on equipment and logistics equate to higher state tax revenues, and stocking more locations would likely encourage more anglers to purchase licenses than would be expected with the other two alternatives.

Fifty-eight lakes in urban areas would be stocked under this alternative. This alternative would provide the greatest number of urban angler options, which would create fishing opportunities for a diverse demographic cross-section and would provide the most opportunities for anglers who rely on fish harvest for food. No data are available, but low-income anglers may be more likely to rely on fishing as a part of their food supply than higher-income anglers. Furthermore, low-income anglers may have limited transportation options to reach fishing destinations. Therefore, they likely rely on stocked urban lakes that are close and easy to access. The higher number of stocked lakes in urban areas associated with the Proposed Action would improve access to stocking sites for a large number of anglers, including those that fish primarily for food.

As with the current AGFD Sport Fish Stocking Program, the Proposed Action would have a substantial beneficial impact on local and statewide socioeconomics. Of the three alternatives, contributions to economic benefit with the Proposed Action would be notably greater than the Reduced Stocking Alternative and substantially greater than the No Action alternative.

Reduced Stocking Alternative

To estimate the economic importance of fishing in each county with the Reduced Stocking Alternative, the average dollar expenditure per AUD in each county was multiplied by the total number of AUDs for the 48 stocking sites in this alternative with data. Table 29 shows the

number of sites with data by county, the total 2001 AUDs for those sites, the average dollar expenditure by county based on Silberman (2003) data, and the total estimated annual dollar expenditure for the total AUDs by county.

Of the sites eliminated with the Reduced Stocking Alternative, some have records of fish species that are known to, or are likely to, be self-sustaining. Therefore, some level of angling activity would be likely to continue at these sites following the cessation of stocking. However, economic values are expected to decrease in most counties under the Reduced Stocking Alternative compared with the Proposed Action. Maricopa County would see a noticeable decline in economic activities associated with the corresponding decrease in AUD, perhaps as much as 75 percent compared with the Proposed Action. Cochise and Santa Cruz county sites would not be stocked under this alternative.

Table 29. Approximate annual economic impact of Angler User Days (AUDs) for sites with data in the Reduced Stocking Alternative.

County	Number of Proposed Sites with AUD Data	Total AUD for Sites with Data	Average Expenditure per AUD	Estimated Economic Value of Total AUD for Sites with Data (million dollars)
Apache	8	74,508	\$107	\$8.0
Cochise	0	0	\$240	\$0.0
Coconino	17	222,483	\$120	\$26.7
Gila	1	13,437	\$98	\$1.3
Graham	3	16,183	\$124	\$2.0
Greenlee	0	No data	\$511	No data
La Paz	0	No data	\$82	No data
Maricopa	3	234,174	\$388	\$90.9
Mohave	0	No data	\$115	No data
Navajo	7	133,114	\$149	\$19.8
Pima	1	22,936	\$539	\$12.4
Pinal	0	No data	\$607	No data
Santa Cruz	0	0	\$123	\$0.0
Yavapai	7	58,639	\$137	\$8.0
Yuma	1	35,288	\$147	\$5.2
Total Sites¹	47	823,867		\$174.3

Sources: Pringle (2004), Silberman (2003)

¹ Values represent a total of only those sites in the Reduced Stocking Alternative with data. These values do not include the sites without data nor do these reflect the estimated economic value for the state as a whole.

As mentioned in the Recreation section, one of the impacts of this alternative could be that AUDs would increase at some sites as some anglers would shift their activities to stocked locations, resulting in increased fishing pressure at these sites. This would somewhat offset the overall decrease in AUDs from this alternative, but a notable decrease in AUDs would still be expected. Therefore, the numbers in the previous table are meant to provide a general idea of the potential economic impact of the Reduced Stocking Alternative with the understanding that other factors also influence the extent of any decrease in angler use and associated expenditures.

As discussed under the Proposed Action, an unknown proportion of anglers rely on fish harvest for food, the majority of which likely use lakes in urban areas. The Reduced Stocking

Alternative would reduce the overall number of stocked lakes in urban areas from 58 to 29. The largest decrease would occur in the Phoenix Metro area, where stocking locations in urban areas would drop to six from 31 in the Proposed Action. All five Tucson area lakes would be stocked under this alternative, but no waters in urban areas would be stocked in Payson, Sedona, or Cottonwood. The decrease in stocked lakes in urban areas, particularly in the Phoenix Metro area, also translates to a greater distance between stocked lakes. Those who rely on fish harvest as a part of their food supply may be less likely to have a convenient mode of transportation to lakes that are farther away. Because of this decrease in locations and greater distance between lakes in urban areas, this alternative could have a higher impact on the portion of the angling population that relies on fishing as a source of food.

The Reduced Stocking Alternative would result in a reduction in state tax revenue compared with the Proposed Action. No quantitative data are available to determine the extent of this impact, but it would be correlated to the expenditures and fishing license sales expected under this alternative.

The Reduced Stocking Alternative would be expected to generate noticeably less economic benefit than the current AGFD Sport Fish Stocking Program or the Proposed Action, though it would generate a notably greater economic impact compared with the No Action alternative. For many small, rural communities, fishing is a primary attraction, and local businesses depend on the income generated from anglers. The elimination of stocking in the waters of these communities could result in a substantial loss to the local economy because anglers may provide a substantial percentage of the income generated by these businesses.

No Action

It is expected that decreases in AUDs with the No Action alternative would result in related decreases in economic benefit. Of the alternatives, the No Action alternative would be most likely to result in a decline in demand for fishing equipment and licenses, and a decline in fishing-related expenditures to businesses, including restaurants, hotels, boat rentals, fuel stations, and bait and tackle shops. With less fishing-related expenditures, job opportunities in the associated service industries may also decrease.

The Urban Sport Fish Stocking Subprogram sites are more intensively stocked than those in the Statewide Sport Fish Stocking Subprogram. The elimination of all sport fish stocking at these urban lakes would constitute a substantial change in fishing opportunities for a high percentage of anglers who fish at these waters. Furthermore, some unknown percentage of anglers who fish at lakes in urban areas may rely on fishing as a source of food. The decline or elimination of fish populations in these metropolitan areas could constitute a socioeconomic impact on these anglers, who may have limited opportunities to travel out of the area to fish.

Compared with the Proposed Action, the No Action alternative would be expected to negatively impact local economies along travel routes and in the vicinity of angler fishing destinations. For many small, rural communities, fishing is a primary attraction, and local businesses depend on the income generated from anglers. For these communities, the elimination of stocking could result in a substantial loss to the local economy because anglers may provide a substantial percentage of the income generated by these businesses. State tax revenue and licensing fees would also decline with this alternative.

Considering the existing condition as the baseline, the No Action alternative would result in a substantial decrease in economic contribution across the state. The No Action alternative would be expected to generate substantially less economic benefit than the current AGFD Sport Fish Stocking Program, the Proposed Action, or even the Reduced Stocking Alternative.

4.3 Comparison of Environmental Consequences by Alternative

The following table summarizes and compares the environmental consequences of the alternatives to biological resources, recreation, and socioeconomics (Table 30). It also summarizes by alternative the mitigation and conservation commitments documented in Chapter 5.0.

Table 30. Comparison of potential effects on biological resources, recreation, and socioeconomics by alternative.

Resource/Topic	Alternatives Under Consideration		
	Proposed Action (166 stocking sites)	Reduced Stocking Alternative (101 stocking sites)	No Action (no sites)
BIOLOGICAL RESOURCES—CONSULTATION SPECIES¹⁶			
Effects on listed, candidate, and potential candidate species	• No jeopardy to consultation species and no adverse modification of critical habitat. • Adverse effects on 14 listed species (seven with designated critical habitat and two with proposed critical habitat), four candidate species, and two species under consideration for candidate status. • The extent to which potential adverse effects would occur varies by species and by stocking site based on existing conditions, fish species proposed for stocking, and other factors. • May affect but not likely to adversely affect nine listed species, three of which have designated critical habitat, and three candidate species.	• A draft BCO was not developed for the Reduced Stocking Alternative; therefore, the number of species with adverse effects is not identified. Fewer potential interactions with, and adverse effects on, consultation species would be anticipated. • Reinitiation of consultation would be required and the resulting BCO would identify the number of species and/or critical habitat adversely affected.	No effects on consultation species or critical habitat.

¹⁶ These are the species that were included in the ESA Section 7 consultation and include listed (threatened and endangered) and certain non-listed (candidate and potential candidate) species.

Table 30. Comparison of potential effects on biological resources, recreation, and socioeconomics by alternative.

Resource/Topic	Alternatives Under Consideration		
	Proposed Action (166 stocking sites)	Reduced Stocking Alternative (101 stocking sites)	No Action (no sites)
BIOLOGICAL RESOURCES—OTHER SPECIAL STATUS AQUATIC AND SEMI-AQUATIC SPECIES¹⁷			
Effects on longfin dace	121 sites no effect 35 sites low impact 10 sites moderate impact	76 sites no effect 23 sites low impact 2 sites moderate impact	No sites stocked with potential effects on species.
Effects on speckled dace	96 sites no effect 55 sites low impact 15 sites moderate impact	58 sites no effect 32 sites low impact 11 sites moderate impact	No sites stocked with potential effects on species.
Effects on Sonora sucker	87 sites no effect 75 sites low impact 4 sites moderate impact	70 sites no effect 29 sites low impact 2 sites moderate impact	No sites stocked with potential effects on species.
Effects on desert sucker	85 sites no effect 76 sites low impact 5 sites moderate impact	68 sites no effect 31 sites low impact 2 sites moderate impact	No sites stocked with potential effects on species.
Effects on Little Colorado sucker	143 sites no effect 13 sites low impact 10 sites moderate impact	84 sites no effect 10 sites low impact 7 sites moderate impact	No sites stocked with potential effects on species.
Effects on bluehead sucker	121 sites no effect 32 sites low impact 13 sites moderate impact	76 sites no effect 23 sites low impact 2 sites moderate impact	No sites stocked with potential effects on species.
Effects on lowland leopard frog	130 sites no effect 24 sites low impact 8 sites moderate impact 4 sites high impact	83 sites no effect 14 sites low impact 2 sites moderate impact 2 sites high impact	No sites stocked with potential effects on species.
Exposure to Western narrow-mouthed toad ¹⁸	160 sites no exposure 3 sites low exposure 1 sites moderate exposure 2 sites high exposure	97 sites no exposure 2 sites low exposure 1 sites moderate exposure 1 sites high exposure	No sites stocked with potential exposure to species.
Exposure to California floater ¹⁸	135 sites no exposure 26 sites low exposure 3 sites moderate exposure 2 sites high exposure	78 sites no exposure 20 sites low exposure 2 sites moderate exposure 1 sites high exposure	No sites stocked with potential exposure to species.
Exposure to White Mountain water penny beetle ¹⁸	149 sites no exposure 15 sites low exposure 2 sites high exposure	90 sites no exposure 11 sites low exposure	No sites stocked with potential exposure to species.
Exposure to Page Springs caddisfly ¹⁸	164 sites no exposure 1 site low exposure 1 site high exposure	101 sites no exposure	No sites stocked with potential exposure to species.
Exposure to Balmorhea saddle-case caddisfly ¹⁸	164 sites no exposure 1 site low exposure 1 site high exposure	101 sites no exposure	No sites stocked with potential exposure to species.

¹⁷ These are all other potentially affected species with special status, but that are not federally listed, candidate, or potential candidate species.

¹⁸ Analysis assessed exposure only and did not identify effects.

Table 30. Comparison of potential effects on biological resources, recreation, and socioeconomics by alternative.

Resource/Topic	Alternatives Under Consideration		
	Proposed Action (166 stocking sites)	Reduced Stocking Alternative (101 stocking sites)	No Action (no sites)
BIOLOGICAL RESOURCES—OTHER SPECIAL STATUS NON-AQUATIC SPECIES			
Effects on riparian plants and non-piscivorous riparian/aquatic nesting birds	• 36 stocking sites with one or more plant species recorded in the vicinity. • 25 stocking sites with one or more bird species recorded in the vicinity. • No direct effects. • Potential for only indirect effects from angler activity.	• 22 stocking sites with one or more plant species recorded in vicinity. • 21 stocking sites with one or more bird species recorded in vicinity. • No direct effects. • Potential for only indirect effects from angler activity.	No stocking of any sites with records of special status plant or bird species in vicinity.
Effects on terrestrial riparian invertebrates and ground-dwelling riparian mammals and reptiles	• 4 stocking sites with one terrestrial riparian invertebrate species recorded in the vicinity. • 12 stocking sites with one or more mammal or reptile species recorded in vicinity. • No direct effects. • Potential for only indirect effects from angler activity.	• 2 stocking sites with one terrestrial riparian invertebrate species recorded in the vicinity. • 11 stocking sites with one or more mammal or reptile species recorded in vicinity. • No direct effects. • Potential for only indirect effects from angler activity.	No stocking of any sites with other special status terrestrial riparian invertebrates or ground-dwelling riparian mammal or reptile species records in the vicinity.
Effects on piscivorous riparian/aquatic nesting birds	• 104 stocking sites with one or more bird species recorded in the vicinity. • Direct effects from food augmentation and indirect effects from angler disturbance, entanglement/ingestion of fishing line and tackle, augmentation of overall prey base, and decreased diversity of native prey base.	• 62 stocking sites with one or more bird species recorded in the vicinity. • Direct effects from food augmentation and indirect effects from angler disturbance, entanglement/ingestion of fishing line and tackle, augmentation of overall prey base, and decreased diversity of native prey base.	No stocking of any sites with other special status piscivorous riparian or aquatic nesting bird records in the vicinity.

Table 30. Comparison of potential effects on biological resources, recreation, and socioeconomics by alternative.

Resource/Topic	Alternatives Under Consideration		
	Proposed Action (166 stocking sites)	Reduced Stocking Alternative (101 stocking sites)	No Action (no sites)
CONSERVATION AND MITIGATION PROGRAM			
Implementation of mitigation and conservation measures	Expenditure of \$5 million over 10 years for: • Implementation of substantial mitigation measures targeting other special status species, as identified in Chapter 5.0, including removal of stressors from aquatic systems and watershed planning. • Implementation of substantial mitigation measures targeting draft BCO species, as identified in Chapter 5.0, including transition to production and stocking of triploid rainbow trout and securing or establishing populations and other actions. • Implementation of additional conservation measures identified in Chapter 5.0 as funding allows. • Mitigation and conservation measures employ a watershed management approach that would benefit aquatic communities in general.	• Reinitiation of Section 7 consultation would determine required mitigation measures, based on reduced impacts. • Reduced funding available for mitigation and conservation measures.	No mitigation or conservation measures implemented.
RECREATION AND SOCIOECONOMICS			
Title VI/ Environmental Justice	• No protected populations of low income or minorities identified. • No disproportionately high or adverse impacts.	• No protected populations of low income or minorities identified. • No disproportionately high or adverse impacts.	• No protected populations of low income or minorities identified. • No disproportionately high or adverse impacts.

Table 30. Comparison of potential effects on biological resources, recreation, and socioeconomics by alternative.

Resource/Topic	Alternatives Under Consideration		
	Proposed Action (166 stocking sites)	Reduced Stocking Alternative (101 stocking sites)	No Action (no sites)
Range of angling opportunities/ diversity of locations	• Provides the most comprehensive and widespread range of angling opportunities across the state (166 sites). • Alternative most similar to existing program.	Provides a range of angling opportunities but at 38 percent fewer sites (101 sites) than the Proposed Action.	• No stocking. • Angling opportunities limited to sites with self-sustaining fish populations.
Angler satisfaction	Additional recreational opportunities provided to meet projected demand; therefore, angler satisfaction is expected to be similar to, or higher than, the existing program.	• With the elimination of many previously stocked sites, a decline in angler satisfaction and use of these sites would be anticipated. • Angler use at some of the remaining stocked sites could increase as a result. • Overuse or overcrowding of remaining sites could degrade sport fish populations and quality of angler experiences; therefore, angler satisfaction would be lower.	With the elimination of all stocking activities and the resultant decline or permanent loss of many fisheries across the state, a substantial decline in angler satisfaction would be anticipated.
Youth recruitment and outdoor recreation opportunities	Enhances opportunities (such as fishing derbies) for outdoor recreation for youth, supporting angler recruitment.	Enhances opportunities (such as fishing derbies) for outdoor recreation for youth, supporting angler recruitment, but to a much lesser extent than the Proposed Action due to the elimination of key stocking sites in or near urban areas.	With the elimination of all stocking activities, programs that enhance opportunities for outdoor recreation for youth and support angler recruitment would be severely limited.
Decline or loss of fisheries due to catastrophic events	Accommodates restoration of fisheries lost due to catastrophic events (e.g., algae blooms) at up to 50 sites.	Accommodates restoration of fisheries lost due to catastrophic events at up to 42 sites.	Accommodates no restoration of fisheries lost due to catastrophic events. Any total loss would be permanent.

Table 30. Comparison of potential effects on biological resources, recreation, and socioeconomics by alternative.

Resource/Topic	Alternatives Under Consideration		
	Proposed Action (166 stocking sites)	Reduced Stocking Alternative (101 stocking sites)	No Action (no sites)
Economic Value of Sport Fish Stocking	Results in highest angler-related expenditures and highest overall economic value. Annual economic value of stocking estimated at \$542.5 million ¹⁹ in Arizona.	Elimination of some sites would result in a reduction in angler-related expenditures and a lower overall economic value compared with the Proposed Action. Annual economic value of this level of stocking estimated at \$174.3 million ¹⁹ in Arizona.	Substantial reduction in angler-related expenditures and overall economic value compared with the other alternatives. No economic value added from stocking.

¹⁹ Economic estimates are relative values based on available data from 2001 and do not include all of the stocking sites in the action alternatives. Refer to Sections 4.2.2 and 4.2.3 for details on the approach used and its limitations.

5.0 SPORT FISH CONSERVATION AND MITIGATION PROGRAM

5.1 Introduction

Mitigation/conservation measures would be implemented to avoid, reduce, offset, or otherwise minimize environmental impacts associated with the Proposed Action. The AGFD has developed a Sport Fish Stocking CAMP for species potentially affected by proposed sport fish stocking activities. The measures identified in this mitigation and conservation program target consultation species addressed in the draft BCO and other special status aquatic and semi-aquatic species identified in this EA, collectively termed “Program Species.” Mitigation associated with the Proposed Action includes measures that address existing stressors such as the presence of nonnative aquatic species or loss of habitat. These measures would mitigate stocking impacts on consultation and other special status aquatic and semi-aquatic species and would contribute to the recovery of several species.

The CAMP has been included in its entirety below. AGFD’s mitigation and conservation program identifies two types of measures. The first type are committed mitigation/conservation activities targeted at Program Species, Additional Conservation Species with reasonable and prudent measures and terms and conditions identified in the draft BCO, and other special status aquatic and semi-aquatic species identified in the EA. The second are additional (non-mandatory) measures or activities targeting Program Species that would be implemented depending on funding availability. Only the committed mitigation/conservation measures described in the CAMP would constitute mandatory measures under the Proposed Action; these are listed in Tables 4 and 5 of the CAMP. The remaining measures listed in Table 6 of the CAMP would be implemented contingent on the availability of funding after committed mitigation/conservation obligations were met. AGFD funding is authorized by the Arizona Game and Fish Commission. Most measures in this CAMP are consistent with recovery actions in species recovery plans or actions in other conservation planning documents for species that do not have recovery plans (AGFD 2006a, FWS 1990a, 1990b, 1991, 1992, 1998b, 1998c, 2002, 2007b, 2008d, 2009b).

The CAMP describes mitigation/conservation measures only for the Proposed Action. If a different alternative were to be selected, ESA Section 7 consultation with AESO would be reinitiated to determine appropriate conservation measures, reasonable and prudent measures, and terms and conditions. Concomitant with the selection of any alternative that involves reduced stocking activities and reduced impacts to consultation and other special status species, there would be reduced funding and need for implementation of other mitigation/conservation measures. Under the No Action alternative, no mitigation would be implemented. The following text (indented) is the CAMP in its entirety.

Sport Fish Stocking Conservation & Mitigation Program

Conservation and Mitigation Program (CAMP) Overview

For over 40 years, the Arizona Game and Fish Department (AGFD) has provided significant management resources for the conservation of nongame wildlife. In 1967, the AGFD created a full time position for the management of nongame

species, the first such state position in the nation. Since 1967 the AGFD has developed one of the most robust state nongame programs in the nation, with expenditures of several million dollars per year.

The AGFD recognizes that the ability to continue to provide sport fishing opportunities is closely tied to the continued conservation of native aquatic species. It is upon this foundation, and consistent with its long history of conservation, that the Department intends to reduce and offset impacts of the stocking program through implementation of the Sport Fish Stocking Conservation & Mitigation Program (CAMP). To implement the CAMP, AGFD will commit an average of \$500,000 per year for the 10 year CAMP period; a total commitment of \$5 million over 10 years. This \$5 million will be a net increase in funding over current funding of AGFD programs toward conservation of CAMP species. The intent of the CAMP is to not only offset impacts but to contribute to the recovery and conservation of CAMP species (see below).

CAMP Species

CAMP includes activities targeted at both consultation species identified in the draft Biological and Conference Opinion (BCO) and additional other (non-consultation) sensitive aquatic species identified in the Environmental Assessment (EA). Collectively, these are termed the “CAMP Species.” CAMP Focal Species are those identified by the draft BCO that are federally listed or candidate species likely to be impacted by the stocking action (Table 1). Additional Conservation Species (ACS) are the other CAMP Species evaluated in the draft BCO comprised of federally listed or candidate species whose future conservation status can have a direct bearing on future sport fish stocking activities (Table 2). Other non-consultation sensitive aquatic species addressed by CAMP are found in Table 3.

Table 1. Draft BCO CAMP Focal Species

Species	ESA Status
Chiricahua leopard frog	Threatened
Headwater chub	Candidate
Loach minnow	Threatened
Narrow-headed garter snake	Potential Candidate ²⁰
Northern Mexican garter snake	Candidate
New Mexico meadow jumping mouse	Candidate
Northern leopard frog	Potential Candidate ¹ ; 12 Month Review in prep
Roundtail chub	Candidate

²⁰ Species likely to be listed in the near future were evaluated in the DBCO.

Table 2. Draft BCO CAMP Additional Conservation Species (ACS)

Species	ESA Status
Apache trout	Threatened
Bonytail chub	Endangered
Gila chub	Endangered
Gila topminnow	Endangered
Gila trout	Threatened
humpback chub	Endangered
Little Colorado spinedace	Threatened
Mount Graham red squirrel	Endangered
Razorback sucker	Endangered
Sonoran tiger salamander	Endangered
spikedace	Threatened
Southwestern willow flycatcher	Endangered

Table 3. Other non-consultation sensitive aquatic species

Species	Status
Longfin dace	S, SC
Speckled dace	S, SC
Sonora sucker	S, SC
Desert sucker	S, SC
Little Colorado sucker	S, SC, WSCA
Bluehead sucker	S
Lowland leopard frog	S, SC, WSCA

S = U.S. Department of Agriculture Forest Service and/or Bureau of Land Management Sensitive
 SC = U.S. Department of the Interior Fish and Wildlife Service Species of Concern
 WSCA = Wildlife of Special Concern in Arizona

CAMP Approach

CAMP Species currently are affected by a variety of human and natural caused threats on the landscape that impact both the species and their habitats. Examples of threats are habitat loss or degradation (including loss or reduction of surface water), predation/competition by non-native species and direct disturbance of individuals of a species by people. CAMP employs several approaches or tools that will be used to address the conservation needs of CAMP Species: 1) provide information that will help determine what actions are necessary for the conservation and recovery of CAMP Species or 2) directly implement conservation and recovery actions for CAMP Species. These tools include:

- Population inventory: systematic sampling of areas to assess species presence;
- Population or community monitoring: systematic sampling of populations to determine status and/or trend over time;
- Directed research: activities that focus on issues relating to CAMP Species to inform management actions (e.g. life history traits, habitat needs, reestablishment methods, sport fish interactions with program species);

- Address stressors: Identify and assess current and future key stressors to native aquatic wildlife populations that are, or may be, contributing to species declines. Collaborate with stakeholders to address, remove, minimize or reduce these key stressors;
- Reintroduction and augmentation: reintroduction or augmentation into historical range is a frequently used tool to recover species. Reintroductions are often coupled with construction of exclusion barriers and removal or suppression of nonnative species. Reintroductions and augmentations are implemented consistent with accepted guidelines such as George et al. (2009).
- Information, education, and outreach activities: includes signs, publications, promotions, and marketing activities intended to promote conservation stewardship by the public; and
- Guidelines: assessing, evaluating, and proposing modifications of guidelines or regulations that can protect or minimize threats to native aquatic species.

The fundamental concept of the CAMP is to provide aquatic community-based conservation actions that will benefit CAMP Species as well as other native species. Community-based conservation actions provide benefits to CAMP and other native species at the individual, population and watershed scales, and depending on location, can benefit multiple species at one time. Aquatic habitats available for conservation actions for CAMP Species are limited, thus, a community-based focus is critical to achieving CAMP goals and objectives. The tools used in this CAMP will often benefit multiple species in using this community-based approach. For example, reintroduction or augmentation actions will often include suppression or removal of nonnative species and salvage (and subsequent return) of existing native species prior to reintroduction of the target species benefitting the entire native aquatic community at the introduction site and possibly downstream and will also often include reintroduction of additional appropriate natives species in order to establish a functional native community.

CAMP Definitions

Stressors are identified in existing listing decisions, recovery plans or conservation agreements and are usually termed “**threats**” in most existing plans and agreements. Particular stressors that will be the focus of this program, and are most aligned with the AGFD’s authority, include nonnative predatory and competitive species, degraded habitat, and dewatered habitat or habitat with reduced flows. Addressing these may include eradicating, removing, or otherwise controlling non-native predatory and competitive species, restoring habitat, purchasing land, purchasing land with accompanying water rights, providing for instream flow protection, and other actions under the statutory authority of the

AGFD. Reduction or removal of stressors on the landscape is a tool that has a range of benefits at both the local and broad scales. Removal of sources of nonnative species from the landscape (e.g. to facilitate introductions or to eliminate a watershed source, etc.) minimizes impacts to native species at the site of removal and also minimizes downstream contributions of individuals that help maintain or augment resident nonnative populations.

To secure a population existing stressors (threats) would be removed or reduced to a level that would allow for the population to persist into the foreseeable future and contribute to recovery or conservation. The success of these actions will be evaluated based on a measurable improvement in population status (e.g. increase in numbers, distribution, or reproduction) and/or a measurable improvement in biological or physical characteristics (habitat) upon which the species depends (e.g. decreased numbers of nonnative competitor/predator species, decreased movement of nonnative fish following installation of a barrier, increased or protected/secured water flows). The effectiveness of these actions in meeting the desired outcome of securing each of the populations committed to in the CAMP will be monitored by AGFD and the results evaluated by FWS and AGFD. This evaluation will consider the following five factors when determining whether the intended outcome of the action has been met. Not all five factors will be applicable to every evaluation.

1. A measurable reduction in the stressors that have recognized adverse effects or an improvement in biological or physical characteristics.
2. Species persistence over time.
3. Detection of new individuals recruiting into the population or multiple age classes present. For short-lived species such as loach minnow or leopard frogs, simple persistence for 3+ years would imply recruitment was occurring. For long-lived species presence of multiple size classes and/or other methods would be used to determine if recruitment was occurring.
4. Relative abundance through time where appropriate.
5. Detection of species beyond initial geographic extent where appropriate.

To reintroduce a population (and if needed, augment since most reintroductions require multiple stocking events) the species would be stocked into a location within the historical range where the species does not currently exist. The success of these actions will be evaluated on the degree to which a population is established (i.e. established would be self-sustaining without a need of further stocking, establishing/potentially establishing would be reproducing whereby

additional stocking may still be needed, and not established would be no or insufficient reproduction to lead to a self sustaining population). Establishment of a population (self-sustaining or without a need for continued stocking) can take considerable time; therefore, it may not be possible to fully realize establishment within the timeframe of the CAMP implementation period. Therefore, by the end of the 10-year project timeframe the populations committed to must be determined to either be established or have shown sufficient progress towards becoming established by FWS AZESO. The effectiveness of reintroductions will be monitored by the AGFD and the results evaluated by FWS and AGFD. This evaluation will consider the following four factors when determining whether the intended outcome of the action has been met. Not all four factors will be applicable to every evaluation.

1. Species persistence since stocking.
2. Detection of new individuals recruiting into the population or multiple age classes present. For short-lived species such as loach minnow or leopard frogs, simple persistence for 3+ years without stocking would imply recruitment was occurring. For long-lived species presence of multiple size classes and/or other methods would be used to determine if recruitment was occurring.
3. Relative abundance through time since stocking where appropriate.
4. Dispersal beyond initial stocking locations where appropriate.

Funding and Authority to Implement Mitigation

Guidance from the Council of Environmental Quality directs agencies to provide mitigation that is reasonably certain to occur. To reach that conclusion there must be a funding source and authority to accomplish the mitigation.

To implement the CAMP, AGFD will commit an average of \$500,000 per year for the 10 year CAMP period. There will be multiple funding sources for implementation of this program. Funding sources that may be used to support the CAMP include, but are not limited to, any combination of the following: Sport Fish Restoration Act funds, Arizona Heritage Fund, Game and Fish fund, Wildlife Conservation Fund, and other eligible funds. The AGFD's budget process is administered by the Arizona Game and Fish Commission (AGFC). Funding sources that are received by the AGFD and committed to other required mitigation projects, such as the Central Arizona Project, or funds specifically dedicated such as the National Fish and Wildlife Foundation for Apache trout will not count towards this CAMP funding.

Authority to manage and regulate wildlife, including fish, in Arizona is provided under Arizona Revised Statute (ARS) Title 17. ARS Title 17 also outlines AGFD and AGFC authorities related to funding, the taking, handling, and management of wildlife (including regulations and licenses), fish hatching, and fish culture.

Some of the actions (e.g., establishment of new populations) will be located on U.S.D.A. Forest Service (USFS) and possibly, Bureau of Land Management (BLM) managed lands. The AGFC has a Master Memorandum of Understanding (October 2, 2007) with the BLM that establishes the AGFD's authority to manage fish and wildlife populations. The Master MOU is backed by a Joint Policy Statement (August 25, 2008) that restates that the parties will work cooperatively to manage resources on public lands and that the AGFD's mandate to meet statutory trust responsibilities to manage fish and wildlife populations is supported by the BLM. The AGFC also has a master MOU with the USFS which recognizes the AGFC and AGFD as having primary responsibility for managing fish and wildlife populations consistent to state and federal laws.

In addition to these agreements, the AGFD holds a Federal Fish and Wildlife Permit which authorizes activities for scientific purposes or to enhance the propagation and survival of federally listed species (ESA § 10(a)(1)(A)). The AGFD also has ESA § 6 authorities to manage threatened and endangered species.

Planning and CAMP Implementation

A 10-year planning document will be developed to guide annual work plans for actions included for mandatory activities as shown in Table 4 and Table 5 in the next section that prioritize and identify resources necessary to accomplish all objectives. Within the parameters of the 10-year plan there will be annual work plans that will describe activities to be undertaken each year

The annual work plan will be developed by AGFD in concert with FWS (AESO and WSFR). The plan will be completed by July 1 annually and will identify specific actions which will be taken for CAMP Species in that year. The first Annual Work Plan will be completed within 90 days of the finalization of the FONSI.

These annual work plans will identify and prioritize species, activities, conservation tools, budget and staffing that will implement achievable conservation objectives, including specific conservation actions or targets identified in Table 4 and 3 for CAMP Species within the \$500,000 average annual CAMP budget. To the extent that funding is available in a particular year,

conservation actions identified in Table 4 will be included in the annual work plan.

CAMP Activities

Two tiers of CAMP activities have been identified: 1) a set of mandatory conservation/mitigation activities that include activities targeted at CAMP Focal draft BCO species (Table 4), activities identified in the draft BCO as either reasonable and prudent measures (RPMs) or mandatory conservation measures as part of the proposed action (Table 4), and activities targeted at non-consultation sensitive aquatic species identified in the EA (Table 5); and 2) an additional set of non-mandatory activities targeting CAMP Species that will be implemented depending on funding availability (Table 6).

Each year WSFR, the AESO, and the AGFD will identify Table 4 and Table 5 activities for implementation that year. If funds remain after the Table 4 and Table 5 activities are funded, activities from Table 6 will be implemented.

CAMP activities will be coordinated to achieve maximum benefit for all CAMP species. For each measure, the magnitude of benefits for a species will vary, and some species may benefit directly and some species may benefit indirectly with the end result that mitigation commitments for all species are met by the end of the 10-year implementation.

The success of the CAMP over its lifetime will depend on the use of adaptive management to inform decisions about the actions undertaken. Adaptive Management is a decision process that involves flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. This process provides managers with flexibility to make decisions and take actions that accommodate uncertainties and provide the ability to change direction when necessary to achieve conservation objectives. By assessing past outcomes, management will learn what actions will best achieve the conservation and recovery objectives of the CAMP.

Adaptive Management is a structured iterative approach to resource management employed by both the U.S. Fish and Wildlife Service (Williams et al. 2009) and the Arizona Game and Fish Department (AGFD Policy I1.6). Generally, adaptive management consists of six steps that form a feedback loop: 1) assess problem/objective, 2) design an action, 3) implement an action, 4) assess outcomes, 5) evaluate achievement, and 6) adjust.

Every year, during the annual planning process, WSFR, AESO and AGFD will identify any modification of conservation actions that need to be taken due to

unforeseeable/changed circumstances or new information (such as destruction of proposed reintroduction habitat, new threats identified, new tools/technology) that affect the effectiveness or the ability to complete those actions. In turn, the agencies will identify new actions that will replace or augment previously identified actions. These new measures will offset effects of the proposed action and will provide as close to, the same or better benefit as the actions that are modified or eliminated. It is expected that the timelines identified for specific actions identified in this document will sometimes need to shift as the agencies go through this adaptive management process.

Table 4. Mandatory ESA Conservation Measures. Note that many CAMP species, regardless of activity focus as identified in the table, will benefit from actions identified in both the ESA and NEPA analyses.

Species	Conservation Measure		
Multiple species	Within three years, the AGFD shall convert to triploid rainbow trout for all AGFD hatchery stockings with the exception of closed systems and urban lakes.		
	The AGFD shall secure existing or reintroduce new conservation populations for Focal Species:		
	Species	Number of populations secured or reintroduced	Estimated Timeframe
	Chiricahua leopard frog	3	Within four years begin stocking or securing one population; Within six years begin stocking or securing a second population; Within eight years begin stocking or securing a third population
	Headwater chub	3	Within three years begin stocking or securing one population; Within six years begin stocking or securing a second population; Within eight years begin stocking or securing a third population
	Roundtail chub	3	Within two years begin stocking or securing one population; Within four years begin stocking or securing a second population; Within six years begin stocking or securing a third population

Species	Conservation Measure		
	Loach minnow	2	Within four years begin stocking or securing one population; Within six years begin stocking or securing a second population
	Northern leopard frog	2	Within four years begin stocking or securing one population; Within six years begin stocking or securing a second population
	²¹ Northern Mexican garter snake	2	Within five years begin stocking or securing one population; Within seven years begin stocking or securing a second population
	² Narrow-headed garter snake	2	Within five years begin stocking or securing one population; Within seven years begin stocking or securing a second population
	Within three years, the AGFD shall conduct a statewide live bait (bait fish and tiger salamander) use assessment and risk analysis to develop recommendations to amend live bait management. The AGFD shall present these recommendations to the Arizona Game and Fish Commission for implementation consideration.		
	Within three years, the AGFD shall review and update existing outreach programs addressing use of live bait to ensure they are adequately informing the public about capture, use, and proper disposal of live bait species.		
	Within three years, the AGFD shall review and update existing outreach programs on the risks to native aquatic species from the transport of nonnative aquatic species (sport fish, baitfish, other fish species, amphibians, invertebrates, and plants) to ensure they are adequately informing the public of the harmful nature of such actions, and means they can take to reduce or prevent inadvertent transport of such nonnative species.		
Apache trout	The AGFD shall continue to work with partners to annually evaluate barrier conditions on Mineral Creek, South Fork Little Colorado River, and West Fork Little Colorado River, survey for nonnative fish in recovery streams following the established schedule, and repair barriers in these three streams as needed as part of the proposed action. ²²		

²¹ Dependent upon available repatriation source, numbers, and protocols.

²² Funds expended to implement these activities do not contribute to meeting the annual average funding requirement of \$500,000.

Species	Conservation Measure
Chiricahua leopard frog	For warm-water sport fish stocking actions via contract vendors at sites where effects to Chiricahua leopard frogs are a concern, the “sensitive areas” HACCP plan shall be followed by AGFD personnel receiving the fish from the vendor. This “sensitive areas” plan shall involve the double-sorting and examination of all fish in the load to reduce the risk of introduction of unwanted aquatic organisms with the sport fish. Loads containing unwanted aquatic organisms shall be refused and not stocked. This measure will be implemented as needed.
	For coldwater sport fish stocking actions at sites where effects to Chiricahua leopard frogs are a concern and trout or grayling are coming from AGFD hatcheries, the HACCP plan for disease and parasite control at the hatchery shall be in place to reduce the risk of contamination of the fish to be stocked. This measure has been ongoing and will continue to be implemented. 3
	Within three years, the AGFD shall review the existing angler information concerning the restrictions on transport and use of tiger salamanders at Parker Canyon Lake and modify the information as deemed appropriate to increase angler awareness that such transport and use are harmful.
Gila chub	In two years during the 10-year period, the AGFD shall survey the occupied Gila chub habitat on public lands in Spring Creek above the barrier when habitat conditions are conducive to rainbow trout persistence. If any stocked rainbow trout are found, these shall be documented and removed from the stream and an additional survey to locate stocked rainbow trout shall be implemented in the following year. The first survey will be completed within three years.
Headwater chub	The AGFD shall implement actions to increase angler awareness of headwater chub, including the fact that headwater chub is not a legal sport fish at the East Verde River and Haigler Creek stocking sites. This measure will be completed within three years of implementation of the proposed action.
	Headwater chub habitats in the East Verde River and Tonto Creek shall be considered priority areas for use of triploid rainbow trout to avoid augmentations to existing wild populations. This measure will be implemented within three years of implementation of the proposed action.
	In order to obtain information needed to implement conservation actions, the AGFD shall undertake an assessment of headwater chub populations in the East Verde River, Tonto Creek, and the Haigler Creek drainage to determine population structure and extent, nonnative species present as stressors, sites for potential reestablishment, and identification of specific research needs. This assessment shall tier off the Arizona Statewide Conservation Agreement and Strategy (AGFD 2006) for headwater chub and five other native fish species, because that document contains considerable information on the conservation needs and a strategy to address those needs. The assessment shall serve as a guidance document for implementing conservation actions for the headwater chub. This assessment shall be completed within three years.

Species	Conservation Measure
Roundtail chub	The AGFD shall, within the first two years of the CAMP, develop an assessment of opportunities across the range of the roundtail chub focusing on those with the greatest potential for conservation benefits for the species. This assessment shall tier off the Arizona Statewide Conservation Agreement and Strategy (AGFD 2006) for roundtail chub and five other native fish species, as that document contains considerable information on the conservation needs and a strategy to address those needs. The assessment shall serve as a guidance document for implementing conservation actions for the roundtail chub.
Spikedace	The AGFD shall continue monitoring of the Upper Verde River to evaluate native and nonnative fish populations. Any individuals of the stocked sport fish species captured during such monitoring shall be removed from the river. This measure will be implemented following the established schedule of once every three years.
Loach minnow	In the event of insufficient Apache trout to meet annual recreational stocking demands, the East Fork Black River shall be stocked with Apache trout after those recreational stocking sites associated with a recovery population (i.e., West Fork Black River, West Fork Little Colorado River at Sheeps Crossing, and Lee Valley Lake). Any rainbow trout that are stocked into the East Fork Black River shall be sterile triploids to avoid any augmentation to the reproducing population of rainbow trout in the East Fork Black River. This measure will be ongoing and will be implemented as needed.
	If a spill from Big Lake or Crescent Lake is anticipated, the AGFD shall install a fish weir to capture fish and prevent downstream movement. If the weir is not installed prior to a spill, a survey for nonnative trout species in the occupied habitat of the loach minnow shall be completed within that spring/summer season. All nonnative fish species encountered during that survey shall be removed. This measure will be implemented as needed.
	In coordination with partners, the AGFD shall develop and implement a standard survey schedule and procedures to evaluate fish community with emphasis on stocked trout presence in the loach minnow occupied areas of the East Fork Black River drainage. The first survey shall be completed by the third year.
Northern leopard frog	For warm-water sport fish stocking actions via contract vendors at sites where effects to northern leopard frogs are a concern, the “sensitive areas” HACCP plan shall be followed by AGFD personnel receiving the fish from the vendor. This “sensitive areas” plan shall involve the double-sorting and examination of all fish in the load to reduce the risk of introduction of unwanted aquatic organisms with the sport fish. Loads containing unwanted aquatic organisms shall be refused and not stocked. This measure will be implemented as needed.
	For coldwater sport fish stocking actions at sites where effects to northern leopard frogs are a concern and trout or grayling are coming from AGFD hatcheries, the HACCP plan for disease and parasite control at the hatchery shall be in place to reduce the risk of contamination of the fish to be stocked. This measure has been ongoing and will continue to be implemented as needed. ³
Sonoran tiger salamander	The AGFD shall work with Federal, state, and private partners to identify and implement projects that reduce the risk of hybridization between Sonoran tiger salamanders and nonnative salamanders. This measure will be completed by year ten.

Species	Conservation Measure
	Within three years, the AGFD shall review the existing angler information concerning the restrictions on transport and use of tiger salamanders at Parker Canyon Lake and modify the information as deemed appropriate to increase angler awareness that such transport and use are harmful.
Northern Mexican garter snake	Within three years, the AGFD shall develop outreach material on garter snakes to attempt to reduce the deliberate killing or injuring of garter snakes by the public. Materials developed for this program shall be posted at stocking sites that contain populations of garter snakes.
	In providing for two garter snake populations either through securing existing but threatened populations or establishment of new conservation populations, a source for individuals to reestablish conservation populations is needed, as well as information on propagation, release options, and techniques for successfully securing existing threatened populations. Member organizations of the Garter Snake Conservation Working Group have initiated applied research in these arenas, and the AGFD shall contribute to these types of efforts during the 10-year program. Once sufficient information is obtained on techniques to reestablish populations and/or secure existing threatened populations, the AGFD shall initiate the population reestablishment and/or securing actions. Within two years the AGFD will develop a plan to support and/or implement research in these arenas. Supporting and/or implementing this research will then follow the plan.
	As part of all native fish reintroduction efforts in Arizona, the AGFD shall ensure that renovated streams occupied by northern Mexican garter snakes are quickly restocked with appropriate native fish species and native frog species that can provide prey for northern Mexican garter snakes in order to not put stress on any garter snake population through elimination of its forage base. This measure will be implemented as needed.
Narrow-headed garter snake	Within three years, the AGFD shall develop outreach material on garter snakes to attempt to reduce the deliberate killing or injuring of garter snakes by the public. Materials developed for this program shall be posted at stocking sites that contain populations of garter snakes.
	In providing for two garter snake populations either through securing existing but threatened populations or establishment of new conservation populations, a source for individuals to reestablish conservation populations is needed, as well as information on propagation, release options, and techniques for successfully securing existing threatened populations. Member organizations of the Garter snake Conservation Working Group have initiated applied research in these arenas, and the AGFD shall contribute to these types of efforts during the 10-year program. Once sufficient information is obtained on techniques to reestablish populations and/or secure existing threatened populations, the AGFD shall initiate the population reestablishment and/or securing actions. Within two years the AGFD will develop a plan to support and/or implement research in these arenas. Supporting and/or implementing this research will then follow the plan.

Species	Conservation Measure
	As part of all native fish reintroduction efforts in Arizona, the AGFD shall ensure that renovated streams occupied by narrow-headed garter snakes are quickly restocked with appropriate native fish species that can provide prey for narrow-headed garter snakes in order to not put stress on any garter snake population through elimination of its forage base. This measure will be implemented as needed.
Three Forks springsnail	The AGFD shall continue to implement the HACCP plan for operations at state hatcheries and the transport of trout to the stocking sites in the Black River drainage. This measure has been ongoing and will continue to be implemented as needed. ³
Mt Graham red squirrel	The AGFD shall coordinate with the Coronado National Forest on traffic management that can reduce the risk of mortality to Mount Graham red squirrels from vehicles accessing Riggs Flat Lake as part of continuing implementation of the Mount Graham Red Squirrel Recovery Plan. This measure will be implemented as needed. ³
Little Colorado spinedace	The stocking restrictions and implementing actions from the 1995 (USFWS 1995) and 2001 (USFWS 2001) incidental take statements for CC Craigin Reservoir, Knoll Lake, and Nelson Reservoir, except for modified creel survey requirements, are part of the Proposed Action for this consultation and shall be implemented over the next 10 years as described in those documents. Creel surveys shall occur no less than once every 10 years.
Arizona treefrog, Huachuca Distinct Population Segment	Within three years, the AGFD shall review the existing angler information concerning the restrictions on transport and use of tiger salamanders at Parker Canyon Lake and modify the information as deemed appropriate to increase angler awareness that such transport and use are harmful.
Bonytail chub Razorback sucker	A barrier net shall be installed at the La Paz County Park Lagoon immediately prior to the stocking event and remain in place for seven days after the stocking event.
	Prior to any stocking into La Paz County Park Lagoon, signs similar to those used on Lake Havasu shall be posted at the lagoon describing bonytail to anglers and informing them of what to do should they catch a bonytail. These signs shall remain in place as long as the barrier net is in place at the lagoon.
New Mexico meadow jumping mouse	The AGFD shall provide protection from human access impacts (completed within three years), and if needed, enhancement actions for meadow jumping mouse habitats on AGFD-owned lands on the West Fork Black River (if needed, completed within five years).
	The AGFD shall coordinate with the Apache–Sitgreaves National Forests on evaluations of effects to meadow jumping mouse habitat along the East and West Forks of the Little Colorado River. This measure will be implemented as needed.

Table 5. Mandatory NEPA Mitigation Measures. Note that many CAMP Species will benefit from actions identified in both the ESA and NEPA analyses.

Species	Mitigation Action
Other special status aquatic and semi-aquatic species	The AGFD shall contribute to the conservation of other special status aquatic and semi-aquatic species through the removal of key stressors. The AGFD shall address two stressors impacting these species and associated aquatic communities within each of the following sub-watersheds/ catchments: • Verde River sub-basin • Salt River sub-basin • Middle Gila sub-basin • Little Colorado River sub-basin • Bill Williams sub-basin A total of ten stressors will be addressed with implementation of this action. The timeframe for completion will be four stressors addressed by year four, two more by year six, two more by year eight, and two more by year ten.
	The AGFD shall contribute to the conservation of other special status aquatic and semi-aquatic species through planning using a watershed approach. The AGFD shall apply its Watershed-based Fish Management Process (AGFD 2009) to develop aquatic species management plans for all priority watersheds in the state. The planning process will include consideration for special status species and identify conservation opportunities for incorporation within the planning framework. Special status species will benefit through identification of focal management areas and restoration needs that can be prioritized into multiple land management programs and funding sources in a coordinated approach. For the first priority watershed, planning will begin within the first year and be completed by the third year.
Piscivorous riparian or aquatic nesting birds	Within the one year, the AGFD shall develop information tools to educate anglers on the impacts of fishing debris on riparian or aquatic nesting birds. The AGFD shall continue to support the monofilament recovery bin program by replacing old and providing new bins as needed.

Table 6. ESA Discretionary Conservation Measures that will be implemented contingent upon funding availability.

Species	Conservation Measure
Multiple species	The AGFD shall reintroduce ACS and sensitive aquatic species alongside Focal species as deemed appropriate during planning.
Arizona treefrog Huachuca DPS, Northern leopard frog, Northern Mexican garter snake, narrow- headed garter snake, headwater chub, roundtail chub, loach minnow, Chiricahua leopard frog, quitobaquito pupfish, desert pupfish, Sonoran tiger salamander, Gila topminnow, razorback sucker, Apache trout, Southwestern willow flycatcher, Little Colorado spinedace, page springs springsnail, Sonora chub, spikedace, three forks spring snail, yellow-billed cuckoo	The AGFD shall continue to work with partners to implement species recovery plans or other recovery/conservation strategies, including monitoring, nonnative species removal efforts, reestablishment of populations within the historical range, monitoring and repair of barriers, or other tools/approaches.
Chiricahua leopard frog, spikedace, loach minnow, Northern leopard frog, narrow- headed garter snake	The AGFD shall share information with, and periodically solicit available information from, the New Mexico Department of Game and Fish to assess if stocking at Luna Lake potentially may have impacts to native fish, leopard frog, and garter snake populations in the San Francisco River drainage.
Gila chub	The AGFD shall work with AESO and partners to develop and implement a recovery plan for the Gila chub. As part of that effort, conservation needs for the species relative to nonnative fish species will be identified and included in the plan.
Southwestern willow flycatcher	The AGFD shall work with the ASNF to evaluate impacts to physical and biological features of designated critical habitat on the West Fork Little Colorado River from anglers accessing the stocking sites at Greer and Sheeps Crossing.
Yellow-billed cuckoo	The AGFD shall work with the Coconino, Prescott, and Tonto National Forests to evaluate impacts to physical habitat features along the occupied habitats on the Verde River from anglers accessing the stocking sites at the middle Verde River, Oak Creek, West Clear Creek, and Wet Beaver Creek.

Species	Conservation Measure
Little Colorado spinedace	While implementing the Integrated Fisheries Management Plan for the Little Colorado River (Young et al. 2001) and the East Clear Creek Watershed Recovery Strategy for Little Colorado Spinedace and Other Riparian Species (USDA 1999), in cooperation with other partners, the AGFD shall consider other conservation measures to benefit the species. Such measures may include, but are not limited to: • Surveys in the Chevelon Creek watershed from the headwaters to Rock Art Ranch to identify nonnative species distribution and determine suitability of habitats for spinedace reintroductions; • Once suitable habitats are identified, plan and implement renovations and reintroductions of spinedace into the Chevelon Creek watershed; • Remove wild trout from drainages above CC Cragin Reservoir and green sunfish from below the reservoir; • Remove wild brown trout and nonnative warmwater fish species from the mainstem Little Colorado River above Lyman Lake; • Repatriate any spinedace found in Nelson Reservoir to occupied habitat upstream; • Continue to work with partners to replicate populations, fund habitat improvements, and maintain or improve habitat for spinedace on Wildlife Management areas that support spinedace.
New Mexico meadow jumping mouse	The AGFD shall explore opportunities to manage for suitable meadow jumping mouse habitats at other AGFD-owned properties in the White Mountains.
Humpback chub	While implementing the Integrated Fisheries Management Plan for the Little Colorado River (Young et al. 2001), the AGFD shall consider information and recommendations identified in Stone et al. (2007), Hilwig et al. (2009) and Valdez and Thomas (2009) regarding the Little Colorado River drainage above Grand Falls as a possible source of nonnative fish species (particularly channel catfish) into occupied humpback chub habitat in the lower Little Colorado River.

Evaluation & Reporting: Performance Measures and Outcomes

The AGFD will report on progress and implementation of mitigation measures annually over the 10-year period. Reports will be submitted to the WSFR and AESO. The annual report will provide the status of each activity, both new and ongoing, included in the reporting year's annual work plan. Annual Reports will be submitted by September 30 annually. Reporting on CAMP will be in a standalone document, reported separately from other grant documents.

The Annual Report will:

- Identify completion of annual work plan actions and evaluate the outcomes to date
- Identify ongoing actions and estimated completion and outcomes
- Identify remaining measures to be completed and evaluate the timeline and feasibility for completion
- Identify any modification of measures due to unforeseeable/changed circumstances that affect the ability to complete measures
- Identify how any new measures that may replace old measures will offset effects of the proposed action and are commensurate with initial measures that can no longer be implemented due to circumstances outside of WSFR or AGFD control
- Identify expenditures (including amount and source) on implementation of the measures during the reporting year
- Identify total funding to date.

FWS will review the annual report and evaluate progress to date.

Sufficient Progress Assessment

At the end of Year 3, Year 6 and in Year 10, the FWS (AESO and WSFR) will assess progress of CAMP using the following measures:

- CAMP Focal species population responses from reestablishment or securing actions based on criteria in definitions.
- Measurable reduction in stressors to other (non-consultation) special status aquatic and semi-aquatic CAMP species from stressor reduction actions. For example, this would include a measurable reduction or complete elimination of problem nonnative species or a measurable improvement in habitat quality or security.
- Sufficient progress toward completion of other mandatory activities;
- Evaluate whether intended magnitude of the mitigation measures has been achieved for all CAMP species.
- Contribution towards recovery of BCO species in the Action area.

Only if suitable progress is made, as determined by WSFR and AESO, will grant funds be eligible for use in implementing the Statewide Sport Fish Stocking Program.

Public Involvement

The public will be notified of Annual CAMP Report availability and reports will be posted on the AGFD website: www.azgfd.gov and hard copies will be made available upon request. CAMP progress updates will be provided to the AGFD

Commission. AGFD Commission meetings are held monthly and are open to the public. The public may comment or question any wildlife activity or program at any Commission meeting. A schedule of upcoming meetings is posted on the AGFD website. Members of the public can attend in person or view the meeting remotely via web-broadcasting.

Anticipated Benefits

The CAMP is designed to reduce and offset effects from the stocking action and contribute to recovery of consultation species and conservation of other (non-consultation) special status species. Though the CAMP is a 10-year program that will be operated concurrent with the 10-year stocking action, many of the benefits of the CAMP will be long lasting and accrue well beyond the 10-year project period. Beneficial outcomes of measures such as stressor removal, watershed plan development, establishing new populations, and others will continue beyond the 10-year period (e.g., reestablished populations are expected to persist into the foreseeable future).

The following discussion is a summary of the benefits of the actions that will be taken for the CAMP species. These actions are tied back to recovery plans or conservation plans, as appropriate.

Chiricahua leopard frog

Chiricahua leopard frog is a CAMP Focal species for conservation in the proposed action and as such, will receive benefits from both general and specific actions to address the effects of sportfish stocking on the species as part of the CAMP contained in the proposed action. As of 2009, there were 84 sites in Arizona at which Chiricahua leopard frog occur or are likely to occur in the wild, with four additional captive or partially captive refugia sites. Chiricahua leopard frogs also face a myriad of threats including disease, habitat desiccation, and predation from various nonnative species. According to the AESO analysis in the draft BCO for the proposed action, stocking at thirteen stocking locations has the potential to affect Chiricahua leopard frogs with varying probability and severity at eight occupied areas (East Fork Black River, Ellison/Lewis Creek, San Francisco River near Reserve, Cienega Creek, Empire Cienega, Scotia Canyon, Peña Blanca, and Tonto Creek). An important concern and potential effect is inadvertent transport of nonnative organisms or disease by stocking or by anglers using live bait. Predation to frogs by stocked sport fish is also a concern. These effects will be reduced and offset by the following measures found in that draft BCO and the CAMP in the proposed action. Most of these measures are directly tied to recovery actions identified in the Chiricahua leopard frog recovery plan

(USFWS 2007). Where this is the case the specific recovery action is identified after the measure.

1. For warm water sportfish stocking actions at sites where effects to Chiricahua leopard frogs are a concern, the “sensitive areas” HACCP plan will be followed by AGFD personnel receiving the fish from the vendor. This “sensitive areas” plan involves the double-sorting and examination of all fish in the load to reduce the risk of introduction of unwanted aquatic organisms with the sportfish. Loads containing unwanted aquatic organisms will be refused and not stocked. Recovery Actions 1.2.10; 1.2.11
2. For coldwater sportfish stocking actions at sites where effects to Chiricahua leopard frogs are a concern and trout or grayling are coming from AGFD hatcheries, the HACCP plan for disease and parasite control at the hatchery will be in place to reduce the risk of contamination of the fish to be stocked. Recovery Actions 1.2.10; 1.2.11
3. AGFD will, within three years, convert all rainbow trout stocking from its hatcheries to triploid individuals. While sterility of triploid rainbow trout is not absolute, this conversion will significantly reduce the opportunity for stocked rainbow trout to contribute to maintenance of any wild population. Recovery Action 1.2.10
4. AGFD will conduct a statewide live bait (bait fish and tiger salamanders) use assessment and risk analysis to develop recommendations to amend live bait management. These recommendations will be presented to the AGFC for implementation consideration. Recovery Actions 1.2.10.3
5. AGFD will review and update existing outreach programs addressing use of live bait to ensure they are adequately informing the public about capture, use, and proper discard of live bait species. Recovery Action 1.2.10.3
6. AGFD will review the existing angler information concerning the restrictions on transport and use of tiger salamanders at Parker Canyon Lake and modify the information as deemed appropriate to increase angler awareness that such transport and use are harmful. Recovery Action 1.2.10.3; 7.3.
7. AGFD will review and update existing outreach programs on the risks to native aquatic species from the transport of nonnative aquatic species (sportfish, baitfish, other fish species, amphibians, invertebrates, and plants) to ensure they are adequately informing the public of the harmful nature of such actions, and means they can take to reduce or

prevent inadvertent transport of such nonnative species. Recovery Action 1.2.10.3

8. AGFD commits to provide for three populations of Chiricahua leopard frog either through securing existing but threatened populations or establishment of new conservation populations. Recovery Actions 1.2.9; 1.2.17; 1.3; 3.
9. AGFD will share information with, and periodically solicit available information from, the New Mexico Department of Game and Fish to assess if stocking at Luna Lake potentially may have impacts to native fish, leopard frog, and garter snake populations in the San Francisco River drainage.

In particular, measures 1-3 will reduce potential effects of the proposed action; measures 4-7 will both reduce potential effects of the proposed action and offset effects of the proposed action by also reducing the risk posed to Chiricahua leopard frog from other actions (actions outside of the proposed action); measure 8 will offset effects of the proposed action by directly benefiting Chiricahua leopard frog, and measure 9 will involve data sharing to determine if effects will occur from stocking at one particular site (Luna Lake). The overall result of these measures will be a reduction in risk to Chiricahua leopard frog from the proposed action, an overall range-wide reduction in the risk of spread of potentially destructive non-native organisms and diseases, and either an increase of three populations of Chiricahua leopard frog or securing of three existing threatened populations or some combination. These would represent a substantial contribution to the conservation of this species and implementation of the recovery plan.

Additional actions are also included in the CAMP contained in the proposed action that are not intended as mitigation to this species but still may benefit this species. These additional efforts include removal of threats in Verde River, Salt River, LCR, and Gila River watersheds, and watershed planning in priority watersheds (Recovery Action 1.2.1). In addition, several non-mandatory measures including a general measure of implementing the recovery plan for the Chiricahua leopard frog. The non-mandatory measures will be implemented if funds are available.

Loach minnow

Loach minnow is a CAMP focal species for conservation in the proposed action and as such, will receive benefits from both general and specific actions to address the effects of sportfish stocking on the species as part of the draft BCO and CAMP contained in the proposed action. Loach minnow currently occupy 8

general locations in NM and AZ: Eagle Creek, North Fork East Fork Black River, White River including East Fork and North Fork, Aravaipa Creek, San Francisco and Blue rivers, Upper Gila River and tributaries East, Middle, and West Forks, and Tularosa Rivers and tributaries Negrito and Whitewater creeks. At these locations loach minnow range from abundant (Aravaipa Creek and Blue River) to possibly extirpated (Black River and Eagle Creek) and face a variety of threats. In recent years (2007-current), loach minnow have been stocked into 4 additional locations: Fossil Creek, Bonita Creek, Hot Springs Canyon, and Red Field Canyon. Loach minnow have been consistently more abundant in annual surveys at Hot Springs Canyon and young-of-year fish have been detected so they may be in the process of establishing a population (Robinson et al. 2011) but the status of the other stocking efforts is not yet conclusive (i.e. it is not know if they have or will establish populations). According to the AESO analysis in the draft BCO for the proposed action, stocking at thirteen stocking locations has the potential to affect loach minnow and loach minnow critical habitat in two areas (Black River and San Francisco River) and the potential to affect critical habitat in the Verde River and tributaries. The probability and severity of the effects vary. These effects will be reduced and offset by the following measures found in that draft BCO and the CAMP in the proposed action. Most of these measures are directly tied to recovery actions identified in the loach minnow recovery plan (USFWS 1991a). Where this is the case the specific recovery action is identified after the measure.

1. In coordination with AESO, ASNF, and USBR, AGFD will commit to provide for two loach minnow populations either through securing existing but threatened populations or establishment of new conservation populations. These efforts are over and above those included in the USBR funded Gila River Basin Native Fishes Conservation Program for the loach minnow. Recovery Actions 1 & 6
2. AGFD will, within three years, convert all rainbow trout stocking from its hatcheries to triploid individuals. While sterility of triploid rainbow trout is not absolute, this conversion will significantly reduce the opportunity for stocked rainbow trout to contribute to maintenance of any wild population. Recovery Action 1.7
3. In the event of insufficient Apache trout to meet annual recreational stocking demands, the East Fork Black River will be a first priority for stocked Apache trout after the recreational stocking sites that are associated with a recovery population (West Fork Black River, West Fork Little Colorado River at Sheeps Crossing, and Lee Valley Lake). Any rainbow trout that are stocked into the East Fork Black River will be sterile triploids to avoid any augmentation to the reproducing

population of rainbow trout in the East Fork Black River. Recovery Action 1.7

4. If a spill from Big Lake or Crescent Lake is anticipated, AGFD will place a fish weir to capture fish and prevent downstream movement. If the weir is not installed prior to a spill, a survey for trout species in the occupied habitat of the loach minnow will be completed within that spring/summer season immediately following the spill. All nonnative fish species encountered during that survey will be removed. Recovery Action 1.7
5. In coordination with partners, AGFD will develop and implement a standard survey schedule and protocol to evaluate the fish community with emphasis on stocked trout presence in the loach minnow occupied areas of the East Fork Black River drainage. Recovery Action 1.7 & 2
6. AGFD will share information with, and periodically solicit available information from, the New Mexico Department of Game and Fish to assess if stocking at Luna Lake potentially may have impacts to native fish, leopard frog, and garter snake populations in the San Francisco River drainage. Recovery Action 1.7
7. AGFD will conduct a statewide live bait (bait fish and tiger salamanders) use assessment and risk analysis to develop recommendations to amend live bait management. These recommendations will be presented to the Arizona Game and Fish Commission for implementation consideration. Recovery Action 1.7
8. AGFD will review and update existing outreach programs addressing use of live bait to ensure they are adequately informing the public about capture, use, and proper discard of live bait species. Recovery Action 1.7 & 9
9. AGFD will review and update existing outreach programs on the risks to native aquatic species from the transport of aquatic species (sportfish, baitfish, other fish species, amphibians, invertebrates, and plants) to ensure they are adequately informing the public of the harmful nature of such actions, and means they can take to reduce or prevent inadvertent transport of such species. Recovery Action 1.7 & 9

In particular, measures 2-4 will reduce potential effects of the proposed action; measures 7-9 will both reduce potential effects of the proposed action and offset effects of the proposed action by also reducing the risk posed to loach minnow from other actions (actions outside of the proposed action); measure 1 will offset effects of the proposed action by directly benefiting loach minnow, and measure 5-6 will involve monitoring and data sharing to determine if effects will occur at two sites (San Francisco River via stocking at Luna Lake and Black River). The

overall result of these measures will be a reduction in risk to loach minnow and critical habitat from the proposed action, an overall range-wide reduction in the risk of spread of potentially destructive non-native organisms, and either an increase of two populations of loach minnow or securing of two existing threatened populations or some combination. These outcomes would represent a substantial contribution to the conservation of this species and implementation of the recovery plan.

Additional actions are also included in the CAMP contained in the proposed action that are not intended as mitigation to this species but still may benefit this species. These additional efforts include removal of threats in Verde River, Salt River, and Gila River watersheds (Recovery Actions 6.2.4; 6.2.5; 1.6; 1.10; 1.11), watershed planning in priority watersheds, and several non-mandatory measures including a general measure of implementing the recovery plan for loach minnow. The non-mandatory measures will be implemented if funds are available.

Headwater chub

Headwater chub is a CAMP Focal species for conservation in the proposed action and as such, will receive benefits from both general and specific actions to address the effects of sportfish stocking on the species as part of the CAMP contained in the proposed action. Headwater chub currently occupy 23 locations in Arizona and New Mexico and the status of the populations range from unknown to unstable and threatened to stable and secure. Headwater chub also face a myriad of threats including habitat loss and predation by or competition with various nonnative species. According to the AESO analysis in the draft BCO for the proposed action, stocking at five stocking locations has the potential to affect headwater chub with varying probability and severity at nine occupied areas (East Verde River, Webber Creek, Pine Creek, The Gorge, Fossil Creek, Tonto Creek, Haigler Creek, Marsh Creek, Gordon Creek, and Tonto Creek). These effects will be reduced and offset by the following measures found in that draft BCO and the CAMP contained in the proposed action. Since the headwater chub is not listed it does not have a recovery plan. However, most of these measures are directly tied to the *Arizona Statewide Conservation Agreement for Roundtail Chub, Headwater Chub, Flannelmouth Sucker, Little Colorado River Sucker, Bluehead Sucker, and Zuni Bluehead Sucker* (AGFD 2006). Where this is the case the specific conservation action is identified after the measure.

1. AGFD commits to provide for three populations of headwater chub either through securing existing but threatened populations or establishment of new conservation populations. Conservation Actions 4.6; 4.8; 3

2. AGFD will, within three years, convert all rainbow trout stocking from its hatcheries to triploid individuals. While sterility of triploid rainbow trout is not absolute, this conversion will significantly reduce the opportunity for stocked rainbow trout to contribute to maintenance of any wild population. Conservation Action 3.2
3. Headwater chub habitats in the East Verde River and Tonto Creek are priority areas for use of triploid rainbow trout to avoid augmentations to existing wild populations. Conservation Action 3.2
4. AGFD will implement actions to increase angler awareness of headwater chub and inform them that at the East Verde River and Haigler Creek stocking sites it is not a legal sportfish.
5. In order to obtain information needed to implement conservation actions, AGFD will undertake an assessment of headwater chub populations in the East Verde River, Tonto Creek, and the Haigler Creek drainage to determine population structure and extent, nonnative species present as stressors, sites for potential reestablishment, and identification of specific research needs. This assessment will tier off the Arizona Statewide Conservation Agreement and Strategy (AGFD 2006) for headwater chub and five other native fish species, as that document contains considerable information on the conservation needs and a strategy to address those needs. The assessment will serve as a guidance document for implementing conservation actions for the headwater chub. Conservation Actions 5.1-5.4
6. AGFD will review and update existing outreach programs on the risks to native aquatic species from the transport of nonnative aquatic species (sportfish, baitfish, other fish species, amphibians, invertebrates, and plants) to ensure they are adequately informing the public of the harmful nature of such actions, and means they can take to reduce or prevent inadvertent transport of such nonnative species. Conservation Action 1.9

In particular, measure 2-3 will reduce potential effects of the proposed action; measures 4 & 6 will both reduce potential effects of the proposed action and offset effects of the proposed action by also reducing the risk posed to headwater chub from other actions (actions outside of the proposed action); measure 1 will offset effects of the proposed action by directly benefiting headwater chub, and measure 5 will involve monitoring to help determine the status of the species and identify conservation opportunities which is necessary to implement measure 1 and other future conservation actions. The overall result of these measures will be a reduction in risk to headwater chub from the proposed action, an overall range-wide reduction in the risk of spread of potentially destructive non-native

organisms, and either an increase of three populations of headwater chub or securing of three existing threatened populations or some combination. In addition, the required monitoring will allow management agencies to better assess the status of headwater chub, identify the most relevant threats, and ultimately identify conservation opportunities which are all needed to advance conservation of this species. These measures would represent a substantial contribution to the conservation of this species and implementation of the *Arizona Statewide Conservation Agreement for Roundtail Chub, Headwater Chub, Flannelmouth Sucker, Little Colorado River Sucker, Bluehead Sucker, and Zuni Bluehead Sucker*.

Addition actions are also included in the CAMP contained in the proposed action that are not intended as mitigation to this species but still may benefit this species. These additional efforts include removal of threats in Verde River and Salt River watersheds (Conservation Actions 3.1; 3.2; 3.9), watershed planning in priority watersheds, and several non-mandatory measures including a general measure of implementing the *Arizona Statewide Conservation Agreement for Roundtail Chub, Headwater Chub, Flannelmouth Sucker, Little Colorado River Sucker, Bluehead Sucker, and Zuni Bluehead Sucker*. The non-mandatory measures will be implemented if funds are available.

Roundtail chub

Roundtail chub is a CAMP Focal species for conservation in the proposed action and as such, will receive benefits from both general and specific actions to address the effects of sportfish stocking on the species as part of the CAMP contained in the proposed action. Roundtail chub currently occupy 31 streams in Arizona and New Mexico and the status of the stream populations range from unstable and threatened to unknown to stable and secure. Roundtail chub also face a myriad of threats including habitat loss and predation by or competition with various nonnative species. According to the AESO analysis in the draft BCO for the proposed action, stocking at 36 stocking sites and the Phoenix urban stocking locations has the potential to affect roundtail chub with varying probability and potential severity. The analysis for roundtail chub is complex and concludes that 18 occupied areas may be affected. The AESO analysis also concludes that stocking in the Phoenix urban lakes and Tempe Town Lake will not significantly affect the roundtail chub. In addition, at 16 of the stocking sites and 6 of the roundtail chub areas being affected only less predacious species will be stocked (rainbow trout, grayling, Apache trout, bluegill, and redear sunfish). The remaining 19 stocking sites and 12 occupied areas involve stocking both more and less predacious species into areas with varying potential for stocked species to escape and move into roundtail chub habitat. These effects will be reduced and

offset by the following measures found in that draft BCO and the CAMP contained in the proposed action. Roundtail chub is not listed it does not have a recovery plan; however, most of these measures are directly tied to the *Arizona Statewide Conservation Agreement for Roundtail Chub, Headwater Chub, Flannelmouth Sucker, Little Colorado River Sucker, Bluehead Sucker, and Zuni Bluehead Sucker* (AGFD 2006). Where this is the case the specific conservation action is identified after the measure.

1. AGFD commits to provide for three roundtail chub populations either through securing existing but threatened populations or establishment of new conservation populations. Conservation Actions 4.6; 4.8; 3
2. AGFD will, within three years, convert to triploid rainbow trout for all AGFD hatchery stockings except in closed systems and urban lakes.
3. AGFD will conduct a statewide live bait (bait fish and tiger salamanders) use assessment and risk analysis to develop recommendations to amend live bait management. These recommendations will be presented to the AGFC for implementation consideration. Conservation Action 3.2
4. AGFD will review and update existing outreach programs addressing use of live bait to ensure they are adequately informing the public about capture, use, and proper discard of live bait species. Conservation Action 3.2
5. AGFD will review and update existing outreach programs on the risks to native aquatic species from the transport of nonnative aquatic species (sportfish, baitfish, other fish species, amphibians, invertebrates, and plants) to ensure they are adequately informing the public of the harmful nature of such actions, and means they can take to reduce or prevent inadvertent transport of such nonnative species.
6. In order to obtain information needed to implement conservation actions, AGFD will undertake an assessment of roundtail chub populations to determine population structure and extent; nonnative species present as stressors, sites for potential reestablishment, and identification of specific research needs. These efforts will be structured to focus on areas across the range with the greatest potential for conservation benefits. The number and extent of such conservation actions will be determined through the annual work plan for the conservation program. Conservation Actions 5.3-5.4

In particular, measure 2 will reduce potential effects of the proposed action; measures 3-5 will both reduce potential effects of the proposed action and offset effects of the proposed action by also reducing the risk posed to roundtail chub

from other actions (actions outside the proposed action); measure 1 will offset effects of the proposed action by directly benefiting roundtail chub, and measure 6 will involve compellation of existing monitoring information and data to help determine the status of the species and identify conservation opportunities. The overall result of these measures will be a reduction in risk to roundtail chub from the proposed action, an overall range-wide reduction in the risk of spread of potentially destructive non-native organisms, and either an increase of three populations of roundtail chub or securing of three existing threatened populations or some combination. In addition, the required population assessments will allow management agencies to better assess the status of roundtail chub, identify the most relevant threats, and ultimately identify conservation opportunities which are all needed to advance conservation of this species. These measures would represent a substantial contribution to the conservation of this species and implementation of the *Arizona Statewide Conservation Agreement for Roundtail Chub, Headwater Chub, Flannelmouth Sucker, Little Colorado River Sucker, Bluehead Sucker, and Zuni Bluehead Sucker*.

Addition actions are also included in the CAMP contained in the proposed action that are not intended as mitigation to this species but still may benefit this species. These additional efforts include removal of threats in Bill Williams, Little Colorado River, Verde River, Gila River, and Salt River watersheds (Conservation Actions 3.1; 3.2; 3.9), watershed planning in priority watersheds, and several non-mandatory measures including a general measure of implementing the *Arizona Statewide Conservation Agreement for Roundtail Chub, Headwater Chub, Flannelmouth Sucker, Little Colorado River Sucker, Bluehead Sucker, and Zuni Bluehead Sucker*. The non-mandatory measures will be implemented if funds are available.

Narrow-headed Garter Snake

Narrow-headed garter snake is a CAMP Focal species for conservation in the proposed action and as such, will receive benefits from both general and specific actions to address the effects of sportfish stocking on the species as part of the CAMP contained in the proposed action. Narrow-headed garter snake currently occupy at least 19 areas in Arizona and New Mexico. The narrow-headed garter snake faces a myriad of threats including habitat loss and various nonnative species. According to the AESO analysis in the draft BCO for the proposed action, stocking at 20 stocking sites has the potential to affect narrow-headed garter snake. Effects from five of the stocking sites are considered limited and effects from an additional site (Luna Lake) is considered not likely; however, a mitigation measure is in place to determine if effects will occur. The remaining 14 sites have varying probability to affect narrow-headed garter snake with varying

severity at 4 narrow-head garter snake occupied areas (Black River, Canyon Creek, Middle Verde, and Oak Creek). In particular the main potential effects from the proposed action are anglers directly killing snakes (which is illegal but still could happen) and either spreading non-target organisms or stocked fish themselves which could affect the native fish prey base of the narrow-headed garter snake. These effects will be reduced and offset by the following measures found in that draft BCO and the CAMP contained in the proposed action. Since the narrow-headed garter snake is not listed it does not have a recovery plan. However, these measures are directly tied to actions identified in the draft Arizona State Wildlife Action Plan (AGFD 2011).

1. AGFD commits to provide for two NH garter snake populations either through securing existing but threatened populations or establishment of new conservation populations. In providing for two NH garter snake populations either through securing existing but threatened populations or establishment of new conservation populations, AGFD recognizes that a source for individuals to reestablish conservation populations is needed, as is information on propagation and release options. The Garter Snake Working Group has initiated work in these arenas, and AGFD will contribute to these efforts during the 10-year program. Once sufficient information on potential release sites, release progeny, and release methods is obtained, AGFD will initiate the reestablishment program.
2. AGFD will, within three years, convert to triploid rainbow trout for all AGFD hatchery stockings except in closed systems and urban lakes.
3. AGFD will develop outreach material on garter snakes to attempt to reduce the deliberate killing or injuring of garter snakes by the public. Materials developed for this program will be posted at stocking sites that contain populations of garter snakes.
4. AGFD will ensure that renovated streams occupied by NH garter snakes will be quickly restocked with appropriate native fish species that can provide prey for NH garter snakes so as to not put stress on any NH garter snake population through elimination of its forage base. This will be done as part of all native fish reintroduction efforts in Arizona near garter snake occupied areas.
5. AGFD will conduct a statewide live bait (bait fish and tiger salamanders) use assessment and risk analysis to develop recommendations to amend live bait management. These recommendations will be presented to the Arizona Game and Fish Commission for implementation consideration.

6. AGFD will review and update existing outreach programs addressing use of live bait to ensure they are adequately informing the public about capture, use, and proper discard of live bait species.
7. AGFD will review and update existing outreach programs on the risks to native aquatic species from the transport of nonnative aquatic species (sportfish, baitfish, other fish species, amphibians, invertebrates, and plants) to ensure they are adequately informing the public of the harmful nature of such actions, and means they can take to reduce or prevent inadvertent transport of such nonnative species.
8. AGFD will develop and implement a public education program on garter snakes to attempt to reduce the deliberate killing or injuring of garter snakes by the public. Materials developed for this program will be posted at stocking sites (in cooperation with land management agencies) that contain populations of garter snakes.
9. AGFD will work with New Mexico Department of Game and Fish to examine the role of escaped rainbow trout from Luna Lake in supporting wild rainbow trout populations in the San Francisco River, the Tularosa River, and Negrito Creek, both tributaries to the San Francisco River supporting NH garter snake.

In particular, measure 2 will reduce potential effects of the proposed action; measures 5-7 will both reduce potential effects of the proposed action and offset effects of the proposed action by also reducing the risk posed to narrow-headed garter snakes from other actions (actions outside the proposed action); measures 3 & 8 will offset effects of the proposed action by reducing the risk posed to narrow-headed garter snakes by illegal killing; measure 1 & 4 will offset effects of the proposed action by directly benefitting narrow-headed garter snakes, and measure 9 will involve data sharing to determine effects from one stocking site (Luna Lake). The overall result of these measures will be a reduction in risk to narrow-headed garter snake from the proposed action, an overall range-wide reduction in the risk of spread of potentially destructive non-native organisms, a reduction in the risk from illegal deliberate killing by people, and either an increase of two populations of narrow-headed garter snake or securing two existing threatened populations or some combination. These measures would represent a substantial contribution to the conservation of this species.

Additional actions are also included in the CAMP contained in the proposed action that are not intended as mitigation for this species but still may benefit this species. These additional efforts include removal of threats in Verde River, Salt River, and Gila River watersheds, watershed planning in priority watersheds, and several non-mandatory measures including a general measure of implementing

conservation for the species. The non-mandatory measures will be implemented if funds are available.

New Mexico meadow jumping mouse

New Mexico meadow jumping mouse is a CAMP Focal species for conservation in the proposed action and as such, will receive benefits from both general and specific actions to address the effects of sportfish stocking on the species as part of the CAMP contained in the proposed action. The New Mexico meadow jumping mouse currently occupies at least 23 areas in Arizona and New Mexico. The main threat for New Mexico meadow jumping mouse is habitat destruction including destruction and degradation of riparian vegetation. According to the AESO analysis in the draft BCO, stocking at six stocking locations has the potential to affect New Mexico meadow jumping mouse at six occupied areas with varying probability and severity. The potential effect of stocking is increased angler use of riparian areas which could lead to habitat degradation. These effects will be reduced and offset by the following measures found in that DBCO and the CAMP contained in the proposed action. Since the New Mexico meadow jumping mouse is not listed it does not have a recovery plan.

1. AGFD will provide protection from human access impacts, and if needed, enhancement actions for meadow jumping mouse habitats on AGFD owned lands on the West Fork Black River.
2. AGFD will coordinate with the Apache-Sitgreaves National Forest on evaluations of effects to meadow jumping mouse habitat along the East and West Forks of the Little Colorado River.

In particular, the measures will both reduce potential effects of the proposed action and offset effects of the proposed action by also reducing the effects to New Mexico meadow jumping mouse from other actions (actions outside the proposed action). These would represent site-specific mitigation and an overall contribution to the conservation of this species.

An additional action is also included in the CAMP contained in the proposed action that is not intended as mitigation for this species but still may benefit this species. This action is a non-mandatory action of exploring opportunities to manage for suitable meadow jumping mouse habitats at other AGFD-owned properties in the White Mountains.

Northern leopard frog

Northern leopard frog is a CAMP Focal species for conservation in the proposed action and as such, will receive benefits from both general and specific actions to address the effects of sportfish stocking on the species as part of the CAMP

contained in the proposed action. The western populations of northern leopard frog are found in Arizona, California, Colorado, Idaho, Iowa, Minnesota, Missouri, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, Texas, Utah, Washington, Wisconsin, and Wyoming. Northern leopard frogs have declined throughout their range and face a myriad of threats including disease, habitat desiccation and destruction, and predation from various nonnative species. According to the AESO analysis in the draft BCO, stocking at 22 stocking locations has the potential to affect northern leopard frogs with varying probability and severity. Of those 22 sites, 11 could affect frogs in currently known occupied areas and the other 11 could affect frogs in historically occupied areas if those areas are still occupied. An important concern and potential effect is inadvertent transport of nonnative organisms or disease by stocking or by anglers using live bait. Predation of frogs by stocked sport fish is also a concern. These effects will be reduced and offset by the following measures found in that draft BCO and the CAMP contained in the proposed action. Since the northern leopard frog is not listed it does not have a recovery plan.

1. AGFD commits to provide for two northern leopard frog populations either through securing existing but threatened populations or establishment of new conservation populations. Replication of the Lyman Lake population into another portion of the eastern Little Colorado River drainage (the Forks area of the Little Colorado River is a potential area) is included in this commitment.
2. For warmwater sport fish stocking actions at sites where effects to northern leopard frogs are a concern, the “sensitive areas” HACCP plan will be followed by AGFD personnel receiving the fish from the vendor. This “sensitive areas” plan involves the double-sorting and examination of all fish in the load to reduce the risk of introduction of unwanted aquatic organisms with the sport fish. Loads containing unwanted aquatic organisms will be refused and not stocked.
3. For fish coming from AGFD hatcheries, the HACCP plan for disease and parasite control at the hatchery will be in place to reduce the risk of contamination of the fish to be stocked.
4. AGFD will, within three years, convert to triploid rainbow trout for all AGFD hatchery stockings except in closed systems and urban lakes.
5. AGFD will conduct a statewide live bait (bait fish and tiger salamanders) regulation assessment and risk analysis to develop recommendations to amend live bait regulations. These recommendations will be presented to the AGFC for implementation consideration.

6. AGFD will review and update existing outreach programs addressing use of live bait to ensure they are adequately informing the public about the regulations regarding capture, use, and proper discard of live bait species.
7. AGFD will share information with, and periodically solicit available information from, the New Mexico Department of Game and Fish to assess if stocking at Luna Lake potentially may have impacts to native fish, leopard frog, and garter snake populations in the San Francisco River drainage.

In particular, measures 2-4 will reduce potential effects of the proposed action; measures 5 & 6 will both reduce potential effects of the proposed action and offset effects of the proposed action by also reducing the risk posed to northern leopard frog from other actions (actions outside of the proposed action); measure 1 will offset effects of the proposed action by directly benefitting northern leopard frog, and measure 7 will involve data sharing to determine if effects will occur from stocking at one particular site (Luna Lake). The overall result of these measures will be a reduction in risk to northern leopard frog from the proposed action, an overall range-wide reduction in the risk of spread of potentially destructive non-native organisms and diseases, and either an increase of three populations of northern leopard frog or securing of three existing threatened populations or some combination. These would represent a substantial contribution to the conservation of this species.

Additional actions are also included in the CAMP contained in the proposed action that are not intended as mitigation to this species but still may benefit this species. These additional efforts include removal of threats in Verde River, Salt River, LCR, and Gila River watersheds, watershed planning in priority watersheds, and several non-mandatory measures including a general measure of implementing the conservation measures for this species. The non-mandatory measures will be implemented if funds are available.

Northern Mexican Garter Snake

Northern Mexican garter snake is a CAMP Focal species for conservation in the proposed action and as such, will receive benefits from both general and specific actions to address the effects of sportfish stocking on the species as part of the CAMP contained in the proposed action. The northern Mexican garter snake currently occupies at least eight areas in Arizona and status at ten additional sites is unknown. Northern Mexican garter snakes face a myriad of threats including habitat loss, food source loss and replacement with inedible or less suitable nonnative species, and predation by and competition with various nonnative

species. According to the AESO analysis in the draft BCO for the proposed action, stocking at 32 stocking locations has the potential to affect northern Mexican garter snake. Effects from 23 of those 32 stocking sites are considered limited. The remaining nine sites have varying probabilities of affect Northern Mexican garter snake with varying severity at seven areas (Middle Verde River, Oak Creek, Arivaca Cienega, Cienega Creek, Scotia Canyon, San Rafael Valley, and Sonoita Creek). These effects will be reduced and offset by the following measures found in the draft BCO and the CAMP contained in the proposed action. The northern Mexican garter snake is not listed and does not have a recovery plan. However, these measures are directly tied to actions identified in the draft Arizona State Wildlife Action Plan (AGFD 2011) and address general threats identified in the 12-month finding for northern Mexican garter snake (USFWS 2008).

1. AGFD commits to provide for two NM garter snake populations either through securing existing but threatened populations or establishment of new conservation populations. AGFD recognizes that a source for individuals to reestablish conservation populations is needed to accomplish this measure, as is information on propagation and release options. The Garter Snake Working Group has initiated work in these arenas, and AGFD will contribute to these efforts during the 10-year program. Once sufficient information on potential release sites, release progeny, and release methods is obtained, AGFD will initiate the reestablishment program.
2. AGFD will, within three years, convert to triploid rainbow trout for all AGFD hatchery stockings except in closed systems and urban lakes.
3. AGFD will develop outreach material on garter snakes to attempt to reduce the deliberate killing or injuring of garter snakes by the public. Materials developed for this program will be posted at stocking sites (in cooperation with land management agencies) that contain populations of garter snakes.
4. AGFD will ensure that renovated streams occupied by NM garter snakes will be quickly restocked with appropriate native fish species and native frog species that can provide prey for NM garter snakes so as to not put stress on any NM garter snake population through elimination of its forage base. This will be done as part of all native fish reintroduction efforts in Arizona near garter snake occupied areas.
5. AGFD will conduct a statewide live bait (bait fish and tiger salamanders) use assessment and risk analysis to develop recommendations to amend live bait management. These

recommendations will be presented to the AGFC for implementation consideration.

6. AGFD will review and update existing outreach programs addressing use of live bait to ensure they are adequately informing the public about capture, use, and proper discard of live bait species.
7. AGFD will review and update existing outreach programs on the risks to native aquatic species from the transport of nonnative aquatic species (sportfish, baitfish, other fish species, amphibians, invertebrates, and plants) to ensure they are adequately informing the public of the harmful nature of such actions, and means they can take to reduce or prevent inadvertent transport of such nonnative species.

In particular, measure 2 will reduce potential effects of the proposed action; measures 5-7 will both reduce potential effects of the proposed action and offset effects of the proposed action by also reducing the risk posed to northern Mexican garter snake from other actions (actions outside the proposed action); measure 3 will offset effects of the proposed action by reducing the risk posed to narrow-headed garter snakes by illegal killing; measure 1 & 4 will offset effects of the proposed action by directly benefitting northern Mexican garter snake. The overall result of these measures will be a reduction in risk to northern Mexican garter snake from the proposed action, an overall range-wide reduction in the risk of spread of potentially destructive non-native organisms, a reduction in the risk from illegal deliberate killing by people, and either an increase of two populations of northern Mexican garter snake or securing of two existing threatened populations or some combination. These measures would represent a substantial contribution to the conservation of this species.

Additional actions are also included in the CAMP contained in the proposed action that are not intended as mitigation for this species but still may benefit this species. These additional efforts include removal of threats in Verde River, Salt River, and Gila River watersheds, watershed planning in priority watersheds, and several non-mandatory measures including a general measure of implementing conservation for northern Mexican garter snake. The non-mandatory measures will be implemented if funds are available.

Other consultation species with likely to adversely affect calls

The following species were determined by the AESO analysis in the draft BCO for the proposed action to have potential negative effects but were not identified in that analysis as a focal species for the conservation measures due to a lesser level of effects: Apache trout, Bonytail chub, Gila chub, Gila topminnow, Gila trout, humpback chub, Little Colorado spinedace, Mount Graham red squirrel,

Razorback sucker, Sonoran tiger salamander, spinedace, and Southwestern willow flycatcher. However, several mitigation and conservation measures were identified in the draft BCO and CAMP contained in the proposed action that will reduce and offset effects to some of these species from the proposed action. Many of these measures are directly tied to recovery actions in the species recovery plans (USFWS 2009, USFWS 2002, USFWS 1998a, USFWS 1998b, USFWS 1992, USFWS 1990b, USFWS 1990c).

General measures that would benefit all aquatic species on this list

1. AGFD will, within three years, convert to triploid rainbow trout for all AGFD hatchery stockings except in closed systems and urban lakes.
2. AGFD will conduct a statewide live bait (bait fish and tiger salamanders) use assessment and risk analysis to develop recommendations to amend live bait management. These recommendations will be presented to the AGFC for implementation consideration.
3. AGFD will review and update existing outreach programs addressing use of live bait to ensure they are adequately informing the public about capture, use, and proper discard of live bait species.
4. AGFD will review and update existing outreach programs on the risks to native aquatic species from the transport of nonnative aquatic species (sportfish, baitfish, other fish species, amphibians, invertebrates, and plants) to ensure they are adequately informing the public of the harmful nature of such actions, and means they can take to reduce or prevent inadvertent transport of such nonnative species.

Apache trout

5. The AGFD shall continue to work with partners to evaluate barrier conditions on the three streams, survey for nonnative fish in recovery streams, and repair barriers as part of the proposed action. Recovery Actions 1.11-1.12

Gila chub

6. In two years during the 10-year period, the AGFD shall survey the occupied Gila chub habitat on public lands in Spring Creek above the barrier when habitat conditions are conducive to rainbow trout persistence. If any stocked rainbow trout are found, these shall be documented and removed from the stream and an additional survey to locate stocked rainbow trout shall be implemented in the following year.

Spikedace

7. The AGFD shall continue monitoring of the Upper Verde River to evaluate native and nonnative fish populations. Any individuals of the stocked sport fish species captured during such monitoring shall be removed from the river and reported annually. Recovery Action 2.5

Sonoran tiger salamander

8. The AGFD shall work with Federal, state, and private partners to identify and implement projects that reduce the risk of hybridization between Sonoran tiger salamanders and nonnative salamanders. Recovery Action 3.1-3.2
9. The AGFD shall review the existing angler information concerning the restrictions on transport and use of tiger salamanders at Parker Canyon Lake and modify the information as deemed appropriate to increase angler awareness that such transport and use are harmful. Recovery Actions 7.1-7.2

Mount Graham red squirrel

10. The AGFD shall coordinate with the Coronado National Forest on traffic management that can reduce the risk of mortality to Mount Graham red squirrels from vehicles accessing Riggs Flat Lake as part of continuing implementation of the Mount Graham Red Squirrel Recovery Plan. Recovery Action 1.2.7

Little Colorado spinedace

11. The stocking restrictions and implementing actions from the 1995 (FWS 1995) and 2001 (FWS 2001) incidental take statements for CC Cragin Reservoir, Knoll Lake, and Nelson Reservoir, except for modified creel survey requirements, are part of the Proposed Action for this consultation and shall be implemented over the next 10 years as described in those documents. Creel surveys shall occur no less than once every 10 years. Recovery Actions 1.5.1; 3.1.2; 3.1.3

Bonytail chub and razorback sucker

12. Prior to any stocking into La Paz County Park Lagoon, signs similar to those used on Lake Havasu will be posted at the lagoon describing bonytail to anglers and informing them of what to do should they catch one. These signs will remain in place as long as the barrier net is in place at the lagoon. Bonytail chub Recovery Action 4.41.
13. A barrier net will be placed at the La Paz County Park Lagoon immediately prior to the stocking event and remain in place for seven days after the stocking event. Razorback sucker Recovery Action 1.3.1 and Bonytail chub Recovery Action 1.12

In particular, measure 1 will reduce potential effects of the proposed action; and measures 2-4 will both reduce potential effects of the proposed action and offset effects of the proposed action by also reducing the risk posed to many of these species from other actions (actions outside the proposed action).

Measure 5 & 6 consists of monitoring at three Apache trout and one Gila chub populations to determine if effects could occur. This measure will also provide direct benefit to Apache trout and Gila chub by reducing the risk of barrier failure and total loss of a population should a barrier fail. Since this risk is mostly associated with the existing populations of nonnative species near these sites, this benefit would be offsetting potential effects from the proposed action on these species by reducing risks.

Measure 7 consists of monitoring at a spinedace population to determine if effects from the proposed action occur and to reduce those effects if they were to occur by removing the stocked fish.

Measure 8 would offset effects of the proposed action by directly benefiting Sonoran tiger salamander through reduction of genetic threats from nonnative salamanders. Measure 9 would both reduce potential effects of the proposed action and offset effects by also reducing the risk posed to Sonoran tiger salamander from other actions (actions outside the proposed action).

Measure 10 would reduce the effects from the proposed action on Mount Graham red squirrel.

Measure 11 includes several measures that would monitor at several stocking locations to determine if effects occur to Little Colorado River spinedace. In addition, several measures included would implement management and stocking practices that would reduce the risk of stocked fish escapement from several stocking locations with nearby Little Colorado River spinedace populations.

Measures 12 & 13 would reduce the effects of the proposed action on razorback sucker and bonytail chub.

Overall, these measures would represent reductions in the effects to several additional consultation species for which the AESO identified as needing mitigation in the draft BCO for the proposed action. In addition, some of these measures would also contribute to the general conservation of many of these species.

Additional actions are also included in the CAMP in the proposed action that are not intended to as mitigation to these species but still may benefit these species. These additional efforts include removal of threats in five watersheds, watershed planning in priority watersheds, and several non-mandatory measures including a general measure of implementing recovery plans for these species or other conservation strategies for the species without recovery plans. The non-mandatory measures will be implemented if funds are available.

Non-consultation fish species (longfin dace, speckled dace, desert sucker, Sonoran sucker, LCR sucker, and bluehead sucker).

The proposed action has the potential to affect longfin dace, speckled dace, desert sucker, Sonoran sucker, LCR sucker, and bluehead sucker. The potential effects are summarized in the following table:

Summary of Potential Effects to Non-Consultation Fish and One Amphibian

Species	Low Potential Effects (# of stocking sites)	Moderate Potential Effects (# of stocking sites)	High Potential Effects (# of stocking sites)
longfin dace	35	10	0
speckled dace	55	15	0
Sonora sucker	75	4	0
desert sucker	76	5	0
Little Colorado sucker	13	10	0
bluehead sucker	32	13	0
lowland leopard frog	27	5	4

Definitions from Draft EA

High—Stocking locations predicted to have exposure that was highly probable and the potential biological impacts to non-consultation special status species would be expected to be substantial. Actions at these stocking sites could result in long-term population declines of other special status species in a localized area or at a watershed level.

Moderate—Stocking locations predicted to have exposure that was more limited in probability or to have exposure that was highly probable but in conjunction with potential biological impacts to other special status species that were not substantial. Actions at these sites, when analyzed at a site-specific level, could

impact individuals of other special status species or even cause temporary and/or localized population declines but would not likely result in long-term population declines at a watershed level. However, individual sites, when considered together with other stocking sites in the same watershed that had “Moderate” outcomes, could have more substantial impacts and result in long-term population declines of other special status species in a localized area or at a watershed level.

Low—Stocking locations predicted to have exposure that was limited in probability or probable exposure but in conjunction with limited potential biological impacts to other special status species. Actions at these sites could impact individuals of other special status species but would not likely result in population declines of other special status species even when considered with other stocking sites within the same watershed that had “Low” outcomes.

These effects will be reduced and offset by the following measures found in the CAMP contained in the proposed action. Since these species are not listed they do not have a recovery plans. However, these measures are directly tied to actions identified in the draft Arizona State Wildlife Action Plan (AGFD 2011).

14. The AGFD shall contribute to the conservation of other special status aquatic and semi-aquatic species (i.e. non-consultation species) through the removal of key stressors. The AGFD shall address two stressors impacting these species and associated aquatic communities within each of the following sub-watersheds/catchments:
 - a. Verde River sub-basin
 - b. Salt River sub-basin
 - c. Middle Gila sub-basin
 - d. Little Colorado River sub-basin
 - e. Bill Williams sub-basin
15. The AGFD shall contribute to the conservation of other special status aquatic and semi-aquatic species (i.e. non-consultation species) through planning using a watershed approach. The AGFD shall apply the Watershed-based Fish Management Process (AGFD 2009) to develop aquatic species management plans for all priority watersheds in the state. The planning process will include consideration for special status species and identify conservation opportunities for incorporation within the planning framework. Special status species will benefit through identification of focal management areas and restoration needs that can be prioritized into multiple land management programs and funding sources in a coordinated approach.

16. AGFD will, within three years, convert to triploid rainbow trout for all AGFD hatchery stockings except in closed systems and urban lakes.
17. AGFD will conduct a statewide live bait (bait fish and tiger salamanders) use assessment and risk analysis to develop recommendations to amend live bait management. These recommendations will be presented to the AGFC for implementation consideration.
18. AGFD will review and update existing outreach programs addressing use of live bait to ensure they are adequately informing the public about capture, use, and proper discard of live bait species.
19. AGFD will review and update existing outreach programs on the risks to native aquatic species from the transport of nonnative aquatic species (sportfish, baitfish, other fish species, amphibians, invertebrates, and plants) to ensure they are adequately informing the public of the harmful nature of such actions, and means they can take to reduce or prevent inadvertent transport of such nonnative species.

In particular, measure 3 will reduce potential effects of the proposed action; measures 4-6 will both reduce potential effects of the proposed action and offset effects of the proposed action by also reducing the risk posed to these species from other actions (actions outside the proposed action); and measure 1 & 2 will offset effects of the proposed action by reducing threats from other actions (actions outside the proposed action) and threats from the existing baseline; and developing a plan that will identify focal management areas and restoration needs for native species that can be prioritized into multiple land management programs and funding sources in a coordinated approach. These measures would represent a substantial contribution to the conservation of these species.

Additional actions are also included in the CAMP in the proposed action that are not intended to mitigate and offset impacts to these species but still may benefit this species. These additional efforts include reestablishment of some of these species along with focal species in a community-based approach.

Lowland leopard frog

Lowland leopard frog are now found mainly in Arizona but historically were also found in SE California, SW New Mexico, and N Sonora (Sredl 1997). The status of the species in Sonora is poorly known, it is believed to be extirpated from California, and the last detection in New Mexico (1 individual) was in 2000 (Sredl 2005, Sredl 1997). Sredl (1997) detected lowland leopard frog in Arizona at 43 of 115 surveyed historical locations and 61 new sites for a total of 104 known occupied locations as of the mid 1990's (140 historical sites were not surveyed).

During this survey lowland leopard frog were found in the following watersheds: Colorado River, Bill Williams River, Upper Gila River, San Pedro River, Santa Cruz River, Salt River, Aqua Fria River, Verde River, and Rio Concepcion.

Stocking at 36 stocking sites has the potential to affect lowland leopard frogs, with 27 of those sites having a low potential effect (will only affect individuals or affect populations on a short-term basis/see definition). Of the remaining sites, 4 will have a high potential effect and 5 will have a moderate potential effect (see above definitions). The high potential effect stocking locations are in the Bill Williams (2) and the Verde River (2) watersheds. The moderate effect stocking locations are in the Verde River (2), Santa Cruz (1), and Salt River (2).

Based on the site level analysis in this EA, none of the high effects stocking actions would result in watershed-level declines of lowland leopard frogs because in both watersheds where high effects occur lowland leopard frog have additional available habitat and are known from several locations besides the locations being impacted by the stocking action. However, at these stocking locations stocked fish could have impacts to local populations.

These effects will be reduced and offset by the following measures found in the CAMP contained in the proposed action. Since these species are not listed they do not have a recovery plans. However, these measures are directly tied to actions identified in the draft Arizona State Wildlife Action Plan (AGFD 2011).

1. The AGFD shall contribute to the conservation of other special status aquatic and semi-aquatic species (i.e. non-consultation species) through the removal of key stressors. The AGFD shall address two stressors impacting these species and associated aquatic communities within each of the following sub-watersheds/catchments:
 - a. Verde River sub-basin
 - b. Salt River sub-basin
 - c. Middle Gila sub-basin (including Santa Cruz watershed)
 - d. Little Colorado River sub-basin
 - e. Bill Williams sub-basin
2. The AGFD shall contribute to the conservation of other special status aquatic and semi-aquatic species (i.e. non-consultation species) through planning using a watershed approach. The AGFD shall apply the its Watershed-based Fish Management Process (AGFD 2009) to develop aquatic species management plans for all priority watersheds in the state. The planning process will include consideration for special status

species and identify conservation opportunities for incorporation within the planning framework. Special status species will benefit through identification of focal management areas and restoration needs that can be prioritized into multiple land management programs and funding sources in a coordinated approach.

3. AGFD will, within three years, convert to triploid rainbow trout for all AGFD hatchery stockings except in closed systems and urban lakes.
4. AGFD will conduct a statewide live bait (bait fish and tiger salamanders) use assessment and risk analysis to develop recommendations to amend live bait management. These recommendations will be presented to the AGFC for implementation consideration.
5. AGFD will review and update existing outreach programs addressing use of live bait to ensure they are adequately informing the public about capture, use, and proper discard of live bait species.
6. AGFD will review and update existing outreach programs on the risks to native aquatic species from the transport of nonnative aquatic species (sportfish, baitfish, other fish species, amphibians, invertebrates, and plants) to ensure they are adequately informing the public of the harmful nature of such actions, and means they can take to reduce or prevent inadvertent transport of such nonnative species.

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6.0 CUMULATIVE EFFECTS

Cumulative effects result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). Certain conditions (e.g., climate change) may also contribute to cumulative effects. In this section, the term “actions” is defined to include anthropogenic activities and conditions, such as climate change.

The level and scale of the cumulative analysis should be commensurate with the proposed project’s potential impacts, scale, and other factors. NEPA documents should consider those past, present, and future actions that incrementally contribute to the cumulative effects on resources affected by the proposed action (CEQ 1997).

This chapter summarizes and analyzes relevant past, present, and reasonably foreseeable actions that are expected to contribute to the cumulative impact. It describes relevant cumulative effects issues and assessment goals, geographic and temporal scales for cumulative effects analysis, and past, present, and reasonably foreseeable future actions that are expected to result in cumulative effects. Based on CEQ guidance, this analysis addresses resources most likely to be significantly affected, focuses on meaningful or important effects, and includes all relevant federal, non-federal, and private actions (CEQ 1997). Per this guidance, the cumulative effects analysis in this chapter addresses impacts to biological resources—special status aquatic and semi-aquatic species. These include federally listed and candidate species as well as aquatic and semi-aquatic species with other (federal or non-federal) special status designations.

6.1 Cumulative Effects Issues and Assessment Goals

The primary issue identified during the scoping process is the potential effect of the Proposed Action on special status aquatic and semi-aquatic species. The analysis in this EA indicates that these are the species that have the most potential to experience negative effects across a range of spatial or geographic scales (from stocking site to regional scale). The assessment goals for cumulative effects on these species are to identify the extent to which past, present, and reasonably foreseeable future actions contribute to the continued decline of these species or contribute to their conservation or recovery.

6.2 Geographic Scope for Analysis

The geographic scope of analysis for cumulative effects is the State of Arizona.

6.3 Temporal Scope of Analysis

6.3.1 Time Frame of Past Actions

The analysis time frame for past actions is from post-European and other non-Native American settlement to the present because this is the time frame in which most large-scale changes in the quality and/or quantity of aquatic habitats have occurred.

6.3.2 Time Frame of Present and Reasonably Foreseeable Future Actions

For the analysis, the time frame for present and reasonably foreseeable future actions refers to the time frame within which future actions could be reasonably foreseen. Though it can often be speculative to identify specific projects out more than 10 years, it is assumed that the types of future actions identified in this cumulative analysis would extend farther into the future.

6.4 Relevant Past, Present, and Reasonably Foreseeable Future Actions

Within the geographic and temporal scales identified, a number of types of actions are expected to contribute to the effects on special status aquatic and semi-aquatic species.

6.4.1 Description of Past, Present, and Reasonably Foreseeable Future Actions

The general categories of past, present, and reasonably foreseeable actions and their potential effects are summarized in Table 31. The potential for these actions or conditions to result in adverse or beneficial effects on special status aquatic and semi-aquatic species is summarized in Table 32.

Table 31. General categories of actions and associated types of effects included in the analysis of cumulative effects on special status aquatic and semi-aquatic species.

Types of Actions	Types of Effects on Special Status Aquatic and Semi-aquatic Species
Fish stocking ²³	Predation; competition; hybridization; habitat alteration, disturbance; introduction or spread of parasites, diseases, or aquatic invasive species
Water diversion/irrigation	Reduction in amount, extent, connectivity, and quality of aquatic habitats
Dam construction and operation	Disruption of migration corridors; isolation of subpopulations; changes in flow regimes and water temperature; changes in habitat type from lotic (stream, river) to lentic (lake, reservoir) habitats
Urbanization	Changes in flow regime, stream morphology, and water quality (increased sediment, non-point source, and point source pollution of aquatic habitats); changes in riparian vegetation and aquatic habitats, including the reduction/loss of habitat from water diversions
Recreation	Disturbance impacts; introduction or spread of invasive aquatic species; changes in water quality from pollution/debris
Mining	Point and non-point source pollution of waters; reduction of aquatic habitat from water diversion for mine operations
Agriculture	Reduction in aquatic habitat from water diversion for irrigation; reduction in water quality from discharge of pesticides and fertilizers; increased salinity; increased nutrient inputs; changes in riparian vegetation and water temperatures; increased erosion/sedimentation from livestock grazing; changes in stream morphology and flow characteristics
Wildfire, fire suppression, and fuels management	Changes in water quality due to increased surface runoff and sedimentation and discharge of fire retardants into waters
Timber harvest	Changes in water quality due to increased surface runoff and sedimentation from timber and fuelwood harvest and associated road construction

²³ Fish stocking includes legal (private, state, tribal, local, and federal) and illegal (e.g., illegal movement, illegal bait release, illegal aquarium release) stocking.

Table 31. General categories of actions and associated types of effects included in the analysis of cumulative effects on special status aquatic and semi-aquatic species.

Types of Actions	Types of Effects on Special Status Aquatic and Semi-aquatic Species
Restoration and conservation	Enhancement, reestablishment, and conservation of habitats (e.g., through elimination of predatory nonnative fishes or other species; construction and maintenance of barriers to prevent fish movement, habitat improvement, and reintroduction of consultation and other special status species).
Climate change	Climate change is a continuing threat to aquatic habitats. Changes in seasonality and the amount of precipitation across the action area can affect the amount of stream flow that occurs over a year. This includes the timing and strength of spring runoff or other seasonal high flows, groundwater recharge that supports base flows, and water available in springs and seeps. These changes not only affect the amount of water in the system but the amount and quality of different habitat types (pool, runs, or riffles), the amount of seasonal connectivity within the system, and water quality parameters. Parameters of particular concern are temperature, dissolved oxygen, and salinity, all of which influence the health of fish and the extremes of which result in mortality. Reductions in aquatic habitat or habitat quality also influence species assemblages, with the most resilient species better able to survive than ones with more narrow physical requirements. Loehman (2010) presents a summary of hydrological concerns for arid lands that are relevant to the action area. Climate change may result in changes in habitat suitability for native and introduced aquatic and semi-aquatic species from increased temperatures and changes in dissolved oxygen concentrations and salinity; contraction of geographic range for species with lower temperature, dissolved oxygen, and salinity tolerances and range expansion for species with higher tolerances; changes in species assemblages to favor species more resilient to changing water quality conditions; loss or reduction of available aquatic habitats, disruption of dispersal corridors, increased predation, increased competition between native and nonnative aquatic and semi-aquatic species, enhanced spread of diseases and parasites, and changes in riparian vegetation from increased temperature coupled with more frequent and longer duration drought.²⁴

²⁴ Climate model estimates at the state, subcatchment, or stream unit basis are lacking. Identified effects represent many climate models predicted at a regional (Southwest) scale.

Table 32. Adverse and beneficial cumulative effects on special status aquatic and semi-aquatic species from past, present, and reasonably foreseeable future actions and conditions.

Types of Effects √- = adverse effect √+ = beneficial effect	Actions and Conditions										
	Fish Stocking	Water Diversion/ Irrigation	Dam Construction and Operation	Urbanization	Recreation	Mining	Agriculture	Wildfire, Fire Suppression, and Fuels Management	Timber Harvest	Restoration and Conservation	Climate Change
Predation	√-		√-				√-			√+	√-
Competition	√-									√+	√-
Hybridization	√-									√+	√-
Spread of parasites, diseases, or aquatic invasive species	√-	√-	√-		√-						√-
Loss of aquatic habitat		√-	√-	√-	√-	√-	√-			√+	√-
Changes in water quality (chemical, biological, and/or physical parameters)	√-	√-	√-	√-	√-	√-	√-	√-	√-	√+	√-
Disruption of migration corridors and genetic isolation	√-	√-	√-	√-		√-			√-	√+	√-
Changes in aquatic habitat and riparian vegetation	√-	√-	√-	√-	√-	√-	√-		√-	√+	√-

6.4.2 Effects of Past, Present, and Reasonably Foreseeable Future Actions

For the past 100–150 years, the effects of human development and land management actions described in Table 31 have had profound negative effects on native aquatic species and their habitats in Arizona (Minckley 1973, Minckley and Marsh 2009, Vogt 2003). Even as early as 1904, naturalists were documenting the decline and loss of fish habitat and populations (Minckley 1999). Commensurate with that, the effects of climate fluctuations have also had their effects, with some fish and amphibian populations being lost as a result of drought or disease. Past actions and effects on special status aquatic and semi-aquatic species are discussed and summarized in more detail in Chapters 1.0, 2.0, and 4.0 of this EA.

The result of past cumulative effects have led to loss of populations and general declines in the distribution and abundance of many of Arizona’s native aquatic species to the point that 19 of 36 native fish, one frog, and one salamander species are listed under the Endangered Species Act as threatened or endangered. Two additional fish species, one frog, and one garter snake are currently candidates for federal listing and are expected to be listed in the near future.

Beginning in the late 1960s, changes were made to state and federal laws and regulations, and new laws were enacted to protect and conserve native aquatic and semi-aquatic species (e.g., the ESA and NEPA). Resource management changed in response to these new laws and because the science showed that past management practices were having an unacceptable effect on native species (e.g., addition of a native fishes conservation program to the AGFD in the late 1960s and AGFD baitfish regulations in 1976). The actions described in Table 31 still occur today and result in negative effects on native species and will continue to occur throughout the duration of this project. However, in some cases, these legal and policy measures have likely reduced the impacts of such actions from those that would be expected without them. One example is the requirement for federal agencies to evaluate and consider impacts to ESA-listed species in land management. In addition, conservation and recovery programs for listed aquatic species have been ongoing since at least 1969, when the first species were listed under the predecessor to the ESA—the Endangered Species Conservation Act. The regulatory background and resource management history are further discussed and summarized in Chapters 2.0 and 4.0 of this EA.

Even with the existing regulation and management environment, additional conservation and recovery actions are needed to reverse the trend of habitat loss, habitat destruction, contamination of habitats with undesirable and incompatible nonnative aquatic species, and ultimately the decline of native aquatic and semi-aquatic species. Many of the problem nonnative species currently persist in habitats across Arizona as a result of past actions. Their mere existence on the landscape will likely result in continued expansion and detrimental effects on native aquatic species in the future unless actions are taken to reverse or reduce their presence. In addition, past habitat changes are still impacting native species and will continue to do so unless habitats are restored and the threats removed from the landscape.

6.5 Contributions of the Alternatives to Cumulative Effects

Table 33 compares the contribution of the alternatives on cumulative effects on aquatic and semi-aquatic special status species and considers the implementation of conservation and mitigation measures.

Table 33. Contribution of the Proposed Action and its alternatives on cumulative effects.

Alternatives	Cumulative Effects Contribution
Proposed Action	The Proposed Action would result in adverse effects on aquatic and semi-aquatic consultation and other special status species from stocking of nonnative sport fish. These effects would include continued predation and competition from stocked fish and/or progeny of stocked fish, illegal stocking, and the potential for disease transmittal. These effects would be offset by the Sport Fish Stocking CAMP, which is part of the Proposed Action. In addition to offsetting the impacts of the stocking program, the Sport Fish Stocking CAMP includes measures that would contribute to the recovery of some targeted at improving the environmental baseline condition of aquatic and semi-aquatic consultation and other special status species by removing stressors (nonnative species or other stressors) from the stocked watersheds, reestablishing populations of native species, protecting existing populations of native species, and other conservation activities (Chapter 5.0). It is expected that the contribution of the Proposed Action to cumulative effects on native aquatic and semi-aquatic consultation and other special status species would be net positive or, at a minimum, neutral, and that the environmental baseline may be improved for a number of aquatic and semi-aquatic species. The positive effects to CAMP species from implementation of the CAMP will extend beyond the 10-year period. Cumulative effects include any effects from stocking actions analyzed in other consultations, present and future (e.g., Biological Opinion on Stocking of Warmwater Fish at Pena Blanca Lake (22410-2010-F-0330) and Stocking at Biscuit Tank (in progress)).
Reduced Stocking Alternative	Compared with the Proposed Action, adverse effects on aquatic and semi-aquatic consultation and other special status species from AGFD sport fish stocking would be reduced due to the removal of stocking sites known to have impacts on listed species. Section 7 consultation would need to be reinitiated and would likely result in the development of a revised conservation and mitigation program with a reduction in the amount of funding and conservation activities commensurate with the reduction of negative effects on special status species. It is expected that the cumulative effects on native aquatic and semi-aquatic special status species would be neutral.
No Action	Under the No Action alternative, there would be no adverse effects on aquatic and semi-aquatic consultation and other special status species from AGFD sport fish stocking and, therefore, no associated conservation and mitigation program would be implemented. Though the No Action alternative would not contribute to the downward trends of special status species, these trends would be expected to continue.

7.0 COORDINATION AND PUBLIC INVOLVEMENT

7.1 Agency and Public Scoping

Scoping outreach included notices in general-distribution newspapers, postings on agency websites and on-line classified listings, electronic distribution of email notices to multiple email addresses and LISTSERVs, electronic distribution of newsletters, and three public meetings. The following summarizes these outreach efforts.

Emails were forwarded to the following federal and state agencies:

- U.S. Department of the Interior Bureau of Land Management
- U.S. Department of the Interior Bureau of Reclamation
- U.S. Department of the Interior National Park Service—Grand Canyon and Glen Canyon National Parks
- U.S. Department of Agriculture Forest Service
- U.S. Department of the Interior Geological Survey
- Arizona Department of Environmental Quality

Offer of Consultation letters were mailed to 22 Native American tribes:

• Ak Chin Indian Community	• Pascua Yaqui Tribe
• Chemehuevi Tribe	• Quechan Tribe
• Cocopah Indian Tribe	• Salt River Pima-Maricopa Indian Community
• Colorado River Indian Tribes	• San Carlos Apache Tribe
• Fort McDowell Yavapai Nation	• San Juan Southern Paiute Tribe
• Fort Mohave Indian Tribe	• Tohono O’odham Nation
• Gila River Indian Community	• Tonto Apache Tribe
• Havasupai Tribe	• White Mountain Apache Tribe
• Hopi Tribe	• Yavapai Apache Nation
• Hualapai Tribe	• Yavapai-Prescott Indian Tribe
• Kaibab Band of Paiute Indians	
• Navajo Nation	

Emails were sent to the Salt River Project and the Central Arizona Project.

Public open-house-style meetings were held in three AGFD office locations: in Pinetop on November 17, 2008; in Tucson on November 24, 2008; and in Phoenix on November 25, 2008. The purpose of the meetings was to provide information on the Wildlife and Sport Fish Restoration Program, the NEPA process and associated timelines, and program background and purpose and need, and to solicit early input from the public. Presentation boards were displayed for public review, and handouts were provided. Comment forms were made available to attendees. No written comments were received during the meetings.

Notices were placed in three general-distribution newspapers in November 2008: the *Arizona Daily Star*, the *Tucson Citizen*, and the *White Mountain Independent* (Show Low). A legal notice ran in *The Arizona Republic* on February 4, 2009. Media releases were also sent to more than 500 contacts statewide.

Notices were posted on the FWS and the AGFD websites on November 14, 2008, and on the AGFD website on February 5, 2009. Notices were also posted in the classified on-line legal notice section of azcentral.com and on the Phoenix area craigslist.org site on February 4, 2009.

The scoping process included sending email notices to a number of electronic mailing lists: the Desert Fishes Council, the Wildlife Society, the American Fisheries Society Arizona/New Mexico Chapter, the Native Fish Conservation Team, the Arizona Invasive Species Advisory Council, the Arizona Riparian Council, the American Sportfishing Association, the Arizona Chamber of Commerce, and Partners in Amphibian and Reptiles Conservation.

Notices were emailed to the following AGFD email lists: AISAC Advisors/Experts/Stakeholders; AISAC 2 Advisors/Experts/Stakeholders; Angling Groups; Sporting Retailers; Communities–Pinetop, Show Low, and Payson; Communities–General (League of Cities and Towns, Legislators, Counties, etc.); Apache County; Gila County; Graham County; Greenlee County; Navajo County; and Alpine Area Chamber of Commerce.

The project scoping notice was placed in four electronic newsletters: *AGFD Fishing Report*, *AGFD Wildlife News*, *AGFD Urban Fishing Bulletin*, and *AGFD Hunting Highlights*.

A summary of the results of scoping is included in Chapter 2.0.

7.2 Public Review of Draft EA

The Notice of Availability of the Draft EA was sent to media contacts and members of Congress, published in general-distribution newspapers, posted on agency websites and on-line classified listings, and distributed electronically to multiple email addresses, LISTSERVs, and electronic newsletters. An electronic copy of the Draft EA was posted on the FWS and AGFD websites for public review. The Draft EA was initially made available for a 30-calendar-day public review period. However, requests were made by members of the public for a time extension based on the length of the Draft EA and supporting documentation. In response, the FWS extended the public review period to 60 days.

Comment letters and emails were received on the Draft EA from 577 persons, some representing agencies, organizations, and clubs. A large percentage (376) commented solely on the Take a Kid Fishing program and associated stocking at La Paz County Park Lagoon. Appendix P provides a Comment Log, which lists the names of the individual commenters and, if provided, their affiliations. A summary of the pertinent comments received on the Draft EA during the public comment period and responses to these comments prepared by the FWS and the AGFD is also provided in Appendix P of this document.

7.3 Agency and Tribal Coordination

A notification of availability of the Draft EA was emailed to the following federal and state agencies: the BLM, Reclamation, NPS, the FS, the USGS, and the ADEQ. Notice of Availability and Offer of Consultation letters were mailed to the 33 Native American tribes

- Ak Chin Indian Community
- Chemehuevi Tribe
- Cocopah Indian Tribe
- Colorado River Indian Tribes
- Fort McDowell Yavapai Nation
- Fort Mohave Indian Tribe
- Gila River Indian Community
- Havasupai Tribe
- Hopi Tribe
- Hualapai Tribe
- Kaibab Band of Paiute Indians
- Las Vegas Paiute Tribe
- Mescalero Apache Tribe
- Moapa Business Council
- Navajo Nation
- Paiute Indian Tribe of Utah
 - Indian Peaks Band
 - Kanosh Band
 - Koosharem Band
 - Shivwits Band of Paiutes
 - Cedar Band
- Pascua Yaqui Tribe
- Pueblo of Zuni
- Quechan Tribe
- Salt River Pima-Maricopa Indian Community
- San Carlos Apache Tribe
- San Juan Southern Paiute Tribe
- Tohono O’odham Nation
- Tonto Apache Tribe
- Torres Martinez Desert Cahuilla Indian Tribe
- White Mountain Apache Tribe
- Yavapai Apache Nation

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APPENDIX A

Historic Stocking Records, Past and Ongoing Wildlife Conservation Actions, and Proposed Stocking Sites and Species

Table A. Records of the original authorized stockings in Arizona by species for those records where stocking source is known.

Common Name	Scientific Name	First Stocked	Origin
American shad	<i>Alosa sapidissima</i>	1883	Fisheries Commission
Bigmouth buffalo	<i>Ictiobus cyprinellus</i>	1917	Fisheries Commission
Yellow bass (barfish)	<i>Morone mississippiensis</i>	1929	Fisheries Commission
Spotted bass	<i>Micropterus punctulatus</i>	1941	Arizona Game and Fish Department (AGFD)
Redear sunfish	<i>Lepomis microlophus</i>	1948	AGFD*
Threadfin shad	<i>Dorosoma petenense</i>	1955	AGFD (from Tennessee)
Kokanee	<i>Oncorhynchus nerka</i>	1957	AGFD
Tilapia species	<i>Tilapia</i> spp.	1959	AGFD–Page Springs Hatchery
Northern pike	<i>Esox lucius</i>	1965	U.S. Department of the Interior Fish and Wildlife Service
Bairdiella (croaker)	<i>Bairdiella icistia</i>	1967	AGFD–Sterling Springs Hatchery
Orangemouth corvina	<i>Cynoscion xanthulus</i>	1967	AGFD–Sterling Springs Hatchery
Sargo	<i>Anisotremus davidsonii</i>	1967	AGFD–Sterling Springs Hatchery
White sturgeon	<i>Acipenser transmontanus</i>	1967	AGFD
Redbelly tilapia	<i>Tilapia zillii</i>	1968	University of Arizona
Striped bass	<i>Morone saxatilis</i>	1969	California and the AGFD–Page Springs Hatchery
Muskie	<i>Esox masquinongy</i>	1973	Wisconsin
Blue tilapia	<i>Tilapia aurea</i>	1975	AGFD–Bubbling Ponds Hatchery

* = Suspected source based on California records

Table B. Records of the first documentation of stocking by species in Arizona where the stocking source is unknown or suspected (not verified), and the first year of known stockings with known stocking source, if applicable.

Species Name	Scientific Name	First Documented	Suspected Source	First Year of Known Stocking Source	Subsequent Stocking Source
Carp	<i>Cyprinus carpio</i>	1880	Fisheries Commission		
Largemouth bass	<i>Micropterus salmoides</i>	1896	Fisheries Commission	1964	Arizona Game and Fish Department (AGFD)–Page Springs Hatchery
Rock bass	<i>Ambloplites rupestris</i>	1896	Fisheries Commission		
Rainbow trout	<i>Oncorhynchus mykiss</i>	1897	Fisheries Commission	1936	AGFD–Tonto Creek Hatchery
Cutthroat trout	<i>Oncorhynchus clarkii</i>	1899	Fisheries Commission	1965	AGFD–Sterling Springs Hatchery
Black crappie	<i>Pomoxis nigromaculatus</i>	1902	Fisheries Commission	1964	AGFD–Page Springs Hatchery
Brook trout	<i>Salvelinus fontinalis</i>	1902	Fisheries Commission	1964	AGFD–Tonto Creek Hatchery
White crappie	<i>Pomoxis annularis</i>	1902	Fisheries Commission	1991	AGFD–Bubbling Ponds Hatchery
Channel catfish	<i>Ictalurus punctatus</i>	1904	Fisheries Commission	1964	U.S. Department of the Interior Fish and Wildlife Service (FWS) and AGFD–Page Springs Hatchery
Black buffalo	<i>Ictiobus niger</i>	1917	Fisheries Commission		
Yellow perch	<i>Perca flavescens</i>	1918	Fisheries Commission	1965	McClelland Lake
Black bullhead catfish	<i>Ameiurus melas</i>	1919	Fisheries Commission*		
Smallmouth bass	<i>Micropterus dolomieu</i>	1920	Fisheries Commission	1970	Black River
Brown trout	<i>Salmo trutta</i>	1924	Fisheries Commission	1964	AGFD–Page Springs Hatchery
Green sunfish	<i>Lepomis cyanellus</i>	1925	Fisheries Commission*		
Mosquitofish	<i>Gambusia affinis</i>	1925	Unknown	1968	AGFD
Golden shiner	<i>Notemigonus crysoleucas</i>	1929	Fisheries Commission		
Bluegill sunfish	<i>Lepomis macrochirus</i>	1931	Fisheries Commission	1964	AGFD–Page Springs Hatchery
Sunfish hybrid	<i>Lepomis</i> spp. x <i>Lepomis</i> spp.	1931	Unknown	2008	Commercial
Brown bullhead catfish	<i>Ameriurus nebulosus</i>	1935	Fisheries Commission*		
Arctic grayling	<i>Thymallus arcticus</i>	1939	Fisheries Commission	1965	AGFD–Sterling Springs Hatchery

Table B. Records of the first documentation of stocking by species in Arizona where the stocking source is unknown or suspected (not verified), and the first year of known stockings with known stocking source, if applicable.

Species Name	Scientific Name	First Documented	Suspected Source	First Year of Known Stocking Source	Subsequent Stocking Source
Flathead catfish	<i>Pylodictis olivaris</i>	1940	Unknown	1968	AGFD–Page Springs Hatchery
Plains red shiner	<i>Notropis lutrensis</i>	1948	Unknown	1965	AGFD–Page Springs Hatchery
Fathead minnow	<i>Pimephales promelas</i>	1950	Unknown**	1978	AGFD–Bubbling Ponds Hatchery
White bass	<i>Morone chrysops</i>	1951	Unknown	1975	Lake Pleasant
Walleye	<i>Sander vitreus</i>	1956	Unknown	1965	AGFD–Page Springs Hatchery
Kokanee	<i>Oncorhynchus nerka</i>	1957	FWS*	1964	AGFD–Tonto Creek Hatchery
Mozambique tilapia	<i>Tilapia mozambica</i>	1959	Unknown	1962	AGFD
Coho salmon	<i>Oncorhynchus kisutch</i>	1966	Unknown	1969	AGFD–Page Springs Hatchery

* = Suspected source, based on California records

** = First record of found fish in a bait tank on the Arizona side of the Colorado River in 1950

Table C. Records of the first capture of a fish species stocked illegally (intentionally or unintentionally) through suspected sources: bait bucket releases, aquaria releases, and unknown (potentially angler introductions or by the Fisheries Commission).

Species Name	Scientific Name	First Record	Suspected Source
Goldfish spp.	<i>Carassius</i> spp.	1925	Bait bucket releases, aquaria releases
Rio Grande killifish	<i>Fundulus zebrinus</i>	1937	Bait bucket releases, aquaria releases
Bream	<i>Acanthopagrus</i> spp.	1937	Unknown
Warmouth	<i>Lepomis gulosus</i>	1939	Unknown
Bullhead catfish	<i>Ameiurus</i> spp.	1941	Unknown
Redside shiner	<i>Richardsonius balteatus</i>	1948	Bait bucket releases
Mexican tetra	<i>Astyanax mexicanus</i>	1949	Aquaria releases
Pumpkinseed sunfish	<i>Lepomis gibbosus</i>	1949	Unknown
Blue catfish	<i>Ictalurus furcatus</i>	1950	Unknown
Sailfin molly	<i>Poecilia latipinna</i>	1951	Aquaria releases
Variable platyfish	<i>Xiphophorus variatus</i>	1962	Aquaria releases
Green swordtail	<i>Xiphophorus helleri</i>	1964	Aquaria releases
Guppy	<i>Poecilia reticulata</i>	1967	Aquaria releases
Mexican sailfin molly	<i>Poecilia velifera</i>	1967	Aquaria releases
Sacramento perch	<i>Archoplites interruptus</i>	1967	Unknown
Convict cichlid	<i>Archocentrus nigrofasciatus</i>	1968	Aquaria releases
Gizzard shad	<i>Dorosoma cepedianum</i>	2007	Federal hatchery (accidental)
Inland silverside	<i>Menidia beryllina</i>	2007	Unknown
Alligator gar	<i>Atractosteus spatula</i>	2008	Aquaria releases

Table D. Past and ongoing conservation actions initiated by the AGFD or with AGFD involvement that target consultation and other special status species (incomplete list).

Guild	Project	Species Benefited	Duration
Native Fish	Statewide Native Fish Monitoring	All native fish species	Before 2000
	Apache Trout Population Maintenance at North Canyon Creek (surveys and moving fish upstream over barriers)	Apache trout	Before 2000
	Apache Trout Stream Barrier Maintenance (10 barriers)	Apache trout	2000–present
	Apache Trout Stream Barrier Construction (seven barriers)	Apache trout	2000–present
	Stream Renovations for Apache Trout Reestablishment (nine streams)	Apache trout	2000–present
	Apache Trout Reestablishments (six streams stocked)	Apache trout	2000–present
	Livestock Exclusion and Fence Installation on Apache Trout Streams, Including Fence Maintenance (nine streams)	Apache trout	2000–present
	Evaluation of Apache Trout Habitat Protection Areas	Apache trout	2001–2004
	Bluehead Sucker Reestablishment in Walnut Creek	Bluehead sucker	2007–2009
	Desert Pupfish Reestablishments, Including Nonnative Removal and Habitat Improvements (more than 19 sites stocked)	Desert pupfish	Before 2000
	Evaluation and Planning for the Cave Creek Native Fish Population Expansion	Desert sucker, Sonoran sucker, longfin dace	2003–present
	Bear Canyon Gila Chub Reestablishment	Gila chub	2005
	Evaluation of Native Fish Reestablishment Potential of Grapevine Canyon	Gila chub	2008–present
	Romero Canyon Gila Chub Reestablishment	Gila chub	2005
	Sabino Canyon Gila Chub Emergency Salvage and Reestablishment	Gila chub	2003–2005
	T-4 Spring Habitat Improvements	Gila chub	Ongoing
	Cline Pond (Northwest Reservoir) Renovation	Gila chub and Gila topminnow	2009–present
	Transfer Gila Chub and Gila Topminnow to New Mexico Game and Fish to Reestablish in New Mexico	Gila chub and Gila topminnow	2007–present
	Evaluation of Renovation and Native Fish Reestablishment Potential of Devil's Canyon	Gila chub and longfin dace	2008–present
	Evaluation of Renovation and Native Fish Reestablishment Potential of Turkey and O'Donnell Creek, Including Post Canyon	Gila chub, Gila topminnow, and longfin dace	2007–present

Table D. Past and ongoing conservation actions initiated by the AGFD or with AGFD involvement that target consultation and other special status species (incomplete list).

Guild	Project	Species Benefited	Duration
Native Fish (continued)	The Nature Conservancy Lower San Pedro Preserve Native Fish Stockings	Gila chub, Gila topminnow, and desert pupfish	2008
	Bonita Creek Renovation and Native Fish Reestablishment	Gila chub, loach minnow, spikedace, desert pupfish, Gila topminnow, longfin dace, speckled dace, Sonora sucker, and desert sucker	2007–2008
	The Spawning and Culture of Gila Chub Research (Heritage Grant to University of Arizona [UA])	Gila chub	2003–2007
	Gila Topminnow Reestablishment, Including Nonnative Removal and Habitat Improvements (more than 23 sites stocked)	Gila topminnow	2000–present
	Boyce Thompson Arboretum Nonnative Fathead Removal	Gila topminnow and desert pupfish	2010
	Fresno Canyon Renovation and Native Fish Reestablishment	Gila topminnow and longfin dace	2006–2007
	Topminnow and Desert Pupfish Safe Harbor Program	Gila topminnow and desert pupfish	2008–present
	Raspberry Creek Gila Trout Reestablishment	Gila trout	2000
	Grapevine Creek Gila Trout Reestablishment	Gila trout	2009–present
	Frye Creek Gila Trout Reestablishment	Gila trout	2009–present
	Raspberry Creek Gila Trout Emergency Salvage and Reestablishment	Gila trout	2004
	Apache Trout Translocation from Coleman Creek (Gila Trout Recovery Action)	Gila trout	2005–present
	Reintroduction of Gila Trout (<i>Oncorhynchus gilae gilae</i>) in West Fork of Oak Creek (Heritage Grant to Federation of Fly Fishers)	Gila trout	2007–present
	Fossil Creek Renovation and Native Fish Reestablishment	Headwater chub, roundtail chub, Gila topminnow, loach minnow, razorback sucker, spikedace, desert sucker, Sonora sucker, speckled dace, and longfin dace	2003–present
	Statewide Conservation Agreement and Strategy	Headwater chub, roundtail chub, Zuni bluehead sucker, Little Colorado sucker, flannelmouth sucker, and bluehead sucker	Before 2000
	A Survey of the Aquatic Community at Fossil Creek, Arizona (Heritage Grant to Northern Arizona University [NAU])	Headwater chub, roundtail chub, Gila topminnow, loach minnow, razorback sucker, spikedace, desert sucker, Sonora sucker, speckled dace, longfin dace, and lowland leopard frog.	2002–2005

Table D. Past and ongoing conservation actions initiated by the AGFD or with AGFD involvement that target consultation and other special status species (incomplete list).

Guild	Project	Species Benefited	Duration
Native Fish (continued)	Humpback Chub Translocation from Lower Little Colorado River to Little Colorado River Above Chute Falls	Humpback chub	2004–present
	Humpback Chub Translocation from Lower Little Colorado River to Shinumo Creek	Humpback chub	2009
	Removal of Nonnative Fish from Main Stem Colorado River near Mouth of Little Colorado River	Humpback chub, bluehead sucker, flannelmouth sucker, and speckled dace	2003–present
	West Leonard Canyon Little Colorado Spinedace Emergency Salvage and Reestablishment	Little Colorado spinedace	2001
	Little Colorado Spinedace Refugia at Raymond Wildlife Area and Site Renovation	Little Colorado spinedace	2008–present
	Little Colorado Spinedace Refugia at Winslow High School and Site Renovation	Little Colorado spinedace	2004–present
	Little Colorado Spinedace Refugia at Arizona Game and Fish Department (AGFD) Grasslands Wildlife Area	Little Colorado spinedace	2004–present
	West Chevelon Creek Little Colorado Spinedace Reestablishment	Little Colorado spinedace	2003–2007
	Bear Canyon Little Colorado Spinedace Reestablishment	Little Colorado spinedace	2004–2005
	Dane Canyon Little Colorado Spinedace Reestablishment	Little Colorado spinedace	2004–2005
	Yaeger Canyon Little Colorado Spinedace Reestablishment	Little Colorado spinedace	2004–2005
	Survey Little Colorado Spinedace Habitat and Assess Reestablishment Sites	Little Colorado spinedace	Before 2000
	Survey Historic Spikedace and Loach Minnow Habitat and Acquire Rare Populations for Refugia	Loach minnow and spikedace	2006–present
	Spikedace and Loach Minnow Propagation and Refugia at Bubbling Ponds	Loach minnow and spikedace	2007–present
	Hot Springs Canyon Native Fish Reestablishment	Loach minnow and spikedace	2008–present
	Meda/Tiaroga Data Assembly	Loach minnow and spikedace	2007–present
	Predator Depletion on Blue River	Loach minnow, desert sucker, Sonoran sucker, longfin dace, speckled dace, and narrow-headed garter snake	2009
	Redfield Canyon Native Fish Reestablishment	Loach minnow, spikedace, Gila topminnow, and desert pupfish	2008–present

Table D. Past and ongoing conservation actions initiated by the AGFD or with AGFD involvement that target consultation and other special status species (incomplete list).

Guild	Project	Species Benefited	Duration
Native Fish (continued)	Arnett Creek Longfin Dace Reestablishment	Longfin dace	2006–2007
	Mineral Creek Longfin Dace Reestablishment	Longfin dace	2006
	Razorback Sucker Rearing at Hualapai Elementary School and Kingman Academy of Learning	Razorback sucker	2008–present
	Razorback Sucker Stocking in Lower Colorado River	Razorback sucker	Before 2000
	Razorback Sucker and Bonytail Chub Rearing at Cervat Cliff Golf Course and Site Renovation	Razorback sucker and bonytail chub	2008–present
	Razorback Sucker and Colorado Pikeminnow Propagation (Bubbling Ponds)	Razorback sucker and Colorado pikeminnow	Before 2000
	Razorback Sucker and Colorado Pikeminnow Stocking in Verde River	Razorback sucker and Colorado pikeminnow	Before 2000
	Razorback Sucker Rearing at Mohave Community College and Site Renovation	Razorback sucker and longfin dace	2003–present
	Roundtail Chub Canal Salvage and Translocation to Salt River	Roundtail chub	2002–2003
	Eagle Creek Roundtail Chub Refugia Population Establishment and Propagation (Bubbling Ponds)	Roundtail chub	2009–present
	Predator Depletion on Upper Verde	Roundtail chub	2000–present
	Roundtail Propagation (Bubbling Ponds)	Roundtail chub	2007–present
	Round tree Canyon Roundtail Chub Reestablishment	Roundtail chub	2008–2009
	Roundtail Refuge Pond at Boy Scout Camp	Roundtail chub	2008–present
	Roundtail Refuge Ponds at Southwest Academy	Roundtail chub	2008–present
	Ash Creek Native Fish Reestablishment	Roundtail chub, desert sucker, longfin dace, Sonora sucker, and speckled dace	2008–2009
	Stillman Lake Renovation and Native Fish Reestablishment	Roundtail chub, razorback sucker, Sonora sucker, and desert sucker	2002–present
	Speckled Dace Reestablishment into Apache Trout Streams	Speckled dace	2003–2007
	Developing An Interactive Model for Delineating Native Fish & Sport Fish Management Areas for Use in the Integrated Fisheries Management Plan (Heritage Grant to UA)	Native fish	2007–present
	Factors Influencing Distribution of Introduced Asian Tapeworm and Effects on Selected Southwestern Fishes Research	Native fish	2003–2005

Table D. Past and ongoing conservation actions initiated by the AGFD or with AGFD involvement that target consultation and other special status species (incomplete list).

Guild	Project	Species Benefited	Duration
Native Fish (continued)	Suppression of Populations and Reproduction in a Nonnative Fish: Sensitivity of Various Life History Stages of Red Shiners to Environments Manipulation Research (Heritage Grant to NAU)	Native fish	2003–2005
Native Amphibians	Monitor Extant Chiricahua Leopard Frog Populations	Chiricahua leopard frog	2002–present
	Survey Chiricahua Leopard Frog Habitat and Assess Reestablishment sites (110 sites evaluated)	Chiricahua leopard frog	2000–present
	Identify and Implement Chiricahua Leopard Frog Habitat Improvement (14 locations)	Chiricahua leopard frog	2002–present
	Chiricahua Leopard Frog Reestablishment (32 sites stocked)	Chiricahua leopard frog	2002–present
	Chiricahua Leopard Frog Phylogenetic Research	Chiricahua leopard frog	2004–present
	Chiricahua Leopard Frog Captive Rearing Program	Chiricahua leopard frog	2000–present
	Chytrid Fungus Research and Monitoring	Chiricahua leopard frog, Northern leopard frogs, Arizona treefrogs, Sonoran tiger salamander, and other native amphibians	2004–present
	Nonnative Removal in Chiricahua Leopard Frog Recovery Areas (25 sites)	Chiricahua leopard frog, Arizona treefrog, native fish, narrow-headed garter snake, Northern Mexican garter snake, and other native amphibians	2005–present
	Scotia Canyon Bullfrog Removal (Heritage Grant to the U.S. Department of Agriculture Forest Service [FS])	Chiricahua leopard frog	2009–present
	Aquatic Environment and the Persistence of the Frog Killing Fungus (Heritage Grant to Arizona State University [ASU])	Chiricahua leopard frog, Northern leopard frogs, Arizona treefrogs, Sonoran tiger salamander, and other native amphibians	2009–present
	Novel Survey Methods to Increase Detectability of Rare Frogs in the Field (Heritage Grant to the State University of New York)	Chiricahua leopard frog, Northern leopard frogs, Arizona treefrogs, Sonoran tiger salamander, and other native amphibians	2010–present
	Northern Leopard Frog Breeding Site Protection Project (Heritage Grant to the Friends of the Forest)	Northern leopard frog	2007–2008
	Population Status and Population Genetics of Leopard Frogs in Northern Arizona	Northern leopard frog	2007–present
	Northern Leopard Frog Backyard Pond Project in Flagstaff	Northern leopard frog	2009
	Northern Leopard Frog Monitoring on the Coconino National Forest and Other Extant Sites	Northern leopard frog	Before 2000

Table D. Past and ongoing conservation actions initiated by the AGFD or with AGFD involvement that target consultation and other special status species (incomplete list).

Guild	Project	Species Benefited	Duration
Native Amphibians (continued)	Northern Leopard Frog Habitat Improvements on the Coconino National Forest (various projects including fences, berm repairs, and erosion control measures)	Northern leopard frog	Before 2000
	Historical Range Surveys to Assess Potential for Reestablishment of Northern Leopard Frogs	Northern leopard frog	Before 2000
	House Rock Wildlife Area Ranch Northern Leopard Frog Refugium	Northern leopard frog	2005–present
	Sonoran Tiger Salamander Range-wide Monitoring	Sonoran tiger salamander	Before 2000
	Amphibian Disease and Pathogen Pollution Research (Heritage Grant to ASU)	Sonoran tiger salamander, and other native amphibians	2005–2009
Native Semi-aquatic Reptiles	Northern Mexican Garter Snake Radiotelemetry Study at Bubbling Ponds Fish Hatchery	Northern Mexican garter snake	2009–present
	Northern Mexican Garter Snake Monitoring and Population Study at Bubbling Ponds Fish Hatchery	Northern Mexican garter snake	2007–present
	Northern Mexican Garter Snake Population Study in San Rafael Valley	Northern Mexican garter snake	2008
	Demography of the Mexican Garter Snake Research (Heritage Grant to Virginia State University)	Northern Mexican garter snake	2007–present
	Narrow-headed and Northern Mexican Garter Snake Experimental Captive Breeding and Head Start Program	Narrow-headed garter snake and Northern Mexican garter snake	2007–present
	Garter Snake Conservation Working Group	Narrow-headed garter snake and Northern Mexican garter snake	2007–present
	Population Impacts on the Narrow Headed Garter Snakes Research (Heritage Grant to UA)	Narrow-headed garter snake	2007–present
	Narrow-Headed Garter Snake Population Genetics (Heritage Grant to ASU)	Narrow-headed garter snake	2007–present
	Status, Distribution, and Management Recommendations for Narrow-headed Garter Snakes Study (Heritage Grant to NAU)	Narrow-headed garter snake	Before 2000
	Monitoring Surveys and Radio Telemetry of Narrow-headed Garter Snakes in Oak Creek, Arizona (Heritage Grant to NAU)	Narrow-headed garter snake	2005–2006
	Surveys for <i>Thamnophis eques</i> and <i>Thamnophis rufipunctatus</i> in the Gila River Watershed of Arizona and New Mexico (Heritage Grant to ASU)	Narrow-headed garter snake and Northern Mexican garter snake	2005–2006

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Guild	Project	Species Benefited	Duration
Native Invertebrates	Candidate Conservation Agreement with Assurances for the Page Springsnail (Protects Habitat at 7 Occupied Sites)	Page springsnail	2009–present
	Page Springsnail Monitoring	Page springsnail	2001–present
	Page Springsnail Reestablishment at Bass House Springhead	Page springsnail	2009–present
	Toxicity of Rotenone to Page Springsnail Research	Page springsnail	2009
	Investigation of Captive Housing of Springsnails	Three Forks springsnail	2001–present
	Investigation of Captive Housing of Springsnails	Three Forks springsnail	2001–present
	Three Forks Crayfish Removal Experiment	Three Forks springsnail	2001–2004
	Conservation Genetics of Arizona Springsnails: Identifying Management Units and Regions of Endemism Research (Heritage Grant to ASU)	Page Spring snail, Three Forks springsnail, other native spring snails	2003–2005
Native Mammals	Inventory of the Meadow Jumping Mouse in Arizona Study (Heritage Grant to New Mexico State University)	New Mexico jumping mouse	2008–present
Native Birds	Arizona Bald Eagle Nestwatch Program	Bald eagle	Before 2000
	Arizona Bald Eagle Nest Survey	Bald eagle	Before 2000
	Occupancy and Reproductive Assessment Flights	Bald eagle	Before 2000
	Banding and Visual Identification Project	Bald eagle	Before 2000
	Arizona Bald Eagle Winter Count	Bald eagle	Before 2000
	Southwestern Eagle Management Committee	Bald eagle	Before 2000
	Monofilament Recovery Program	Bald eagle, native birds, and other wildlife	2002–present
	Long-Term Cuckoo Monitoring in Yuma Area (Heritage Grant to the Bureau of Land Management [BLM])	Yellow-billed cuckoo	2005–2006
	Yellow-billed Cuckoo Distribution and Abundance, Habitat Requirements, and Breeding Ecology in the Verde Valley Watershed of Arizona Study (Heritage Grant to NAU)	Yellow-billed cuckoo	2003–2008
	North American Marsh Bird Survey (statewide)	Yuma clapper rail, and other native birds	Before 2000
	Riparian Breeding Bird Survey (statewide)	Southwest willow flycatcher, yellow-billed cuckoos, and other riparian native birds	Before 2000
	Bill Williams and San Pedro rivers Southwest Willow Flycatcher Surveys	Southwest willow flycatcher, yellow-billed cuckoos, and other riparian native birds	2006–2010
	Yuma East Wetland Habitat Improvements (Heritage Grant to the City of Yuma)	Yuma clapper rail, yellow-billed cuckoo, and other native riparian birds	2003–2004

Table D. Past and ongoing conservation actions initiated by the AGFD or with AGFD involvement that target consultation and other special status species (incomplete list).

Guild	Project	Species Benefited	Duration
Native Birds (continued)	Yuma West Wetland Improvements (Heritage Grant to the City of Yuma)	Yuma clapper rail, yellow-billed cuckoo, and other native riparian birds	2004
	Powers Butte Riparian Habitat Enhancement Project	Native riparian birds	2005–present
	McCormick Springs Elk Proof Fence Habitat Protection (Heritage Grant to the U.S. National Forest [USNF])	Native riparian birds	2005–2006
	Jacques Marsh Elk Proof Fence and Riparian Restoration Project (Heritage Grant to the USNF)	Native riparian birds	2005–2006
	Lower Colorado River Transient Burn Riparian Habitat Rehabilitation (Heritage Grant to the BLM)	Native riparian birds	2005
	Johnson Canyon Fence (Heritage Grant to the FS)	Native riparian birds	2006–2007
	The Arboretum at Flagstaff Wetland Habitat Enhancement (Heritage Grant to the Arboretum at Flagstaff)	Native riparian birds	2005–2006
	Mittry South Site Riparian Habitat Restoration Project (Heritage Grant to the BLM)	Native riparian birds	2006
	Riparian Enhancement of West Chevelon Canyon (Heritage Grant to the UA)	Native riparian birds	2008–2009
	Establishment of High Elevation Riparian Habitat Along a Channel Project (Heritage Grant to the FS)	Native riparian birds	2009–present
	Avian Community and Riparian Vegetation Response to Wetland Restoration (Heritage Grant to the U.S. Department of the Interior Fish and Wildlife Service [FWS])	Native riparian birds	2005–2006
	Effects of Groundwater Withdrawal on Avian Abundance and Species Richness in Riparian Areas of Southeastern Arizona Research (Heritage Grant to the UA)	Native riparian birds	2005–2006
	Riparian Restoration Effects in Southeast Arizona Study (Heritage Grant to the FWS)	Native riparian birds	2005–2006
	Avian Monitoring Agua Fria and the Salt/Gila Important Bird Areas (IBA's) (Heritage Grant to the Sonoran Audubon Society)	Native riparian birds	2006
	Bird Population Monitoring at the Rio Salado Habitat Restoration Project (Heritage Grant to the City of Phoenix)	Native riparian birds	2007

Table D. Past and ongoing conservation actions initiated by the AGFD or with AGFD involvement that target consultation and other special status species (incomplete list).

Guild	Project	Species Benefited	Duration
Native Birds (continued)	Bird Inventory and Population Monitoring at Tuzigoot IBA (Heritage Grant to the Northern Arizona Audubon)	Native riparian birds	2006–2007
	Effects of Surface Water Depletion and Vegetation Health on Arizona’s Riparian Birds Research (Heritage Grant to UA)	Native riparian birds	2008–2009
	Enhance Survey Design and Implement Long Term Monitoring of Arizona’s Riparian Birds Research (Heritage Grant to the Great Basin Bird Observatory)	Native riparian birds	2009–present
	Arizona’s Important Bird Areas Program at Tucson Audubon Society (Heritage Grant to the Tucson Audubon Society)	Native riparian birds, other native birds	2005–2008
	Watson Woods IBA Inventory Component of the Arizona Bird Conservation Initiative (Heritage Grant to Archaeological Consulting Services, Ltd.)	Native riparian birds, other native birds	2004–2006
Multiple Taxa	Water Rights Acquisitions Program (the AGFD owns 276 water rights statewide)	Various wildlife species	Before 2000
	Land Acquisition Program (the AGFD owns 37 properties statewide totaling 7,785 acres of riparian habitat)	Riparian wildlife species, and other wildlife species	Before 2000
	Battles Between Non-Native Crayfish and Native Species in Fossil Creek, Arizona: Does Restoration Hinder or Help? Research (Heritage Grant to NAU)	Narrow-headed garter snake, Northern Mexican garter snake, Chiricahua leopard frog, other native amphibians and fish	2004–2009
	Biological Control of the Northern Crayfish (<i>Orconectes virilis</i>) Research (Heritage Grant to ASU)	Narrow-headed garter snake, Northern Mexican garter snake, Chiricahua leopard frog, other native amphibians and fish	2006–present
	Optimizing Control Methods for Northern Crayfish (<i>Orconectes virilis</i>) Research (Heritage Grant to UA)	Narrow-headed garter snake, Northern Mexican garter snake, Chiricahua leopard frog, other native amphibians and fish	2005–2009

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Colorado River–Havasus Creek	Havasus Creek Complex	Cataract Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brown trout Channel catfish Largemouth bass Bluegill sunfish Redear sunfish	Coconino	Cold- and warm-water fishery	Proposed Action (PA) Reduced Stocking Alternative (RSA)
		City Reservoir	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brown trout Channel catfish Largemouth bass ¹ Bluegill sunfish ¹ Redear sunfish ¹	Coconino	Cold- and warm-water fishery	PA RSA
		Dogtown Reservoir	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brown trout Channel catfish Largemouth bass Bluegill sunfish Redear sunfish	Coconino	Cold- and warm-water fishery	PA RSA
		Russell Tank	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Coconino	Cold-water fishery	PA RSA
		Santa Fe Tank	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brown trout Channel catfish Largemouth bass Bluegill sunfish Redear sunfish	Coconino	Cold- and warm-water fishery	PA RSA
		Kaibab Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brown trout Channel catfish Largemouth bass Bluegill sunfish Redear sunfish ¹	Coconino	Cold- and warm-water fishery	PA RSA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Colorado River–Yuma North	Yuma Complex	La Paz County Park Pond	Statewide Sport Fish Stocking Subprogram	Rainbow trout Channel catfish ¹ Bluegill sunfish ¹	La Paz	Cold- and warm-water fishery	PA RSA
		La Paz County Park Lagoon	Statewide Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish	La Paz	Cold- and warm-water fishery	PA
Colorado River–Yuma South	Yuma Complex	Yuma West Wetland	Statewide Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Largemouth bass Bluegill sunfish	Yuma	Cold- and warm-water fishery	PA RSA
		Hidden Shores ²	Statewide Sport Fish Stocking Subprogram	Rainbow trout Largemouth bass ¹ Channel catfish ¹ Bluegill sunfish	Yuma	Cold- and warm-water fishery	PA RSA
Little Colorado River	Little Colorado River Above Lyman Complex	Hulsey Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Apache	Cold-water fishery	PA
		Pratt Tank	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Apache	Cold-water fishery	PA RSA
		Nelson Reservoir	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Apache	Cold-water fishery	PA
		Lyman Reservoir	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Apache	Cold-water fishery	PA
		Carnero Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Apache	Cold-water fishery	PA RSA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Little Colorado River (continued)	Little Colorado River Above Lyman Complex (continued)	Becker Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Apache trout Arctic grayling ¹	Apache	Cold-water fishery	PA RSA
	West Fork Little Colorado River	Mexican Hay Lake	Statewide Sport Fish Stocking Subprogram	Apache trout ¹	Apache	Cold-water fishery	PA RSA
		Lee Valley Lake	Statewide Sport Fish Stocking Subprogram	Apache trout Arctic grayling	Apache	Cold-water fishery	PA RSA
		Bunch Reservoir	Statewide Sport Fish Stocking Subprogram	Rainbow trout Apache trout ¹	Apache	Cold-water fishery	PA RSA
		River Reservoir	Statewide Sport Fish Stocking Subprogram	Rainbow trout Apache trout ¹	Apache	Cold-water fishery	PA RSA
		Tunnel Reservoir	Statewide Sport Fish Stocking Subprogram	Rainbow trout Apache trout ¹	Apache	Cold-water fishery	PA RSA
		White Mountain Reservoir	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Apache	Cold-water fishery	PA RSA
		Little Colorado River Greer	Statewide Sport Fish Stocking Subprogram	Apache trout Rainbow trout	Apache	Cold-water fishery	PA RSA
		Little Colorado River Sheep's Crossing	Statewide Sport Fish Stocking Subprogram	Apache trout	Apache	Cold-water fishery	PA RSA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Little Colorado River (continued)	Upper Little Colorado River	Little Ortega	Statewide Sport Fish Stocking Subprogram	Channel catfish	Apache	Warm-water fishery	PA RSA
		Concho Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Largemouth bass ¹ Bluegill sunfish ¹ Channel catfish	Apache	Cold- and warm-water fishery	PA RSA
	White Mountain Complex	Sponseller	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Apache	Cold-water fishery	PA RSA
		Silver Creek	Statewide Sport Fish Stocking Subprogram	Apache trout Rainbow trout	Navajo	Cold-water fishery	PA RSA
		Long Lake (Show Low)	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Navajo	Cold-water fishery	PA RSA
		Whipple	Statewide Sport Fish Stocking Subprogram	Channel catfish	Navajo	Warm-water fishery	PA RSA
		Little Mormon Lake	Statewide Sport Fish Stocking Subprogram	Channel catfish	Navajo	Warm-water fishery	PA RSA
	Schoen's Complex	Woodland Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish	Navajo	Cold- and warm-water fishery	PA RSA
		Rainbow Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Largemouth bass	Navajo	Cold- and warm-water fishery	PA RSA
		Show Low Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brook trout Cutthroat trout Apache trout ¹ Channel catfish Bluegill sunfish	Navajo	Cold- and warm-water fishery	PA RSA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Little Colorado River (continued)	Schoen's Complex (continued)	Fool Hollow Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Apache trout ¹ Cutthroat trout Brook trout ¹ Channel catfish Bluegill sunfish	Navajo	Cold- and warm-water fishery	PA RSA
		Scott's Reservoir	Statewide Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish	Navajo	Cold- and warm-water fishery	PA RSA
		Show Low Creek ²	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Navajo	Cold-water fishery	PA RSA
		Mountain Meadow Recreational Complex ³	Statewide Sport Fish Stocking Subprogram	Rainbow trout ¹ Bluegill sunfish ¹	Navajo	Cold- and warm-water fishery	PA RSA
	Chevelon Creek Complex	Chevelon Canyon Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Arctic grayling	Coconino	Cold-water fishery	PA RSA
		Long Tom	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Coconino	Cold-water fishery	PA RSA
		Willow Springs	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Coconino	Cold-water fishery	PA RSA
		Woods Canyon	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Coconino	Cold-water fishery	PA RSA
	Black Canyon Lake	Black Canyon Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brook trout	Navajo	Cold-water fishery	PA RSA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Little Colorado River (continued)	Clear Creek Complex	Bear Canyon Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Arctic grayling	Coconino	Cold-water fishery	PA RSA
		C.C. Cragin (Blue Ridge Reservoir)	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Coconino	Cold-water fishery	PA
		Knoll Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Coconino	Cold-water fishery	PA
	Clear Creek Reservoir	Clear Creek Reservoir	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Navajo	Cold-water fishery	PA
	Jack's Canyon Complex	Soldiers Annex	Statewide Sport Fish Stocking Subprogram	Rainbow trout Largemouth bass Channel catfish Bluegill sunfish Yellow perch ¹	Coconino	Cold- and warm-water fishery	PA RSA
		Long Lake (Diablo)	Statewide Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Walleye Largemouth bass Bluegill sunfish Yellow perch ¹	Coconino	Cold- and warm-water fishery	PA RSA
		Soldiers	Statewide Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Largemouth bass Bluegill sunfish Yellow perch ¹	Coconino	Cold- and warm-water fishery	PA RSA
		Tremaine Lake ³	Statewide Sport Fish Stocking Subprogram	Channel catfish ¹ Bluegill sunfish ¹ Largemouth bass ¹ Redear sunfish ¹	Coconino	Warm-water fishery	PA RSA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Little Colorado River (continued)	Canyon Diablo Complex	Mud Tank	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Coconino	Cold-water fishery	PA
		Kinnikinick Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brown trout Brook trout Arctic grayling Cutthroat trout	Coconino	Cold-water fishery	PA
		Coconino Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brown trout Brook trout ¹ Cutthroat trout Arctic grayling ¹	Coconino	Cold-water fishery	PA
		Morton	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Coconino	Cold-water fishery	PA
		Ashurst Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Cutthroat trout Brown trout Brook trout Arctic grayling	Coconino	Cold- and warm-water fishery	PA
		Frances Short Pond	Statewide Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish ¹ Largemouth bass	Coconino	Cold- and warm-water fishery	PA RSA
	Walnut Creek Complex	Marshall Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brook trout Arctic grayling	Coconino	Cold-water fishery	PA
		Mormon Lodge Pond	Statewide Sport Fish Stocking Subprogram	Rainbow trout Bluegill sunfish ¹ Redear sunfish ¹	Coconino	Cold- and warm-water fishery	PA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Little Colorado River (continued)	Walnut Creek Complex (continued)	Upper Lake Mary	Statewide Sport Fish Stocking Subprogram	Channel catfish Rainbow trout Brown trout Cutthroat trout Brook trout ¹ Bluegill sunfish Redear sunfish	Coconino	Cold- and warm-water fishery	PA
		Lower Lake Mary	Statewide Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish	Coconino	Cold- and warm-water fishery	PA
Riggs Flat	Riggs Flat Lake	Riggs Flat Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brown trout Brook trout White amur ¹	Graham	Cold- and warm-water fishery	PA RSA
Upper Gila River	Upper Gila	Cluff Pond #3	Statewide Sport Fish Stocking Subprogram	Rainbow trout White amur Channel catfish Largemouth bass Bluegill sunfish Redear sunfish ¹ Black crappie	Graham	Cold- and warm-water fishery	PA RSA
		Dankworth Pond ²	Statewide Sport Fish Stocking Subprogram	Rainbow trout White amur ¹ Channel catfish Largemouth bass Black crappie Bluegill sunfish Redear sunfish	Graham	Cold- and warm-water fishery	PA RSA
		Frye Mesa Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brown trout Brook trout Gila trout	Graham	Cold-water fishery	PA RSA
		Graham County Fairgrounds	Statewide Sport Fish Stocking Subprogram	Rainbow trout Channel catfish	Graham	Cold- and warm-water fishery	PA RSA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Upper Gila River (continued)	Upper Gila (continued)	Roper Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout White amur ¹ Channel catfish Largemouth bass Black crappie Bluegill sunfish Redear sunfish	Graham	Cold- and warm-water fishery	PA RSA
Middle Gila River	Kearny	Kearny	Statewide Sport Fish Stocking Subprogram	Rainbow trout Channel catfish ¹ Largemouth bass Bluegill sunfish ¹ Redear sunfish ¹	Pinal	Cold- and warm-water fishery	PA RSA
Lower Gila–Yuma	Lower Gila–Yuma Complex	Fortuna Pond	Statewide Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Largemouth bass Bluegill sunfish	Yuma	Cold- and warm-water fishery	PA RSA
		Redondo/Yuma Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout ¹ Channel catfish Largemouth bass Bluegill sunfish	Yuma	Cold- and warm-water fishery	PA RSA
		Wellton Golf Course ²	Statewide Sport Fish Stocking Subprogram	Rainbow trout ¹ Channel catfish ¹ Bluegill sunfish ¹ Largemouth bass ¹	Yuma	Cold- and warm-water fishery	PA RSA
Luna Lake	Luna Lake	Luna Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Cutthroat trout	Apache	Cold-water fishery	PA
Agua Fria River	Agua Fria River Complex	Fain Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brook trout Brown trout ¹ Cutthroat trout ¹ Bluegill sunfish Largemouth bass White crappie ¹ Channel catfish	Yavapai	Cold- and warm-water fishery	PA RSA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Agua Fria River (continued)	Agua Fria River Complex (continued)	Horse Thief Basin	Statewide Sport Fish Stocking Subprogram	Channel catfish Largemouth bass Bluegill sunfish ¹	Yavapai	Warm-water fishery	PA RSA
		Lynx Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Bluegill sunfish Brown trout Brook trout Cutthroat trout Largemouth bass White crappie ¹ Channel catfish	Yavapai	Cold- and warm-water fishery	PA RSA
Salt River	Black River Complex	Ackre Lake	Statewide Sport Fish Stocking Subprogram	Apache trout Arctic grayling	Greenlee	Cold-water fishery	PA RSA
		Big Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brook trout Cutthroat trout Apache trout	Apache	Cold-water fishery	PA
		Black River East Fork	Statewide Sport Fish Stocking Subprogram	Apache trout Rainbow trout	Apache	Cold-water fishery	PA
		Black River West Fork	Statewide Sport Fish Stocking Subprogram	Apache trout	Apache	Cold-water fishery	PA
		Crescent Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brook trout	Apache	Cold-water fishery	PA RSA
	Canyon Creek Complex	Canyon Creek	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brown trout	Gila	Cold-water fishery	PA RSA
	Workman Creek	Workman Creek	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Gila	Cold-water fishery	PA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Salt River (continued)	Tonto Creek Complex	Tonto Creek	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Gila	Cold-water fishery	PA
		Christopher Creek	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Gila	Cold-water fishery	PA
		Haigler Creek	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Gila	Cold-water fishery	PA
	Lower Salt Complex	Apache Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Walleye Smallmouth bass Largemouth bass Black crappie Channel catfish	Maricopa	Cold- and warm-water fishery	PA RSA
		Canyon Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Walleye Channel catfish Smallmouth bass Largemouth bass Black crappie	Maricopa	Cold- and warm-water fishery	PA
		Saguaro Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Walleye Smallmouth bass Black crappie Largemouth bass Channel catfish	Maricopa	Cold- and warm-water fishery	PA
		Tempe Town Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Maricopa	Cold-water fishery	PA
		Salt River Lower	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Maricopa	Cold-water fishery	PA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Salt River (continued)	Phoenix Urban Lakes	Alvord Lake	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish Largemouth bass	Maricopa	Cold- and warm-water fishery	PA
		Chaparral Lake	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish Largemouth bass	Maricopa	Cold- and warm-water fishery	PA
		Cortez Lake	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish Largemouth bass	Maricopa	Cold- and warm-water fishery	PA
		Desert Breeze Lake	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish Largemouth bass	Maricopa	Cold- and warm-water fishery	PA
		Desert West Lake	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish Largemouth bass	Maricopa	Cold- and warm-water fishery	PA
		Encanto Lake	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish Largemouth bass	Maricopa	Cold- and warm-water fishery	PA
		Evelyn Hallman Pond	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish Largemouth bass	Maricopa	Cold- and warm-water fishery	PA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Salt River (continued)	Phoenix Urban Lakes (continued)	Kiwanis Lake	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish Largemouth bass	Maricopa	Cold- and warm-water fishery	PA
		Papago Ponds	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish Largemouth bass	Maricopa	Cold- and warm-water fishery	PA
		Red Mountain Lake	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish Largemouth bass	Maricopa	Cold- and warm-water fishery	PA RSA
		Rio Vista Pond	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish Largemouth bass	Maricopa	Cold- and warm-water fishery	PA
		Riverview Lake	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish Largemouth bass	Maricopa	Cold- and warm-water fishery	PA
		Steele Indian School Pond	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish Largemouth bass	Maricopa	Cold- and warm-water fishery	PA
		Surprise Lake	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish Largemouth bass	Maricopa	Cold- and warm-water fishery	PA RSA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Salt River (continued)	Phoenix Urban Lakes (continued)	Veterans Oasis Lake	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish Largemouth bass	Maricopa	Cold- and warm-water fishery	PA RSA
		Water Ranch Lake	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish Largemouth bass	Maricopa	Cold- and warm-water fishery	PA RSA
	Phoenix Fishing in the Neighborhood (FIN)	Crossroads Park ³	Fishing in the Neighborhood Subprogram	Rainbow trout ¹ Channel catfish ¹ Largemouth bass Bluegill sunfish Redear sunfish ¹	Maricopa	Cold- and warm-water fishery	PA
		Freestone Park ²	Fishing in the Neighborhood Subprogram	Rainbow trout ¹ Channel catfish Largemouth bass Bluegill sunfish Redear sunfish ¹	Maricopa	Cold- and warm-water fishery	PA RSA
		McQueen Park ³	Fishing in the Neighborhood Subprogram	Rainbow trout ¹ Channel catfish Largemouth bass Bluegill sunfish Redear sunfish ¹	Maricopa	Cold- and warm-water fishery	PA
		Bonsall Park ²	Fishing in the Neighborhood Subprogram	Rainbow trout ¹ Channel catfish Largemouth bass Bluegill sunfish Redear sunfish ¹	Maricopa	Cold- and warm-water fishery	PA
		Pacana Park ³	Fishing in the Neighborhood Subprogram	Rainbow trout ¹ Channel catfish Largemouth bass Bluegill sunfish Redear sunfish ¹	Pinal	Cold- and warm-water fishery	PA RSA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Salt River (continued)	Phoenix FIN (continued)	Granada Park ³	Fishing in the Neighborhood Subprogram	Rainbow trout ¹ Channel catfish Largemouth bass Bluegill sunfish Redear sunfish	Maricopa	Cold- and warm-water fishery	PA
		Roadrunner Park ²	Fishing in the Neighborhood Subprogram	Rainbow trout Channel catfish Largemouth bass Bluegill sunfish Redear sunfish	Maricopa	Cold- and warm-water fishery	PA
		Eldorado Park ²	Fishing in the Neighborhood Subprogram	Rainbow trout ¹ Channel catfish Largemouth bass Bluegill sunfish Redear sunfish	Maricopa	Cold- and warm-water fishery	PA
		Indian School Park ³	Fishing in the Neighborhood Subprogram	Rainbow trout ¹ Channel catfish Largemouth bass Bluegill sunfish Redear sunfish	Maricopa	Cold- and warm-water fishery	PA
		Vista del Camino Park ³	Fishing in the Neighborhood Subprogram	Rainbow trout ¹ Channel catfish Largemouth bass Bluegill sunfish Redear sunfish	Maricopa	Cold- and warm-water fishery	PA
		Tempe Papago Park ²	Fishing in the Neighborhood Subprogram	Rainbow trout ¹ Channel catfish Largemouth bass Bluegill sunfish Redear sunfish	Maricopa	Cold- and warm-water fishery	PA
		Water Treatment ³	Fishing in the Neighborhood Subprogram	Rainbow trout ¹ Channel catfish ¹ Largemouth bass Bluegill sunfish Redear sunfish ¹	Maricopa	Cold- and warm-water fishery	PA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Salt River (continued)	Phoenix FIN (continued)	Discovery District Park ³	Fishing in the Neighborhood Subprogram	Rainbow trout ¹ Channel catfish ¹ Largemouth bass Bluegill sunfish Redear sunfish	Maricopa	Cold- and warm-water fishery	PA
		Selleh Park ³	Fishing in the Neighborhood Subprogram	Rainbow trout ¹ Channel catfish Largemouth bass Bluegill sunfish Redear sunfish ¹	Maricopa	Cold- and warm-water fishery	PA
Santa Cruz River	Upper Santa Cruz	Parker Canyon	Statewide Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Redear sunfish Bluegill sunfish	Cochise	Cold- and warm-water fishery	PA
		Patagonia	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Santa Cruz	Cold-water fishery	PA
		Peña Blanca	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Santa Cruz	Cold-water fishery	PA
	Middle Santa Cruz	Rose Canyon	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brown trout	Pima	Cold-water fishery	PA
		Fagen Tank	Statewide Sport Fish Stocking Subprogram	Bluegill sunfish ¹ Redear sunfish	Pima	Warm-water fishery	RSA
	Pantano Wash-Rillito River	Arivaca	Statewide Sport Fish Stocking Subprogram	Channel catfish Redear sunfish Bluegill sunfish	Pima	Warm-water fishery	PA RSA
	Tucson Santa Cruz Complex	Sahuarita Lake	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish ¹ Largemouth bass	Pima	Cold- and warm-water fishery	PA RSA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Santa Cruz River (continued)	Tucson Santa Cruz Complex (continued)	Kennedy Lake	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish ¹ Largemouth bass	Pima	Cold- and warm-water fishery	PA RSA
		Lakeside Lake	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish ¹ Largemouth bass	Pima	Cold- and warm-water fishery	PA RSA
		Silverbell Lake (and Archer Pond)	Urban Sport Fish Stocking Subprogram	Rainbow trout Channel catfish Bluegill sunfish Redear sunfish ¹ Largemouth bass Black crappie	Pima	Cold- and warm-water fishery	PA RSA
	Tucson Santa Cruz FIN	Reid Park ²	Fishing in the Neighborhood Subprogram	Rainbow trout ¹ Channel catfish Largemouth bass Bluegill sunfish Redear sunfish ¹	Pima	Cold- and warm-water fishery	PA RSA
Verde River	Big Chino Wash Complex	Granite Basin Lake	Statewide Sport Fish Stocking Subprogram	Largemouth bass Bluegill sunfish	Yavapai	Warm-water fishery	PA
		Garrett Tank	Statewide Sport Fish Stocking Subprogram	Channel catfish Rainbow trout Black crappie ¹ Bluegill sunfish	Coconino	Cold- and warm-water fishery	PA RSA
		Stone Dam	Statewide Sport Fish Stocking Subprogram	Channel catfish Bluegill sunfish Largemouth bass Redear sunfish ¹	Coconino	Warm-water fishery	PA RSA
		Shucking Tank	Statewide Sport Fish Stocking Subprogram	Largemouth bass Bluegill sunfish Channel catfish Rainbow trout ¹ Black crappie ¹	Coconino	Cold- and warm-water fishery	PA RSA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Verde River (continued)	Big Chino Wash Complex (continued)	Presley Tank	Statewide Sport Fish Stocking Subprogram	Largemouth bass Bluegill sunfish Channel catfish Rainbow trout ¹ Black crappie ¹	Coconino	Cold- and warm-water fishery	PA RSA
	Sycamore Complex	Elk Tank	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brown trout ¹	Coconino	Cold-water fishery	PA RSA
		JD Dam	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brown trout	Coconino	Cold-water fishery	PA RSA
		White Horse Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brown trout	Coconino	Cold-water fishery	PA RSA
		Middle Tank	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brown trout	Coconino	Cold-water fishery	PA RSA
		Perkins Tank	Statewide Sport Fish Stocking Subprogram	Rainbow trout Brown trout Brook trout Arctic grayling	Coconino	Cold-water fishery	PA RSA
	Middle Verde Complex	Mingus Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Bluegill sunfish ¹ Black crappie ¹	Yavapai	Cold- and warm-water fishery	PA RSA
		Dead Horse Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Threadfin shad ¹ Channel catfish Bluegill sunfish Largemouth bass Black crappie	Yavapai	Cold- and warm-water fishery	PA
		Verde River Middle	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Yavapai	Cold-water fishery	PA
		Oak Creek	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Yavapai	Cold-water fishery	PA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Verde River (continued)	Middle Verde Complex (continued)	Wet Beaver Creek	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Yavapai	Cold-water fishery	PA
		West Clear Creek	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Yavapai	Cold-water fishery	PA
		Huffer Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Coconino	Cold-water fishery	PA RSA
	Granite Creek Complex	Watson Lake	Statewide Sport Fish Stocking Subprogram	Rainbow trout Black crappie Bluegill sunfish	Yavapai	Cold- and warm-water fishery	PA RSA
		Goldwater Lake	Statewide Sport Fish Stocking Subprogram	Largemouth bass Black crappie Bluegill sunfish Rainbow trout	Yavapai	Cold- and warm-water fishery	PA RSA
		Willow Creek Reservoir	Statewide Sport Fish Stocking Subprogram	Black crappie Bluegill sunfish Rainbow trout	Yavapai	Cold- and warm-water fishery	PA RSA
	Lower Verde River Complex	East Verde River	Statewide Sport Fish Stocking Subprogram	Rainbow trout	Gila	Cold-water fishery	PA
		Green Valley Lake	Urban Sport Fish Stocking Subprogram	Rainbow trout	Gila	Cold-water fishery	PA
Bill Williams River	Santa Maria complex	Granite Mountain #1	Statewide Sport Fish Stocking Subprogram	Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	PA RSA
		Granite Mountain #2	Statewide Sport Fish Stocking Subprogram	Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	PA RSA
		Bass Tank	Statewide Sport Fish Stocking Subprogram	Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	PA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Bill Williams River (continued)	Santa Maria complex (continued)	Blue Tank	Statewide Sport Fish Stocking Subprogram	Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	PA
	Burro Creek Complex	Carter Tank	Statewide Sport Fish Stocking Subprogram	Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	PA
				Channel catfish	Yavapai	Warm-water fishery	RSA
		Coors Lake	Statewide Sport Fish Stocking Subprogram	Channel catfish Largemouth bass Black crappie Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	PA RSA
		Antelope Tank	Statewide Sport Fish Stocking Subprogram	Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	PA
				Channel catfish Largemouth bass Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	RSA
		Bar 37 Tank	Statewide Sport Fish Stocking Subprogram	Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	PA
				Channel catfish Largemouth bass ¹ Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	RSA
		Harman Tank	Statewide Sport Fish Stocking Subprogram	Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	PA
				Channel catfish	Yavapai	Warm-water fishery	RSA
		Harmon Tank #2	Statewide Sport Fish Stocking Subprogram	Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	PA RSA
		Little Antelope Tank	Statewide Sport Fish Stocking Subprogram	Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	PA
				Largemouth bass Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	RSA

Table E. Proposed stocking sites and species under Proposed Action and Reduced Stocking Alternative.

Subcatchment	Complexes	Stocking Sites	Applicable AGFD Subprogram	Stocking Species	County	Management Objective	Applicable Alternatives
Bill Williams River (continued)	Burro Creek Complex (continued)	McElhaney Tank	Statewide Sport Fish Stocking Subprogram	Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	PA
				Largemouth bass Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	RSA
		Stubbs Tank	Statewide Sport Fish Stocking Subprogram	Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	PA
				Largemouth bass Bluegill sunfish Redear sunfish ¹	Yavapai	Warm-water fishery	RSA
		Swale Tank	Statewide Sport Fish Stocking Subprogram	Bluegill sunfish Redear sunfish ¹	Mohave	Warm-water fishery	PA
				Channel catfish	Mohave	Warm-water fishery	RSA

Green = Infrequent or low level stockings of some sustained yield fisheries under some circumstances, such as in response to full or partial loss of a fishery due to catastrophic events.

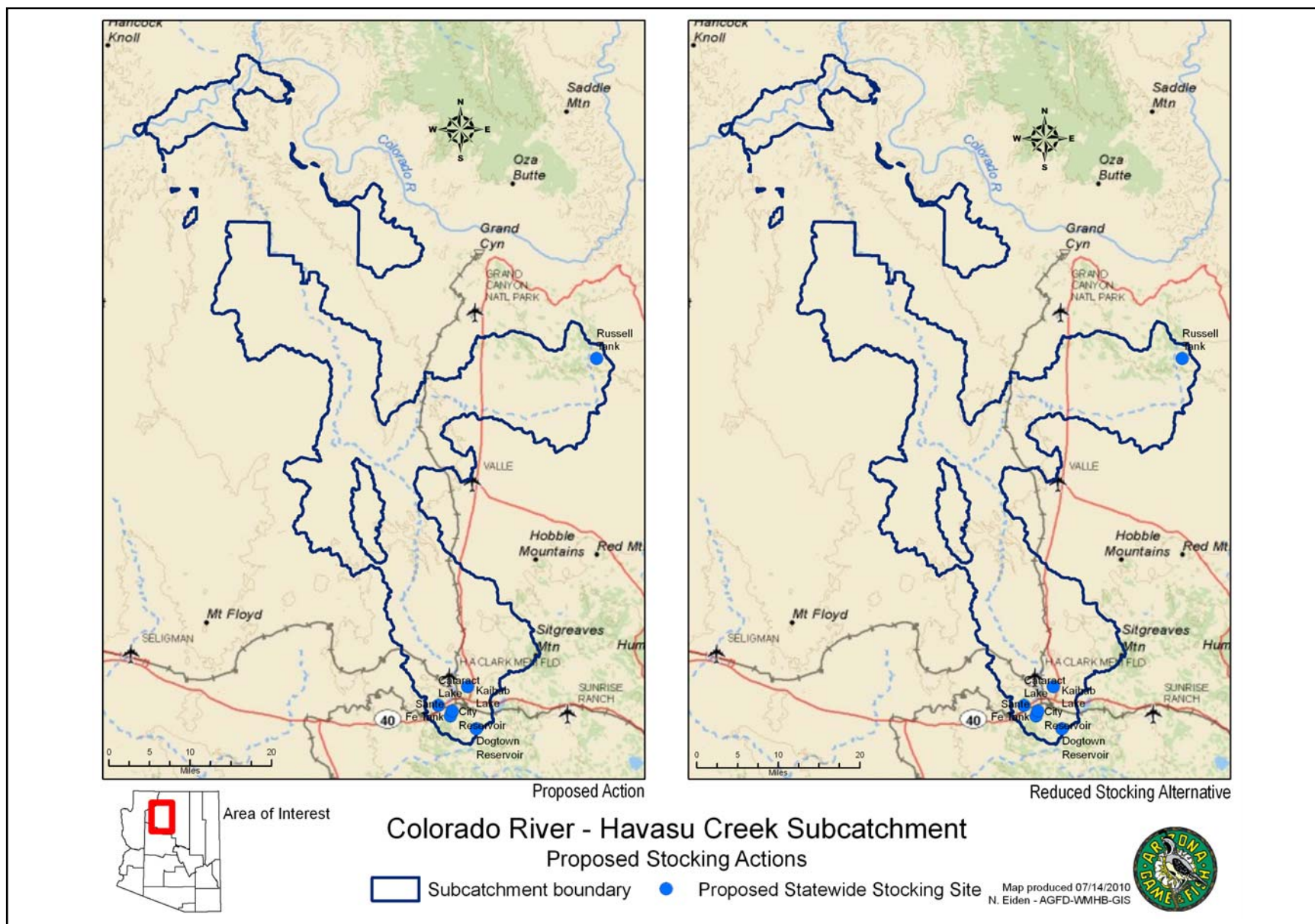
¹ Species not known to be present historically or currently in water body (Note: Species indicated in green text that also have the superscript 1 are those that are not currently present at the site but would be stocked initially as part of the action to establish them. After the initial stocking, these species would not be stocked again except in response to a catastrophic loss or to support fishing clinics, etc.)

² Site not recently stocked but stocked in the past by the AGFD

³ Site not previously stocked by the AGFD, based on AGFD stocking records

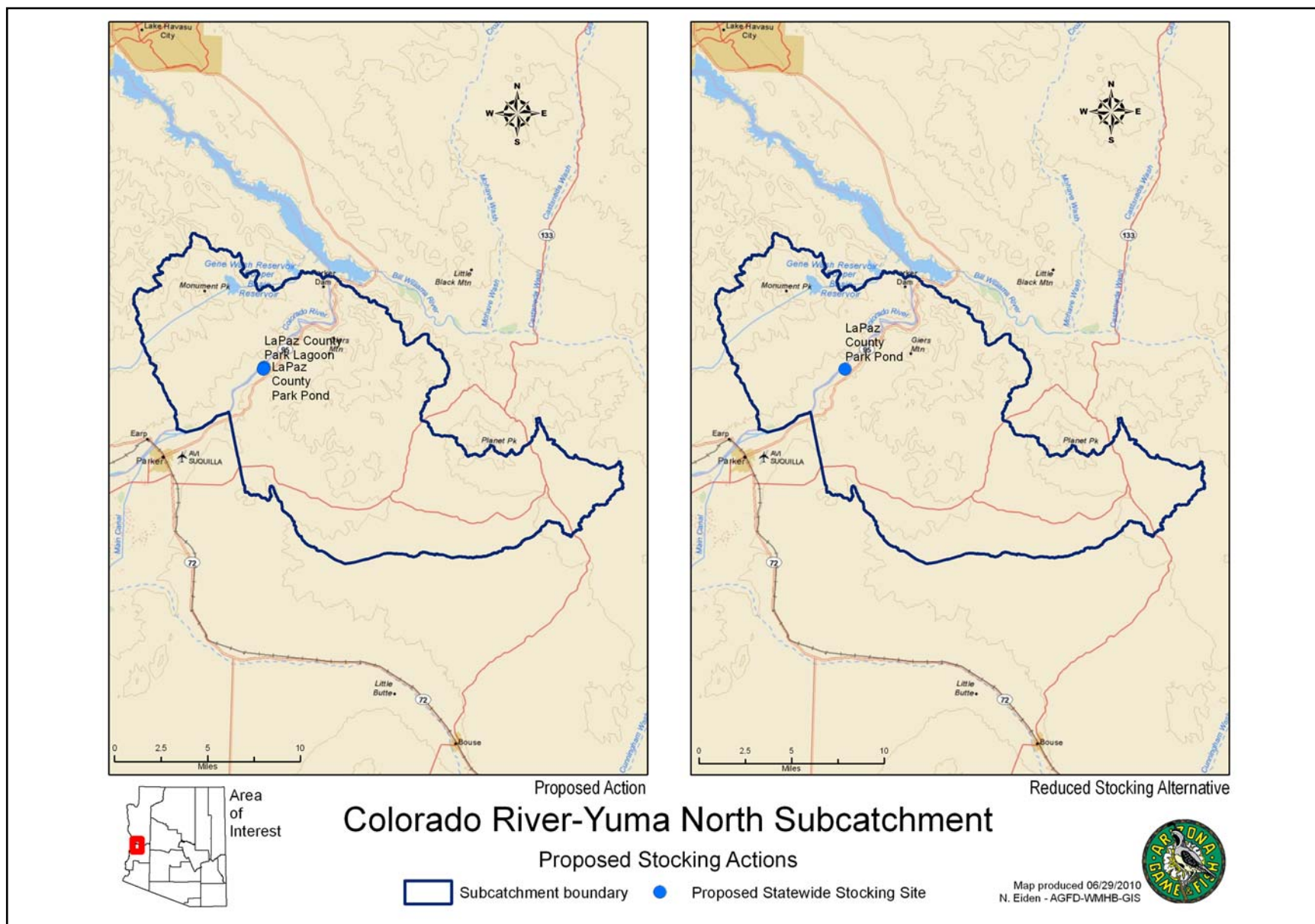
APPENDIX B

Individual Subcatchment Maps for the Proposed Action and the Reduced Stocking Alternative



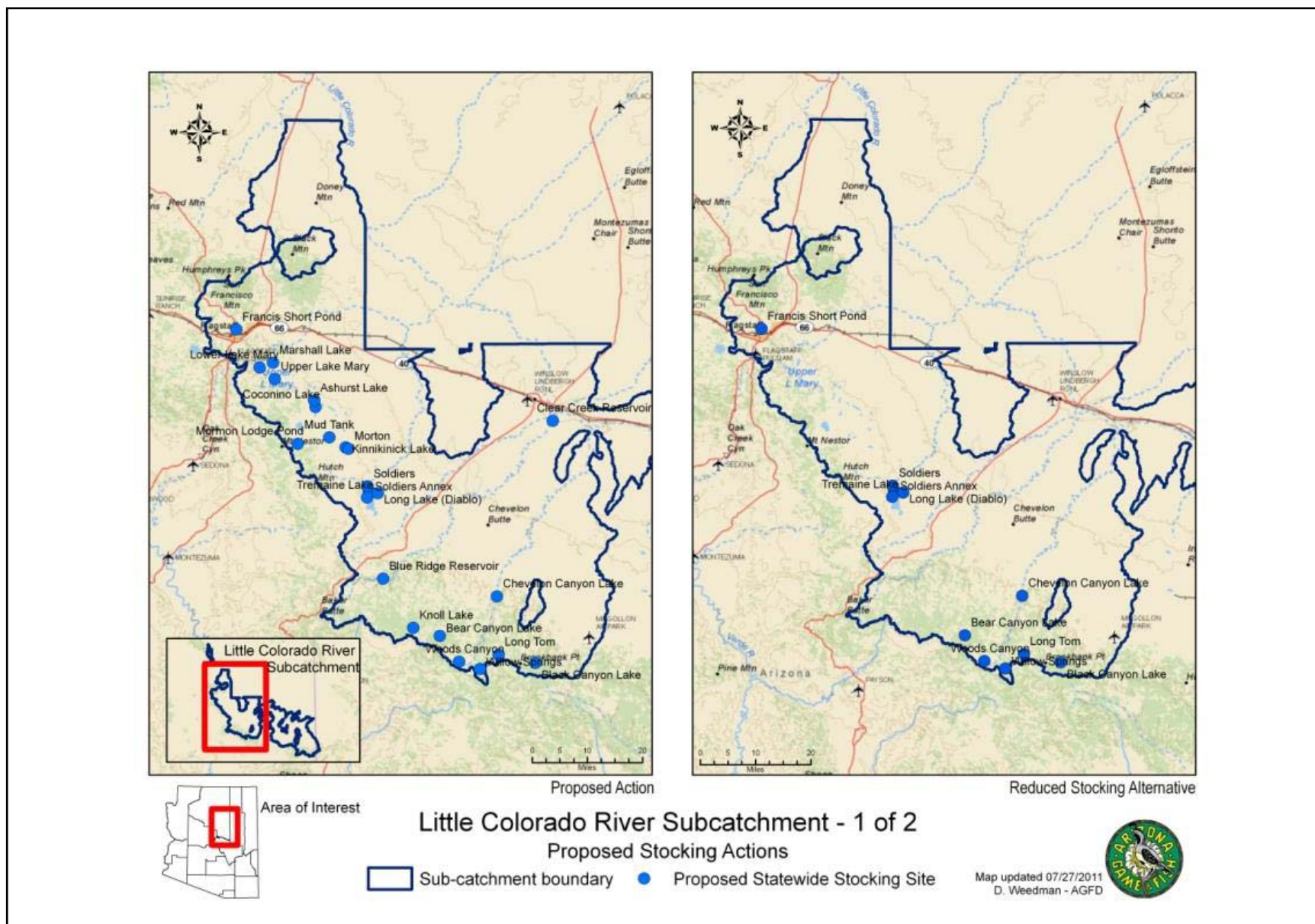
W/09-279/NEPA/EA/FigB1

Figure B1. Colorado River—Havasu Creek Subcatchment.



W/09-279/NEPA/EA/figB2

Figure B2. Colorado River—Yuma North Subcatchment.



W/09-279/NEPA/E/A/FigB4a

Figure B4a. Little Colorado River Subcatchment—1 of 2.

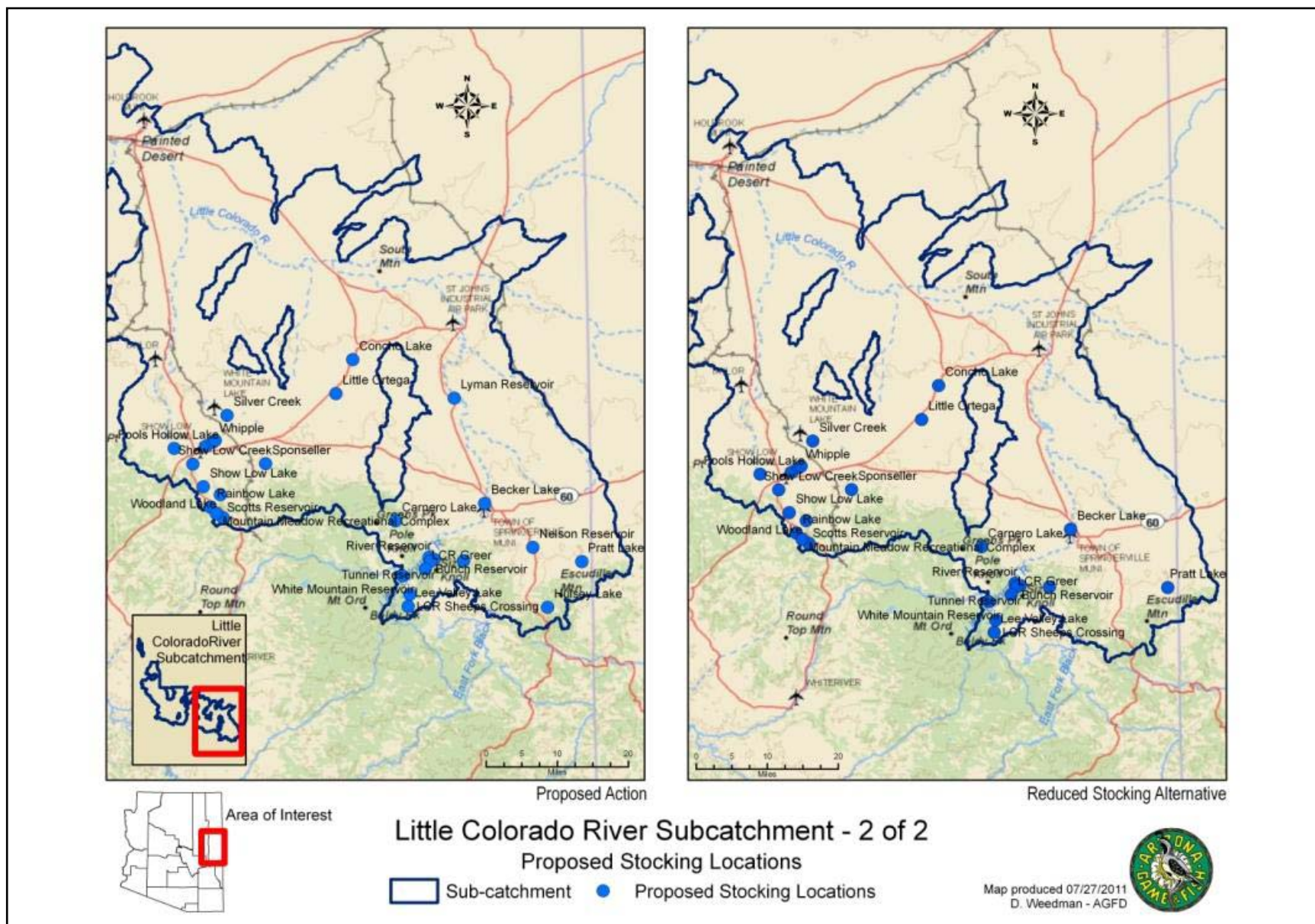


Figure B4b. Little Colorado River Subcatchment—2 of 2.

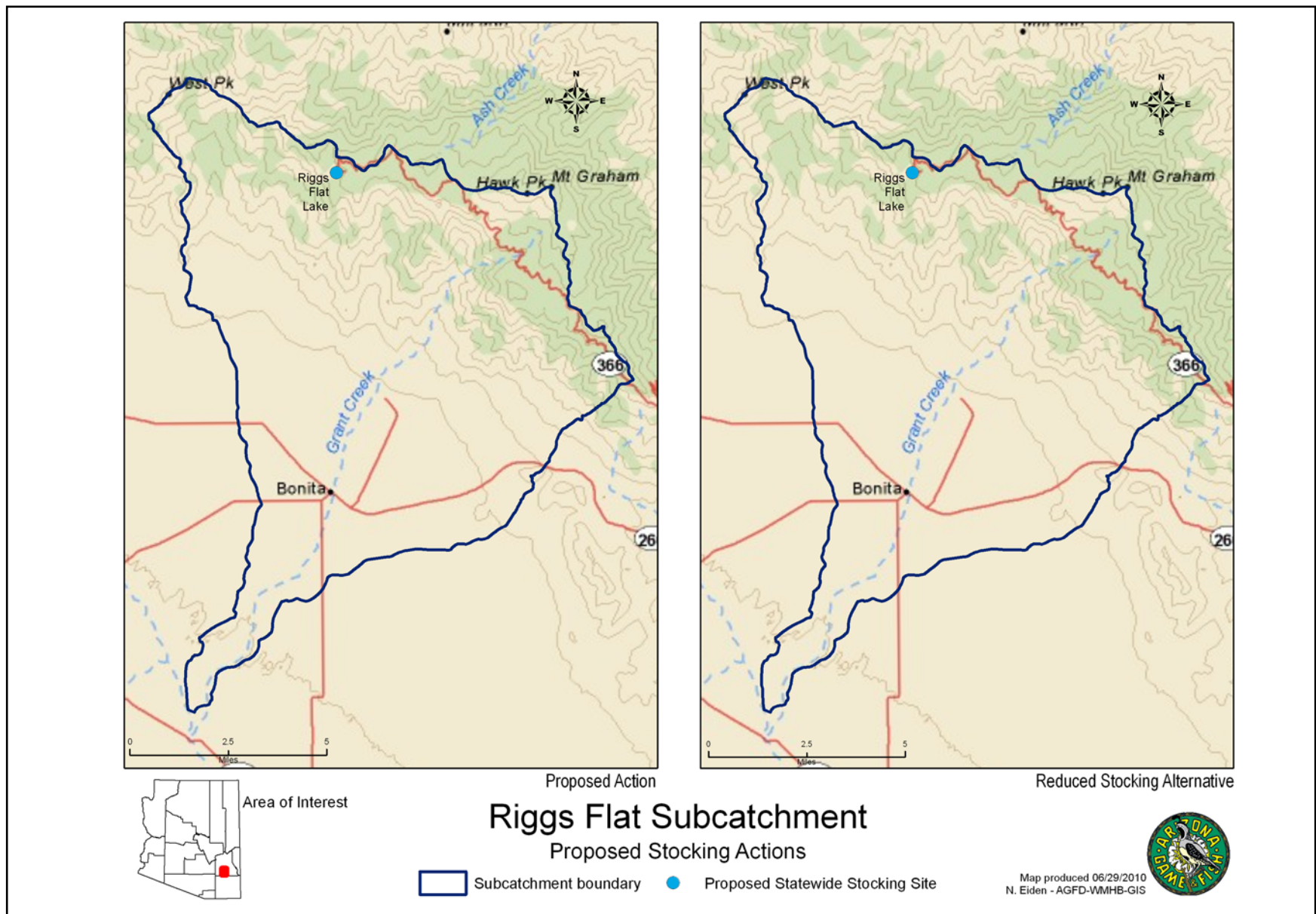
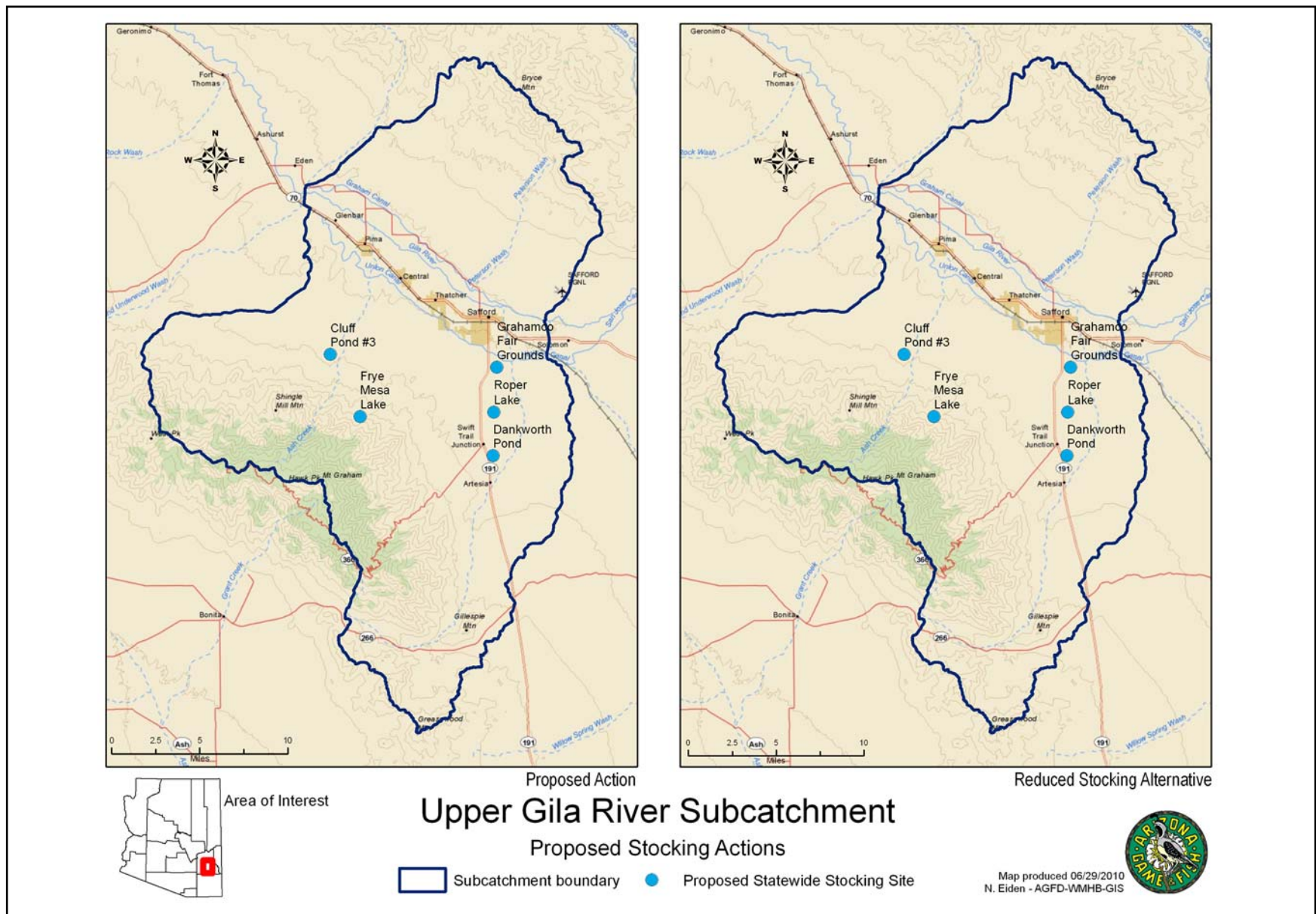
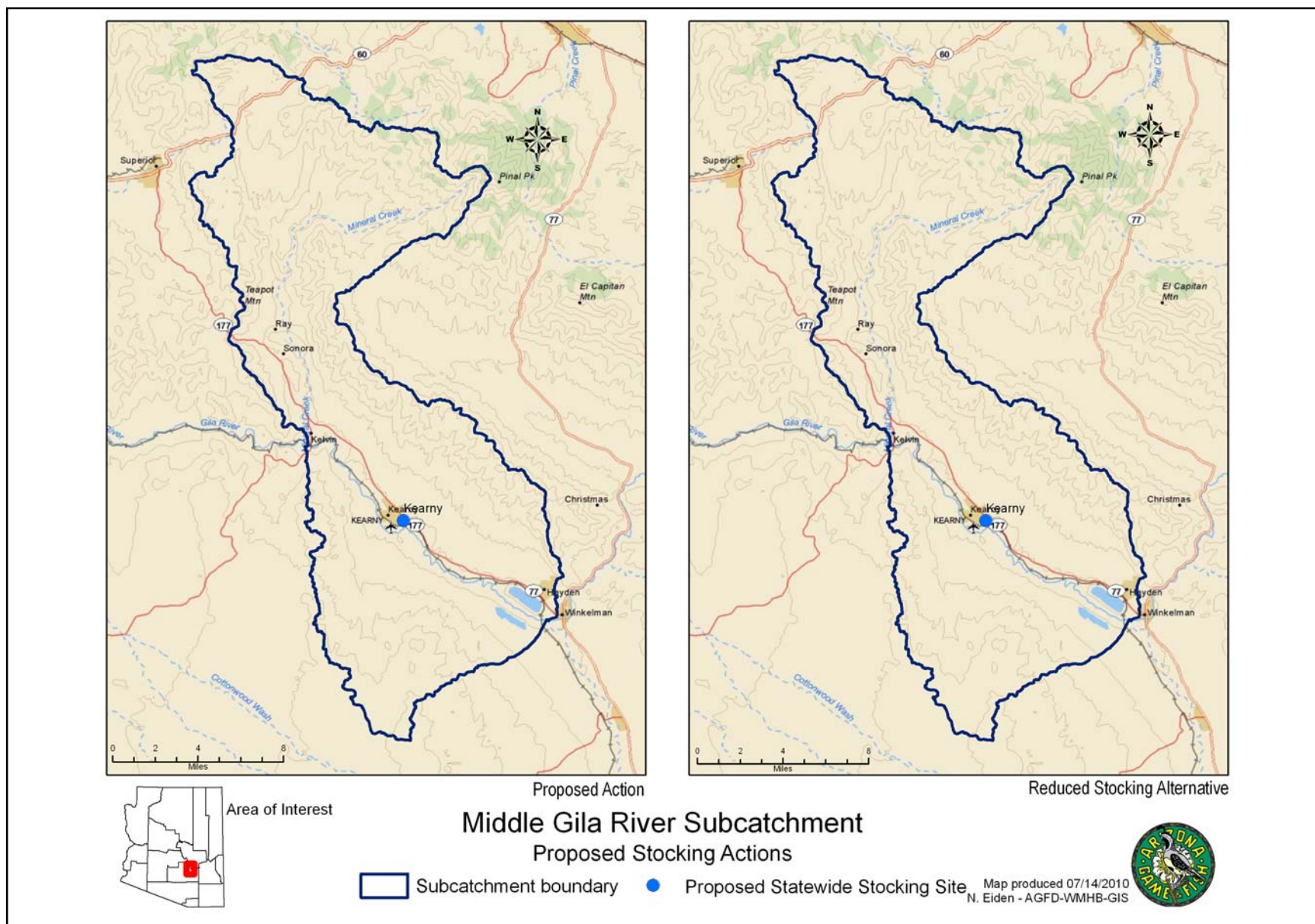


Figure B5. Riggs Flat Subcatchment.



W/09-279/NEPA/EA/FigB6

Figure B6. Upper Gila River Subcatchment.



W/09-279/NEPA/EA/FIGB7

Figure B7. Middle Gila River Subcatchment.

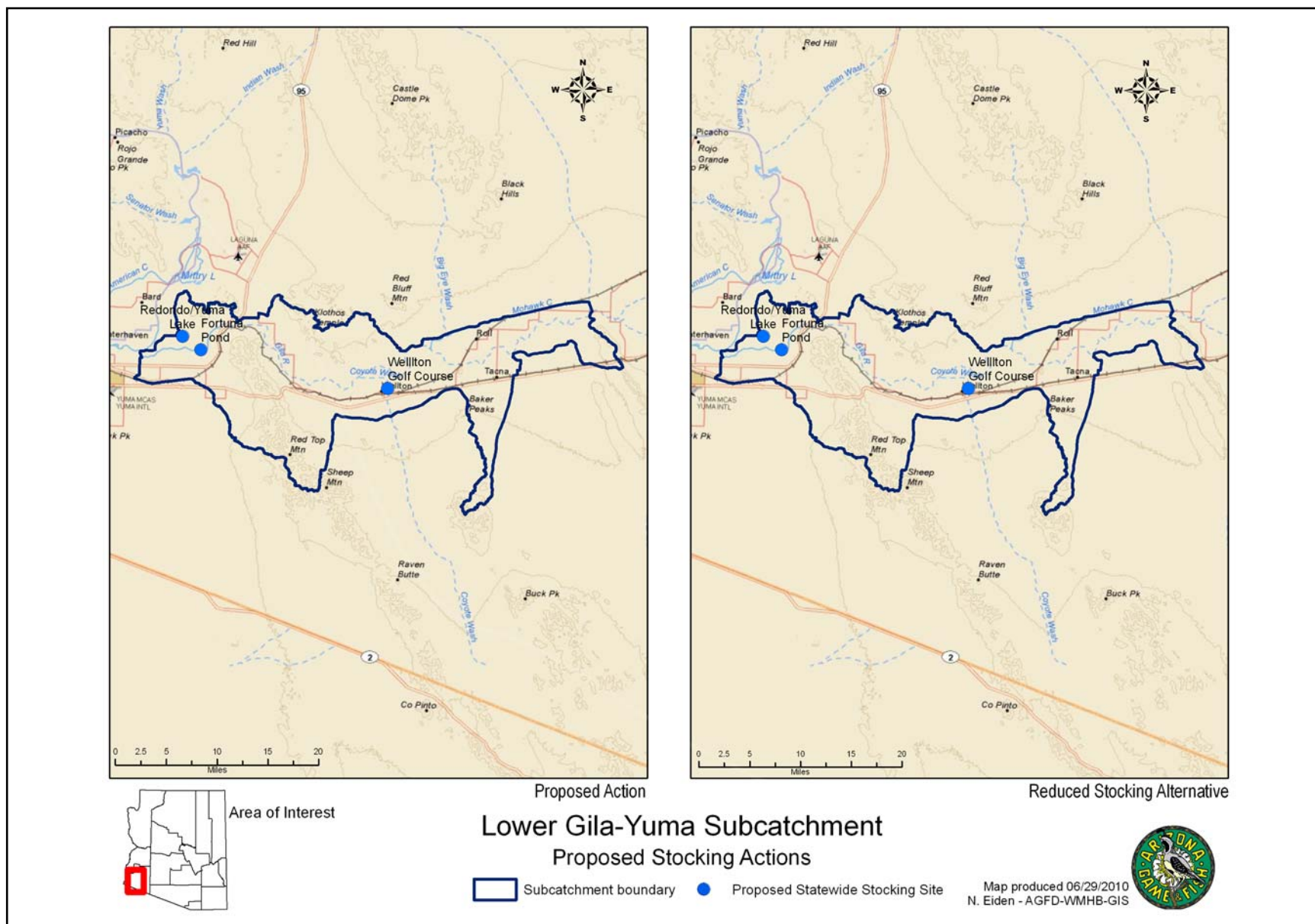


Figure B8. Lower Gila–Yuma Subcatchment.

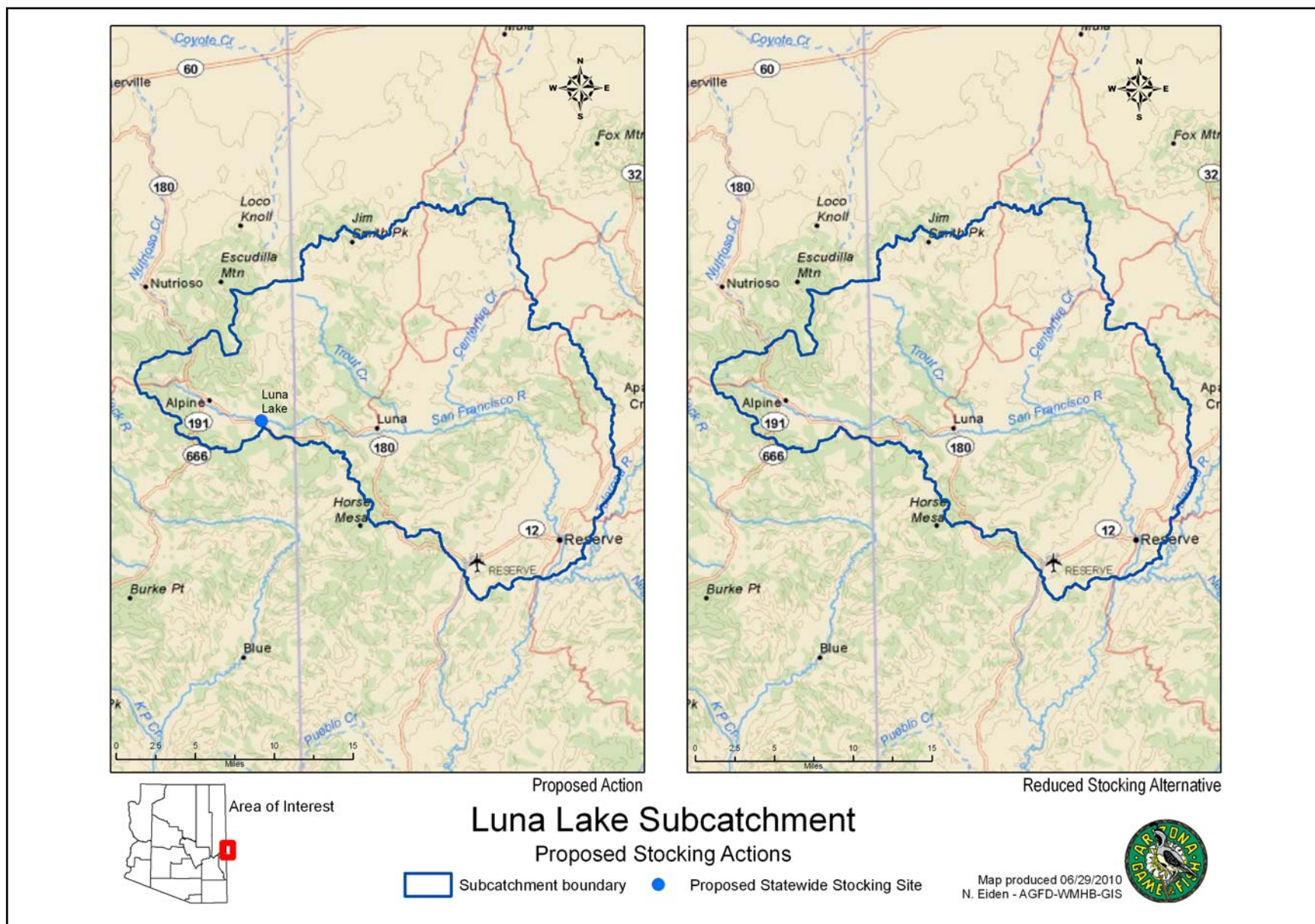


Figure B9. Luna Lake Subcatchment.

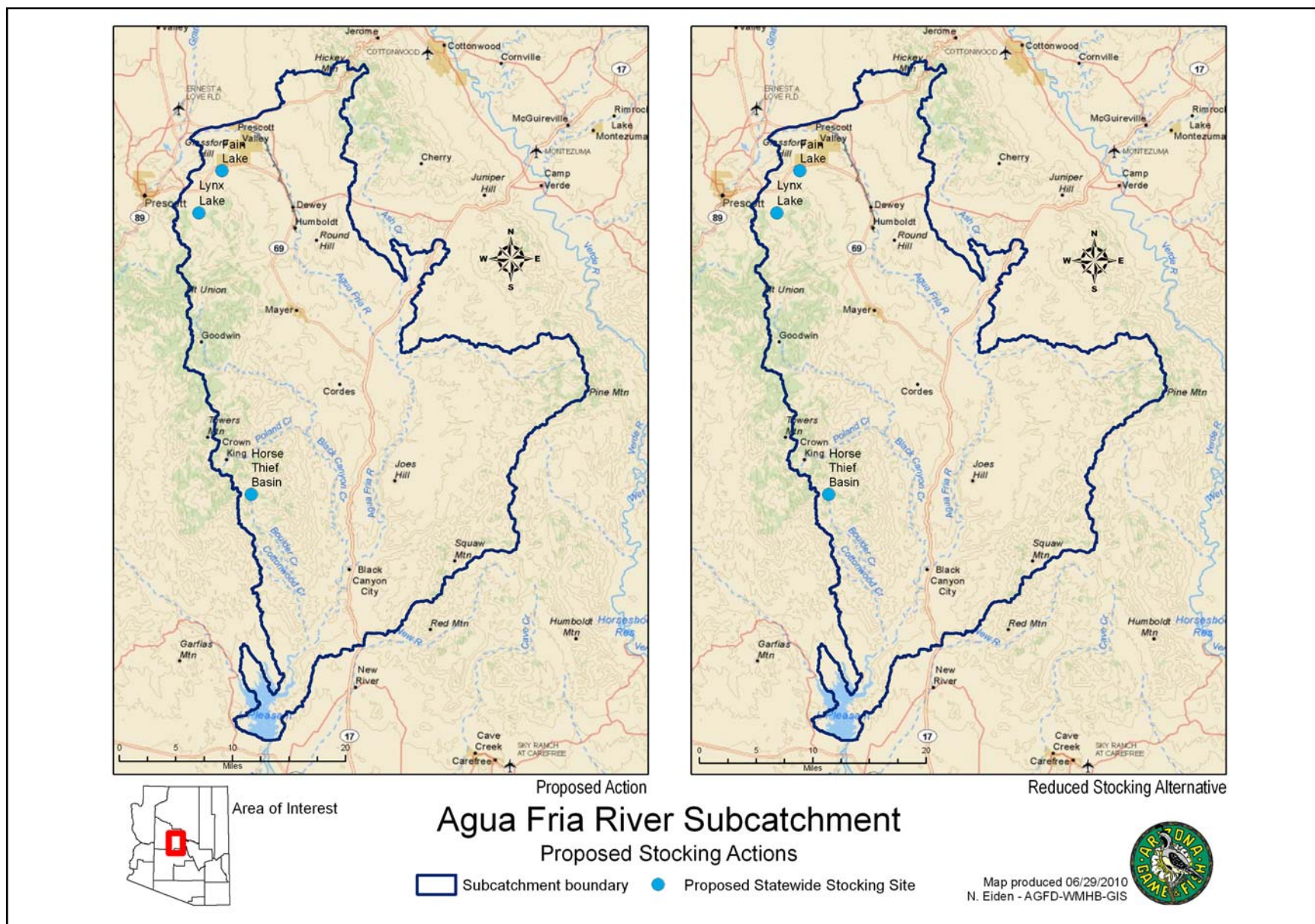


Figure B10. Agua Fria River Subcatchment.

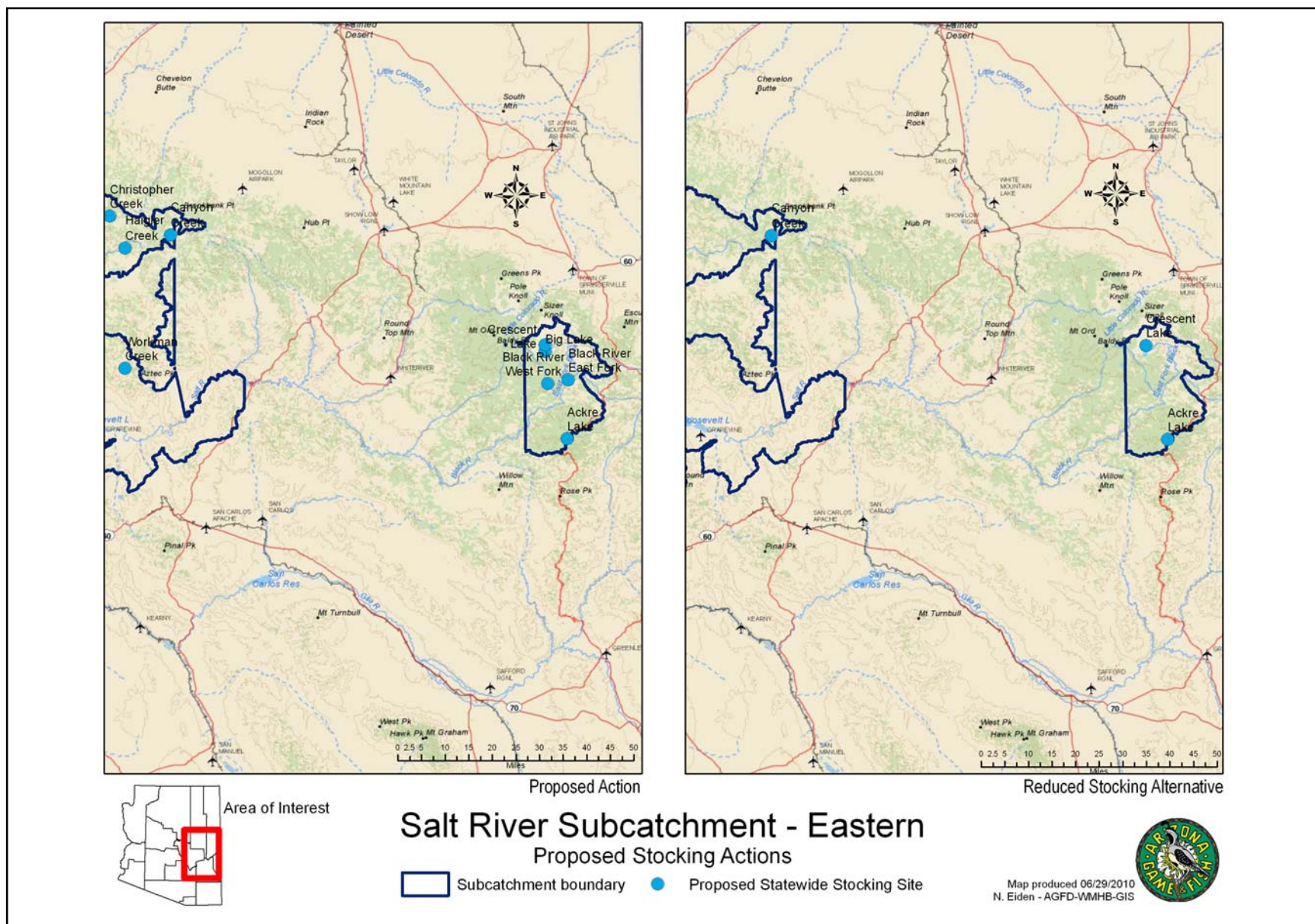
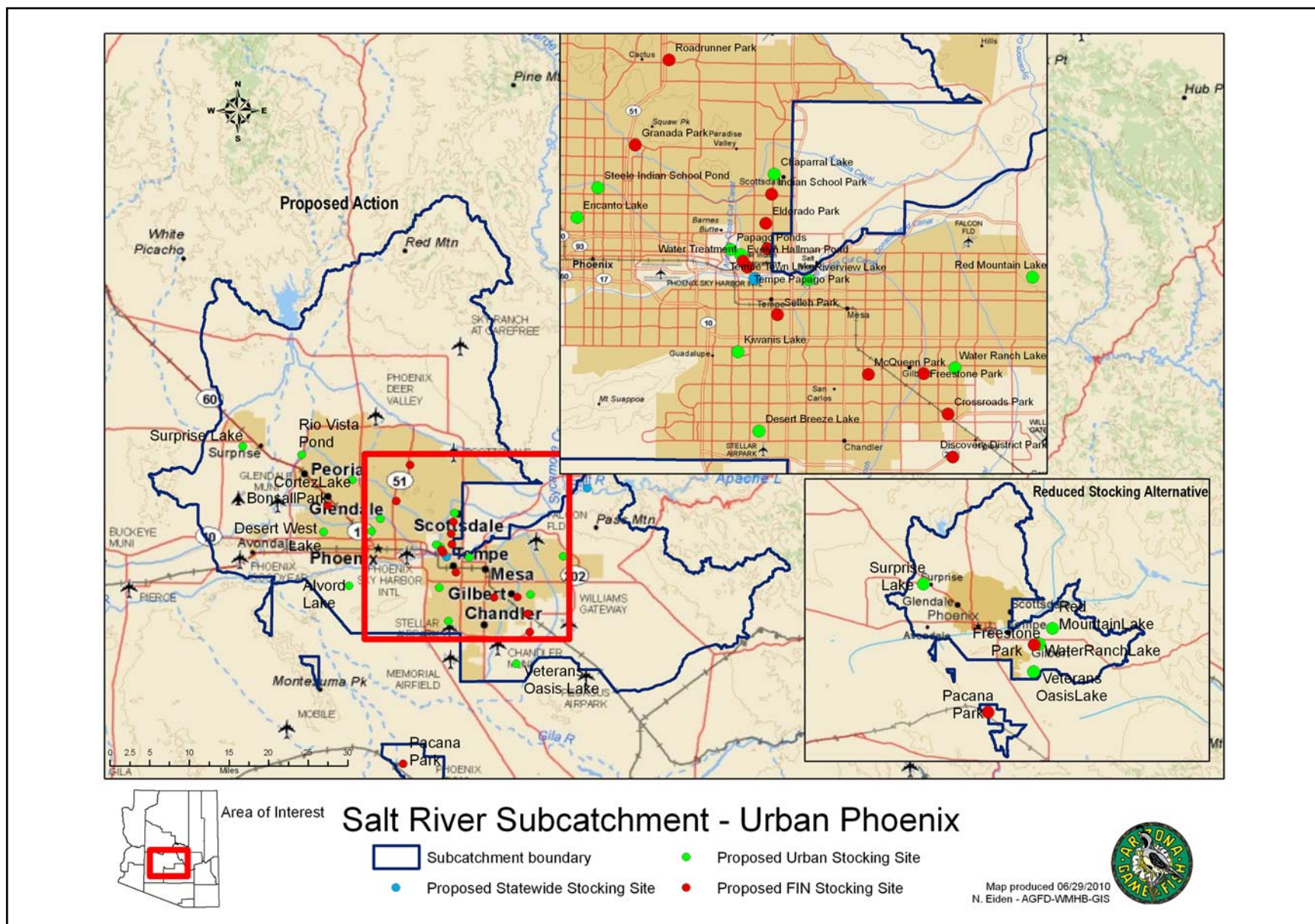
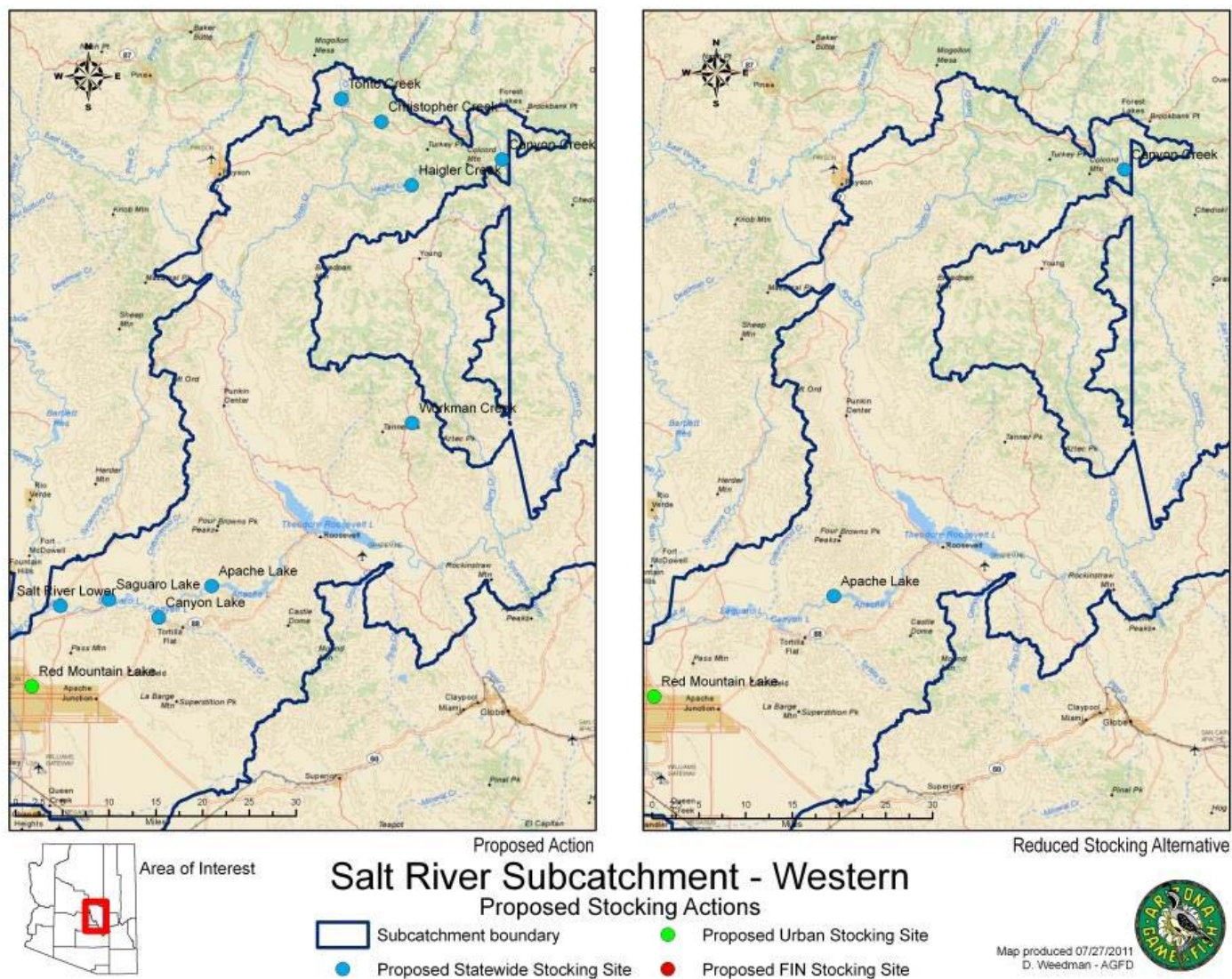


Figure B11a. Salt River Subcatchment—Eastern.



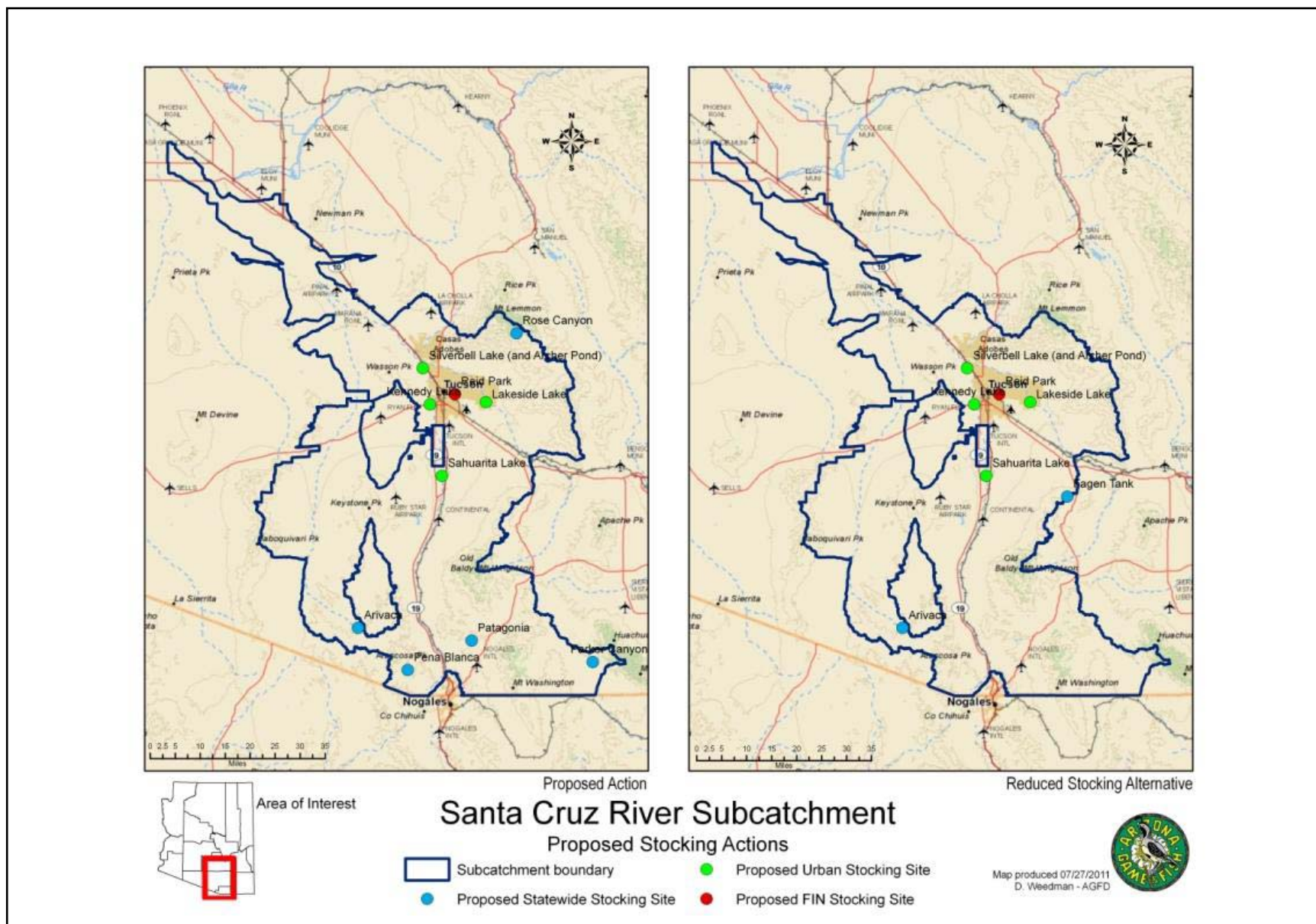
W/09-279/NEPA/EA/FigB11b

Figure B11b. Salt River Subcatchment—Urban Phoenix.



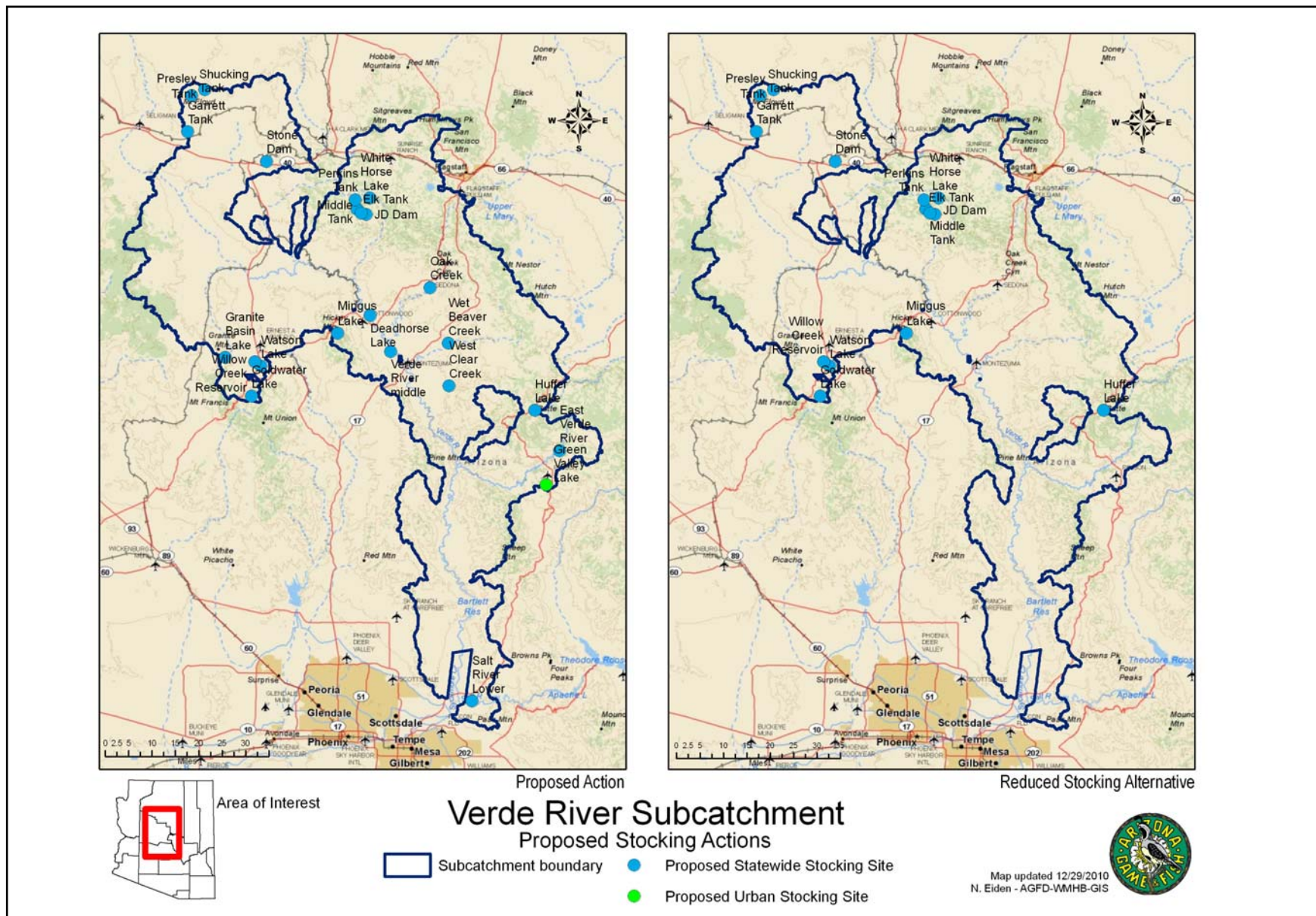
W/09-279/NEPA/EA/FigB11c

Figure B11c. Salt River Subcatchment—Western.



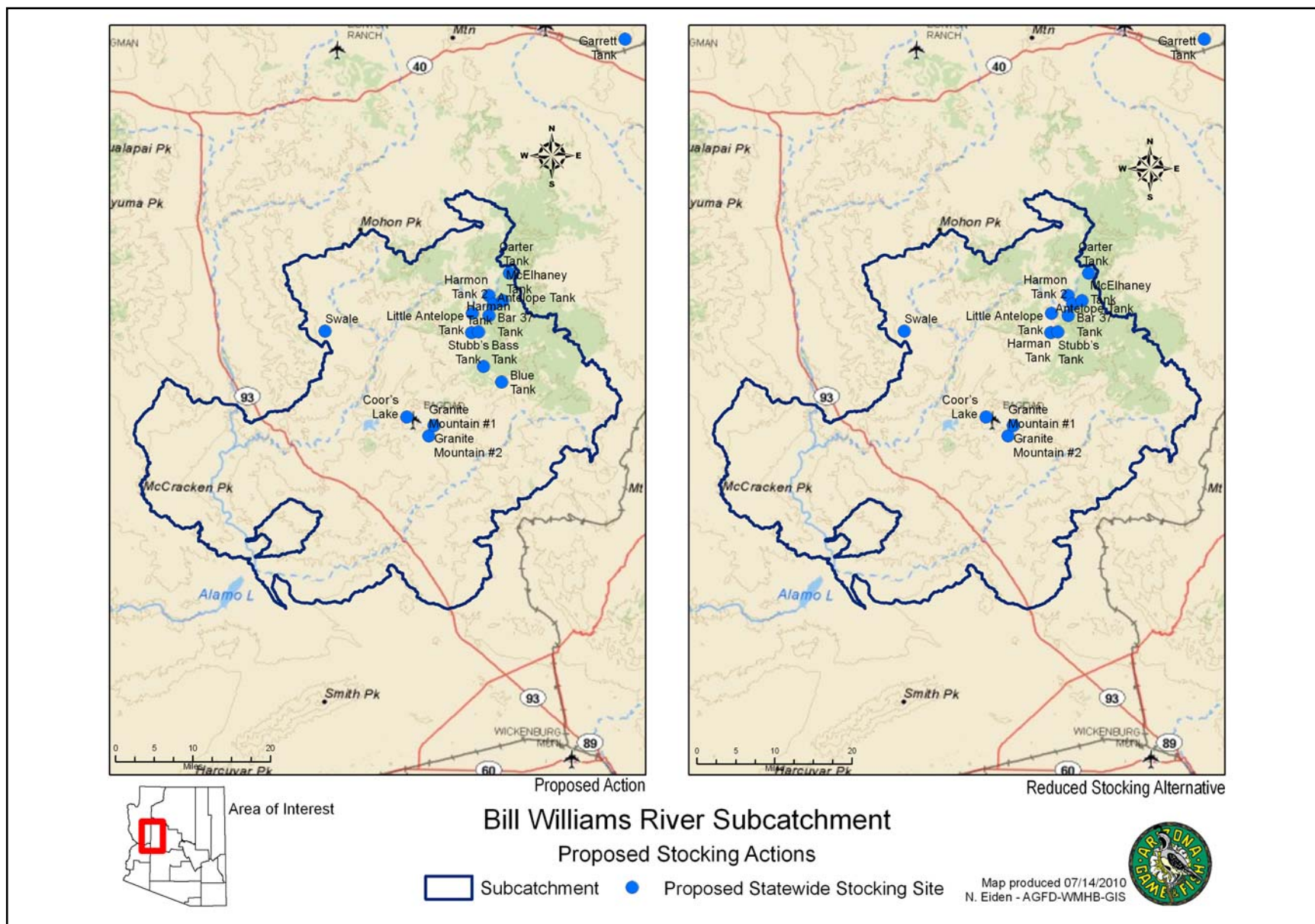
W/09-279/NEPA/EA/figB12

Figure B12. Santa Cruz River Subcatchment.



W/09-279/NEPA/EA/figB13

Figure B13. Verde River Subcatchment.



W/09-279/NEPA/EA/figB14

Figure B14. Bill Williams River Subcatchment.

APPENDIX C

Elevation and Vegetative Characteristics of Subcatchment and Stocking Sites

Table F. Elevation and vegetative characteristics of subcatchments and stocking sites.

SUBCATCHMENT/Complex/ Stocking Site	Elevation Above Mean Sea Level (feet)	Vegetation Type (biome)
COLORADO RIVER– HAVASU CREEK	1,870–6,775	Mohave desertscrub, Great Basin desertscrub, Plains and Great Basin grassland, Great Basin conifer woodland, Petran montane conifer forest
Havasu Creek Complex		
Cataract Lake	6,825	Petran montane conifer forest
City Reservoir	6,750	Petran montane conifer forest
Dogtown Reservoir	7,070	Petran montane conifer forest
Russell Tank	7,000	Petran montane conifer forest, Great Basin conifer woodland
Santa Fe Tank	6,850	Petran montane conifer forest
Kaibab Lake	6,795	Petran montane conifer forest
COLORADO RIVER– YUMA NORTH	364–600	Sonoran desertscrub
Yuma Complex		
La Paz County Park Pond	375	Sonoran desertscrub
La Paz County Park Lagoon	375	Sonoran desertscrub
COLORADO RIVER– YUMA SOUTH	100–1,560	Sonoran desertscrub
Yuma Complex		
Yuma West Wetland	130	Sonoran desertscrub
Hidden Shores	160	Sonoran desertscrub
LITTLE COLORADO RIVER	2,623–11,000	Mohave desertscrub, Great Basin desertscrub, Plains and Great Basin grassland, Great Basin conifer woodland, Petran montane conifer forest, Petran subalpine conifer forest, subalpine grassland
Little Colorado River Above Lyman Complex		
Hulsey Lake	8,580	Petran montane conifer forest
Pratt Tank	7,990	Great Basin conifer woodland
Nelson Reservoir	7,412	Plains and Great Basin grassland, Great Basin conifer woodland
Lyman Reservoir	5,978	Plains and Great Basin grassland
Carnero Lake	9,033	Petran montane conifer forest
Becker Lake	6,910	Plains and Great Basin grassland
West Fork Complex		
Mexican Hay Lake	8,890	Petran montane conifer forest
Lee Valley Lake	9,418	Petran subalpine conifer forest
Bunch Reservoir	8,256	Petran montane conifer forest
River Reservoir	8,221	Petran montane conifer forest
Tunnel Reservoir	8,261	Petran montane conifer forest
White Mountain Reservoir	9,164	Subalpine grassland
Little Colorado River Greer	8,221–8,800	Petran montane conifer forest
Little Colorado River Sheep's Crossing	8,900–9,200	Petran subalpine conifer forest
Upper Little Colorado River		
Little Ortega Lake	6,420	Plains and Great Basin grassland
Concho Lake	6,296	Plains and Great Basin grassland

Table F. Elevation and vegetative characteristics of subcatchments and stocking sites.

SUBCATCHMENT/Complex/ Stocking Site	Elevation Above Mean Sea Level (feet)	Vegetation Type (biome)
White Mountain Complex		
Sponseller Lake	6,960	Great Basin conifer woodland
Silver Creek	6,100	Plains and Great Basin grassland
Long Lake (Show Low)	6,324	Plains and Great Basin grassland
Whipple	6,324	Plains and Great Basin grassland
Little Mormon Lake	6,343	Plains and Great Basin grassland
Schoen's Complex		
Woodland Lake	6,893	Petran montane conifer forest
Rainbow Lake	6,707	Petran montane conifer forest
Show Low Lake	6,542	Petran montane conifer forest
Fools Hollow Lake	6,256	Plains and Great Basin grassland
Scott's Reservoir	6,715	Petran montane conifer forest
Show Low Creek	6,275–6,530	Petran montane conifer forest, Plains and Great Basin grassland
Mountain Meadow Recreation Complex	6,730	Petran montane conifer forest
Chevelon Creek Complex		
Chevelon Canyon Lake	6,366	Petran montane conifer forest
Long Tom Lake	7,500	Petran montane conifer forest
Willow Springs Lake	7,513	Petran montane conifer forest
Woods Canyon Lake	7,505	Petran montane conifer forest
Black Canyon Lake		
Black Canyon Lake	7,060	Petran montane conifer forest
Clear Creek Complex		
Bear Canyon Lake	7,560	Petran montane conifer forest
C.C. Cragin (Blue Ridge Reservoir)	6,600	Petran montane conifer forest
Knoll Lake	7,340	Petran montane conifer forest
Clear Creek Reservoir		
Clear Creek Reservoir	4,870	Great Basin desertscrub
Jack's Canyon Complex		
Soldiers Annex Lake	6,777	Plains and Great Basin grassland
Long Lake (Diablo) Lake	6,760	Plains and Great Basin grassland
Soldiers Lake	6,778	Plains and Great Basin grassland
Tremaine Lake	6,737	Plains and Great Basin grassland
Canyon Diablo Complex		
Mud Tank	7,160	Plains and Great Basin grassland
Kinnikinick Lake	7,042	Plains and Great Basin grassland
Coconino Lake	7,130	Plains and Great Basin grassland
Morton Lake	7,031	Plains and Great Basin grassland, Great Basin conifer woodland
Ashurst Lake	7,110	Plains and Great Basin grassland
Frances Short Pond	6,926	Petran montane conifer forest
Walnut Creek Complex		
Marshall Lake	7,112	Petran montane conifer forest
Mormon Lodge Pond	7,110	Petran montane conifer forest
Upper Lake Mary	6,829	Petran montane conifer forest
Lower Lake Mary	6,787	Petran montane conifer forest

Table F. Elevation and vegetative characteristics of subcatchments and stocking sites.

SUBCATCHMENT/Complex/ Stocking Site	Elevation Above Mean Sea Level (feet)	Vegetation Type (biome)
RIGGS FLAT	4,275–10,720	Semidesert grassland, Madrean evergreen woodland, Petran montane conifer forest, Petran subalpine conifer forest
Riggs Flat Lake		
Riggs Flat Lake	8,700	Petran montane conifer forest
UPPER GILA RIVER	2,540–10,758	Semidesert grassland, Sonoran desertscrub, Madrean evergreen woodland, Great Basin conifer woodland, Petran montane conifer forest, Petran subalpine conifer forest
Upper Gila		
Cluff Pond #3	3,000	Semidesert grassland
Dankworth Pond	3,190	Sonoran desertscrub
Frye Mesa Lake	5,000	Semidesert grassland
Graham County Fairgrounds	3,043	Sonoran desertscrub
Roper Lake	3,130	Sonoran desertscrub
MIDDLE GILA RIVER	1,773–7,812	Sonoran desertscrub, semidesert grassland, interior chaparral, Madrean evergreen woodland, Petran montane conifer forest
Kearny		
Kearny	1,860	Sonoran desertscrub
LOWER GILA–YUMA	141–2,722	Sonoran desertscrub
Lower Gila–Yuma Complex		
Fortuna Pond	155	Sonoran desertscrub
Redondo/Yuma Lake	145	Sonoran desertscrub
Wellton Golf Course	250	Sonoran desertscrub
LUNA LAKE	5,663–10,665	Petran montane conifer forest, Petran subalpine conifer forest, subalpine grassland
Luna Lake		
Luna Lake	7,882	Petran montane conifer forest
AGUA FRIA RIVER	1,570–7,800	Sonoran desertscrub, interior chaparral, Petran montane conifer forest, semidesert grassland, Plains and Great Basin grassland, Great Basin conifer woodland
Agua Fria River Complex		
Fain Lake	5,060	Interior chaparral
Horse Thief Basin	6,080	Interior chaparral
Lynx Lake	5,529	Interior chaparral
SALT RIVER	880–10,110	Sonoran desertscrub, interior chaparral, semidesert grassland, Petran montane conifer forest, Madrean evergreen woodland
Black River Complex		
Ackre Lake	8,600	Petran montane conifer forest
Big Lake	8,985	Subalpine grassland
Black River East Fork	7,600–7,890	Petran montane conifer forest
Black River West Fork	7,660–7,760	Petran montane conifer forest
Crescent Lake	9,043	Subalpine grassland
Canyon Creek Complex		
Canyon Creek	6,260–6,720	Petran montane conifer forest
Workman Creek		
Workman Creek	5,260–5,500	Petran montane conifer forest

Table F. Elevation and vegetative characteristics of subcatchments and stocking sites.

SUBCATCHMENT/Complex/ Stocking Site	Elevation Above Mean Sea Level (feet)	Vegetation Type (biome)
Tonto Creek Complex		
Tonto Creek	4,960–6,160	Petran montane conifer forest
Christopher Creek	5,520–6,120	Petran montane conifer forest
Haigler	5,200–5,400	Great Basin conifer woodland, Petran montane conifer forest
Lower Salt Complex		
Apache Lake	1,891	Sonoran desertscrub
Canyon Lake	1,610	Sonoran desertscrub
Saguaro Lake	1,506	Sonoran desertscrub
Tempe Town Lake	1,148	Sonoran desertscrub
Salt River Lower	1,313–1,506	Sonoran desertscrub
Phoenix Urban Lakes		
Alvord Lake	1,065	Sonoran desertscrub
Chaparral Lake	1,260	Sonoran desertscrub
Cortez Lake	1,230	Sonoran desertscrub
Desert Breeze Lake	1,175	Sonoran desertscrub
Desert West Lake	1,075	Sonoran desertscrub
Encanto Lake	1,095	Sonoran desertscrub
Evelyn Hallman Pond	1,245	Sonoran desertscrub
Kiwanis Lake	1,190	Sonoran desertscrub
Papago Ponds	1,250	Sonoran desertscrub
Red Mountain Lake	1,505	Sonoran desertscrub
Rio Vista Pond	1,165	Sonoran desertscrub
Riverview Lake	1,200	Sonoran desertscrub
Steele Indian School Pond	1,120	Sonoran desertscrub
Surprise Lake	1,215	Sonoran desertscrub
Veterans Oasis Lake	1,275	Sonoran desertscrub
Water Ranch Lake	1,275	Sonoran desertscrub
Phoenix Special Urban Lakes		
Crossroads Park	1,273	Sonoran desertscrub
Freestone Park	1,245	Sonoran desertscrub
McQueen Park	1,217	Sonoran desertscrub
Bonsall Park	1,137	Sonoran desertscrub
Pacana Park	1,186	Sonoran desertscrub
Granada Park	1,260	Sonoran desertscrub
Roadrunner Park	1,397	Sonoran desertscrub
Eldorado Park	1,210	Sonoran desertscrub
Indian School Park	1,237	Sonoran desertscrub
Vista del Camino Park	1,190	Sonoran desertscrub
Tempe Papago Park	1,170	Sonoran desertscrub
Water Treatment	1,240	Sonoran desertscrub
Discovery District Park	1,285	Sonoran desertscrub
Selleh Park	1,187	Sonoran desertscrub

Table F. Elevation and vegetative characteristics of subcatchments and stocking sites.

SUBCATCHMENT/Complex/ Stocking Site	Elevation Above Mean Sea Level (feet)	Vegetation Type (biome)
SANTA CRUZ RIVER	1,100–9,400	Sonoran desertscrub, semidesert grassland, interior chaparral, Madrean evergreen woodland, Petran montane conifer forest, Plains and Great Basin grassland, Chihuahuan desertscrub
Upper Santa Cruz River		
Parker Canyon Lake	5,380	Madrean evergreen woodland
Patagonia Lake	3,765	Semidesert grassland
Peña Blanca Lake	3,832	Madrean evergreen woodland
Middle Santa Cruz		
Rose Canyon Lake	6,933	Madrean evergreen woodland
Fagen Tank	4,200	Semidesert grassland
Arivaca Lake	3,800	Semidesert grassland
Tucson Santa Cruz Complex		
Sahuarita Lake	2,710	Sonoran desertscrub
Kennedy Lake	2,450	Sonoran desertscrub
Lakeside Lake	2,700	Sonoran desertscrub
Silverbell Lake (and Archer Pond)	2,255	Sonoran desertscrub
Tucson Santa Cruz Special Urban Lakes		
Reid Park	2,490	Sonoran desertscrub
VERDE RIVER	1,300–12,633	Sonoran desertscrub, interior chaparral, semidesert grassland, Petran montane conifer forest, Great Basin conifer woodland, Plains and Great Basin grassland, Petran subalpine conifer forest, alpine tundra
Big Chino Wash Complex		
Granite Basin Lake	5,600	Interior chaparral
Garrett Tank	5,800	Great Basin conifer woodland
Stone Dam	5,500	Great Basin conifer woodland
Shucking Tank	6,000	Great Basin conifer woodland
Presley Tank	5,820	Great Basin conifer woodland
Sycamore Complex		
Elk Tank	6,680	Petran montane conifer forest
JD Dam	6,456	Great Basin conifer woodland
White Horse Lake	6,551	Great Basin conifer woodland
Middle Tank	6,500	Great Basin conifer woodland
Perkins Tank	6,800	Great Basin conifer woodland
Middle Verde Complex		
Mingus Lake	7,573	Petran montane conifer forest
Dead Horse Lake	3,300	Semidesert grassland
Verde River Middle	3,060–3,400	Semidesert grassland
Oak Creek	3,400–5,480	Interior chaparral, Great Basin conifer woodland, semidesert grassland
Wet Beaver Creek	3,640–3,900	Great Basin conifer woodland, Sonoran desertscrub
West Clear Creek	3,200–3,680	Great Basin conifer woodland
Huffer Lake	7,440	Petran montane conifer forest
Granite Creek Complex		
Watson Lake	5,161	Great Basin conifer woodland
Goldwater Lake	6,800	Petran montane conifer forest

Table F. Elevation and vegetative characteristics of subcatchments and stocking sites.

SUBCATCHMENT/Complex/ Stocking Site	Elevation Above Mean Sea Level (feet)	Vegetation Type (biome)
Granite Creek Complex		
Willow Creek Reservoir	5,136	Great Basin conifer woodland
Lower Verde River Complex		
East Verde River	4,536–5,600	Interior chaparral, Petran montane conifer forest
Green Valley Lake	4,840	Great Basin conifer woodland
BILL WILLIAMS RIVER	1,176–7,263	Sonoran desertscrub, interior chaparral, semidesert grassland, Great Basin conifer woodland, Petran montane conifer forest
Santa Maria Complex		
Granite Mountain #1	3,675	Sonoran desertscrub
Granite Mountain #2	3,800	Interior chaparral
Bass Tank	5,170	Interior chaparral
Blue Tank	4,695	Interior chaparral
Burro Creek Complex		
Carter Tank	6,200	Great Basin conifer woodland
Coor's Lake	3,700	Interior chaparral
Antelope Tank	6,000	Great Basin conifer woodland
Bar 37 Tank	5,820	Great Basin conifer woodland
Harman Tank	5,660	Interior chaparral
Harmon Tank #2	5,930	Great Basin conifer woodland
Little Antelope Tank	5,790	Great Basin conifer woodland
McElhaney Tank	6,000	Petran montane conifer forest
Stubbs Tank	5,660	Interior chaparral
Swale Tank	4,520	Semidesert grassland

APPENDIX D

Consultation and Other Special Status Species Analyzed Further

Table G. Consultation and other special status species analyzed further, their status designation, and habitat characteristics.

Taxonomic Group	Common Name	Scientific Name	Status	Habitat
Native fish	Apache trout	<i>Oncorhynchus apache</i>	S, T, WSCA	Streams above 5,780 feet; Petran montane conifer to subalpine conifer forests
	Bluehead sucker	<i>Catostomus discobolus</i>	S	Streams, rivers; 2,001–6,759 feet; desertscrub to Petran montane conifer forest
	Bonytail chub	<i>Gila elegans</i>	E*, S, WSCA	Mid-sized to large rivers and pools; 235–1,960 feet; desertscrub to interior chaparral
	Colorado pikeminnow	<i>Ptychocheilus lucius</i>	E, S, WSCA	Mid-sized to large rivers with swift waters and cobbles for breeding; 600–3,800 feet; desertscrub to interior chaparral
	Desert pupfish	<i>Cyprinodon macularius</i>	E*, WSCA	Shallow water of desert springs, small streams, and marshes; below 5,000 feet
	Desert sucker	<i>Catostomus clarkii</i>	S, SC	Rapids in streams and rivers; 480–8,840 feet; desertscrub to subalpine conifer forest
	Gila chub	<i>Gila intermedia</i>	E*, S, WSCA	Smaller headwaters, cienegas, springs, or marshes; 2,720–5,420 feet; desertscrub to Petran montane conifer forest
	Gila topminnow	<i>Poeciliopsis occidentalis occidentalis</i>	E, WSCA	Headwaters, springs, and backwaters; 1,320–7,510 feet; desertscrub to Petran montane conifer forest
	Gila trout	<i>Oncorhynchus gilae</i>	T, WSCA	Small mountain headwater streams; 5,446–9,220 feet; Petran montane conifer to subalpine conifer forests
	Headwater chub	<i>Gila nigra</i>	C, S	Mid- to headwaters of mid-sized streams; 4,347–6,562 feet; desertscrub to Petran montane conifer forest
	Humpback chub	<i>Gila cypha</i>	E*, WSCA	High-gradient, canyon-bound rivers; 1,530–4,400 feet; desertscrub to interior chaparral/Great Basin conifer woodland
	Little Colorado spinedace	<i>Lepidomeda vittata</i>	T*, WSCA	Slow to moderate waters with gravelly bottoms; 3,300–9,800 feet; desertscrub to subalpine conifer forest
	Little Colorado sucker	<i>Catostomus</i> sp. 3	S, SC, WSCA	Creeks, small to medium rivers, and impoundments; 2,200–7,100 feet; desertscrub to Petran montane conifer forest
	Loach minnow	<i>Tiaroga cobitis</i>	T*, PE, WSCA	Riffles in mainstream rivers and tributaries; 2,325–8,240 feet; desertscrub to Petran montane conifer forest

Table G. Consultation and other special status species analyzed further, their status designation, and habitat characteristics.

Taxonomic Group	Common Name	Scientific Name	Status	Habitat
Native fish (continued)	Longfin dace	<i>Agosia chrysogaster chrysogaster</i>	S, SC	Small to medium streams; less than 6,700 feet; desertscrub to Petran montane conifer forest
	Quitobaquito pupfish	<i>Cyprinodon eremus</i>	E*, WSCA	Springs, marshes, slow-flowing streams, and river backwaters; currently restricted to small ponds and springs; in Arizona, only known from Quitobaquito Springs and nearby concrete tank
	Razorback sucker	<i>Xyrauchen texanus</i>	E*, WSCA	Medium to large rivers; 181–5,000 feet; desertscrub to interior chaparral/Great Basin conifer woodland
	Roundtail chub	<i>Gila robusta</i>	C, S, WSCA	Mid-elevation streams and rivers; 1,210–7,220 feet; desertscrub to Petran montane conifer forest
	Sonora chub	<i>Gila ditaenia</i>	T*, WSCA	Perennial and spatially intermittent small to moderately sized streams; approximately 3,900 feet elevation
	Sonora sucker	<i>Catostomus insignis</i>	S, SC	Streams; 1,210–8,730 feet; desertscrub to subalpine conifer forest
	Speckled dace	<i>Rhinichthys osculus</i>	S, SC	Small to medium rivers; 1,550–9,843 feet; desertscrub to subalpine conifer forest
	Spikedace	<i>Meda fulgida</i>	T*, PE, WSCA	Shallow waters less than 3.3 feet; 1,620–4,500 feet; desertscrub to semidesert grasslands/interior chaparral
	Woundfin	<i>Plagopterus argentissimus</i>	E*, WSCA	Shallow, warm, turbid, fast-flowing water; below 4,500 feet in elevation
Amphibians and semi-aquatic reptiles	Chiricahua leopard frog	<i>Rana chiricahuensis</i>	T, WSCA	Ponds, tanks, streams; 3,281–8,890 feet; desertscrub to subalpine conifer forest
	Arizona tree frog (Huachucas/Canelo Hills Distinct Population Segment)	<i>Hyla wrightorum</i>	C	In shrubs or trees near water; 5,000–8,500 feet; Petran montane conifer forests and meadows to subalpine conifer forest
	Lowland leopard frog	<i>Rana yavapaiensis</i>	S, SC, WSCA	Permanent waters, both natural and man-made; 480–6,200 feet; desertscrub to Petran montane conifer forest
	Narrow-headed garter snake	<i>Thamnophis rufipunctatus</i>	S, SC, WSCA	Permanently flowing streams with bank-side vegetation; 2,440–8,080 feet; Great Basin conifer woodlands to subalpine conifer forest

Table G. Consultation and other special status species analyzed further, their status designation, and habitat characteristics.

Taxonomic Group	Common Name	Scientific Name	Status	Habitat
Amphibians and semi-aquatic reptiles (continued)	Northern leopard frog	<i>Rana pipiens</i>	S, WSCA	Permanent waters with rooted aquatic vegetation; 0–11,000 feet; desertscrub to just below alpine tundra
	Northern Mexican garter snake	<i>Thamnophis eques megalops</i>	C, S, WSCA	Vegetated cienegas, streams, and stock tanks; 3,000–5,000 feet; desertscrub to Petran montane conifer forest
	Sonora tiger salamander	<i>Ambystoma mavortium stebbinsi</i>	E, WSCA	Lakes, ponds and cattle tanks; 4,650–6,220 feet; semidesert grasslands
	Sonoyta mud turtle	<i>Kinosternon sonoriense longifemorale</i>	C	Ponds and streams; 0–6,700 feet; desertscrub to Petran montane conifer forest
	Western narrow-mouthed toad	<i>Gastrophryne olivacea</i>	S, WSCA	In the vicinity of streams, pools, and springs; 1,400–4,700 feet; desertscrub to Petran montane conifer forest
Aquatic invertebrates	Balmorhea saddle-case caddisfly	<i>Protoptila balmorhea</i>	SC	Larger, slower-moving warm streams; 3,500 feet; semidesert grasslands
	California floater	<i>Anodonta californiensis</i>	S, SC	Shallow waters in perennial waters; 4,000–8,670 feet; Petran montane conifer forest
	Page Springs caddisfly	<i>Metrichia nigrutta</i>	SC	Streams, springs; unknown elevation and associated plant community
	Page springsnail	<i>Pyrgulopsis morrisoni</i>	C, S	Springs, seeps; 3,300–3,600 feet; plains and desert grassland
	Three Forks springsnail	<i>Pyrgulopsis trivialis</i>	C, S	Springs and spring-fed streams; 8,220–8,459 feet; Petran montane conifer forest
	White Mountains water penny beetle	<i>Psephenus montanus</i>	SC	Cold, fast-flowing streams; 6,720–8,830 feet; Petran montane to subalpine conifer forests
Riparian plants	Alcove bog-orchid	<i>Platanthera zothecina</i>	S, SC	Moist stream banks, seeps, and hanging gardens with constant moisture; 5,000–9,000 feet; desertscrub to Great Basin conifer woodland
	Aravaipa wood fern	<i>Thelypteris puberula</i> var. <i>sonorensis</i>	S	On riverbanks, seepage areas, and meadows; 2,220–4,500 feet; desertscrub
	Arizona alum root	<i>Heuchera glomerulata</i>	S	Shaded rocky cliffs near seeps or streams; 4,000–9,000 feet; interior chaparral to subalpine conifer forest
	Arizona giant sedge	<i>Carex ultra</i>	S	Moist soils near perennial springs and streams; 2,040–6,000 feet; Great Basin conifer woodland

Table G. Consultation and other special status species analyzed further, their status designation, and habitat characteristics.

Taxonomic Group	Common Name	Scientific Name	Status	Habitat
Riparian plants (continued)	Arizona willow	<i>Salix arizonica</i>	S, HS	High elevation wet meadows, streamsides, and cienegas; 8,550–10,000 feet; subalpine conifer forest.
	Blumer's dock	<i>Rumex orthoneurus</i>	HS, S, SC	Mid- to high elevation wetlands adjacent to perennial water; 4,480–9,660 feet; Petran montane meadows
	Boreal bog orchid	<i>Platanthera hyperborea</i>	SR	Rich, moist woods; 7,500–9,500 feet; Petran montane conifer forests
	Chihuahuan sedge	<i>Carex chihuahuensis</i>	S	Wet soils in streambeds; 3,600–7,200 feet; Petran montane conifer forests and subalpine conifer forest
	Crenulate moonwort	<i>Botrychium crenulatum</i>	S, SC	Marshes and springs; 10,000–11,000 feet; Petran montane conifer forests
	Goodding's onion	<i>Allium gooddingii</i>	S, HS	Moist shaded canyon bottoms in climax conifer forests along perennial, intermittent, and ephemeral streams; 7,000–10,600 feet; Petran montane conifer forest and subalpine conifer forest.
	Lemmon lily	<i>Lilium parryi</i>	S, SC, SR	Shady canyon bottom along perennial streams or springs; 5,500–7,800 feet; Petran montane conifer forests
	Lemmon's stevia	<i>Stevia lemmonii</i>	S	Rocky canyon slopes, ravines, and streambeds; 3,000–4,580 feet; subalpine conifer forest
	Slender bog orchid	<i>Platanthera purpurascens</i>	SR	Seeps, stream banks, fens, open woodlands; 8,200–10,900 feet; Petran montane conifer forests
	Texas purple spike	<i>Hexalectris warnockii</i>	HS, S, SC	Shady canyon bottoms along streams; 5,000–7,000 feet; subalpine conifer forest
	Thurber's bog orchid	<i>Platanthera limosa</i>	SR	Marshes, springs, and stream banks; 5,900–8,200 feet; Petran montane conifer forests
	Weeping muhly	<i>Muhlenbergia xerophila</i>	S	Seeps or associated with water; 3,520–6,000 feet; desertscrub to Petran montane conifer forests
	Whisk fern	<i>Psilotum nudum</i>	HS, S	Mesic woods, thickets, swamps, hammocks, rocky slopes; 3,610 feet; Petran montane conifer forests

Table G. Consultation and other special status species analyzed further, their status designation, and habitat characteristics.

Taxonomic Group	Common Name	Scientific Name	Status	Habitat
Riparian plants (continued)	White mandarin twisted stalk	<i>Streptopus amplexifolius</i>	SR	Moist areas; below 9,190 feet; Petran montane conifer forests
	White Mountain clover	<i>Trifolium neurophyllum</i>	S, SC	Permanently wet meadows, springs, and streamsides; 6,500–9,000 feet; Petran montane conifer forests
	Yellow lady's-slipper	<i>Cypripedium parviflorum</i> var. <i>pubescens</i>	HS, S	Boggy, swampy areas near rivers, canal banks, and meadows; 6,000–9,560 feet; Petran montane conifer forests
Non-piscivorous riparian/aquatic nesting birds	American redstart	<i>Setophaga ruticilla</i>	WSCA	Mature and second growth wooded habitat; 5,190–7,365 feet; Madrean evergreen woodland to Petran montane conifer forests
	Black-bellied whistling-duck	<i>Dendrocygna autumnalis</i>	WSCA	Along rivers, ponds, stock tanks, marshes, and swamps; 985–4,200 feet; desertscrub to interior chaparral
	California black rail	<i>Laterallus jamaicensis coturniculus</i>	S, SC, WSCA	Marshes; 155–475 feet; desertscrub
	Elegant trogon	<i>Trogon elegans</i>	WSCA	Canyons with riparian vegetation; 3,400–6,800 feet; Madrean evergreen woodland to Petran montane conifer forest
	Mexican spotted owl	<i>Strix occidentalis lucida</i>	T*, WSCA	Canyons, steep slopes; 4,500–10,000 feet; Great Basin conifer woodland to subalpine conifer forest
	Northern gray hawk	<i>Buteo nitidus maximus</i>	S, SC, WSCA	Riparian forests with mesquite adjacent; 1,960–4,600 feet; desertscrub to interior chaparral
	Pine grosbeak	<i>Pinicola enucleator</i>	WSCA	Open forests and edges; 7,140–9,400 feet; Petran montane conifer to subalpine conifer forests
	Rose-throated becard	<i>Pachyramphus aglaiae</i>	S, WSCA	Sycamore riparian habitats; 3,550–4,030 feet; Great Basin conifer forests
	Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E*, WSCA	Dense riparian thickets near water; 75–9,180 feet; desertscrub to Petran montane conifer meadows and forests
	Tropical kingbird	<i>Tyrannus melancholicus</i>	WSCA	Lowlands near water, often associated with cottonwoods; 1,070–4,100 feet; desertscrub and semidesert grasslands

Table G. Consultation and other special status species analyzed further, their status designation, and habitat characteristics.

Taxonomic Group	Common Name	Scientific Name	Status	Habitat
Non-piscivorous riparian/aquatic nesting birds (continued)	Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C, S, WSCA	Streamside riparian groves; 90–6,710 feet; desertscrub to Petran montane conifer forest
	Yuma clapper rail	<i>Rallus longirostris yumanensis</i>	E, WSCA	Freshwater marshes with extensive cattails; 100–1,500 feet; desertscrub
Terrestrial riparian invertebrates	Maricopa tiger beetle	<i>Cicindela oregona maricopa</i>	S	Sandy banks along streamsides; 1,092–6,940 feet; desertscrub to Petran montane conifer forest
Ground-dwelling riparian mammals and reptiles	American water shrew	<i>Sorex palustris</i>	S, WSCA	Boreal and Petran montane riparian habitats; 8,200–9,630 feet; Petran montane conifer forests
	Arizona shrew	<i>Sorex arizonae</i>	S, SC, WSCA	Rocky, narrow canyons usually near surface water; 5,160–8,500 feet; subalpine conifer forest
	Giant spotted whiptail	<i>Aspidoscelis burti stictogrammus</i>	S, SC	Mountain canyons, arroyos, and mesas; 0–4,500 feet; desertscrub to semidesert grasslands
	Mexican wolf	<i>Canis lupus baileyi</i>	E, WSCA	Oak and pine/juniper savannahs in foothills and mixed conifer woodlands above 4,000 feet
	Mount Graham red squirrel	<i>Tamiasciurus hudsonicus grahamensis</i>	E*, WSCA	Higher conifer forests of high humidity and a closed canopy; 7,360–10,235 feet; spruce-fir forests
	New Mexico jumping mouse	<i>Zapus hudsonius luteus</i>	C, S, WSCA	Moist meadows near streams; 6,500–9,430 feet; plains and semidesert grasslands
	Redback whiptail	<i>Aspidoscelis xanthonota</i>	SC	Canyons and hills; 1,070–3,500 feet; desertscrub
Piscivorous riparian/aquatic nesting birds	Bald eagle (Sonoran Desert area and winter populations)	<i>Haliaeetus leucocephalus</i>	S, SC, WSCA	Breeding populations in riparian habitat along streams, rivers, and reservoirs; 460–7,930 feet; desertscrub to Petran montane conifer forests. Winter populations along streams, rivers, and reservoirs and roadsides where adequate prey base exists; unknown elevation range; Petran montane conifer forests
	Belted kingfisher	<i>Megasceryle alcyon</i>	WSCA	Perennial waters; 1,840–8,400 feet; desertscrub to Petran montane conifer forests

Table G. Consultation and other special status species analyzed further, their status designation, and habitat characteristics.

Taxonomic Group	Common Name	Scientific Name	Status	Habitat
Piscivorous riparian/aquatic nesting birds (continued)	Common black-hawk	<i>Buteogallus anthracinus</i>	S, WSCA	Mature riparian along perennial waterways; 1,570–7,080 feet; desertscrub to Petran montane conifer forests
	Golden eagle	<i>Aquila chrysaetos</i>	Bald and Golden Eagle Protection Act	Open areas in prairies in hilly or mountainous regions; 4,000–10,000 feet; desertscrub to alpine tundra
	Great egret	<i>Ardea alba</i>	S, WSCA	Waterways and water bodies, agricultural fields and meadows; 100–1,500 feet; desertscrub
	Least bittern	<i>Ixobrychus exilis</i>	S, WSCA	Marshes with tall vegetation; 850–1,500 feet; desertscrub
	Osprey	<i>Pandion haliaetus</i>	S, WSCA	Near waterways and water bodies where adequate prey exists; 800–8,300 feet; desertscrub to Petran montane conifer forests
	Snowy egret	<i>Egretta thula</i>	S, WSCA	Marshes and other water bodies, agricultural fields; 100–1,950 feet; desertscrub

Source: Arizona Game and Fish Department Heritage Data Management System. 2011. Element Status Designations by Taxon, Scientific Name.
http://www.azgfd.gov/w_c/edits/documents/allspecies_bytaxon_003.pdf. Updated November 24, 2010. Accessed July 27, 2011.

* = Proposed or Designated Critical Habitat

C = U.S. Department of the Interior Fish and Wildlife Service Candidate

E = U.S. Department of the Interior Fish and Wildlife Service Endangered

HS = Arizona Department of Agriculture Highly Safeguarded

PE = Proposed Endangered

S = U.S. Department of Agriculture Forest Service and/or Bureau of Land Management Sensitive

SC = U.S. Department of the Interior Fish and Wildlife Service Species of Concern

SR = Arizona Department of Agriculture Salvage Restricted

T = U.S. Department of the Interior Fish and Wildlife Service Threatened

WSCA = Wildlife of Special Concern in Arizona

APPENDIX E

Consultation and Other Special Status Species Eliminated from Further Analysis

Table H. Consultation and other special status species eliminated from further analysis.*

Common Name	Scientific Name	Range and Habitat	Rationale for Elimination
American frog orchid	<i>Coeloglossum viride</i> var. <i>virescens</i>	Hannagan Meadow, Greenlee County.	Not near any stocking sites
Arizona cave amphipod	<i>Stygobromus arizonensis</i>	Prefers aquatic habitats in subterranean caves and mine tunnels. Type specimen taken in deep pool at depth of about 3 feet.	Different habitat; not near any stocking sites
Arizona myotis	<i>Myotis occultus</i>	Most records are from the Mogollon Rim from Alpine northwest to near Flagstaff, including Mingus Mountain, Verde Valley, Sierra Ancha Mountains, and the Pinal Mountains. Likely occurs along the lower Colorado River Valley since it is known from at least four localities in the California portion of that area, from the southernmost tip of Nevada south to near Yuma and one unmappable locality in the Mojave Desert of Arizona. There is also a record of 12 specimens collected in 1894 by W. Price from the then-abandoned Fort Lowell near Tucson and a 1992 record from Tucson.	No measureable effects anticipated; competition with native aquatic or semi-aquatic species for invertebrate prey has not been documented
Arizona snaketail	<i>Ophiogomphus arizonicus</i>	They are found in fairly swift rocky mountain streams in pine woodland with silt for larval habitat.	Not near any stocking sites
Arizona water penny beetle	<i>Psephenus arizonensis</i>	Cold, fast-flowing high-elevation streams in the Chiricahua Mountains. This restricted distribution may be caused by poor dispersal ability, which appears to occur only during larval stages.	Not near any stocking sites
Beautiful shiner	<i>Cyprinella formosa</i>	Extirpated from San Bernardino Creek, Cochise County, by 1970. Reintroduced into four ponds on the San Bernardino National Wildlife Refuge in 1990.	Not near any stocking sites
Black-billed magpie	<i>Pica hudsonia</i>	Northeastern portion of state, in Apache County. This includes Teec Nos Pos Wash, Chinle Wash, the vicinity of Many Farms, Walker Creek, and historically south of Puerco River. Open country with scattered trees, brushy habitats, sagebrush communities, riparian.	Range of bird is not in or near any stocking areas
Black-capped gnatcatcher	<i>Poliophtila nigriceps</i>	Southeastern Arizona—more specifically Sonoita Creek (Santa Cruz County), Chino Canyon (Pima and Santa Cruz counties), Florida Wash, Sycamore Canyon, and Kino Springs (Santa Cruz County). Riparian woodland and associated brushy areas. Per NatureServe (2001), “Riparian thickets, thorn forest, wooded washes; mesquite/hackberry thickets especially favored in Arizona (Dunn and Garrett 1987). In Arizona, nests have been found in the upper branches of mesquite, Arizona sycamore, and hackberry trees (Groschupf 1992).”	Different habitat; mostly xeric riparian breeder

Table H. Consultation and other special status species eliminated from further analysis.*

Common Name	Scientific Name	Range and Habitat	Rationale for Elimination
Black Mountain talussnail	<i>Sonorella papagorum</i>	Found deep within the slopes covered with slides of black basalt; only known from Black Mountain, Pima County.	Different habitat; not near any stocking sites
Bleached skimmer	<i>Libellula composita</i>	Southeast Arizona only.	Not near any stocking sites
Blue silverspot butterfly	<i>Speyeria nokomis coerulescens</i>	Spring-fed meadows, moist hillsides, and canyon bottoms; 5,000–6,000 feet; subalpine conifer forest; Catalina Mountains south to Huachuca Mountains in southeastern Arizona; may be extirpated from Arizona.	Not near any stocking sites
Bobolink	<i>Dolichonyx oryzivorus</i>	Eastern Arizona in Gila and Apache counties. Herbaceous wetland, cropland-hedgerow, grassland-herbaceous. In migration and winter, they can be found in rice fields, marshes, and open, woody areas. They breed in open grassland, preferring moist, lush areas.	Casual visitor
Box Canyon muhly	<i>Muhlenbergia dubioides</i>	Grows on steep slopes, ridge tops, limestone rock outcrops, and along draws, at elevations of 1,500–2,300 meters.	Not near any stocking sites
Brown springsnail	<i>Pyrgulopsis sola</i>	Endemic to type locality of Brown Spring, Yavapai County, northwestern Arizona.	Not near any stocking sites
Buff-breasted flycatcher	<i>Empidonax fulvifrons</i>	Preferred breeding habitat is scrub and open woodlands. Rincon Mountains.	Not near any stocking sites
Bylas springsnail	<i>Pyrgulopsis arizonae</i>	Endemic to three springs on the north bank of the Gila River between Bylas and Pima, Graham County, southeastern Arizona.	Not near any stocking sites
California fan palm	<i>Washingtonia filifera</i>	Only in two remote sites in the Kofa Mountains.	Not near any stocking sites
Cameron water-parsley	<i>Cymopterus megacephalus</i>	Endemic to northern Arizona. From eastern Coconino County, north and south of Cameron, and north of Gray Mountain, northeast of Flagstaff. Also collected in Yavapai County near Montezuma Castle. McDougall (1973) reports that the distribution for this plant includes Utah, Colorado, New Mexico, and Arizona. In Yavapai County, collected on Canotia hillsides with limy soil.	Not near any stocking sites
Canyon spotted whiptail	<i>Aspidoscelis burti</i>	Primarily an inhabitant of the Semidesert Grassland and Madrean Evergreen Woodland communities but also follows drainages down into Arizona Upland Sonoran desertscrub and Chihuahuan desertscrub in some areas. Usually encountered along canyons and drainage.	Different habitat; grassland species

Table H. Consultation and other special status species eliminated from further analysis.*

Common Name	Scientific Name	Range and Habitat	Rationale for Elimination
Cave myotis	<i>Myotis velifer</i>	South of Mogollon Plateau from Lake Mohave, Burro Creek, Montezuma Well, San Carlos Apache Reservation, and the Chiricahua Mountains south to Mexico. Although known from as far southwest as the Harquahala Mountains, Gila Bend, Organ Pipe Cactus National Monument and about 20 miles north of Yuma near the Colorado, it has not been recorded from the extreme southwestern part of the state. Found in small numbers in southeastern Arizona in the winter.	No measureable effects anticipated; competition with native aquatic or semi-aquatic species for invertebrate prey has not been documented
Chiricahua mock pennyroyal	<i>Hedeoma costatum</i>	Huachuca Mountains in Cochise County. Arid calcareous mountain regions of mixed pine and oak woodlands, on open rocky limestone outcrops and cliff faces, and road embankments.	Different habitat; woodland habitats
Chiricahua Mountain brookweed	<i>Samolus vagans</i>	In Arizona, this species is found in the Huachuca Mountains of Cochise County, the Rincon, Santa Catalina, and Santa Rita mountains of Pima County, and the Canelo Hills and Pajarito mountains of Santa Cruz County. The Chiricahua Mountain brookweed is confined to areas with permanent water, such as springs, seeps, and in and along streams at elevations of 1,219 to 2,195 meters (4,000–7,200 feet) (Arizona Game and Fish Department [AGFD] 1999d).	Not near any stocking sites
Chisos coral-root	<i>Hexalectris revoluta</i>	Flowering May to August. Oak-juniper-pinyon pine woodlands in leaf litter and humus, occasionally in rocky, open terrain; of conservation concern; 1,000–1,600 meters; Arizona, Texas, New Mexico. In Arizona, it grows in Cochise and Pima counties; in Texas, in the Guadalupe and Chisos mountains.	Different habitat; woodland habitats
Clark Peak talussnail	<i>Sonorella christenseni</i>	Rockslides on the north slope of Clark Peak, Blue Jay Ridge area, and Ladybug Saddle, Pinaleno Mountains, Graham County, Arizona.	Different habitat; not near any stocking sites
Clark's Grebe	<i>Aechmophorus clarkii</i>	Marshes, lakes and bays; 440–480 feet; desertscrub. Found along the Colorado River year-round in Mohave and La Paz counties; breeds at Topock Marsh and Topock Gorge in Havasu National Wildlife Refuge.	Not near any stocking sites
Crested coral root	<i>Hexalectris spicata</i>	Flowering May to August. In organic mesic to dry soil over limestone or sandstone, in juniper, pine, and oak woodlands.	Different habitat; woodland habitat
Dalhouse spleenwort	<i>Asplenium dalhousiae</i>	Moist, rocky ravines, terrestrial among and at bases of rocks; 1,300–2,000 meters; Arizona, New Mexico. In the flora, it is found only in the Mule, Huachuca, and Baboquivari mountains of southern Arizona. The pattern of disjunction in the worldwide range of this species is highly unusual.	Different habitat; not near any stocking sites

Table H. Consultation and other special status species eliminated from further analysis.*

Common Name	Scientific Name	Range and Habitat	Rationale for Elimination
Desert springsnail	<i>Pyrgulopsis deserta</i>	Unidentified springs in the Littlefield area, Mohave County.	Not near any stocking sites
Eastwood alum root	<i>Heuchera eastwoodiae</i>	Rocky slopes and cliffs.	Different habitat
Flagstaff pennyroyal	<i>Hedeoma diffusum</i>	San Francisco Plateau of the Colorado Plateau Province; Flagstaff and southward in Coconino and Yavapai counties, including the rims of Oak Creek and Sycamore canyons. Rock pavement, cliff, limestone, and sandstone break habitats in the Ponderosa pine vegetation type. Canopy coverage ranges from 0 to 86 percent. The plant prefers open spots with weathered limestone solution pockets filled with 4 to 6 inches of soil but also grows in vertical cracks and around the edges of boulders.	Different habitat
Flannelmouth sucker	<i>Catostomus latipinnis</i>	Large and moderately large rivers; 1,540–3,160 feet; desertscrub to Great Basin conifer woodland.	Not near any stocking sites
Fossil springsnail	<i>Pyrgulopsis simplex</i>	Spring near Strawberry, Gila County, along with Fossil Springs, Yavapai County. This species occupies springheads and shallow, muddy spring runs or seeps (not usable by fish)	Different habitat; not near any stocking sites
Fringed myotis	<i>Myotis thysanodes</i>	Throughout much of state, although not known from northeast or southwest corner. Their winter range in Arizona shifts to the southernmost counties and Mohave County.	No measureable effects anticipated; competition with native aquatic or semi-aquatic species for invertebrate prey has not been documented
Fulvous whistling-duck	<i>Dendrocygna bicolor</i>	Formerly this duck occurred irregularly within the Sonoran Desert, especially along the Colorado River, where it probably nested. Now decidedly rare, this species has become sporadic in occurrence eastward to Phoenix and Picacho Lake, most observations still being along the Colorado River south of Cibola (Brown 1985).	Rare in Arizona
Gila tryonia	<i>Tryonia gilae</i>	Unnamed spring north of Bylas, Graham County.	Not near any stocking sites
Grand Wash springsnail	<i>Pyrgulopsis bacchus</i>	Grapevine Springs, Whisky Springs, and Tassi Springs within the Grand Wash trough, Mohave County, northwestern Arizona.	Not near any stocking sites
Huachuca springsnail	<i>Pyrgulopsis thompsoni</i>	Springs in southern Santa Cruz and Cochise counties, Arizona, and northern Sonora, Mexico.	Not near any stocking sites
Huachuca water umbel	<i>Lilaeopsis schaffneriana</i> var. <i>recurva</i>	Cienegas or marshy wetlands at 2,000 to 6,000 feet elevation, within Sonoran desertscrub, grassland or oak woodland, and conifer forest. Plants found in unshaded or shaded sites in shallow water, saturated soil near seeps, springs and streams; Cochise and Santa Cruz counties.	If concern, would be covered in Biological Assessment; not near any stocking sites

Table H. Consultation and other special status species eliminated from further analysis.*

Common Name	Scientific Name	Range and Habitat	Rationale for Elimination
Hualapai milkwort	<i>Polygala rusbyi</i>	Central and west-central Arizona, in Yavapai and Mohave counties. Desert grassland and juniper woodland. Elevation: 3,150–5,000 feet (960–1,524 meters).	Different habitat
Kaibab bladderpod	<i>Lesquerella kaibabensis</i>	Kaibab Plateau, Coconino County, Arizona. Along Arizona 67 from Telephone Hill south to 1 mile south of Kaibab Lodge. Also, Dry Park, Marble Viewpoint, and Dog Canyon southeast of Dog Point. On limestone-clay knolls with a high percentage of exposed rock on the surface, within open windswept meadows (pseudo-alpine fellfield). Meadows of the Kaibab Plateau probably functioned as Pleistocene refugia for this and other endemic species (Phillips 1999).	Different habitat
Kingman springsnail	<i>Pyrgulopsis conica</i>	Burns, Dripping, and Cool Springs in the Black Mountains near Kingman, Mohave County, northwestern Arizona.	Not near any stocking sites
Lemmon cloak fern	<i>Notholaena lemmonii</i>	Sporulating summer to fall. Rocky slopes and cliffs, usually on granitic or volcanic substrates; 1000–1500 meters.	Different habitat
Long-legged myotis	<i>Myotis volans</i>	In forested mountains in Apache, Cochise, Coconino, Gila, Mohave, and Yavapai counties. Absent from desert and desert mountains of southwestern part of the state.	No measureable effects anticipated; competition with native aquatic or semi-aquatic species for invertebrate prey has not been documented
Lowland burrowing treefrog	<i>Pternohyla fodiens</i>	San Simon Wash between Sells and Ajo, north to near Hickiwan, Pima County. Also reported from Vekol Valley, Maricopa County. Though tropical in origin, in Arizona this species is most often associated with xeric environments, where it lives in burrows in low open mesquite grasslands, usually associated with major washes and arroyos that help form the large mesquite bosques it seems to prefer.	Different habitat; mesquite grasslands
Madrean ladies'-tresses	<i>Spiranthes delitescens</i>	Flowering July to August. Cienegas, wet riparian meadows, stream banks; of conservation concern; 1,400–1,500 meters.	Not near any stocking sites
Maricopa tiger beetle	<i>Cicindela oregona maricopa</i>	Sandy banks along streamsides; 1,092–6,940 feet; desertscrub to Petran montane conifer forest	Not near any stocking sites
Masked bobwhite	<i>Colinus virginianus ridgwayi</i>	Extirpated before or soon after 1900 because of overgrazing and a series of droughts. Northern edge of range extended to bottomlands of Altar and Santa Cruz valleys. Habitat restoration efforts and reintroductions were halted in the late 1970s and early 1980s.	Different habitat; grasslands

Table H. Consultation and other special status species eliminated from further analysis.*

Common Name	Scientific Name	Range and Habitat	Rationale for Elimination
Mazatzal triteleia	<i>Triteleia lemmoniae</i>	Flowering spring to summer (late May to August). Yellow pine belts, mountains; 1,000–3,000 meters; Arizona.	Different habitat
Mexican stoneroller	<i>Campostoma ornatum</i>	Currently known only from Rucker Canyon in the Chiricahua Mountains and San Bernardino Creek (AGFD 2003, AGFD 1996). Shallow riffles and runs over gravel/cobble substrates. Large adults can be found in pools over sand or gravelly bottoms in small streams; they are also often in flowing segments of pools or along undercut banks or other cover.	Not near any stocking sites
Mississippi kite	<i>Ictinia mississippiensis</i>	San Pedro River and Gila River near Kearney, Verde River near Cottonwood, and below Bartlett Lake (Glinski and Gennaro 1988). According to the Heritage Data Management System (HDMS) (AGFD, unpublished records), it has been located in Cochise, Maricopa, and Pinal counties, and one general sighting for Yavapai County in the vicinity of Camp Verde. Tall forest, open woodland, prairie, semiarid rangeland, shelterbelts, wooded areas bordering lakes and streams in more open regions, scrubby oaks and mesquite, and lowland/floodplain forests. Requires open areas near nesting sites for foraging. Breeding habitat in Arizona consists of riparian deciduous forests that border desertscrub upland habitats. Man-made habitat in central Arizona consists of pecan orchards (Glinski and Gennaro 1988).	No known nesting areas near stocking locations
Mock-pennyroyal	<i>Hedeoma dentatum</i>	Chiricahua, Huachuca, Mule, Whetstone, and Winchester Mountains (Cochise County); Pinaleño Mountains (Graham County); Baboquivari, Rincon and Santa Catalina Mountains (Pima County); Atascosa, Mustang, Pajarito, and Santa Rita Mountains (Santa Cruz County).	Different habitat
Mogollon columbine	<i>Aquilegia desertorum</i>	Flowering spring to fall (May to October). Open rocky places; 2,000–2,500 meters; Arizona.	Different habitat
Mojave giant skipper	<i>Agathymus alliae</i>	Northwestern Arizona, desert, woodland-conifer. Pine woodland canyons and desert with <i>Agave utahensis</i> .	Different habitat
Montezuma well springsnail	<i>Pyrgulopsis montezumensis</i>	Endemic to Montezuma Well, Yavapai County. Habitat is high carbon dioxide–laden habitat that is unsuitable for fish.	Different habitat; not near any stocking locations

Table H. Consultation and other special status species eliminated from further analysis.*

Common Name	Scientific Name	Range and Habitat	Rationale for Elimination
Navajo bladderpod	<i>Lesquerella navajoensis</i>	In Arizona, from the Red Valley area (north of Navajo, New Mexico) to Wheatfields Lake, Apache County. Possibly in the Chuska and Carrizo mountains, Apache County. Typically occurs on windward, windswept mesa rims and nearby habitat with little vegetative cover and high insolation. Typically only found on the nearly white Todilto Limestone Member of the Morrison Formation overlaying Entrada Sandstone or Chinle outcrops (Roth 2001).	Different habitat
Navajo Mexican vole	<i>Microtus mexicanus navaho</i>	Navajo Mountain (Navajo County) and Defiance Plateau (Apache County), and more recently from the south rim of the Grand Canyon, and the Flagstaff and Williams area (Coconino County). Occupies prostrate thickets of a variety of shrubs that provide dense cover, in areas of high litter and bare ground. Also dry, grassy areas, usually adjacent to ponderosa pine forests, but sometimes as low as juniper woodland or stands of sagebrush, or as high as spruce-fir (Kime 1994).	Different habitat; grass habitats; not near any stocking sites
Navajo sedge	<i>Carex specuicola</i>	Fruiting June to September. In crevices on rock faces with seeps, small “hanging gardens” of conservation concern; 1,100–2,000 meters; Arizona.	Different habitat
Neumogen’s giant skipper	<i>Agathymus neumoegei</i>	Desert, shrubland/chaparral, shrub-grassland or open woodland-conifer, woodland or mixed. Dry mountains with food plants (NatureServe).	Different habitat
Niobrara ambersnail	<i>Oxyloma haydeni haydeni</i>	In Arizona, one population occurs on the South Rim of the Grand Canyon at Indian Gardens and a second population is found at riverside marsh at about river mile 9 in the Lee’s Ferry reach. Niobrara ambersnail is terrestrial.	Different habitat; not near any stocking sites
Northern buff-breasted flycatcher	<i>Empidonax fulvifrons pygmaeus</i>	Summer resident in southeastern Arizona, breeding only in Huachuca, Santa Catalina, and Chiricahua mountains (Glinski 1988). Open stands of pine (especially ponderosa and Chihuahua) or sycamore with bare, weedy, or grassy under story areas (Glinski 1988); riparian vegetation; does not tolerate dense vegetation.	No known nesting areas near stocking locations
Organ Pipe shovel-nosed snake	<i>Chionactis palarostris organica</i>	In Arizona, occupies paloverde-saguaro habitats; sandy-gravelly soils; prefers bajadas and hilly terrain. Only known along Sonoyta-Ajo road in Organ Pipe Cactus National Monument and the surrounding area, from the U.S.–Mexico border to 23 miles north.	Not near any stocking sites, different habitat; desert habitats
Parker’s cylloepus riffle beetle	<i>Cylloepus parkeri</i>	Permanent, slow streams; 2,850–4,000 feet; desertscrub to Great Basin conifer woodland. Only known habitat in Roundtree Canyon and Tangle Creek in Bloody Basin, Yavapai County.	Not near any stocking sites

Table H. Consultation and other special status species eliminated from further analysis.*

Common Name	Scientific Name	Range and Habitat	Rationale for Elimination
Pinaleño talussnail	<i>Sonorella grahamensis</i>	Rockslides within the Pinaleño Mountains, Graham County.	Not near any stocking sites
Plains leopard frog	<i>Lithobates blairi</i>	Isolated population in southeastern Arizona; western side of Chiricahua Mountains (Turkey Creek, etc.) and adjoining Sulphur Springs Valley. Found mainly around streams, ponds, creek pools, reservoirs, marshes, or irrigation ditches in prairie and desert grasslands, but also can be found in oak and oak-pine woodland and farmland. Can range into terrestrial habitat near water during wet weather. Often bask on vegetation mats at water's edge.	Not near any stocking sites
Plummer onion	<i>Allium plummerae</i>	Chiricahua and Huachuca Mountains, and Leslie Canyon in Cochise County, and Baboquivari Mountains in Pima County.	Different habitat; grassland species; not found near any stocking locations
Pocketed free-tailed bat	<i>Nyctinomops femorosaccus</i>	Pima, Gila, Mohave, Maricopa, La Paz, Pinal, Graham, Cochise, and Yuma counties.	No measureable effects anticipated; competition with native aquatic or semi-aquatic species for invertebrate prey has not been documented
Poling's giant skipper	<i>Agathymus polingi</i>	In Arizona, presently known from Maricopa, Pinal, and Graham counties southward into Sonora, Mexico (Brock and Prchal 2001). County records include Cochise, Graham, Pima, Pinal, and Santa Cruz (Bailowitz and Brock 1991). Open, rocky flats and slopes near stands of the host (Brock and Prchal 2001).	Different habitat
Porsild's starwort	<i>Stellaria porsildii</i>	Chiricahua Mountains.	Not near any stocking sites
Quitobaquito tryonia	<i>Tryonia quitobaquiae</i>	Spring complex within Organ Pipe Cactus National Monument, Pima County.	Isolated; not near any stocking sites
Relict leopard frog	<i>Lithobates onca</i>	Extreme northwest corner of the state in the Virgin River drainage near Littlefield, Mohave County. According to the U.S. Department of the Interior Fish and Wildlife Service (FWS) (2002), "Adult frogs inhabit permanent streams, springs, and spring-fed wetlands below approximately 600 meters (1,968 feet). Adults may prefer relatively open shorelines where dense vegetation does not dominate. Breeding habitat includes pools or slow-moving side areas of streams, with or without emergent vegetation." They typically are found in or near water, or among <i>Scirpus</i> .	Not near any stocking sites

Table H. Consultation and other special status species eliminated from further analysis.*

Common Name	Scientific Name	Range and Habitat	Rationale for Elimination
Sabino Canyon damselfly	<i>Argia sabino</i>	Occurs primarily in Sabino Canyon. A single male was collected at Molino Basin Forest Camp, and a single female was collected 4.6 miles north of Molino Basin. This area is a small canyon with pines and may represent the highest elevation in the Santa Catalina Mountains that the species occurs (AGFD 2001). In Sabino Creek, the range has constricted over the past 35 years, previously occurring in Lower and Upper Sabino Creek but now restricted to the latter area. Populations of <i>Argia</i> spp. closely correlated with water flow, increasing in wet years and decreasing in dry years, or as stream volume changes due to groundwater conditions.	Not near any stocking sites
San Xavier talussnail	<i>Sonorella eremita</i>	Talus slide on northwest aspect of San Xavier Hill, Pima County.	Not near any stocking sites
Southwestern river otter	<i>Lontra canadensis sonora</i>	Occasional non-confirmed sightings along the Colorado River below Lake Mead. Historically occurred in the Colorado and Gila rivers and their major tributaries, but current distribution uncertain, likely extirpated in most of Arizona.	Not near any stocking sites
Spotted bat	<i>Euderma maculatum</i>	Specimens from near Yuma, Roll, Maricopa Junction, Tempe and Littlefield. Recently recorded from the Kaibab Plateau; also two captured at a watershed southeast of Seligman. Appears to be a substantial population in Fort Pierce Wash area on the Utah–Arizona border, with two individuals netted nearby in Arizona. Two individuals captured at a known roost near Marble Canyon. Aural record exists for eastern Arizona.	No measureable effects anticipated; competition with native aquatic or semi-aquatic species for invertebrate prey has not been documented
Spot-winged meadowhawk	<i>Sympetrum signiferum</i>	Cochise and Santa Cruz counties, including Leslie Canyon, and the west side of the Huachuca Mountains just above 6,000 feet down to the headwaters of the Santa Cruz River at roughly 4,700 feet.	Not near any stocking sites
Sprague’s pipit	<i>Anthus spragueii</i>	Winters mainly in San Rafael, Sonoita, and Sulphur Springs grasslands in southeastern Arizona. A few individuals have also been found wintering in grassy (sometimes mixed with alfalfa) fields along lower Colorado River from north of Yuma to Parker, and grass and alfalfa fields near Phoenix and Sierra Vista.	Different habitat; grasslands only
Squaw Park talussnail	<i>Sonorella allynsmithi</i>	These are generally terrestrial species.	Different habitat; not near any stocking sites
Stephan’s heterelmis riffle beetle	<i>Heterelmis stephani</i>	Bog, Kent, and Sylvester Springs, all in Madera Canyon, in the Santa Rita Mountains, Pima and Santa Cruz counties.	Not near any stocking sites

Table H. Consultation and other special status species eliminated from further analysis.*

Common Name	Scientific Name	Range and Habitat	Rationale for Elimination
Striate disc	<i>Discus shimekii</i>	Carr Canyon in the Huachuca Mountains, Cochise County; Agassiz Peak on San Francisco Mountain, and Navajo Mountain, Coconino County.	Not near any stocking sites
Sweet cicely	<i>Osmorhiza brachypoda</i>	Sierra Ancha and Mazatzal mountains in Gila County.	Not near any stocking sites
Tarahumara frog	<i>Lithobates tarahumarae</i>	Before its extirpation from the state in the early 1980s, <i>Rana tarahumarae</i> was found in three drainages in the Santa Rita Mountains and three drainages in the Pajarito-Atascosa-Tumacacori mountains complex in Santa Cruz County. From June to October 2004, an experimental population of 56 adults, 229 juveniles, and 327 larval frogs was reestablished into one of three historic canyons in the Santa Rita Mountains; source of frogs from northern Sonora, Mexico. Additional sites, including a drainage in the Pajarito Mountains, are being considered for additional reestablishments (FWS 2005).	Not near any stocking sites
Tiger beetle	<i>Cicindela hirticollis corpuscula</i>	Tiger beetles occur more often on lighter, drier soils. This species prefers sandy areas such as sand dunes, sand pits, and sand “blowouts,” often away from water. Adult beetles burrow in the soil to pass the night and escape unfavorable weather, either hot and dry or cold and wet.	Different habitat
Tucson shovel-nosed snake	<i>Chionactis occipitalis klauberi</i>	South-central Arizona, in Pima and Pinal counties. They can be found in arid deserts with sandy washes, dunes, and rocky hillsides. They prefer areas with scattered mesquite-creosote bush.	Not near any stocking sites
Ursine giant skipper	<i>Megathymus ursus</i>	Known from Pinal (Santa Catalina Mountains), Pima, Santa Cruz, and Cochise counties. It is recorded in the following mountain ranges: Santa Catalina, Santa Rita, Whetstone, Huachuca, Dragoon, Pozo Verde, Atascosa, Patagonia, and Chiricahua (Brock and Prchal 2001). Mostly oak woodland but also desert regions with stands of the host between 1,200 and 2,200 meters. Most common at the lower edge of the oak belt.	Different habitat
Verde Rim springsnail	<i>Pyrgulopsis glandulosa</i>	Nelson Place Spring complex, consisting of two springs, separated by 150 meters, that form the headwaters of Sycamore Creek, Yavapai County, central Arizona.	Not near any stocking sites
Virgin spinedace	<i>Lepidomeda mollispinis mollispinis</i>	In Mohave County, found lower Beaver Dam Wash to its confluence with the Virgin River at Littlefield, Arizona.	Not near any stocking sites

Table H. Consultation and other special status species eliminated from further analysis.*

Common Name	Scientific Name	Range and Habitat	Rationale for Elimination
Western barking frog	<i>Eleutherodactylus augusti cactorum</i>	Cochise and extreme southern Pima and Santa Cruz counties, including Quinlan, Santa Rita, Patagonia, Huachuca, and Pajarito mountains. Unconfirmed report (Wright and Wright 1949) from Sierra Ancha in Gila County, but probably a misidentification. In Arizona, Western barking frogs are found on limestone, rhyolite, granite, and perhaps other rock outcrops on the hillsides of canyons within Madrean evergreen woodlands and woodland-grassland ecotones.	Different habitat
Western fairy slipper	<i>Calypso bulbosa</i>	North Rim of the Grand Canyon and the San Francisco Peaks, Coconino County; White Mountains, Apache and Greenlee counties. In Arizona, it can be found in the cool understory of moist mixed conifer and subalpine forests with ponderosa pine, aspen, or spruce-fir, bogs, and along streams, in rich organic soil.	Not near any stocking sites
Western red bat	<i>Lasiurus blossevillii</i>	Thirty records (as of 2001) scattered throughout the state, except in desert areas. Summer resident only.	No measureable effects anticipated; competition with native aquatic or semi-aquatic species for invertebrate prey has not been documented
Western small-footed myotis	<i>Myotis ciliolabrum</i>	Coconino, Pinal, Mohave, and Cochise Counties. In winter, found in central Mohave County and south of the Gila River in southeastern Arizona.	No measureable effects anticipated; competition with native aquatic or semi-aquatic species for invertebrate prey has not been documented
Western snowy plover	<i>Charadrius alexandrinus nivosus</i>	Breeds irregularly when conditions are appropriate. Breeding sites are limited to several man-made and alkali ponds near Willcox in Cochise County and the ephemeral Painted Rock Reservoir in Maricopa County. Winters casually along the lower Colorado and Gila rivers and as far north as Phoenix and Prescott. Migrates throughout the state. The species inhabits beaches, lagoons, and salt-evaporation ponds on coasts and barren sparsely vegetated salt flats and braided river channels inland. Coastal beaches and shores of salt ponds and alkaline lakes. In Arizona, snowy plovers may occasionally nest along temporary lakes on sandy playas.	No nesting areas near stocking sites
Wet Canyon talussnail	<i>Sonorella macrophallus</i>	Talus slopes, Pinaleno Mountains, Graham County.	Not near any stocking sites

Table H. Consultation and other special status species eliminated from further analysis.*

Common Name	Scientific Name	Range and Habitat	Rationale for Elimination
White-bellied long-tailed vole	<i>Microtus longicaudus leucophaeus</i>	Pinaleño Mountains, Graham County, Arizona.	Not near any stocking sites
White-faced ibis	<i>Plegadis chihi</i>	Breeding not confirmed in state. Winters along the lower Colorado River in La Paz and Yuma counties in the southwestern part of Arizona. They may use other parts of the state during migration. Primarily freshwater marshes, swamps, ponds, and rivers, especially cattail and bulrush marshes. Nests in marshes, in low trees, on the ground (bulrushes or reeds), or on a floating mat. Will use flooded hay meadows, agricultural fields, and estuarine wetlands.	No known nesting areas near stocking sites
Woodland spurge	<i>Euphorbia macropus</i>	Huachuca Mountains, Cochise County, and the south end of Patagonia Mountains, Santa Cruz County. Shady canyon bottoms in leaf litter, and open hillsides in pine-oak woodland.	Not near any stocking sites
Yaqui catfish	<i>Ictalurus pricei</i>	Rio Yaqui on the northern-most portion of the San Bernardino National Wildlife Refuge (introduced population).	Not near any stocking sites
Yaqui chub	<i>Gila purpurea</i>	Nearly extirpated in the United States, persisting only in one artesian well in San Bernardino Creek drainage; introduced and established in Leslie Creek, Swisshelm Mountains, Arizona.	Not near any stocking sites
Yaqui longfin dace	<i>Agosia chrysogaster</i> sp. 1	Cochise County in the Yaqui River on San Bernardino National Wildlife Refuge (NWR), Leslie Creek NWR, and the Willcox Playa and its tributaries, including West Turkey Creek and Rucker Canyon.	Not near any stocking sites
Yaqui sucker	<i>Catostomus bernardini</i>	Formerly, only in San Bernardino Creek, Cochise County. Disappeared sometime after 1967.	Not near any stocking sites and thought to be extirpated
Yaqui topminnow	<i>Poeciliopsis occidentalis sonoriensis</i>	Limited to the portion of the Rio Yaqui basin in the San Bernardino Wildlife Refuge, Arizona.	Not near stocking sites
Yuma myotis	<i>Myotis yumanensis</i>	Throughout most of state but not found in northeastern corner nor southeastern part of state. Particularly found in the Gila, Graham, La Paz, Maricopa, Mohave, Pinal, and Yuma counties. Probably absent in higher, boreal areas. Winters in the Lower Colorado River area.	No measureable effects anticipated; competition with native aquatic or semi-aquatic species for invertebrate prey has not been documented

*Table H was compiled based on species-specific evaluations completed by AGFD experts and supplemented as needed by information from HDMS abstracts.

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APPENDIX F

Analysis Methods for Other Special Status Fish, Amphibians, and Aquatic Invertebrates

Fish Analysis Methods

This section describes methods used to analyze potential effects that could result from implementation of the alternatives to special status fish species that were not addressed in the Biological Overview. Each stocking location was analyzed to determine if exposure (occurrence of special status species and stocked fish in the same water body) was reasonably possible. If it was, the likelihood of exposure and the potential biological impacts if exposure were to occur were analyzed to determine the magnitude of effects (no effect, low, moderate, or high) for each stocking location and each special status fish species. The number of sites with each determination was compiled by subcatchment and alternative for each special status species.

The majority of the species occurrence information for the analysis was obtained through spatial analysis (Geographic Information Systems [GIS]) of the Lower Colorado Basin Aquatic GAP and the Arizona Game and Fish Department's (AGFD) Heritage Data Management System (HDMS) and Native Fishes databases. The Biological Assessment provided additional species occurrence, hydrological connectivity, habitat, survey, and other details (U.S. Department of the Interior Fish and Wildlife Service [FWS] 2011). Additional fish species occurrences and monitoring results were used where available. The species occurrence records used were limited to those from 1986 to the present.

Exposure Potential (whether or not exposure was possible)

For potential exposure to exist, there must be a potential for stocked fish and special status fish species to come into contact. Potential exposure was determined to exist unless either of the following conditions was met:

- Stocking location is a closed system and special status fish species do not currently occupy the stocking location.
- Stocking location is an open system but special status species do not occupy the subcatchment.¹

If potential exposure does not exist for any given site, then the stocking action at the site was concluded to have no effect to special status species.

Likelihood of Exposure

If exposure was determined possible, the likelihood of actual exposure was analyzed by examining the following factors:

- Whether or not special status fish species are known from the stocking location.
- Nature of hydrological connection between the stocking location and the areas occupied by special status fish species as it relates to fish movement potential.
- Presence and nature of physical barriers that would limit or preclude fish movement.
- Management strategies that would limit or preclude fish movement.

¹ Subcatchments represent the main downstream corridor from the stocking locations to a major water body containing a suite of nonnative predators. It is possible that some stocked fish could move out of the subcatchment in some locations but this would be highly unlikely and if it were to occur would be in low numbers.

- Habitat conditions between the stocking site and special status fish species–occupied areas that would limit or preclude fish movement or survival.

Potential Biological Impacts

If exposure was determined possible, the potential biological impacts were analyzed by examining the following factors:

- The presence or absence of previously established population(s) of stocked species.
- Predatory nature of stocked species (Table A).
- Special status fish species’ abundance despite past stocking and/or existing population(s) of stocked species.
- Ability of stocked species to survive and reproduce in areas occupied by special status fish species based on stocked species’ biology, habitat conditions, and available survey data.

Table A. Stocked species’ relative predatory nature on fish based on the fish interactions section of the Biological Assessment (FWS 2011).

Less Predacious	More Predacious
Apache trout	Walleye
Arctic grayling	Brown trout
Bluegill	Largemouth bass
Brook trout	White crappie
Cutthroat trout	Black crappie
Gila trout	Yellow perch
Redear sunfish	Smallmouth bass
Rainbow trout	Channel catfish

Fish species in the “Less Predacious” column generally consume less fish and pose less of a predation threat to native fish species than the fish species in the “More Predacious” column. White amur and threadfin shad are also proposed for stocking, but these species are herbivorous and planktivorous, respectively (do not consume vertebrate prey), and are therefore not listed in this table.

Analysis Outcomes

Potential for exposure, likelihood of exposure, and potential biological impacts were used to categorize each stocking location into one of four possible effects outcome categories:

- High—Stocking locations that were predicted to have exposure that was highly probable and potential biological impacts to special status species were substantial. Actions at these stocking sites could result in long-term population declines of special status species in either a localized area or within the subcatchment.
- Moderate—Stocking locations that were predicted either to have exposure that was more limited in probability or to have exposure that was highly probable but was coupled with less substantial potential biological impacts to special status species. Actions at these sites could impact individuals of special status species or even cause temporary and/or localized population declines but would not likely result in long-term population declines. Presence of multiple stocking sites in the same watershed that had “Moderate” outcomes could have more

substantial impacts and result in long-term population declines of special status species in either a localized area or at a subcatchment level.

- Low—Stocking locations that were predicted either to have exposure that was very limited in probability or to have probable exposure but in conjunction with potential biological impacts to special status species that were not substantial. Actions at these sites could impact individuals of special status species but would not likely result in population declines of special status species.
- No effects—Stocking locations that were predicted to have no potential exposure or an extremely low probability of exposure. Actions at these sites would not impact individuals or populations of special status species.

Competition is a potential effect that is acknowledged as occurring but was not specifically addressed in this analysis except implicitly at a few sites. All of the stocked species with the exception of threadfin shad have some potential to affect special status fish species through competition. However, the predatory effects generally outweigh the competition effects (i.e., results in direct mortality) and therefore were the focus of the site analysis. However, when stocking only less predacious species, the competition effects can be important in cases when special status fish species are exposed to high numbers of stocked fish. Interspecific competition effects can include decreased fecundity and recruitment, displacement from preferred/suitable habitat, and physical harm due to harassment or defense of territories, among other effects, but these effects typically require longer exposure time at higher numbers of stocked fish before effects are realized at the individual or population levels. A detailed discussion of species-specific competition can be found in the Biological Assessment (FWS 2011). In the cases where only less predacious species are proposed for stocking, competition effects were considered.

The nature of interactions between stocked species and special status fish species is complex, can be affected by site-specific factors, and is an area in need of further research. Many of the uncertainties that exist are complicated and not easily answered by research, and the potential impacts from stocked species to special status fish species are hard to tease apart and consequently may never be fully understood. Site-specific factors that influence these interactions (e.g., habitat complexity, existing species assemblages, and availability of limiting resources) are not always known, seldom can be adequately measured, and are highly dynamic over time in response to seasonal or annual variation. In cases where adequate information was not available to determine the potential biological impacts, we chose the higher effects (more conservative to the special status fish species) outcome to describe the effects. For example, at several reservoir stocking locations in the Little Colorado River drainage, where the stocking action includes stocking only rainbow trout and/or grayling, bluehead and/or Little Colorado River suckers are present in apparent low numbers. It is not known if these sucker species in absence of the stocking action could establish or be present in higher numbers. These are riverine species and it is very possible that the presence of these species is due to immigration from upstream areas, but breeding populations apparently are established at a few reservoirs. In these cases, the outcome was “moderate” effect rather than a “low” effect, which reflects the more conservative approach in the absence of adequate information.

Literature Cited

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Lowland Leopard Frog Analysis Methods

This section describes methods used to analyze potential effects to lowland leopard frog that could result from implementation of the alternatives. Each stocking location was analyzed to determine if exposure (occurrence of lowland leopard frog and stocked fish in the same water body) was reasonably possible. If it was, the likelihood of exposure and the potential biological impacts to lowland leopard frog if exposure were to occur were then analyzed to determine the magnitude of effects (no effect, low, moderate, or high) for each stocking location. The number of sites with each determination was compiled by subcatchment and alternative. The results of this analysis are summarized in Section 4.1.4 of the Environmental Assessment (EA).

Information on lowland leopard frog occurrences was obtained through spatial analysis (GIS) of the AGFD HDMS and Riparian Herpetofauna databases, which provide the best readily available information on the current known locations for lowland leopard frogs. Information on the distribution of nonnative fish across Arizona was obtained through spatial analysis (GIS) of the Lower Colorado River Basin Aquatic GAP and AGFD's Native Fishes databases. The Biological Assessment provided additional species occurrence, hydrological connectivity, habitat, survey, and other details when available (FWS 2011). The species occurrences records used were limited to those from 1986 to the present.

Exposure Potential (whether or not exposure was possible)

For potential exposure to exist, there must be potential for stocked fish and frogs to come into contact. Potential exposure was determined to exist if any of the following conditions were met:

- Lowland leopard frogs are documented at the stocking site.
- Lowland leopard frogs are found within 1 mile overland, 3 miles along an ephemeral or intermittent stream channel, or 5 miles along a perennial waterway.²
- The stocking location is an open system and lowland leopard frogs are known from the subcatchment.

If potential exposure does not exist for any given site, then the stocking action at the site was concluded to have no effect to lowland leopard frog.

Likelihood of Exposure

If exposure was determined possible, the likelihood of actual exposure was analyzed by examining the following factors:

- Whether lowland leopard frogs are known from the stocking location.
- Proximity of frogs to the stocking location with respect to the 1-, 3-, or 5-mile criterion.
- Nature of hydrological connection between the stocking location and the areas occupied by lowland leopard frog as it relates to fish and frog movement.
- Presence and nature of physical barriers that would limit or preclude fish movement.

² Specific movement and dispersal abilities of the lowland leopard frog are not known. Therefore, this movement criterion was adopted from movement and dispersal potential of the closely related Chiricahua leopard frog described in the Chiricahua Leopard Frog Recovery Plan (FWS 2007).

- Management strategies that would limit or preclude fish movement.
- Habitat conditions between the stocking site and lowland leopard frog–occupied areas that would limit or preclude fish movement or survival.

Potential Biological Impacts

If exposure was determined possible, the potential biological impacts were analyzed by examining the following factors:

- The presence or absence of previously established populations of stocked species.
- Ability of the stocked species to survive and reproduce in areas occupied by lowland leopard frogs based on the biology of the stocked species, habitat conditions, and survey data.
- Existence of populations of nonnative predators already established at the stocking location and in the vicinity of lowland leopard frog–occupied areas.
- Potential overlap of stocked species and larval lowland leopard frogs.
- Habitat complexity of lowland leopard frog–occupied areas.

Analysis Outcomes

Potential for exposure, likelihood of exposure, and potential biological impacts were used to categorize each stocking location in one of four possible effects outcome categories:

- High—Stocking locations that were predicted to have exposure that was highly probable and potential biological impacts to special status species were substantial. Actions at these stocking sites could result in long-term population declines of lowland leopard frog in either a localized area or at a watershed level.
- Moderate—Stocking locations that were predicted either to have exposure that was more limited in probability or to have exposure that was highly probable but was coupled with less substantial potential biological impacts to lowland leopard frogs. Actions at these sites could impact individuals of special status species or even cause temporary and/or localized population declines but would not likely result in long-term population declines at a watershed level. Presence of multiple stocking sites in the same watershed that had “Moderate” outcomes could have more substantial impacts and result in long-term population declines of lowland leopard frog in either a localized area or at a watershed level.
- Low—Stocking locations that were predicted either to have exposure that was very limited in probability or to have probable exposure but in conjunction with potential biological impacts to lowland leopard frog that were not substantial. Actions at these sites could impact individuals but would not likely result in population declines of lowland leopard frog.
- No effects—Stocking locations that were predicted to have no potential exposure or an extremely low probability of exposure. Actions at these sites would not impact individuals or populations of lowland leopard frog.

The nature of interactions between stocked species and lowland leopard frog are not fully understood, can be site-specific, and is an area in need of further research. However, many of the uncertainties that exist are complicated, not easily answered by research, and the potential

impacts from stocked species to lowland leopard frog may never be fully understood. In addition, site specific factors that influence these interactions (e.g., habitat complexity) are not always known, seldom can be adequately measured, and are highly dynamic over time in response to seasonal or annual variation. In cases where adequate information was not available to determine the potential biological impacts, we chose the higher effects (more conservative to the lowland leopard frog) outcome to describe the effects.

Literature Cited

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Western Narrow-mouthed Toad Analysis Methods

This section describes methods used to analyze potential effects to the Western narrow-mouthed toad that could result from implementation of the alternatives. The results of this analysis are summarized in Section 4.1.4 of the EA.

The Western narrow-mouthed toad is heavily reliant on shallow, ephemeral waters for reproduction, such as temporary pools, ditches, stock tanks, and playa lakes (Bragg 1940, Anderson et al. 1999, Dayton and Fitzgerald 2001), which in many cases would not be connected to stream systems and not accessible to stocked fish. In cases where the breeding habitat is connected to a stream channel that stocked sport fish could access or if the Western narrow-mouthed toad was present at or able to move to the stocking location, exposure to stocked sport fish could occur. The nature of interactions between nonnative sport fish and the Western narrow-mouthed toad is not known, but it is assumed that nonnative sport fish would prey upon Western narrow-mouthed toad if they came into contact with each other. Although the Western narrow-mouthed toad might use perennial waters, such as the stocking locations, for breeding, the importance of perennial habitats and the degree to which perennial waters contribute to adult recruitment is not known. In addition, ephemeral waters provide an environment with reduced natural predators, such as predatory insects (Dayton and Fitzgerald 2001), which would be present in perennial waters. Therefore, in this EA, we analyzed exposure potential of Western narrow-mouthed toad to stocked fish. However, we acknowledge that this exposure and resulting effects to Western narrow-mouthed toad may not be biologically meaningful to the overall Arizona population of the species due to the species' reliance on ephemeral waterways and the limited ability of stocked fish to reach many of these types of waterways.

Of the stocking subcatchments, the Western narrow-mouthed toad is only found within the Santa Cruz subcatchment, and the nature of exposure at all Santa Cruz stocking locations was examined using the following factors:

- Overland distance between stocking location and areas occupied by the Western narrow-mouthed toad (specific dispersal capabilities of Western narrow-mouthed toad are not known, but Dodd (1996) found that closely related Eastern narrow-mouthed toad (*Gastrophryne carolinensis*) in Florida had a maximum dispersal of 914 meters from its homerange; however, those habitats are far more mesic)
- Nature of hydrological connection between the stocking location and the areas occupied by the Western narrow-mouthed toad
- Presence and nature of physical barriers that would limit or preclude stocked fish movement
- Habitat conditions between the stocking site and western narrow-mouthed toad occupied areas that would limit or preclude fish movement or survival

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Invertebrate Analysis Methods

This section describes methods used to analyze potential effects to special status invertebrate species not addressed in the Biological Overview that could result from implementation of the alternatives. The results of this analysis are summarized in Section 4.1.4 of the EA.

The nature of interactions between nonnative sport fish and special status invertebrate species is largely unknown due to the limited scientific studies of these invertebrate species and the difficulty in conducting research on these small and cryptic species that are often found in only low abundance.

The nature of interactions between nonnative sport fish and the California floater (a clam) are not well understood. Predation by sport fish on California floater has not been documented and was not identified as a threat by the AGFD (2001); however, it is possible that stocked sport fish prey on juvenile California floater. Bequaert and Miller (1973) and Hovingh (2004) suggest that stocked sport fish have impacted the California floater by displacing native fish species that may be needed for its reproduction. This clam, as most clams, has a parasitic larval stage (glochidia) that must attach to a fish, metamorphose, and drop off to complete its life cycle (AGFD 2001). It is not known whether the California floater does indeed need specific native fish host or if nonnative fish species can also be used. Some eastern North American clam species, such as *Lampsilis cardium* and *Utterbackia imbecillis*, have been shown to use a variety of host fish species for reproduction (Watters and O'Dee 1998), while others such as *Alasmidonta atropurpurea* appear to be more limited in their use of host species (Gordon and Layzer 1993).

The nature of interactions between stocked fish species and the three special status insect species (White Mountain water penny beetle, Balmorhea saddle-cased caddisfly, and Page Spring caddisfly) are not well understood. AGFD (2003a, 2003b) identified habitat degradation including water quality as the main threat to the White Mountain water penny beetle and the Balmorhea saddle-cased caddisfly, and did not identify nonnative fish as a threat to these species. Raisanen (1991) identified habitat disturbance as a threat to the Page Spring caddisfly but did not identify nonnative fish as a threat to this species, although fish were identified as a predator of this insect species. Though the limited publications on these three insect species do not identify nonnative fish as a threat, stocked fish species could prey upon these three insect species if they came into contact with each other. It is possible that stocked sport fish could put some additive predation pressure to that of the established native and nonnative fish species.

Due to the poorly understood nature of effects of stocked sport fish on the special status invertebrate species, only the exposure potential of special status invertebrate species to stocked fish was analyzed. It was assumed that if exposure were to happen, there would be some unknown level of negative effect. Each stocking location was analyzed to determine if exposure (occurrence of special status species and stocked sport fish in the same water body) was reasonably possible. If it was, the likelihood of exposure at each site was then analyzed.

The majority of the species occurrence information for the analysis was obtained through spatial analysis (GIS) of the AGFD's HDMS and Native Fishes databases and the Lower Colorado Basin Aquatic GAP. The Biological Assessment provided additional species occurrence, hydrological connectivity, habitat, survey, and other details where available (FWS 2011).

Additional fish species occurrences and monitoring results were used where available. The species occurrence records used were limited to those from 1986 to the present.

Exposure Potential (whether or not exposure was possible)

For potential exposure to exist, there must be a potential for stocked fish and special status invertebrate species to come into contact. Potential exposure was determined to exist unless either of the following conditions was met:

- Stocking location is a closed system and special status invertebrate species do not currently occupy the stocking location.
- Stocking location is an open system but special status invertebrate species do not occupy the subcatchment.

If potential exposure does not exist for any given site, then the stocking action at the site would have no effect to special status species.

Likelihood of Exposure

If exposure was determined possible, the likelihood of actual exposure was analyzed by examining the following factors:

- Whether or not special status invertebrate species are known from the stocking location.
- Nature of hydrological connection and distance between the stocking location and the areas occupied by special status invertebrate species as it relates to fish movement potential.
- Presence and nature of physical barriers that would limit or preclude stocked fish movement.
- Management strategies that would limit or preclude stocked fish movement.
- Habitat conditions between the stocking site and special status invertebrate species-occupied areas that would limit or preclude fish movement or survival.

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APPENDIX G

Recorded Occurrence by Species of Other Special Status Riparian Plants

Table I. Recorded occurrence by species of other special status riparian plants.¹

SUBCATCHMENT/ Complex/ Site	Riparian Plants																			Total Number	
	A sedge	Alcove bog-orchid	Aravaipa wood fern	Arizona alum root	Arizona giant sedge	Arizona willow	Blumer's dock	Boreal bog orchid	Crenulate moonwort	Goodding's onion	Lemmon lily	Lemmon's stevia	Slender bog orchid	Texas purple spike	Thurber's bog orchid	Weeping muhly	Whisk fern	White mandarin twisted stalk	White Mountain clover		Yellow lady's slipper
COLORADO RIVER– HAVASU CREEK																					–
Havasu Creek Complex																					
Cataract Lake																					–
City Reservoir																					–
Dogtown Reservoir																					–
Russell Tank																					–
Santa Fe Tank																					–
Kaibab Lake																					–
COLORADO RIVER– YUMA NORTH																					–
Yuma Complex																					
La Paz County Park Pond																					–
La Paz County Park Lagoon																					–
COLORADO RIVER– YUMA SOUTH																					–
Yuma Complex																					
Yuma West Wetland																					–
Hidden Shores																					–

¹ Occurrences are based on Arizona Game and Fish Department Heritage Data Management System records within 5 miles of individual stocking sites and within subcatchment boundaries. Subcatchments are defined as the U.S. Geological Survey Hydrologic Unit Code (HUC) 10 subwatersheds that surround individual stocking sites and the HUC 12–level subwatersheds downstream of those stocking sites to the confluence of a major water body that supports nonnative aquatic species. Because they encompass larger areas, occurrence records in subcatchments are not necessarily reflected at one or more of the associated stocking sites.

Table I. Recorded occurrence by species of other special status riparian plants.¹

SUBCATCHMENT/ Complex/ Site	Riparian Plants																			Total Number	
	A sedge	Alcove bog-orchid	Aravaipa wood fern	Arizona alum root	Arizona giant sedge	Arizona willow	Blumer's dock	Boreal bog orchid	Crenulate moonwort	Goodding's onion	Lemmon lily	Lemmon's stevia	Slender bog orchid	Texas purple spike	Thurber's bog orchid	Weeping muhly	Whisk fern	White mandarin twisted stalk	White Mountain clover		Yellow lady's slipper
LITTLE COLORADO RIVER						X	X	X	X	X			X					X	X	X	9
Little Colorado River Above Lyman Complex																					
Hulsey Lake							X			X			X								3
Pratt Tank																					—
Nelson Reservoir																					—
Lyman Reservoir																					—
Carnero Lake							X														1
Becker Lake																					—
West Fork Little Colorado River																					
Mexican Hay Lake							X			X			X								3
Lee Valley Lake						X	X	X	X	X			X					X	X	X	9
Bunch Reservoir						X	X			X			X							X	5
River Reservoir							X			X			X							X	4
Tunnel Reservoir						X	X			X			X							X	5
White Mountain Reservoir						X	X	X		X			X					X		X	7
Little Colorado River Greer						X	X	X		X			X							X	6
Little Colorado River Sheep's Crossing						X	X	X	X	X			X					X		X	8
Upper Little Colorado River																					
Little Ortega																					—
Concho Lake																					—
White Mountain Complex																					
Sponseller																					—
Silver Creek																					—
Long Lake (Show Low)																					—
Whipple																					—
Little Mormon Lake																					—

Table I. Recorded occurrence by species of other special status riparian plants.¹

SUBCATCHMENT/ Complex/ Site	Riparian Plants																			Total Number	
	A sedge	Alcove bog-orchid	Aravaipa wood fern	Arizona alum root	Arizona giant sedge	Arizona willow	Blumer's dock	Boreal bog orchid	Crenulate moonwort	Goodding's onion	Lemmon lily	Lemmon's stevia	Slender bog orchid	Texas purple spike	Thurber's bog orchid	Weeping muhly	Whisk fern	White mandarin twisted stalk	White Mountain clover		Yellow lady's slipper
Schoen's Complex																					
Woodland Lake																					—
Rainbow Lake																					—
Show Low Lake																					—
Fool Hollow Lake																					—
Scott's Reservoir																					—
Show Low Creek																					—
Mountain Meadows Recreation Complex																					—
Chevelon Creek Complex																					
Chevelon Canyon Lake																					—
Long Tom							X														1
Willow Springs							X														1
Woods Canyon							X														1
Black Canyon Lake																					
Black Canyon Lake																					—
Clear Creek Complex																					
Bear Canyon Lake							X														1
C.C. Cragin (Blue Ridge Reservoir)							X														1
Knoll Lake							X														1
Clear Creek Reservoir																					
Clear Creek Reservoir																					—
Jack's Canyon Complex																					
Soldiers Annex																					—
Long Lake (Diablo)																					—
Soldiers																					—
Tremaine Lake																					

Table I. Recorded occurrence by species of other special status riparian plants.¹

SUBCATCHMENT/ Complex/ Site	Riparian Plants																			Total Number	
	A sedge	Alcove bog-orchid	Aravaipa wood fern	Arizona alum root	Arizona giant sedge	Arizona willow	Blumer's dock	Boreal bog orchid	Crenulate moonwort	Goodding's onion	Lemmon lily	Lemmon's stevia	Slender bog orchid	Texas purple spike	Thurber's bog orchid	Weeping muhly	Whisk fern	White mandarin twisted stalk	White Mountain clover		Yellow lady's slipper
Canyon Diablo Complex																					-
Mud Tank																					-
Kinnikinick Lake																					-
Coconino Lake																					-
Morton																					-
Ashurst Lake																					-
Francis Short Pond																					-
Walnut Creek Complex																					-
Marshall Lake																					-
Mormon Lodge Pond																					-
Upper Lake Mary																					-
Lower Lake Mary																					-
RIGGS FLAT							X						X								2
Riggs Flat Lake																					-
Riggs Flat Lake							X						X								2
UPPER GILA RIVER	X			X			X	X					X								5
Upper Gila																					-
Cluff Pond #3				X																	1
Dankworth Pond	X			X																	2
Frye Mesa Lake	X			X				X													3
Graham County Fair Grounds																					-
Roper Lake																					-
MIDDLE GILA RIVER			X																		1
Kearny																					-
Kearny																					-

Table I. Recorded occurrence by species of other special status riparian plants.¹

SUBCATCHMENT/ Complex/ Site	Riparian Plants																			Total Number	
	A sedge	Alcove bog-orchid	Aravaipa wood fern	Arizona alum root	Arizona giant sedge	Arizona willow	Blumer's dock	Boreal bog orchid	Crenulate moonwort	Goodding's onion	Lemmon lily	Lemmon's stevia	Slender bog orchid	Texas purple spike	Thurber's bog orchid	Weeping muhly	Whisk fern	White mandarin twisted stalk	White Mountain clover		Yellow lady's slipper
LOWER GILA-YUMA																					-
Lower Gila-Yuma Complex																					
Fortuna Pond																					-
Redondo/Yuma Lake																					-
Wellton Golf Course																					-
LUNA LAKE							X			X									X		3
Luna Lake																					
Luna Lake							X												X		2
AGUA FRIA RIVER																					-
Agua Fria River Complex																					
Fain Lake																					-
Horse Thief Basin																					-
Lynx Lake																					-
SALT RIVER	X					X	X	X		X			X						X	X	8
Black River Complex																					
Ackre Lake							X	X		X			X							X	5
Big Lake						X	X			X									X	X	5
Black River East Fork							X			X									X		3
Black River West Fork							X			X									X		3
Crescent Lake						X	X			X			X						X	X	6
Canyon Creek Complex																					
Canyon Creek							X														1
Workman Creek																					
Workman Creek	X						X														2
Tonto Creek Complex																					
Tonto Creek							X														1
Christopher Creek							X														1
Haigler Creek							X														1

Table I. Recorded occurrence by species of other special status riparian plants.¹

SUBCATCHMENT/ Complex/ Site	Riparian Plants																		Total Number	
	A sedge	Alcove bog-orchid	Aravaipa wood fern	Arizona alum root	Arizona giant sedge	Arizona willow	Blumer's dock	Boreal bog orchid	Crenulate moonwort	Goodding's onion	Lemmon lily	Lemmon's stevia	Slender bog orchid	Texas purple spike	Thurber's bog orchid	Weeping muhly	Whisk fern	White mandarin twisted stalk		White Mountain clover
Lower Salt Complex																				
Apache Lake																				—
Canyon Lake																				—
Saguaro Lake																				—
Tempe Town Lake																				—
Salt River Lower																				—
Phoenix Urban Lakes																				
Alvord Lake																				—
Chaparral Lake																				—
Cortez Lake																				—
Desert Breeze Lake																				—
Desert West Lake																				—
Encanto Lake																				—
Evelyn Hallman Pond																				—
Kiwanis Lake																				—
Papago Ponds																				—
Red Mountain Lake																				—
Rio Vista Pond																				—
Riverview Lake																				—
Steele Indian School Pond																				—
Surprise Lake																				—
Veterans Oasis Lake																				—
Water Ranch Lake																				—

Table I. Recorded occurrence by species of other special status riparian plants.¹

SUBCATCHMENT/ Complex/ Site	Riparian Plants																		Total Number	
	A sedge	Alcove bog-orchid	Aravaipa wood fern	Arizona alum root	Arizona giant sedge	Arizona willow	Blumer's dock	Boreal bog orchid	Crenulate moonwort	Goodding's onion	Lemmon lily	Lemmon's stevia	Slender bog orchid	Texas purple spike	Thurber's bog orchid	Weeping muhly	Whisk fern	White mandarin twisted stalk		White Mountain clover
Phoenix Special Urban Lakes																				
Crossroads Park																				—
Freestone Park																				—
McQueen Park																				—
Bonsall Park																				—
Pacana Park																				—
Granada Park																				—
Roadrunner Park																				—
Eldorado Park																				—
Indian School Park																				—
Vista del Camino Park																				—
Tempe Papago Park																				—
Water Treatment																				—
Discovery District Park																				—
Selleh Park																				—
SANTA CRUZ RIVER	X				X						X	X		X	X	X	X			8
Upper Santa Cruz																				
Parker Canyon	X													X						2
Patagonia																				—
Peña Blanca					X															1
Middle Santa Cruz																				
Rose Canyon	X											X			X	X				4
Fagen Tank															X	X				—
Pantano Wash-Rillito River																				
Arivaca	X																			1

Table I. Recorded occurrence by species of other special status riparian plants.¹

SUBCATCHMENT/ Complex/ Site	Riparian Plants																			Total Number
	A sedge	Alcove bog-orchid	Aravaipa wood fern	Arizona alum root	Arizona giant sedge	Arizona willow	Blumer's dock	Boreal bog orchid	Crenulate moonwort	Goodding's onion	Lemmon lily	Lemmon's stevia	Slender bog orchid	Texas purple spike	Thurber's bog orchid	Weeping muhly	Whisk fern	White mandarin twisted stalk	White Mountain clover	
Tucson Santa Cruz Complex																				
Sahuarita Lake																				—
Kennedy Lake																				—
Lakeside Lake																				—
Silverbell Lake (and Archer Pond)																				—
Tucson Santa Cruz Special Urban Lakes																				
Reid Park					X		X													—
VERDE RIVER					X		X													2
Big Chino Wash Complex																				
Granite Basin Lake																				—
Garrett Tank																				—
Stone Dam																				—
Shucking Tank																				—
Presley Tank																				—
Sycamore Complex																				
Elk Tank																				—
JD Dam																				—
White Horse Lake																				—
Middle Tank																				—
Perkins Tank																				—

Table I. Recorded occurrence by species of other special status riparian plants.¹

SUBCATCHMENT/ Complex/ Site	Riparian Plants																			Total Number	
	A sedge	Alcove bog-orchid	Aravaipa wood fern	Arizona alum root	Arizona giant sedge	Arizona willow	Blumer's dock	Boreal bog orchid	Crenulate moonwort	Goodding's onion	Lemmon lily	Lemmon's stevia	Slender bog orchid	Texas purple spike	Thurber's bog orchid	Weeping muhly	Whisk fern	White mandarin twisted stalk	White Mountain clover		Yellow lady's slipper
Middle Verde Complex																					
Mingus Lake																					—
Deadhorse Lake																					—
Verde River Middle																					—
Oak Creek																					—
Wet Beaver Creek																					—
West Clear Creek																					—
Huffer Lake							X														1
Granite Creek Complex																					
Watson Lake																					—
Goldwater Lake																					—
Willow Creek Reservoir																					—
Lower Verde River Complex																					
East Verde River																					—
Green Valley Lake																					—
BILL WILLIAMS RIVER			X																		1
Santa Maria Complex																					
Granite Mountain #1																					—
Granite Mountain #2																					—
Bass Tank																					—
Blue Tank																					—

Table I. Recorded occurrence by species of other special status riparian plants.¹

SUBCATCHMENT/ Complex/ Site	Riparian Plants																			Total Number	
	A sedge	Alcove bog-orchid	Aravaipa wood fern	Arizona alum root	Arizona giant sedge	Arizona willow	Blumer's dock	Boreal bog orchid	Crenulate moonwort	Goodding's onion	Lemmon lily	Lenmon's stevia	Slender bog orchid	Texas purple spike	Thurber's bog orchid	Weeping muhly	Whisk fern	White mandarin twisted stalk	White Mountain clover		Yellow lady's slipper
Burro Creek Complex																					
Carter Tank																					—
Coor's Lake																					—
Antelope Tank																					—
Bar 37 Tank																					—
Harman Tank																					—
Harmon Tank #2																					—
Little Antelope Tank																					—
McElhaney Tank																					—
Stubbs Tank																					—
Swale Tank																					—
Total Number of Site Occurrences ²	6	0	0	3	1	8	29	6	2	14	0	1	12	1	1	1	0	3	6	10	104

² Totals reflect only the number of occurrences within 5 miles of stocking sites and do not include additional occurrence records at the subcatchment level.

APPENDIX H

**Recorded Occurrence by Species of Other Special Status
Non-piscivorous Riparian/Aquatic Nesting Birds,
Terrestrial Riparian Invertebrates, and Ground-dwelling
Riparian Mammals and Reptiles**

Table J. Recorded occurrence by species of other special status non-piscivorous riparian/aquatic nesting birds, terrestrial riparian invertebrates, and ground-dwelling riparian mammals and reptiles.¹

SUBCATCHMENT/ Complex/ Site	Non-piscivorous Riparian/Aquatic Nesting Birds								Terrestrial Riparian Invertebrates	Ground-dwelling Riparian Mammals and Reptiles				Total Number
	American redstart	Black-bellied whistling-duck	California black rail	Elegant trogon	Northern gray hawk	Pine grosbeak	Rose-throated Becard	Tropical kingbird	Maricopa tiger beetle	American water shrew	Arizona shrew	Giant spotted whiptail	Redback whiptail	
COLORADO RIVER– HAVASU CREEK														–
Havasu Creek Complex														
Cataract Lake														–
City Reservoir														–
Dogtown Reservoir														–
Russell Tank														–
Santa Fe Tank														–
Kaibab Lake														–
COLORADO RIVER–YUMA NORTH														–
Yuma Complex														
La Paz County Park Pond														–
La Paz County Park Lagoon														–
COLORADO RIVER–YUMA SOUTH			X											1
Yuma Complex														
Yuma West Wetland														–
Hidden Shores			X											1

¹ Occurrences are based on Arizona Game and Fish Department Heritage Data Management System records within 5 miles of individual stocking sites and within subcatchment boundaries. Subcatchments are defined as the U.S. Geological Survey Hydrologic Unit Code (HUC) 10 subwatersheds that surround individual stocking sites and the HUC 12–level subwatersheds downstream of those stocking sites to the confluence of a major water body that supports nonnative aquatic species. Because they encompass larger areas, occurrence records in subcatchments are not necessarily reflected at one or more of the associated stocking sites.

Table J. Recorded occurrence by species of other special status non-piscivorous riparian/aquatic nesting birds, terrestrial riparian invertebrates, and ground-dwelling riparian mammals and reptiles.¹

SUBCATCHMENT/ Complex/ Site	Non-piscivorous Riparian/Aquatic Nesting Birds								Terrestrial Riparian Invertebrates	Ground-dwelling Riparian Mammals and Reptiles				Total Number
	American redstart	Black-bellied whistling-duck	California black rail	Elegant trogon	Northern gray hawk	Pine grosbeak	Rose-throated Becard	Tropical kingbird	Maricopa tiger beetle	American water shrew	Arizona shrew	Giant spotted whiptail	Redback whiptail	
LITTLE COLORADO RIVER	X					X				X				3
Little Colorado River Above Lyman Complex														
Hulsey Lake														-
Pratt Tank														-
Nelson Reservoir														-
Lyman Reservoir														-
Carnero Lake										X				1
Becker Lake														-
West Fork Little Colorado River														
Mexican Hay Lake	X													1
Lee Valley Lake						X				X				2
Bunch Reservoir	X													1
River Reservoir	X													1
Tunnel Reservoir	X													1
White Mountain Reservoir						X				X				2
Little Colorado River Greer						X				X				2
Little Colorado River Sheep's Crossing						X				X				2
Upper Little Colorado River														
Little Ortega														-
Concho Lake														-
White Mountain Complex														
Sponseller														-
Silver Creek														-
Long Lake (Show Low)														-
Whipple														-
Little Mormon Lake														-

Table J. Recorded occurrence by species of other special status non-piscivorous riparian/aquatic nesting birds, terrestrial riparian invertebrates, and ground-dwelling riparian mammals and reptiles.¹

SUBCATCHMENT/ Complex/ Site	Non-piscivorous Riparian/Aquatic Nesting Birds								Terrestrial Riparian Invertebrates	Ground-dwelling Riparian Mammals and Reptiles				Total Number
	American redstart	Black-bellied whistling-duck	California black rail	Elegant trogon	Northern gray hawk	Pine grosbeak	Rose-throated Becard	Tropical kingbird	Maricopa tiger beetle	American water shrew	Arizona shrew	Giant spotted whiptail	Redback whiptail	
Schoen's Complex														
Woodland Lake														-
Rainbow Lake														-
Show Low Lake														-
Fool Hollow Lake														-
Scott's Reservoir														-
Show Low Creek														-
Mountain Meadows Recreation Complex														-
Chevelon Creek Complex														
Chevelon Canyon Lake														-
Long Tom														-
Willow Springs														-
Woods Canyon														-
Black Canyon Lake														
Black Canyon Lake														-
Clear Creek Complex														
Bear Canyon Lake														-
C.C. Cragin (Blue Ridge Reservoir)														-
Knoll Lake														-
Clear Creek Reservoir														
Clear Creek Reservoir														-
Jack's Canyon Complex														
Soldiers Annex														-
Long Lake (Diablo)														-
Soldiers														-
Tremaine Lake														-

Table J. Recorded occurrence by species of other special status non-piscivorous riparian/aquatic nesting birds, terrestrial riparian invertebrates, and ground-dwelling riparian mammals and reptiles.¹

SUBCATCHMENT/ Complex/ Site	Non-piscivorous Riparian/Aquatic Nesting Birds								Terrestrial Riparian Invertebrates	Ground-dwelling Riparian Mammals and Reptiles				Total Number
	American redstart	Black-bellied whistling-duck	California black rail	Elegant trogon	Northern gray hawk	Pine grosbeak	Rose-throated Becard	Tropical kingbird	Maricopa tiger beetle	American water shrew	Arizona shrew	Giant spotted whiptail	Redback whiptail	
Canyon Diablo Complex														
Mud Tank														-
Kinnikinick Lake														-
Coconino Lake														-
Morton Lake														-
Ashurst Lake														-
Francis Short Pond														-
Walnut Creek Complex														
Marshall Lake														-
Mormon Lodge Pond														-
Upper Lake Mary														-
Lower Lake Mary														-
RIGGS FLAT														-
Riggs Flat Lake														
Riggs Flat Lake														-
UPPER GILA RIVER												X		1
Upper Gila														
Cluff Pond #3												X		1
Dankworth Pond														-
Frye Mesa Lake												X		1
Graham County Fairgrounds														-
Roper Lake														-
MIDDLE GILA RIVER					X			X						2
Kearny														
Kearny								X						1

Table J. Recorded occurrence by species of other special status non-piscivorous riparian/aquatic nesting birds, terrestrial riparian invertebrates, and ground-dwelling riparian mammals and reptiles.¹

SUBCATCHMENT/ Complex/ Site	Non-piscivorous Riparian/Aquatic Nesting Birds								Terrestrial Riparian Invertebrates	Ground-dwelling Riparian Mammals and Reptiles				Total Number
	American redstart	Black-bellied whistling-duck	California black rail	Elegant trogon	Northern gray hawk	Pine grosbeak	Rose-throated Becard	Tropical kingbird	Maricopa tiger beetle	American water shrew	Arizona shrew	Giant spotted whiptail	Redback whiptail	
LOWER GILA-YUMA														-
Lower Gila-Yuma Complex														
Fortuna Pond														-
Redondo/Yuma Lake														-
Wellton Golf Course														-
LUNA LAKE														-
Luna Lake														
Luna Lake														-
AGUA FRIA RIVER	X								X					2
Agua Fria River Complex														
Fain Lake	X													1
Horse Thief Basin														-
Lynx Lake	X													1
SALT RIVER		X			X	X			X	X			X	6
Black River Complex														
Ackre Lake														-
Big Lake						X				X				2
Black River East Fork														-
Black River West Fork														-
Crescent Lake						X				X				2
Canyon Creek Complex														
Canyon Creek														-
Workman Creek														
Workman Creek														-

Table J. Recorded occurrence by species of other special status non-piscivorous riparian/aquatic nesting birds, terrestrial riparian invertebrates, and ground-dwelling riparian mammals and reptiles.¹

SUBCATCHMENT/ Complex/ Site	Non-piscivorous Riparian/Aquatic Nesting Birds								Terrestrial Riparian Invertebrates	Ground-dwelling Riparian Mammals and Reptiles				Total Number
	American redstart	Black-bellied whistling-duck	California black rail	Elegant trogon	Northern gray hawk	Pine grosbeak	Rose-throated Becard	Tropical kingbird	Maricopa tiger beetle	American water shrew	Arizona shrew	Giant spotted whiptail	Redback whiptail	
Tonto Creek Complex														
Tonto Creek														-
Christopher Creek														-
Haigler Creek														-
Lower Salt Complex														
Apache Lake														-
Canyon Lake														-
Saguaro Lake														-
Tempe Town Lake														-
Salt River Lower														-
Phoenix Urban Lakes														
Alvord Lake														-
Chaparral Lake														-
Cortez Lake														-
Desert Breeze Lake														-
Desert West Lake														-
Encanto Lake														-
Evelyn Hallman Pond														-
Kiwanis Lake														-
Papago Ponds														-
Red Mountain Lake														-
Rio Vista Pond		X												1
Riverview Lake														-
Steele Indian School Pond														-
Surprise Lake														-
Veterans Oasis Lake														-
Water Ranch Lake		X												1

Table J. Recorded occurrence by species of other special status non-piscivorous riparian/aquatic nesting birds, terrestrial riparian invertebrates, and ground-dwelling riparian mammals and reptiles.¹

SUBCATCHMENT/ Complex/ Site	Non-piscivorous Riparian/Aquatic Nesting Birds								Terrestrial Riparian Invertebrates	Ground-dwelling Riparian Mammals and Reptiles				Total Number
	American redstart	Black-bellied whistling-duck	California black rail	Elegant trogon	Northern gray hawk	Pine grosbeak	Rose-throated Becard	Tropical kingbird	Maricopa tiger beetle	American water shrew	Arizona shrew	Giant spotted whiptail	Redback whiptail	
Phoenix Special Urban Lakes														
Crossroads Park		X												1
Freestone Park		X												1
McQueen Park		X												1
Bonsall Park														–
Pacana Park														–
Granada Park														–
Roadrunner Park														–
Eldorado Park														–
Indian School Park														–
Vista Del Camino Park														–
Tempe Papago Park														–
Water Treatment														–
Discovery District Park														–
Selleh Park														–
SANTA CRUZ RIVER		X		X	X		X	X			X	X	X	8
Upper Santa Cruz														
Parker Canyon				X										1
Patagonia					X							X		2
Peña Blanca				X										1
Middle Santa Cruz														
Rose Canyon														–
Fagen Tank												X		1
Pantano Wash–Rillito River														
Arivaca Lake		X			X									2

Table J. Recorded occurrence by species of other special status non-piscivorous riparian/aquatic nesting birds, terrestrial riparian invertebrates, and ground-dwelling riparian mammals and reptiles.¹

SUBCATCHMENT/ Complex/ Site	Non-piscivorous Riparian/Aquatic Nesting Birds								Terrestrial Riparian Invertebrates	Ground-dwelling Riparian Mammals and Reptiles				Total Number
	American redstart	Black-bellied whistling-duck	California black rail	Elegant trogon	Northern gray hawk	Pine grosbeak	Rose-throated Becard	Tropical kingbird	Maricopa tiger beetle	American water shrew	Arizona shrew	Giant spotted whiptail	Redback whiptail	
Tucson Santa Cruz Complex														
Sahuarita Lake														–
Kennedy Lake												X		1
Lakeside Lake														–
Silverbell Lake/Archer Pond		X												1
Tucson Santa Cruz Special Urban Lakes														
Reid Park												X		1
VERDE RIVER	X								X					2
Big Chino Wash Complex														
Granite Basin Lake									X					1
Garrett Tank														–
Stone Dam														–
Shucking Tank														–
Presley Tank														–
Sycamore Complex														
Elk Tank														–
JD Dam														–
White Horse Lake														–
Middle Tank														–
Perkins Tank														–

Table J. Recorded occurrence by species of other special status non-piscivorous riparian/aquatic nesting birds, terrestrial riparian invertebrates, and ground-dwelling riparian mammals and reptiles.¹

SUBCATCHMENT/ Complex/ Site	Non-piscivorous Riparian/Aquatic Nesting Birds								Terrestrial Riparian Invertebrates	Ground-dwelling Riparian Mammals and Reptiles				Total Number
	American redstart	Black-bellied whistling-duck	California black rail	Elegant trogon	Northern gray hawk	Pine grosbeak	Rose-throated Becard	Tropical kingbird	Maricopa tiger beetle	American water shrew	Arizona shrew	Giant spotted whiptail	Redback whiptail	
Middle Verde Complex														
Mingus Lake														-
Deadhorse Lake														-
Verde River Middle														-
Oak Creek														-
Wet Beaver Creek														-
West Clear Creek														-
Huffer Lake														-
Granite Creek Complex														
Watson Lake	X								X					2
Goldwater Lake	X													1
Willow Creek Reservoir	X								X					2
Lower Verde River Complex														
East Verde River									X					1
Green Valley Lake									X					1
BILL WILLIAMS RIVER														-
Santa Maria Complex														
Granite Mountain #1														-
Granite Mountain #2														-
Bass Tank														-
Blue Tank														-

Table J. Recorded occurrence by species of other special status non-piscivorous riparian/aquatic nesting birds, terrestrial riparian invertebrates, and ground-dwelling riparian mammals and reptiles.¹

SUBCATCHMENT/ Complex/ Site	Non-piscivorous Riparian/Aquatic Nesting Birds								Terrestrial Riparian Invertebrates	Ground-dwelling Riparian Mammals and Reptiles				Total Number
	American redstart	Black-bellied whistling-duck	California black rail	Elegant trogon	Northern gray hawk	Pine grosbeak	Rose-throated Becard	Tropical kingbird	Maricopa tiger beetle	American water shrew	Arizona shrew	Giant spotted whiptail	Redback whiptail	
Burro Creek Complex														
Carter Tank														-
Coor's Lake														-
Antelope Tank														-
Bar 37 Tank														-
Harman Tank														-
Harmon Tank #2														-
Little Antelope Tank														-
McElhaney Tank														-
Stubbs Tank														-
Swale Tank														-
Total Number of Site Occurrences²	9	7	1	2	2	6	0	1	5	7	0	6	0	46

² Totals reflect only the number of occurrences within 5 miles of stocking sites and do not include additional occurrence records at the subcatchment level.

APPENDIX I

Recorded Occurrence by Species of Other Special Status Piscivorous Riparian/Aquatic Nesting Birds

Table K. Recorded occurrence by species of other special status piscivorous riparian/aquatic nesting birds.¹

SUBCATCHMENT/ Complex/ Site	Piscivorous Riparian/Aquatic Nesting Birds								Total Number
	Bald eagle	Belted kingfisher	Common black- hawk	Golden eagle	Great egret	Least bittern	Osprey	Snowy egret	
COLORADO RIVER— HAVASU CREEK	X			X			X		3
Havas Creek Complex									
Cataract Lake	X			X			X		3
City Reservoir	X						X		2
Dogtown Reservoir	X						X		2
Russell Tank									—
Santa Fe Tank	X			X			X		3
Kaibab Lake	X			X			X		3
COLORADO RIVER— YUMA NORTH					X	X			2
Yuma Complex									
La Paz County Park Pond									—
La Paz County Park Lagoon									—
COLORADO RIVER— YUMA SOUTH					X	X			2
Yuma Complex									
Yuma West Wetland					X			X	2
Hidden Shores					X	X			2
LITTLE COLORADO RIVER	X	X	X	X			X		5
Little Colorado River Above Lyman Complex									
Hulsey Lake	X								1
Pratt Tank									—
Nelson Reservoir	X			X					2
Lyman Reservoir									—
Carnero Lake									—
Becker Lake	X								1
West Fork Little Colorado River									
Mexican Hay Lake	X	X					X		3
Lee Valley Lake	X								1
Bunch Reservoir	X	X					X		3
River Reservoir	X	X					X		3
Tunnel Reservoir	X	X					X		3
White Mountain Reservoir	X	X					X		3
Little Colorado River Greer	X	X					X		3
Little Colorado River Sheep's Crossing	X	X							2

¹ Occurrences are based on Arizona Game and Fish Department Heritage Data Management System records within 5 miles of individual stocking sites and within subcatchment boundaries. Subcatchments are defined as the U.S. Geological Survey Hydrologic Unit Code (HUC) 10 subwatersheds that surround individual stocking sites and the HUC 12-level subwatersheds downstream of those stocking sites to the confluence of a major water body that supports nonnative aquatic species. Because they encompass larger areas, occurrence records in subcatchments are not necessarily reflected at one or more of the associated stocking site.

Table K. Recorded occurrence by species of other special status piscivorous riparian/aquatic nesting birds.¹

SUBCATCHMENT/ Complex/ Site	Piscivorous Riparian/Aquatic Nesting Birds								Total Number
	Bald eagle	Belted kingfisher	Common black- hawk	Golden eagle	Great egret	Least bittern	Osprey	Snowy egret	
Upper Little Colorado River									
Little Ortega	X								1
Concho Lake	X								1
White Mountain Complex									
Sponseller	X			X					2
Silver Creek	X								1
Long Lake (Show Low)	X								1
Whipple	X								1
Little Mormon Lake	X								1
Schoen's Complex									
Woodland Lake	X								1
Rainbow Lake	X						X		2
Show Low Lake	X						X		2
Fools Hollow Lake	X								1
Scott's Reservoir	X						X		2
Show Low Creek	X								1
Mountain Meadows Recreation Complex	X						X		2
Chevelon Creek Complex									
Chevelon Canyon Lake	X								1
Long Tom	X	X	X	X					4
Willow Springs	X	X	X						3
Woods Canyon	X								1
Black Canyon Lake									
Black Canyon Lake									–
Clear Creek Complex									
Bear Canyon Lake									–
C.C. Craigin (Blue Ridge Reservoir)	X						X		2
Knoll Lake							X		1
Clear Creek Reservoir									
Clear Creek Reservoir									–
Jack's Canyon Complex									
Soldiers Annex	X			X					2
Long Lake (Diablo)	X			X					2
Soldiers	X								1
Tremaine Lake	X								1
Canyon Diablo Complex									
Mud Tank	X								1
Kinnikinick Lake									–
Coconino Lake	X								1
Morton									–
Ashurst Lake	X								1
Francis Short Pond	X								1

Table K. Recorded occurrence by species of other special status piscivorous riparian/aquatic nesting birds.¹

SUBCATCHMENT/ Complex/ Site	Piscivorous Riparian/Aquatic Nesting Birds								Total Number
	Bald eagle	Belted kingfisher	Common black- hawk	Golden eagle	Great egret	Least bittern	Osprey	Snowy egret	
Walnut Creek Complex									
Marshall Lake	X						X		2
Mormon Lodge Pond	X						X		2
Upper Lake Mary	X						X		2
Lower Lake Mary	X						X		2
RIGGS FLAT	X								1
Riggs Flat Lake									
Riggs Flat Lake									–
UPPER GILA RIVER									–
Upper Gila									
Cluff Pond #3									–
Dankworth Pond									–
Frye Mesa Lake									–
Graham County Fairgrounds									–
Roper Lake									–
MIDDLE GILA RIVER	X		X						2
Kearny									
Kearny									–
LOWER GILA-YUMA					X				1
Lower Gila-Yuma Complex									
Fortuna Pond					X				1
Redondo/Yuma Lake					X				1
Wellton Golf Course									–
LUNA LAKE	X								1
Luna Lake									
Luna Lake	X								1
AGUA FRIA RIVER	X	X	X	X					4
Agua Fria River Complex									
Fain Lake	X	X		X					3
Horse Thief Basin									–
Lynx Lake	X	X							2
SALT RIVER	X	X	X	X		X	X		6
Black River Complex									
Ackre Lake									–
Big Lake	X								1
Black River East Fork	X						X		2
Black River West Fork							X		1
Crescent Lake	X								1
Canyon Creek Complex									
Canyon Creek	X	X	X						3
Workman Creek									
Workman Creek			X						1

Table K. Recorded occurrence by species of other special status piscivorous riparian/aquatic nesting birds.¹

SUBCATCHMENT/ Complex/ Site	Piscivorous Riparian/Aquatic Nesting Birds								Total Number
	Bald eagle	Belted kingfisher	Common black- hawk	Golden eagle	Great egret	Least bittern	Osprey	Snowy egret	
Tonto Creek Complex									
Tonto Creek			X						1
Christopher Creek			X						1
Haigler Creek			X						1
Lower Salt Complex									
Apache Lake	X			X					2
Canyon Lake	X			X					2
Saguaro Lake	X								1
Tempe Town Lake	X								1
Salt River Lower	X								1
Phoenix Urban Lakes									
Alvord Lake									–
Chaparral Lake									–
Cortez Lake									–
Desert Breeze Lake									–
Desert West Lake									–
Encanto Lake									–
Evelyn Hallman Pond	X								1
Kiwanis Lake	X								1
Papago Ponds	X								1
Red Mountain Lake									–
Rio Vista Pond									–
Riverview Lake	X								1
Steele Indian School Pond									–
Surprise Lake									–
Veterans Oasis Lake									–
Water Ranch Lake									–
Phoenix Special Urban Lakes									
Crossroads Park									–
Freestone Park									–
McQueen Park									–
Bonsall Park									–
Pacana Park									–
Granada Park									–
Roadrunner Park									–
Eldorado Park	X								1
Indian School Park	X								1
Vista Del Camino Park	X								1
Tempe Papago Park	X								1
Water Treatment	X								1
Discovery District Park									–
Selleh Park	X								1

Table K. Recorded occurrence by species of other special status piscivorous riparian/aquatic nesting birds.¹

SUBCATCHMENT/ Complex/ Site	Piscivorous Riparian/Aquatic Nesting Birds								Total Number
	Bald eagle	Belted kingfisher	Common black- hawk	Golden eagle	Great egret	Least bittern	Osprey	Snowy egret	
SANTA CRUZ RIVER	X		X	X			X		5
Upper Santa Cruz									
Parker Canyon	X								1
Patagonia	X		X						2
Pena Blanca							X		1
Middle Santa Cruz									
Rose Canyon									–
Fagen Tank									–
Pantano Wash–Rillito River									
Arivaca							X		1
Tucson Santa Cruz Complex									
Sahuarita Lake									–
Kennedy Lake									–
Lakeside Lake									–
Silverbell Lake (and Archer Pond)									–
Tucson Santa Cruz Special Urban Lakes									
Reid Park									–
VERDE RIVER	X	X	X	X			X		5
Big Chino Wash Complex									
Granite Basin Lake									–
Garrett Tank				X					1
Stone Dam	X			X					2
Shucking Tank									–
Presley Tank									–
Sycamore Complex									
Elk Tank	X						X		2
JD Dam	X						X		2
White Horse Lake	X						X		2
Middle Tank	X			X			X		3
Perkins Tank	X						X		2
Middle Verde Complex									
Mingus Lake				X					1
Deadhorse Lake	X		X						2
Verde River Middle	X		X						2
Oak Creek	X		X						2
Wet Beaver Creek	X		X						2
West Clear Creek	X		X						2
Huffer Lake			X						1
Granite Creek Complex									
Watson Lake	X	X		X					3
Goldwater Lake	X								1
Willow Creek Reservoir	X	X		X					3

Table K. Recorded occurrence by species of other special status piscivorous riparian/aquatic nesting birds.¹

SUBCATCHMENT/ Complex/ Site	Piscivorous Riparian/Aquatic Nesting Birds								Total Number
	Bald eagle	Belted kingfisher	Common black- hawk	Golden eagle	Great egret	Least bittern	Osprey	Snowy egret	
Lower Verde River Complex									
East Verde River			X						1
Green Valley Lake			X						1
BILL WILLIAMS RIVER	X		X	X					3
Santa Maria Complex									
Granite Mountain #1									-
Granite Mountain #2									-
Bass Tank									-
Blue Tank									-
Burro Creek Complex									
Carter Tank									-
Coors Lake			X						1
Antelope Tank									-
Bar 37 Tank									-
Harman Tank									-
Harmon Tank 2									-
Little Antelope Tank									-
McElhaney Tank									-
Stubbs Tank									-
Swale Tank			X						1
Total No. Site Occurrences ²	85	14	18	17	4	1	30	1	170

² Totals reflect only number of occurrences within 5 miles of stocking sites and do not include additional occurrence records at the subcatchment level.

APPENDIX J

Consultation Species with Not Likely to Adversely Affect Findings, Including Rationale

Arizona treefrog Huachuca/Canelo Distinct Population Segment (DPS)

Arizona treefrogs are found in the Huachuca Mountains near the stocking site at Parker Canyon Lake.

The Proposed Action may affect, but is not likely to adversely affect, the Arizona treefrog in the DPS for the following reasons:

- While there is a potential for individual Arizona treefrogs to access Parker Canyon Lake and be exposed to stocked sport fish or their progeny, the likelihood of this would be low, based on habitat use by treefrogs. This effect would be discountable.
- Stocked sport fish would be unlikely to access treefrog habitats since they are not hydrologically connected to Parker Canyon Lake. This potential effect would be insignificant.
- Use of live bait fish and waterdogs is prohibited at Parker Canyon Lake. While use of waterdogs does occur illegally, the use is connected to illegally stocked sport fish species (largemouth bass, Northern pike) and not sport fish proposed for stocking, so there would be no direct connection between the Proposed Action and the use of waterdogs.

However, the Arizona treefrog was assessed in the larger discussion in the Biological Assessment (BA) and the draft Biological and Conference Opinion (BCO) for the potential of diseases and parasites or vectors that transmit them. These effects are part of the environmental baseline and cumulative effects analysis for illegal and inadvertent transport of unwanted aquatic organisms. This discussion is summarized in Chapter 6 of this Environmental Assessment (EA).

Colorado pikeminnow

Colorado pikeminnow exist in certain ponds in the Arizona State University Research Park and at Karsten Golf Course. The status of the Colorado pikeminnow in these ponds is unknown, but it is presumed they still occur.

The Proposed Action may affect, but is not likely to adversely affect, the Colorado pikeminnow for the following reasons:

- The hydrological connections that could allow for fish movement between the proposed stocking sites and the occupied habitat of the Colorado pikeminnow are extremely limited, and the potential for movement of stocked sport fish to occupied Colorado pikeminnow habitat would be discountable.
- Colorado pikeminnow are in ponds containing nonnative fish species that, like some of the stocked species, may be predators of and competitors with the Colorado pikeminnow. Stocked Colorado pikeminnow were not expected to spawn in these ponds due to a lack of habitat, so the presence of nonnative fish was not deemed a reason not to stock the Colorado pikeminnow into these ponds. Only young-of-the-year, fingerling, or juvenile Colorado pikeminnow would be at risk of predation from stocked sport fish, and these age classes are not likely present in the ponds. The effects of predation would therefore be discountable.

Colorado pikeminnow 10j

Colorado pikeminnow are currently stocked in the Verde River in the vicinity of Childs and Beasley Flat, which are located below the lowest Middle Verde stocking site (West Clear Creek).

The Proposed Action may affect, but is not likely to adversely affect, the Colorado pikeminnow 10j population for the following reasons:

- Colorado pikeminnow are stocked below the Middle Verde River stocking reach, and recent survey data have documented only recaptured Colorado pikeminnow in the vicinity of that stocking reach and in Horseshoe Lake farther downstream. Few stocked fish are likely to reach this area, so the effect would be discountable.
- Rainbow trout (the only fish proposed for stocking into the Middle Verde River stocking reach) would not be likely to prey on the stocked-sized Colorado pikeminnow, and there is no recruitment of Colorado pikeminnow in the Verde River that would provide small fish vulnerable to predation. Channel catfish that may escape from Green Valley Lake may, after residence in the Verde River, become large enough to prey on stocked Colorado pikeminnow; however, the number of such channel catfish would likely be so low as to be an insignificant effect.

Desert pupfish

There would be no direct effects to desert pupfish from the Proposed Action. Indirect effects could occur if desert pupfish from the conservation sites were to move out of those sites and be exposed to stocked sport fish or their progeny or if stocked sport fish or their progeny could reach the conservation sites. The conservation sites potentially affected are the Phoenix Zoo and the Desert Botanical Garden and three sites in the Agua Fria River drainage (Larry Creek, Lousy Canyon, and Tule Creek).

The Proposed Action may affect, but is not likely to adversely affect, the desert pupfish for the following reasons:

- The reintroduced desert pupfish are in habitats at the Phoenix Zoo and the Desert Botanical Garden that are hydrologically isolated from the Phoenix metropolitan urban stocking sites, and stocked sport fish would be unlikely to reach the reintroduction sites.
- The reintroduced desert pupfish in Larry Creek, Lousy Canyon, and Tule Creek in the Agua Fria River drainage are separated from the Lynx and Fain lakes proposed stocking sites by ephemeral reaches of their home streams and the Agua Fria River. Stocked sport fish would not be able to access the reintroduction sites due to the presence of barriers to upstream movement from the Agua Fria River. Though it is possible to describe the circumstances of hydrological connectivity that would result in desert pupfish and stocked sport fish being in the Agua Fria River at the same time, these occasions would be extremely rare over the 10-year period covered by this consultation, and desert pupfish would not be expected to be exposed to stocked sport fish.

However, the desert pupfish was assessed in the larger discussion in the BA and draft BCO for the potential of diseases and parasites or vectors that transmit them. These effects are part of the

environmental baseline and cumulative effects analysis for illegal and inadvertent transport of unwanted aquatic organisms. This discussion is summarized in Chapter 6 of this EA.

Mexican spotted owl with critical habitat

Mexican spotted owl habitat—including portions of protected activity areas, buffers around protected activity areas, and designated critical habitat—is in proximity to 32 stocking sites in seven watersheds. There would be no direct effects from the proposed stocking action; effects would be related to anglers moving through Mexican spotted owl habitat to access fishing sites.

The Proposed Action may affect, but is not likely to adversely affect, the Mexican spotted owl and its designated critical habitat for the following reasons:

- The amount of human disturbance resulting from angler access to stocking sites during the Mexican spotted owl breeding season in and/or adjacent to protected activity areas would be insignificant and discountable. In addition, the key habitat components of Mexican spotted owl habitat would not be adversely affected by the Proposed Action.
- The amount of habitat disturbance resulting from anglers accessing the stocking sites would result in insignificant and discountable effects to primary constituent elements.

Mexican wolf 10j

The nonessential experimental population of Mexican wolves exists in the Apache National Forest in the action area for this consultation. Direct effects to Mexican wolves or their habitat are not expected from the Proposed Action. Effects to Mexican wolves would be limited to the potential for interactions between Mexican wolves and anglers pursuing stocked sport fish.

The Proposed Action may affect, but is not likely to adversely affect, the Mexican wolf 10j population for the following reasons:

- Wolf-human interactions between recreationists (including anglers) are rare and have only resulted in one wolf mortality since 1998. The mortality was not caused by an angler. Additional mortalities relating to recreationists are likely to be insignificant.
- Absent inducements, Mexican wolves avoid people.
- The final rule for establishment of the 10j population has provisions for people to legally harass wolves to scare them away from people, buildings, facilities, livestock, other domestic animals, and pets as long as the incident is reported to the U.S. Department of the Interior Fish and Wildlife Service within 7 days. If anglers encounter a wolf, they can legally (non-lethally) encourage the wolf to leave the area without causing prohibited take. Thus, the probability for non-legal take is discountable.

Page springsnail

Page springsnails are found in springs in the Oak Creek drainage in the vicinity of Page Springs and Bubbling Springs Pond, including at Page Springs State Fish Hatchery. The Proposed Action includes the stocking of rainbow trout into Oak Creek. Stocked rainbow trout would not be able to access occupied Page springsnail habitat, and anglers pursuing stocked trout would be unlikely to enter occupied habitat. The risk of contamination of occupied habitat by nonnative snail

species (such as New Zealand mud snail) through the Proposed Action would be limited by implementation of Hazard Analysis and Critical Control Points (HACCP) plans at hatcheries and normal operational procedures for acceptance and movement of stocked fish.

The Proposed Action may affect, but is not likely to adversely affect, the Page springsnail for the following reasons:

- Rainbow trout or anglers pursuing them would be unlikely to enter Page springsnail habitat, so the potential for effects would be insignificant.
- HACCP plans and standard hatchery operations would reduce the direct risk of contamination of occupied Page springsnail habitat through the activities of the Proposed Action to a discountable level.

Quitobaquito pupfish and designated critical habitat

The Quitobaquito pupfish is an endangered species with designated critical habitat at Quitobaquito Springs and Pond on the Organ Pipe Cactus National Monument.

The Proposed Action may affect, but is not likely to adversely affect, the Quitobaquito pupfish and its designated critical habitat for the following reasons:

- The pupfish habitat at Quitobaquito is hydrologically isolated from the stocking sites, and movement of stocked fish via connected waters would be unlikely to occur.
- There would be limited potential for the illegal or inadvertent movement of stocked sport fish or legal bait species by anglers from the stocking sites to Quitobaquito due to the distance between the stocking sites and Quitobaquito and because of the limited usefulness of the aquatic habitats at Quitobaquito to establish baitfish populations or a usable fishery. These effects would be insignificant.
- There would be a limited potential effect from non-anglers illegally or inadvertently moving stocked sport fish or legal bait to Quitobaquito due to the distance between Quitobaquito and any site that stocked fish or legal bait species. These effects would be discountable.
- Effects to the primary constituent elements of critical habitat related to the presence of nonnative species in the habitat are, as described in the preceding bullets, unlikely to occur. These effects are discountable.

However, the Quitobaquito pupfish was assessed in the larger discussion in the BA and draft BCO for the potential of diseases and parasites or vectors that transmit them. These effects are part of the environmental baseline and cumulative effects analysis for illegal and inadvertent transport of unwanted aquatic organisms. This discussion is summarized in Chapter 6 of this EA.

Sonora chub and designated critical habitat

The Sonora chub is a threatened species with designated critical habitat in the Sycamore Creek drainage of the Rio Magdalena in Pima County, Arizona. The Proposed Action includes stocking of warmwater sport fish species into Arivaca Lake and rainbow trout into Peña Blanca Lake.

The Proposed Action may affect, but is not likely to adversely affect, the Sonora chub and its designated critical habitat for the following reasons:

- Sonora chub habitat in Sycamore Creek and California Gulch is hydrologically isolated from the stocking sites, and movement of stocked fish via connected waters would be unlikely to occur.
- There would be some potential for illegal or inadvertent movement of stocked sport fish from the stocking sites to Yank Tank; however, no individuals of stocked species have been documented in the tank or in Sycamore Creek. Individuals of stocked species (bluegills) in California Gulch may have come from in-watershed sources. These potential effects would be discountable.
- Live bait fish are not allowed for fishing at either proposed stocking site, limiting the impetus for anglers to establish bait fish populations at Yank Tank. Waterdogs are legal for fishing at the two stocking sites; however, waterdogs are generally not used by anglers for the sport fish species proposed for stocking, so there would be limited impetus to establish waterdog populations for angling related to the Proposed Action. These potential effects would be discountable.
- Effects to the primary constituent elements of critical habitat related to the presence of nonnative species in the habitat would be, as described above, unlikely to occur. These effects would be discountable.

However, the Sonora chub was assessed in the larger discussion in the BA and draft BCO for the potential of diseases and parasites or vectors that transmit them. These effects are part of the environmental baseline and cumulative effects analysis for illegal and inadvertent transport of unwanted aquatic organisms. This discussion is summarized in Chapter 6 of this EA.

Sonoyta mud turtle

The Sonoyta mud turtle is a candidate species at Quitobaquito Springs and Pond on the Organ Pipe Cactus National Monument.

The Proposed Action may affect, but is not likely to adversely affect, the Sonoyta mud turtle for the following reasons:

- The Sonoyta mud turtle habitat at Quitobaquito is hydrologically isolated from the stocking sites, and movement of stocked fish via connected waters would be unlikely to occur.
- There would be limited potential for the illegal or inadvertent movement of stocked sport fish or legal bait species by anglers from the stocking sites to Quitobaquito due to the distance between the stocking sites and Quitobaquito and because of the limited usefulness of the aquatic habitats at Quitobaquito to establish baitfish populations or a usable fishery. These effects would be discountable.
- There is a limited potential effect from non-anglers illegally or inadvertently moving stocked sport fish or legal bait to Quitobaquito due to the distance between Quitobaquito and any site that stocked fish or legal bait species. These effects would be discountable.

However, the Sonoyta mud turtle was assessed in the larger discussion in the BA and draft BCO for the potential of diseases and parasites or vectors that transmit them. These effects are part of the environmental baseline and cumulative effects analysis for illegal and inadvertent transport of unwanted aquatic organisms. This discussion is summarized in Chapter 6 of this EA.

Three Forks springsnail

Three Forks springsnail is a candidate species. They are found in the Three Forks Springs and Boneyard Bog Springs near the Three Forks area of the East Fork Black River. The Proposed Action includes stocking salmonids into five sites in the Black River Complex (Ackre Lake, Big Lake, Crescent Lake, East Fork Black River, and West Fork Black River). None of the stocking sites would include the area of the East Fork Black River closest to the tributary containing the Three Forks springsnail populations. The size of the spring and spring outfall areas occupied by the Three Forks springsnail is not sufficient to support salmonids, and none has been found in the occupied habitat. Anglers pursuing stocked sport fish would be unlikely to access the occupied habitat because no fishing is available. The risk of contamination of occupied habitat by nonnative snail species, such as New Zealand mud snail, through the Proposed Action would be limited by implementation of HACCP plans at hatcheries and normal operational procedures for acceptance and movement of stocked fish.

The Proposed Action may affect, but is not likely to adversely affect, the Three Forks springsnail for the following reasons:

- Stocked salmonids or anglers pursuing them would be unlikely to enter Three Forks springsnail habitats, so the potential for effects would be discountable.
- HACCP plans and standard hatchery operations would reduce the direct risk of contamination of occupied Three Forks springsnail habitat through the activities of the Proposed Action to a discountable level.

Woundfin 10j

Woundfin were stocked in 2007 in the experimental population reach of the Hassayampa River near Wickenburg. The number of fish stocked (50) is low, and establishment of a population based on one stocking of this size is questionable. It is unclear, based on the status of the woundfin range-wide, whether additional fish to stock the Hassayampa River will be available over the next 10 years. The Proposed Action includes stocking of warm- and cold-water fish species into stocking sites in the Lower Salt River Complex and in any Urban Fishing or Special Urban Lakes that are connected to Tempe Town Lake. During flood events from the Salt or Verde rivers, stocked fish or their progeny could pass below Tempe Town Lake and arrive at the confluence with the Hassayampa River. If the Hassayampa River is also flooding, woundfin from the 10j population may be displaced downstream to the confluence with the Gila River.

The Proposed Action may affect, but is not likely to adversely affect, the woundfin 10j population for the following reason:

- The current status of the 10j woundfin population in the Hassayampa River is unknown; however, it is likely that the population is small, if it exists at all. That there is a population of woundfin present and available to be displaced downstream is discountable. If a population is

identified during monitoring of the woundfin in the Hassayampa River, or additional stockings are made, this concurrence may need to be reconsidered.

Yellow-billed cuckoo

Yellow-billed cuckoo is a candidate species found in riparian areas during spring and fall migration and summer breeding seasons. They use dense cottonwood-willow and mesquite vegetation communities for nesting; migration habitat may be non-riparian or lower-quality riparian areas. There would be no direct effects from the stocking action on yellow-billed cuckoo or their habitat. Indirect effects would be from disturbance to nesting cuckoos from anglers accessing stocking sites and habitat degradation from the creation or maintenance of access routes through riparian vegetation to reach stocking sites.

The Proposed Action may affect, but is not likely to adversely affect, the yellow-billed cuckoo for the following reasons:

- Habitat of the yellow-billed cuckoo is dense and difficult to move through. This would likely discourage anglers seeking access to stocking sites from creating new trails, instead using existing access through riparian areas or areas with fewer or no trees. Using existing access through riparian areas would preclude their regeneration into yellow-billed cuckoo habitat. Further, habitat does not occur at the stocking site for nine of the 13 sites under consideration for possible effects, and habitat degradation from anglers is not likely occurring at those points. At the other four sites, anglers are only part of the recreational use, and, where stocking is seasonal, they are not present all the time. As a conservation measure, Wildlife and Sport Fish Restoration and the Arizona Game and Fish Department have agreed to evaluate potential effects to habitat and work with the U.S. Department of Agriculture Forest Service to address any issues. The effects to habitat would be discountable and insignificant.
- Nesting yellow-billed cuckoos are present at only two sites (Deadhorse Ranch and Oak Creek) during the active stocking season and at West Clear Creek and Wet Beaver Creek between the two stocking seasons (these two sites are stocked in spring and fall, not over the summer), but some anglers could be present at these sites during the breeding season. Nesting yellow-billed cuckoos are in dense habitat that is difficult to access, reducing the opportunity for anglers to get close to nests and cause disturbance. Yellow-billed cuckoos in heavily used recreation areas such as those under consideration likely nest away from trails and paths to avoid disturbances. The effects to yellow-billed cuckoos from disturbance would be insignificant.

Yuma clapper rail

The Yuma clapper rail is found in cattail marshes on rivers and lakes along the Colorado, Gila, and Salt rivers. There would be no direct effects from the stocking action; effects would be related to the behavior of anglers at the stocking sites that are adjacent to suitable habitat for Yuma clapper rails.

The Proposed Action may affect, but is not likely to adversely affect, the Yuma clapper rail for the following reasons:

- Effects to habitat of Yuma clapper rails by anglers accessing shorelines by creating paths or trails through the marsh would be unlikely to occur. Dense marsh of the type favored by

Yuma clapper rails is difficult to move through, and where habitat is patchy, access is more easily gained at existing openings. Effects to habitat would be insignificant.

- Noise disturbance from shore or boat anglers has not been identified as a threat to Yuma clapper rails. Occupied habitats are in areas where recreational activities, including angling, occur regularly. The stocking sites where noise disturbance may occur are all in areas with recreational activities. Further, occupied Yuma clapper rail habitat is nearby, but not at the stocking sites. The attenuation of noise from the sites would reduce any potential disturbance to discountable levels.

APPENDIX K

Analysis of Potential Impacts to Other Special Status Fish Species

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
COLORADO RIVER WATERSHED (10 sites)		
Havasu Creek Subcatchment		
Dogtown Reservoir, City Reservoir, Santa Fe Tank, Cataract Lake, Kaibab Lake, Russell Tank	Each of these lakes has the potential to spill. If fish escapement occurred, fish would need to travel 120 to 135 miles to reach lower Havasu Creek near its confluence with the Colorado River, which is the closest known location for documented occurrence of any speckled dace, bluehead suckers, and flannelmouth suckers (SSFS). The lower approximately 9 miles of Havasu Creek prior to entering the Colorado River is perennial and is on the Havasupai Indian Reservation. Species occurrence data are not available for reservation lands, but SSFS could occur in this lower reach.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because of the extreme distance escaped fish would need to travel to reach the SSFS
Yuma South and Yuma North Subcatchments		
La Paz County Park Lagoon	There are no known occurrences of SSFS within the subcatchment.	<u>Proposed Action</u> No effects anticipated <u>Reduced Stocking Alternative</u> Site not stocked
Yuma West Wetland, Hidden Shores, La Paz County Park Pond	Systems are closed, and no SSFS are known from these sites.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated
LITTLE COLORADO RIVER WATERSHED (52 sites)		
Analyzed as One Subcatchment		
Pratt Tank, Carnero Lake	Systems are closed, and SSFS are not known from these locations.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated
Hulsey Lake	This is an open system, and the lake fills and spills annually during spring runoff into Hulsey Creek, Milk Creek, and then into Nutrioso Creek. Speckled dace and bluehead suckers are known from downstream Nutrioso Creek, and Little Colorado River suckers are found farther downstream below Nelson Reservoir. Stocking strategies are in place that limit movement of stocked fish by stocking catchable-sized rainbow trout—and only after lake levels have subsided and a few inches of water remain over the spillway. Prior to spring stocking, few stocked trout are left in the lake because of high angler harvest, winter kill loss, and occasional summer kill loss. When the lake does spill, the depth of Lower Hulsey Creek near its confluence with Milk Creek is shallow (usually a half-inch or less), which would make fish movement into Milk Creek difficult. No fish have been found in three surveys in Milk Creek. Rainbow trout are proposed for stocking and have been established in Nutrioso Creek.	<u>Proposed Action</u> Speckled dace— Low Little Colorado River sucker— Low Bluehead sucker— Low Rationale: • Stocking less predacious species • Movement is possible but likely a rare occurrence and only in low numbers due to management of the fishery to prevent escapement • Downstream stream channel conditions make movement unlikely <u>Reduced Stocking Alternative</u> Site not stocked

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Nelson Reservoir	This is an open system, and the lake spills when there is sufficient snowpack (it spilled in 5 of the past 10 years). Speckled dace and bluehead suckers are known from upstream and downstream in Nutrioso Creek, and Little Colorado River suckers are known from downstream in Nutrioso Creek. Upstream movement of fish is restricted because the inflow channel is not defined and the area is a shallow marsh. The Arizona Game and Fish Department (AGFD) manages the fishery to prevent escapement by stocking after the snowpack runoff has stopped. Annual surveys to detect stocked trout have been completed for 11 years, starting in 1996, and have detected five rainbow trout upstream (all in 2000) and 23 rainbow trout downstream. Rainbow trout are proposed for stocking and are established in Nutrioso Creek upstream of the reservoir and in at least one tributary downstream of the reservoir.	<u>Proposed Action</u> Speckled dace–Low Little Colorado River sucker–Low Bluehead sucker–Low Rationale: • Stocking less predacious species • Movement is probable but likely only in low numbers due to management of the fishery to prevent escapement • Several surveys have detected only limited numbers of stocked fish upstream and downstream <u>Reduced Stocking Alternative</u> Site not stocked
Becker Lake	Becker Lake is an off-channel reservoir that is filled with water from the Little Colorado River, and a gabion fish barrier is present upstream of the site that prevents fish movement upstream (back into the Little Colorado River). The lake does not spill; however, water is released for irrigation purposes through a 14- to 16-inch-diameter outlet pipe that flows into an open ditch and then into the Little Colorado River. The valve on the pipe is only opened 1 inch during releases to limit fish escapement. Only catchables and subcatchables are proposed for stocking, and trout do not reproduce in the lake. Little Colorado River suckers are known from this site and in downstream Little Colorado River. Limited numbers of Little Colorado River suckers have been captured during surveys at this site, indicating that this species is not abundant at this site (12 total in annual surveys, 2004–2008). Speckled dace and bluehead sucker are known from downstream Little Colorado River. Rainbow trout, Apache trout, and Arctic grayling are proposed for stocking. Rainbow trout likely do not persist outside the stocking season in downstream Little Colorado River, based on two surveys in 1993 and one in 1999 that detected only three rainbow trout total in that area despite established populations upstream. This is likely due to the high summer water temperatures. Apache and Arctic grayling have similar temperature requirements and likely would not survive downstream in Little Colorado River.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace–Low Bluehead sucker–Low Rationale: • Stocking less predacious species • Movement is possible but likely only in low numbers due to limited depth of releases Little Colorado River sucker–Moderate Rationale: • Stocking less predacious species • Stocking directly into Little Colorado River sucker–occupied areas • Based on surveys, Little Colorado River suckers are not abundant at site

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Lyman Reservoir	This is an open system. The last spill was in 1993; however, water for irrigation is released directly into the Little Colorado River. Little Colorado River suckers are known from this site and in downstream and upstream Little Colorado River. Little Colorado River suckers were captured during surveys of this site in 1996, 1997, and 1998; however, annual surveys from 2000 to 2003 and 2008 did not capture any Little Colorado River suckers. Speckled dace and bluehead suckers are known from approximately 10 miles downstream (mostly ephemeral stream channel) and approximately 1 mile upstream (perennial). Rainbow trout are proposed for stocking. Rainbow trout likely only persist through the stocking seasonal in the upstream Little Colorado River, based on two surveys in 1993 and one in 1999 that detected only three rainbow trout total in that area despite established populations upstream. This is likely due to the high summer water temperatures.	<u>Proposed Action</u> Speckled dace—Low Bluehead sucker—Low Rationale: • Movement probable • Stocking less predacious species that would not survive beyond the stocking season due to high water temperatures Little Colorado River sucker—Moderate Rationale: • Stocking less predacious species • Stocking directly into Little Colorado River sucker-occupied areas • Based on surveys, Little Colorado River suckers are not abundant at site <u>Reduced Stocking Alternative</u> Site not stocked
West Fork Little Colorado River		
White Mountain Reservoir	This is an open system that spills annually during summer irrigation releases. Speckled dace are known from downstream Hall Creek (approximately 3 miles of intermittent stream channel) and farther downstream in the Little Colorado River. Bluehead suckers and Little Colorado River suckers are known from downstream Little Colorado River (approximately 6 additional miles of perennial stream channel beyond Hall Creek). To reach the Little Colorado River, fish would have to move through several private small impoundments. A survey in 1999 found only two rainbow trout in lower Hall Creek downstream of the private impoundments, and these fish could have moved upstream from the Little Colorado River, where wild rainbow trout occur. Rainbow trout are proposed for stocking and have been stocked since 1969. Rainbow trout are established in the Little Colorado River near the confluence with Hall Creek.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace—Low Little Colorado River sucker—Low Bluehead sucker—Low Rationale: • Stocking less predacious species • Movement is possible but likely only in low numbers because of distance and impoundment barriers that would likely limit movement, based on survey results

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Lee Valley Lake	Lee Valley Creek below the dam at Lee Valley Lake enters the East Fork Little Colorado River, but water is not released into the creek out of the outlet valve. AGFD holds water rights at Lee Valley Lake and does not release this water for irrigation or other purposes. However, the lake spills during high-water events through an unnamed tributary of the West Fork Little Colorado River. Speckled dace and bluehead suckers are known from the West Fork Little Colorado River downstream of the Apache trout recovery area and the constructed fish barriers. It is approximately 4.5 miles downstream from the spillway at Lee Valley Lake to areas occupied by these two species. Speckled dace and bluehead suckers are also known from the East Fork Little Colorado River and farther downstream in the Little Colorado River. Little Colorado River suckers are known from River Reservoir and farther downstream in the Little Colorado River. Apache trout and Arctic grayling are proposed for stocking; both have been stocked since 1965. Arctic grayling have not been detected in the West Fork Little Colorado River during three complete chemical renovations in 2006 and several surveys from 1982 to 2003. Apache trout are established in the West Fork Little Colorado River above fish barriers that prevent nonnative species from moving upstream. Brown trout are established downstream of the barriers and would likely preclude Apache trout from establishing populations if Apache trout moved downstream of the barriers.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace–Low Little Colorado River sucker–Low Bluehead sucker–Low Rationale: • Stocking less predacious species • Movement is possible during annual spilling only • Surveys have not detected Arctic grayling in the West Fork Little Colorado River, suggesting that the species does not reach the West Fork Little Colorado River or does not survive there • The frequency and magnitude of Apache trout movement into the West Fork Little Colorado River is not known, but if they move, movement to SSFS-occupied areas would likely be in low numbers and limited to spring spill season and by the distance to SSFS-occupied areas • Apache trout is a native fish

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
West Fork Little Colorado River at Sheep's Crossing, West Fork Little Colorado River at Greer	Stocked fish have the ability to move upstream to the headwaters of the West Fork Little Colorado River, or downstream, over the fish barriers, into the lower West Fork Little Colorado River. These are open stream reaches, and speckled dace and bluehead suckers are known from the West Fork Little Colorado River downstream of the Apache trout recovery area and the constructed fish barriers in the Greer stocking reach. The Sheep's Crossing reach is approximately 2 miles upstream of the Little Colorado River Greer reach. These species are also known from tributary East Fork Little Colorado River, which meets the West Fork within the Greer Stocking reach. The Greer stocking reach extends up the East Fork for approximately 1 mile, and the SSFS are known from just upstream of the stocking reach. Little Colorado River suckers and bluehead suckers are known from River Reservoir (approximately 1 perennial mile downstream). All three species are known from Little Colorado River downstream of the River Reservoir. Population status of these SSFS in the River Reservoir and upstream watershed is not known. Apache trout are proposed for stocking at Sheep's Crossing, and Apache and rainbow trout at Greer. Rainbow trout have been stocked at Greer since 1936. Apache trout are established in West Fork Little Colorado River in the Sheep's Crossing reach above fish barriers that prevent nonnative species from moving upstream. Apache and rainbow trout could potentially establish a population in the Little Colorado River below barriers, but they have not, based on multiple surveys. Presumably established brown trout prohibit Apache trout or rainbow trout from establishing populations within the stocking reaches below the Apache trout recovery area.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace—Moderate Little Colorado River sucker—Moderate Bluehead sucker—Moderate Rationale: • Stocking less predacious species • Stocking into a speckled dace and bluehead sucker-occupied area, in the case of the Greer stocking reach, and into an open stream reach only (2 miles upstream from an occupied area) in the case of Sheep's Crossing • Little Colorado River suckers are found about 1 mile downstream of the Greer stocking reach • These SSFS are either not abundant or are not adequately surveyed in the West Fork Little Colorado River, the East Fork Little Colorado River, and River Reservoir

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
River Reservoir	This is an open system. The lake spills annually during high water and is connected perennially to the upper watershed. Little Colorado River suckers and bluehead suckers are known from this site. Speckled dace, bluehead suckers, and Little Colorado River suckers are known from downstream, and speckled dace and bluehead suckers are known from upstream. Rainbow trout and Apache trout are proposed for stocking. Apache trout established in Sheep's Crossing reach above barriers. Apache and rainbow trout could potentially establish a population in the Little Colorado River below barriers and above the River Reservoir but have not, based on surveys. Presumably, established brown trout prohibit Apache trout or rainbow trout from establishing populations in this area.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace—Moderate Little Colorado River sucker—Moderate Bluehead sucker—Moderate Rationale: • Stocking less predacious species but directly into Little Colorado River sucker and bluehead sucker areas • Movement to speckled dace—occupied areas probably in moderate to high numbers • The population status of these SSFS in River Reservoir and upstream is not known
Bunch Reservoir, Tunnel Reservoir	These are open systems. For Bunch Reservoir, stocked fish could move downstream (approximately 1.5 miles) into lower Hall Creek and into Little Colorado River below River Reservoir during summer irrigation releases; for Tunnel Reservoir, fish could move into River Reservoir during summer irrigation releases and then upstream or downstream from there. At both reservoirs, fish can also move upstream into the Little Colorado River above River Reservoir during winter/spring filling season. Speckled dace are known from downstream Hall Creek and the Little Colorado River below River Reservoir. Bluehead suckers and Little Colorado River suckers are known from River Reservoir and downstream Little Colorado River below River Reservoir. Speckled dace and bluehead suckers are known from upstream Little Colorado River. Rainbow trout and Apache trout are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace—Moderate Little Colorado River sucker—Moderate Bluehead sucker—Moderate Rationale: • Stocking less predacious species • Movement to SSFS areas is probable in moderate to high numbers due to summer irrigation releases • The population status of these SSFS in River Reservoir and upstream is not known

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Mexican Hay Lake	This is an open system but does not spill. Water could potentially be released for irrigation but currently is not, and irrigation is not planned. If water is released, stocked fish could move into the South Fork Little Colorado River and then into the Little Colorado River. Speckled dace and Little Colorado River suckers are known from the lower South Fork Little Colorado River approximately 5 miles downstream and from farther downstream in the Little Colorado River and tributaries. Bluehead suckers are known from farther downstream in the Little Colorado River and tributaries. Apache trout are proposed for stocking, and an Apache trout population is established downstream in the upper South Fork Little Colorado River.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace–Low Little Colorado River sucker–Low Bluehead sucker–Low Rationale: - Stocking less predacious species - Movement to SSFS-occupied areas is not likely because water is currently not released and there are no plans to do so in the future
Upper Little Colorado River Complex		
Little Ortega, Concho Lake	These are closed systems, and no SSFS are known from these sites. Concho Lake is an open lake, but the drainage system is closed.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated
White Mountain Complex		
Sponseller Lake	This is a closed system, and no SSFS are known from this site.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated
Silver Creek	This is an open stream reach, and speckled dace and bluehead suckers are known from the stocking reach. Little Colorado River suckers are known from farther downstream in lower Silver Creek. To reach Little Colorado River sucker–occupied areas, stocked fish would have to travel approximately 5.5 miles down to White Mountain Reservoir, through the reservoir, then approximately 20 miles downstream (interrupted/perennial). White Mountain Reservoir spills annually during spring runoff, and water is released through irrigation releases during summer. Rainbow trout and Apache trout are proposed for stocking. Trout do not reproduce in Silver Creek, possibly due to the warm water temperatures affecting egg development or limited spawning substrate (clean gravel), but trout can persist in upper Silver Creek (based on survey data). Trout would not likely persist in White Mountain Reservoir or downstream of the reservoir due to the high summer temperatures. Twelve surveys below White Mountain Lake from 1991 to 2009 have not detected trout.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace–Moderate Bluehead sucker–Moderate Rationale: - Stocking less predacious species, but directly into bluehead sucker and speckled dace–occupied reach - These SSFS are not abundant or are not adequately surveyed in a stocking reach to determine population status Little Colorado River sucker–Low Rationale: - Stocking less predacious species - Movement to Little Colorado River sucker–occupied areas is possible but not likely due to the extended distance and intervening reservoir

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Little Mormon Lake	This is an open site, and SSFS are known from downstream. Escaped fish would have to travel through Rocky Arroyo to White Mountain Lake and back upstream into Silver Creek or through the lake into lower Silver Creek. White Mountain Lake has an existing reproducing population of channel catfish. Catchable-sized channel catfish are proposed for stocking, and a grate is over the outflow, which would prevent the catchable-sized fish from escaping. It is not known whether channel catfish can reproduce at this site, but the lake has virtually no cover, which is preferred by catfish for spawning. If catfish were able to spawn in this lake, juvenile catfish might be able to escape through the grate structure during irrigation releases. Juvenile catfish would then have to travel 6 miles downstream to White Mountain Lake, then upstream into Silver Creek to reach speckled dace and bluehead sucker-occupied areas. Or they would travel through the dam at White Mountain Lake and approximately 14 miles downstream to additional areas occupied by bluehead suckers or an additional approximately 6 miles to reach areas occupied by Little Colorado River suckers. Channel catfish are established in White Mountain Lake.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace—Low Little Colorado River sucker—Low Bluehead sucker—Low Rationale: • Stocking more predacious species • Movement not likely due to a grate on outflow and stocking only catchable-sized catfish • Even if catfish were able to spawn (no known spawning habitat), channel catfish are established in White Mountain Reservoir, which is between this site and SSFS-occupied areas
Whipple Lake, Long Lake	These are open sites, but fish movement is only possible between lakes. No SSFS are known from these lakes.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated
Schoen's Complex		
Woodland Lake	This is an open site, and speckled dace and bluehead suckers are found downstream in Walnut Creek, which runs about 3 miles between Woodland Lake and Rainbow Lake. Woodland Lake spills annually during spring runoff and occasionally in the late summer, plus water is occasionally released into Walnut Creek for irrigation use downstream. Little Colorado River suckers are known from Silver Creek downstream of Fool Hollow Lake, the most downstream lake in this complex. (See analysis for Fool Hollow Lake.) Channel catfish, rainbow trout, and bluegill are proposed for stocking. Channel catfish have been stocked since 1978, and rainbow trout have been stocked since 1936. Bluegills have established in the lake from a 1986 stocking. None of the stocked species was detected in a 2009 survey of Walnut Creek. Three fingerling rainbow trout were detected in a 1997 survey. Walnut Creek is likely not suitable habitat for rainbow trout or bluegills; this is supported by surveys in 1997 (three rainbow trout) and 2009 (no rainbow trout captured). The small-stream habitat of Walnut Creek is not suitable habitat for channel catfish or bluegills.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace—Low Bluehead sucker—Low Rationale: • Stocking more predacious species • Movement is possible • A recent survey did not detect stocked species, and a 1997 survey detected only three rainbow trout despite a long stocking history of rainbow trout and channel catfish Little Colorado River sucker—No effects anticipated (See analysis for Fool Hollow Lake)

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Mountain Meadow Recreation Complex	This is an open site, and speckled dace and bluehead suckers are found downstream in Walnut Creek. The lake spills during spring runoff and heavy rain events. Little Colorado River suckers are known from Silver Creek downstream of Fool Hollow Lake (see analysis for Fool Hollow Lake). Rainbow trout and bluegill are proposed for stocking. Walnut Creek is likely not suitable habitat for stocked species, based on surveys in 1997 (three rainbow trout) and 2009 (no rainbow trout captured). Rainbow trout have been stocked upstream in Woodland Lake since 1936 and downstream in Rainbow Lake since 1933. The small-stream habitat of Walnut Creek is not suitable habitat for bluegills.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace—Low Bluehead sucker—Low Rationale: • Stocking less predacious species • Movement probable but stocked fish not likely to survive long-term due to inadequate habitat Little Colorado River sucker—No effects anticipated (See analysis for Fool Hollow Lake)
Rainbow Lake	This is an open site, and speckled dace and bluehead suckers are found upstream in Walnut Creek. There is an old hydroelectric power plant dam that serves as a partial barrier to fish passage upstream, but it is only 3 feet tall. Trout could leap the barrier during moderate or higher flows, but warm-water species would be prevented from moving upstream. Little Colorado River suckers are known from downstream in Silver Creek, downstream of Fool Hollow Lake (see analysis for Fool Hollow Lake). Channel catfish, rainbow trout, bluegill, and largemouth bass are proposed for stocking. Channel catfish have been stocked since 1965, and rainbow trout have been stocked since 1933. Channel catfish, rainbow trout, and bluegill were not detected in a 2009 survey of the SSFS-occupied reach. Largemouth bass were detected in low numbers but likely came from upstream Woodland Lake, where they are established.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace—Low Bluehead sucker—Low Rationale: • Stocking less and more predacious species • Movement to SSFS-occupied areas possible but not likely for all species except rainbow trout due to a 3-foot dam that likely serves as a barrier • Surveys in 2009 did not detect rainbow trout despite stocking rainbow trout since 1933 Little Colorado River sucker—No effects anticipated (See analysis for Fool Hollow Lake)
Scott's Reservoir, Show Low Lake, Show Low Creek, Fool Hollow Lake	These are open sites, and all sites drain into Fool Hollow Lake. Speckled dace and bluehead suckers are found upstream in Walnut Creek, but stocked fish are prevented from movement into this area by the dam at Rainbow Lake. Speckled dace, bluehead suckers, and Little Colorado River suckers are also found approximately 25 miles downstream (approximately 18 miles ephemeral and approximately 7 miles perennial) of Fool Hollow Lake in Silver Creek. There are also two large intervening flood-control dams designed to retain water; these are normally dry.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because of the extensive distance of the ephemeral stream channel and intervening flood-control structures that retain floodwater

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Chevelon Creek Complex		
Long Tom Tank	This tank has a small ephemeral watershed and no outlet. It is unknown whether the tank spills. If it did, it would spill into ephemeral Larson Canyon for 3.3 miles to ephemeral Long Tom Canyon for an additional 4.1 miles to Chevelon Creek, where speckled dace and Little Colorado River suckers are known. Bluehead suckers are known from Chevelon Creek and tributaries more than 10 miles farther downstream. Rainbow trout are proposed for stocking. Chevelon Creek has an established population of rainbow trout.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace–Low Little Colorado River sucker–Low Bluehead sucker–Low Rationale: • Stocking less predacious species • Movement to SSFS-occupied areas possible but probably only rarely (because of lack of outlet and lack of evidence indicating spilling) • More than 7 miles of ephemeral reach
Willow Springs Lake	This site spills annually during spring runoff into Willow Springs Canyon and then flows approximately 3.4 miles to Chevelon Creek. Speckled dace are known from Willow Springs Canyon, and speckled dace and Little Colorado River suckers are known from an additional 3.5 miles downstream in Chevelon Creek. Bluehead suckers are known from Chevelon Creek and tributaries more than 12 miles downstream. Surveys indicate speckled dace are numerous in Chevelon Creek. Rainbow trout are proposed for stocking and have been stocked since 1968. Stocked rainbow trout were not detected in the speckled dace–occupied habitat immediately below this lake during surveys in 1991 and 1995, though brook and brown trout (both stocked until 1995) were detected, indicating either lack of escapement or lack of persistence of rainbow trout from the stocking site. Any escaped trout may join a reproducing population of rainbow trout in Chevelon Creek.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace–Moderate Rationale: • Movement to occupied habitat is possible • Stocking less predaceous species Little Colorado River sucker–Low Rationale: • Movement is possible • Stocking less predacious species • Survey information • Distance to occupied habitats Bluehead sucker–Low Rationale: • Movement is possible • Stocking less predacious species • Distance to occupied habitats

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Woods Canyon	The site spills annually during spring runoff into Woods Canyon and then approximately 5.8 miles to Chevelon Creek. Speckled dace are known from Woods Canyon, and speckled dace and Little Colorado River suckers are known from an additional 3.5 miles downstream in Chevelon Creek. Bluehead suckers are known from Chevelon Creek and tributaries more than 12 miles downstream. Surveys indicate speckled dace are numerous in Chevelon Creek. Rainbow trout are proposed for stocking and have been stocked since 1957. Two rainbow trout were detected in 1995 in Woods Canyon; due to lack of spawning habitat, it is likely they came from the lake. Any escaped trout may join a reproducing population of rainbow trout in Chevelon Creek.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace—Moderate Rationale: • Movement is possible • Stocking less predaceous species • A survey in 1995 detected only two rainbow trout, indicating that they do not move downstream in high numbers Little Colorado River sucker—Low Rationale: • Movement is possible • Stocking less predacious species • Survey information • Distance to occupied habitats Bluehead sucker—Low Rationale: • Movement is possible • Stocking less predacious species • Distance to occupied habitats

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Chevelon Canyon Lake	This lake spills every year during spring runoff into Chevelon Creek. Fish can move downstream when the lake spills and upstream into Chevelon Creek. Speckled dace and Little Colorado River suckers occur at this site. Chevelon Creek upstream contains speckled dace and Little Colorado River suckers and immediately downstream has contained speckled dace, Little Colorado River suckers, and bluehead suckers. Annual surveys from 2004 to 2008 indicate that Little Colorado River suckers are abundant in the reservoir. The speckled dace population status in the lake is not known due to the lack of surveys targeted at small-bodied fish. Rainbow trout (stocked since 1966) and Arctic grayling (stocked three times since 1968) are proposed for stocking. Several surveys have not detected Arctic grayling upstream or downstream. Rainbow trout are established in the stream above Chevelon Canyon Lake and have been detected during several surveys in downstream Chevelon Creek (present in only five of 60 date/location sampling events, total N=7 with two of the five detections reporting them as “present”).	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace—Moderate Little Colorado River sucker—Low Rationale: • Stocking less predacious species • Stocking directly into occupied habitat • Speckled dace population status is not known • Little Colorado River suckers appear to be abundant in the reservoir, based on surveys, despite stocking these two species since the 1960s Bluehead sucker—Low Rationale: • Stocking less predacious species • SSFS are located downstream from lake • Movement is probable but only when the site spills • Data indicate stocked species are rare, which indicates limited movement or limited survival once stocked species move

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Black Canyon Complex		
Black Canyon Lake	This site spills during spring runoff only during years with a heavy snowpack or heavy winter precipitation. The downstream reach is ephemeral for more than 50 miles before it reaches Chevelon Creek. Little Colorado River suckers and bluehead suckers are known from this site and downstream in Chevelon Creek. Speckled dace are known from downstream Chevelon Creek. Rainbow trout and brook trout are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> Little Colorado River sucker–Moderate Bluehead sucker–Moderate Rationale: • Stocking less predacious species • Stocking directly into SSFS-occupied habitat • Little Colorado River suckers and bluehead suckers are not abundant in reservoir Speckled dace–No effects anticipated because of extensive distance of ephemeral stream channel to speckled dace–occupied areas.
Clear Creek Complex		
C.C. Cragin Reservoir	This lake spilled in three of the past 10 years. Water is also released continuously through a 2-inch pipe. Water releases and spills go into East Clear Creek, which downstream turns into Clear Creek. Stocked fish can also move into the upstream watershed. Speckled dace, bluehead suckers, and Little Colorado River suckers are known from immediately downstream and upstream of this site. Little Colorado River suckers are known from this site. Rainbow trout are proposed for stocking and have been stocked since 1965. One of the upper tributaries has been surveyed annually from 2003 to 2009; other tributaries were surveyed from 2008 to 2009, and no rainbow trout were detected. Several surveys downstream have only detected one stocked rainbow trout (stocked fish were marked), but wild rainbow trout were present in higher numbers.	<u>Proposed Action</u> Little Colorado River sucker–Moderate Rationale: • Stocking less predacious species • Stocking directly into Little Colorado River sucker–occupied habitat • Little Colorado River suckers are not abundant in reservoir Speckled dace–Low Bluehead sucker–Low Rationale: • Stocking less predacious species • Survey data indicate low movement of stocked fish into areas occupied by these SSFS or low survival of fish if they do move <u>Reduced Stocking Alternative</u> Site not stocked

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Knoll Lake	This lake spills during spring runoff into East Leonard Canyon, then Leonard Canyon, and then into East Clear Creek. Bluehead suckers and speckled dace are known from the reservoir (zero to three bluehead suckers captured during surveys and zero to 97 speckled dace captured, but survey methods did not target small-bodied fish). Bluehead suckers, speckled dace, and Little Colorado River suckers are known throughout the downstream watershed. Rainbow trout are proposed for stocking and have been stocked since 1963. East Clear Creek and Leonard Canyon maintain reproducing rainbow trout populations. Monitoring of Dines Tank in 2006 (downstream tank in the mainstem Leonard Canyon that contains all these SSFS) and West Leonard Creek upstream of the confluence with East Leonard Creek did not detect stocked rainbow trout.	<u>Proposed Action</u> Speckled dace–Moderate Bluehead sucker–Moderate Rationale: • Stocking less predacious species • Stocking directly into bluehead sucker and speckled dace–occupied habitat • These species are not abundant in reservoir or are not adequately surveyed Little Colorado River sucker–Low Rationale: • Stocking less predacious species • Movement of stocked fish to SSFS-occupied areas is possible due to annual spills • Downstream monitoring has not detected stocked rainbow trout, suggesting that if movement occurs, it is in low numbers or fish do not survive downstream <u>Reduced Stocking Alternative</u> Site not stocked

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Bear Canyon Lake	This lake spills annually during spring runoff into mostly ephemeral Bear Canyon for 4.2 miles and then into Willow Creek. Fish could move downstream during this period. Bluehead suckers, Little Colorado River suckers, and speckled dace are known from 3.5 miles downstream in Willow Creek and more than 20 miles farther downstream in Clear Creek. Rainbow trout (stocked since 1984) and Arctic grayling (stocked since 1965) are proposed for stocking. A survey of Bear Canyon in 1997 captured one rainbow trout and no Arctic grayling, and four surveys from 1991 to 2009 of Willow Creek did not detect any rainbow trout or Arctic grayling.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace–Low Little Colorado River sucker–Low Bluehead sucker–Low Rationale: • Stocking less predacious species • Movement of stocked fish to SSFS-occupied areas is possible, based on annual spilling • A survey detected one rainbow trout below the dam; however, the limited number (only one) of rainbow trout in surveys indicates that movement is in low numbers or fish do not survive when they move

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Clear Creek Reservoir		
Clear Creek Reservoir	This lake spills annually during spring runoff, and water is released annually during summer irrigation into Clear Creek and then into the Little Colorado River. Fish could potentially move downstream into the Little Colorado River and tributaries. Stocked fish could also move upstream during spring runoff into Clear Creek. Little Colorado River suckers are known from the reservoir (present in some surveys but not all) and throughout the upstream watershed and in an adjacent tributary of the Little Colorado River—Chevelon Creek. Bluehead suckers and speckled dace are known from upstream Clear Creek and tributaries (more than 32 miles upstream) and in an adjacent tributary of the Little Colorado River, Chevelon Creek (0.5 mile to Little Colorado River and then approximately 9.5 miles upstream to confluence with Chevelon Creek; and there is a diversion structure 1.7 miles upstream in Chevelon Creek that serves as a likely obstruction, but not complete barrier, to fish movement upstream). Rainbow trout are proposed for stocking.	<u>Proposed Action</u> Speckled dace—Low Bluehead sucker—Low Rationale: • Stocking less predacious species • Movement of stocked fish to these SSFS is not likely due to the extensive distance to upstream populations and the distance and partial barrier to adjacent tributary populations Little Colorado River sucker—Moderate Rationale: • Stocking less predacious species • Stocking directly into Little Colorado River sucker—occupied habitat • Based on survey data, this species is not abundant in the reservoir <u>Reduced Stocking Alternative</u> Site not stocked
Jack's Canyon Complex		
Soldiers Annex, Long Lake (Diablo), Soldiers Lake, Tremaine Lake	These lakes are open. Bluehead suckers, speckled dace, and Little Colorado River suckers are known from the Little Colorado River and tributaries. To reach SSFS-occupied areas, stocked fish would have to move more than 10 miles of a complex series of ditches and tanks to reach Diablo Canyon, which is ephemeral for 46 miles before entering the Little Colorado River.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because the extensive distance of the ephemeral streambed and the complex system of ditches and tanks make movement of stocked fish to SSFS-occupied areas highly unlikely.

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effectsⁱ	Magnitude of Potential Effects
Canyon Diablo Complex		
Kinnikinick Lake, Morton Lake, Mud Tank, Frances Short Pond	All of these sites drain into Canyon Diablo and into the Little Colorado River. The nearest SSFS are in the Little Colorado River portion of the Grand Canyon, more than 100 miles downstream. In this location, speckled dace, bluehead suckers, and flannemouth suckers are present. SSFS are also present in the lower portion of Clear Creek, which is 40 miles or more downstream to the Little Colorado River and then back upstream 46 miles, most of which is ephemeral or interrupted perennial stream channel. In this location, only Little Colorado River suckers and speckled dace are known to occur.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because the extreme distance and ephemeral nature of connecting channels make movement of stocked fish to SSFS-occupied areas highly unlikely.
Ashurst Lake, Coconino Lake	The lakes are open but water connects only between them and into a dead-end meadow and, therefore, the system is a closed system. SSFS are not known from this system.	<u>Proposed Action</u> No effects anticipated <u>Reduced Stocking Alternative</u> Sites not stocked
Walnut Creek Complex		
Mormon Lodge Pond, Marshall Lake, Upper Lake Mary, Lower Lake Mary	The Walnut Creek Complex is considered a closed system. No SSFS occur in this system.	<u>Proposed Action</u> No effects anticipated <u>Reduced Stocking Alternative</u> Sites not stocked
WHITEWATER DRAW-WILLCOX PLAYA (1 site)		
Riggs Flat Subcatchment		
Riggs Flat	Any flow leaving Riggs Flat Lake terminates in sheet flow into the Willcox Playa and is not hydrologically connected to any drainages outside of the Willcox Playa; therefore, Riggs Lake is considered a closed system. There are no SSFS located in the subcatchment.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
GILA RIVER WATERSHED (13 sites)		
Luna Lake Subcatchment		
Luna Lake	This is an open lake that spills during precipitation events, primarily in spring during snowmelt and irrigation releases. Fish can move downstream into the San Francisco River. SSFS are not known from upstream of the lake. Speckled dace and desert suckers are known from the river reach immediately below the lake to the Arizona border, a 2.5-mile reach. All four species are present farther downstream, in the Tularosa River below Reserve, New Mexico. It is 30 miles from the lake to the Tularosa/San Francisco confluence, and then back upstream in the Tularosa 10 miles to New Mexico's annual monitoring site. Rainbow trout and cutthroat trout are proposed for stocking. Cutthroat trout have not been detected in the San Francisco River at either of New Mexico's two annual monitoring sites in 20 years of surveys. Monitoring sites are in the Tularosa River (previously mentioned) and at Glenwood, New Mexico, more than 60 miles downstream from the stocked lake. Rainbow trout were collected below the lake in Arizona during several years in the area where speckled dace and desert suckers were detected in 2009. Rainbow trout were also caught in New Mexico in one of 21 years of annual surveys at the Tularosa monitoring site and in several years at the Glenwood site. There are wild rainbow trout populations in tributaries of the San Francisco River and Tularosa River, where the trout may have originated. Water temperatures in the San Francisco River downstream of Reserve, New Mexico (about 27 miles downstream from the lake), have been described as unsuitable for year-round trout survival.	<u>Proposed Action</u> Speckled dace—Moderate Desert sucker—Moderate Rationale: • Stocking less predacious species • Stocking directly upstream of occupied habitat • Spills have been documented and trout have been collected in occupied areas immediately below the lake Sonora sucker—Low Longfin dace—Low Rationale: • Movement is possible based on hydrological connectivity • If they do move, it is likely in low numbers due to extensive distance • Surveys have not detected cutthroat and only detected rainbow trout in one of 21 annual surveys in the nearest monitoring location • Stocking less predacious species that, if they moved downstream, would not survive outside the stocking season due to high water temperatures <u>Reduced Stocking Alternative</u> Site not stocked
Upper Gila Subcatchment		
Cluff Pond #3, Graham County Fairgrounds, Roper Lake, Dankworth Pond, Frye Mesa Lake	These are closed systems, and no SSFS are known from these sites. Cluff Pond #3 is an open pond, but if it were to spill, the runoff would be captured by flood control and canal structures downstream in Ash Creek, making this a closed drainage.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Kearny Subcatchment		
Kearny Lake	Fish movement downstream into the Gila River could only occur through a screened siphon pipe, but the water level is maintained below the siphon by the Town of Kearny to minimize water loss. Stocking includes only catchable-sized fish that cannot pass through the screen. Golden algae typically create a fish kill annually. Only young fish could pass through the screen, and no reproduction has been documented since golden algae were identified at this site. SSFS are present in the downstream Gila River as near as a quarter-mile from the lake. Rainbow trout, largemouth bass, channel catfish, redear sunfish, and bluegill are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> Longfin dace–Low Sonora sucker–Low Desert sucker–Low Rationale: • Stocking more predacious species • Movement not likely due to structure and management of the lake Speckled dace–No effects anticipatedⁱⁱ
Agua Fria Subcatchment		
Lynx Lake	Lynx Lake has the potential for fish movement out of the lake into the ephemeral Lynx Creek, then into the Agua Fria River when the stream flows during high-precipitation events. However, Lynx Creek is highly modified to gravel operations, and any flow would travel through mining ponds before reaching the Agua Fria River, and flow conditions would consist of high turbidity and sediment loads. Because of diversions and a sandy gradient that fans out flowing water, Lynx Creek rarely connects to the Agua Fria. SSFS are found in the Agua Fria River in perennial segments of the otherwise ephemeral river in downstream tributaries, and longfin dace and desert suckers are found in mainstem habitats. Speckled dace are historically found at the confluence of Lynx Creek and the Agua Fria River. The nearest longfin dace–occupied area is 14 miles of perennial and interrupted perennial channel downstream. The nearest desert sucker–occupied area is in Ash Creek, a tributary 31 miles downstream through ephemeral, perennial, and interrupted perennial channel. Survey data indicate that SSFS populations are widespread and abundant in perennial habitat, and no stocked species have been detected. Largemouth bass (stocked since 2006), bluegill (stocked since 1992), white crappie, rainbow trout (stocked since 1963), brook trout (stocked since 1964), brown trout (stocked since 1971), cutthroat trout (stocked since 1972), and channel catfish stocked since 2004) are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> Longfin dace–Low Speckled dace–Low Desert sucker–Low Rationale: • Stocking more predacious species • Movement to SSFS-occupied areas could be possible; however, the ephemeral connectivity, diversions, and the conditions in the gravel operations below the lakes would limit the ability and number of stocked species reaching the Agua Fria River Sonora sucker–No effects anticipatedⁱⁱ

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Fain Lake	Fain Lake has the potential for fish movement out of the lake into the ephemeral Lynx Creek, then into the Agua Fria River. Overflow occurs by water topping the dam and dropping an estimated 60 feet onto bedrock and boulders below. SSFS are found in the Agua Fria River in perennial segments of the otherwise ephemeral river in downstream tributaries, and longfin dace and desert suckers are found in mainstem habitats. Speckled dace are historically found at the confluence of Lynx Creek and the Agua Fria River. The nearest longfin dace are 10 miles downstream, and the nearest desert suckers are in Ash Creek, a tributary joining 27 miles downstream. Survey data indicate that SSFS populations are widespread and abundant in perennial habitat, and no stocked species have been detected. Largemouth bass, bluegill (stocked since 2007), white crappie, rainbow trout (stocked since 1997), brook trout (stocked since 2007), brown trout, cutthroat trout, and channel catfish (stocked since 1997) are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> Longfin dace–Low Speckled dace–Low Desert sucker–Low Rationale: • Stocking more predacious species • Movement to SSFS-occupied areas could be possible • The egress from the lake and the ephemeral connectivity, diversions, and the conditions in the gravel operations below the lakes would limit the ability and number of stocked species reaching the Agua Fria River • Movement to other SSFS-occupied areas is presumed to be not possible due to stream conditions and because of survey data indicating these SSFS are abundant in occupied habitat Sonora sucker–No effects anticipatedⁱⁱ
Horsethief Basin Lake	This lake has a small watershed and relatively large capacity and is presumed not to spill. No SSFS are known from these sites.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated
Lower Gila-Yuma Subcatchment		
Wellton Golf Course, Fortuna Pond, Redondo Lake	No SSFS are known from the subcatchment.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
SALT RIVER SUBCATCHMENT (45 sites)		
Black River Complex		
Big Lake, Crescent Lake	These are open lakes that can spill. Big Lake has not spilled since 1993, and Crescent Lake has not spilled in the past 15 years. When these lakes do spill, fish could travel down an unnamed tributary of the North Fork of the East Fork of the Black River. Sonora suckers, desert suckers, and speckled dace are known from the unnamed tributary 3.5 to 4.0 miles downstream of the lakes and farther downstream. Rainbow trout, cutthroat trout, brook trout, and Apache trout are proposed for stocking into Big Lake, and rainbow trout and brook trout are proposed for stocking into Crescent Lake. All of these species have been stocked into both lakes since 1930 to 1940. Brook trout are established in a downstream tributary, Bone Yard Creek, and rainbow/Apache trout hybrids are established in the upper North Fork Black River based on several surveys. Speckled dace and desert suckers are abundant in the North Fork of the East Fork, and Sonora suckers are present but less abundant based on several surveys in 2000 and 2001. Speckled dace are abundant in the unnamed tributary, and Sonora suckers are present but less abundant, based on a survey in 2000. These same surveys did not detect any of the stocked trout species. However, a survey of the unnamed tributary in 1995 captured one rainbow trout that likely came from Big Lake or Crescent Lake.	<u>Proposed Action</u> Desert sucker—Low Sonora sucker—Low Speckled dace—Low Rationale: - Stocking less predaceous species that could move but would only do so rarely due to infrequent spilling - Several surveys of an unnamed tributary and the North Fork and the East Fork of the Black River only detected one stocked trout Longfin dace—No effects anticipatedⁱⁱⁱ <u>Reduced Stocking Alternative</u> Big Lake not stocked; effects from stocking Crescent Lake same as Proposed Action.

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
East Fork Black River	This is an open stream reach, and speckled dace, desert suckers, and Sonora suckers occupy the stocked reach. Apache and rainbow trout are proposed for stocking. Apache trout have been stocked in this reach since 1996, and rainbow trout have been stocked since 1933. Rainbow/Apache trout hybrids are established in the upper North Fork Black River, based on several surveys. Speckled dace are abundant in stocking reach, and desert suckers and Sonora suckers are present but less abundant, based on surveys in 1988, 1996, and 2009. These surveys also have found few stocked trout outside of the stocking reach and no stocked trout that have survived beyond 2 months after stocking.	<u>Proposed Action</u> Speckled dace—Low Rationale: • Stocking less predaceous species directly into SSFS-occupied areas • Speckled dace are abundant despite stocking rainbow trout since 1933 and Apache trout since 1996 Desert sucker—Moderate Sonora sucker—Moderate Rationale: • Stocking less predaceous species directly into SSFS-occupied areas • These two species are less abundant Longfin dace—No effects anticipatedⁱⁱ <u>Reduced Stocking Alternative</u> Site not stocked

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
West Fork Black River	This is an open stream reach, and speckled dace, desert suckers, and Sonora suckers occupy the reach stocked. Apache trout are proposed for stocking and have been stocked since at least 1995. Records state that “native trout” were stocked beginning in 1938; these were likely Apache trout. Numerous tributary streams maintain recovery populations of Apache trout, but they are not established in the stocking reach. Speckled dace are abundant in stocking reach, and desert suckers and Sonora suckers are present but less abundant, based on surveys in 1988, 1989, and 2002. These surveys also have found few stocked trout downstream of the stocking reach, with only two rainbow trout captured in 1989 (rainbow trout were stocked then) and one Apache trout in 2002.	<u>Proposed Action</u> Speckled dace–Low Rationale: • Stocking less predaceous species directly into SSFS-occupied areas • Speckled dace are abundant despite stocking rainbow trout since 1933 and Apache trout since 1996 Desert sucker–Moderate Sonora sucker–Moderate Rationale: • Stocking less predaceous species directly into SSFS-occupied areas • These two species are less abundant Longfin dace–No effects anticipatedⁱⁱ <u>Reduced Stocking Alternative</u> Site not stocked

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Ackre Lake	This is an open lake that spills nearly every spring. When the lake is spilling, the upper portion of Fish Creek has continuous flow, and stocked fish can potentially move into Fish Creek and beyond. Arctic grayling and Apache trout are proposed for stocking. Arctic grayling have been stocked since 1987 and Apache trout since 1997. Pure Apache trout and speckled dace were restocked into Fish Creek following renovation in 2004 and 2005 and have persisted since. Sonora suckers and desert suckers are found farther downstream in the Black River (approximately 12 miles downstream of the lake). Only two Arctic grayling have been documented in Fish Creek—one in the late 1980s and one during a recent visual survey. Both were found in the upper portion of Fish Creek, not far from the lake. No grayling have ever been documented in the Black River, the East Fork Black River, or the West Fork Black River, based on several surveys.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace—Low Desert sucker—Low Sonora sucker—Low Rationale: • Stocking less predaceous species • Movement to SSFS-occupied areas is possible • Arctic grayling movement only occurs in limited numbers, based on several surveys • Movement of Apache trout is not known, but they are established and coexisting with speckled dace in Fish Creek • Apache trout could move downstream into the Black River, but this would not be in high numbers due to the distance (approximately 12 miles) Longfin dace—No effects anticipatedⁱⁱ

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Canyon Creek Complex		
Canyon Creek	This is an open stream reach, and speckled dace and desert suckers occupy the reach. Sonora suckers and longfin dace are found downstream of the stocked reach in the Salt River (approximately 32 perennial miles downstream of the stocking reach), where movement is possible. If fish do move, they would likely only be in low numbers due to the extensive distance. Sonora suckers and longfin dace may be present closer in portions of the Canyon Creek drainage that are on the White Mountain Apache Indian Reservation, but occurrence data are not available. Rainbow and brown trout are proposed for stocking. Rainbow trout have been stocked since 1933, and brown trout have been stocked since 1948. Brown trout successfully reproduce in Canyon Creek. Rainbow trout may also be reproducing and maintaining themselves in low abundance. Speckled dace and desert suckers are abundant in Canyon Creek, based on several surveys. No trout have been detected in the Salt River near the confluence since 1986, despite numerous surveys.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace–Low Desert sucker–Low Rationale: • Stocking more predaceous species into SSFS-occupied habitat • Rainbow trout have been stocked since 1933 and brown trout since 1948 • Speckled dace and desert suckers have maintained abundant populations in the reach stocked Sonora sucker–Low Longfin dace–Low Rationale: • Stocking more predaceous species into SSFS-occupied habitat • Movement is possible but would only be in low numbers due to extensive distance and because of surveys not detecting trout since 1986

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Workman Creek Complex		
Workman Creek	This is an open stream reach, and Sonora suckers, speckled dace, desert suckers, and longfin dace are present downstream (more than 3 miles perennial to longfin dace and more than 5 miles perennial to other SSFS). Rainbow trout are proposed for stocking and have been stocked since 1939. Wild populations of rainbow trout exist in Workman Creek and tributaries (Reynolds Creek), and downstream in Salome Creek.	<u>Proposed Action</u> Longfin dace–Moderate Sonora sucker–Moderate Speckled dace–Moderate Desert sucker–Moderate Rationale: • Stocking less predaceous species • Movement is probable, and possibly in moderate to high numbers, due to close proximity to SSFS populations • Status of SSFS populations in these areas is not known <u>Reduced Stocking Alternative</u> Site not stocked

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Tonto Creek Complex		
Tonto Creek, Christopher Creek	These are open stream reaches, and longfin dace and desert suckers occupy the reaches. Speckled dace and Sonora suckers are found downstream in middle Tonto Creek downstream of Hell's Gate, and speckled dace are also found in a downstream tributary of Haigler Creek. Stocked fish movement to the middle Tonto Creek is possible but likely in low numbers, based on several surveys in which only one rainbow trout was detected below Hell's Gate. Stocked fish movement to speckled dace-occupied areas in Haigler Creek could be in moderate numbers but not likely in high numbers due to the distance (more than 10 miles). Rainbow trout are proposed for stocking and have been stocked into these reaches since 1933. Wild rainbow trout populations persist in upper Tonto Creek and Christopher Creek in the stocked reaches.	<u>Proposed Action</u> Speckled dace—Low Sonora sucker—Low Rationale: • Stocking less predaceous species • Movement is possible in moderate numbers to Haigler Creek because of the perennial connection and the distance (more than 10 miles) • Movement to other SSFS-occupied areas would likely be in low numbers based on surveys that have detected only one rainbow trout below Hell's Gate in the middle Tonto Creek Longfin dace—Moderate Desert sucker—Moderate Rationale: • Stocking less predaceous species but directly into SSFS-occupied areas • These SSFS are not abundant or are not adequately surveyed to determine population status <u>Reduced Stocking Alternative</u> Site not stocked

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Haigler Creek	This is an open stream reach, and speckled dace, desert suckers, and longfin dace occupy the reach. Sonora suckers are found downstream of the stocked reach in middle Tonto Creek downstream of Hell's Gate, where fish movement is possible but likely in low numbers because surveys have only detected one rainbow trout. Rainbow trout are proposed for stocking and have been stocked in this reach since 1933. Wild populations of rainbow trout persist in Haigler Creek and downstream in Tonto Creek.	<u>Proposed Action</u> Sonora sucker–Low Rationale: • Stocking less predaceous species • Movement is possible but likely in low numbers, as evident by surveys only detecting one rainbow trout downstream of Hell's Gate near Sonora sucker–occupied areas Speckled dace–Moderate Desert sucker–Moderate Longfin dace–Moderate Rationale: • Stocking less predaceous species directly into SSFS-occupied areas • These SSFS are not abundant or are not adequately surveyed to determine population status <u>Reduced Stocking Alternative</u> Site not stocked

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ¹	Magnitude of Potential Effects
Lower Salt River Complex		
Apache Lake, Canyon Lake, Saguaro Lake	These are open systems that have spilled in two of the past 20 years. The lakes are a series of reservoirs in the Lower Salt River, with Apache Lake being the farthest upstream, followed by Canyon Lake and Saguaro Lake. Fish movement is possible over the spillways but is unlikely through deep water turbine releases. Speckled dace are known from subcatchment only upstream of Roosevelt Lake (upstream of Apache Lake). From Apache Lake, stocked fish would have to travel upstream through the dam at Roosevelt Lake to reach speckled dace-occupied areas. For fish stocked in Canyon and Saguaro lakes, they would have to travel upstream through additional dams. The water management at these reservoirs includes off-peak power pump-back. Therefore, movement upstream is possible but fish movement to speckled dace areas is highly unlikely because fish moving upstream would have to travel through Roosevelt Lake and continue upstream. Desert suckers, Sonora suckers, and longfin dace are known from downstream in the Lower Salt River and tributaries below Saguaro Lake, the most downstream reservoir of the three. Longfin dace are also known from Fish Creek, a tributary of Canyon Lake, and Cottonwood Creek, a tributary of Saguaro Lake. There is a waterfall on Fish Creek approximately 5 miles upstream from Canyon Lake that is a barrier to upstream fish movement (C. Gill, personal communication).¹ Longfin dace occurrence records are from immediately upstream of this waterfall, so stocked fish would not be able to reach this area. To reach longfin dace in Cottonwood Creek, stocked fish would have to travel upstream through an approximately 2.5-mile ephemeral reach; however, several surveys conducted since 1976 have not detected nonnative species near longfin dace-occupied areas. More and less predacious species are proposed for stocking: walleye, channel catfish, smallmouth bass, largemouth bass, black crappie, and rainbow trout. Channel catfish, smallmouth bass, largemouth bass, and black crappie are established in reservoirs, as are flathead catfish, yellow bass, green sunfish, and yellow bullhead.	<u>Proposed Action</u> Longfin dace—Low Desert sucker—Low Sonora sucker—Low Rationale: • Movement of stocked species into SSFS-occupied areas in the Lower Salt River is possible, but based on spill information, movement would be expected to be infrequent • All stocked species are established downstream in the Lower Salt River (largemouth bass, channel catfish, and smallmouth bass) or are not likely to establish, based on habitat and survey information (walleye, rainbow trout, and black crappie) • Stocked species are not likely to reach longfin dace in the two occupied tributaries to these reservoirs, based on ephemeral channel characteristics, the waterfall barrier, and survey data • Longfin from these areas could potentially wash downstream into reservoirs during high-flow events, but individuals that move into these locations would not be able to get back upstream, would no longer be part of a viable population, and are not expected to survive long due to the established robust populations of nonnative predators in the reservoir

¹ C. Gill, AGFD Fisheries Biologist, personal communication via e-mail to David Boyarski, AGFD Gila River Basin Native Fishes Conservation Coordinator, on February 15, 2011.

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Apache Lake, Canyon Lake, Saguaro Lake (continued)	Largemouth bass, smallmouth bass, and channel catfish are established in the Lower Salt River. Black crappie are not likely to survive in the Lower Salt River because they require lake- or pond-like habitat that is not present downstream of the reservoirs. Rainbow trout are not likely to survive outside the stocking season due to the warm summer water temperatures in the Lower Salt River. Walleye could potentially survive longer but have not been documented to reproduce in these reservoirs or the Lower Salt River. Annual surveys of the Lower Salt River have only documented rare occurrences of walleye.	Speckled dace— Low because movement to speckled dace—occupied areas is highly unlikely due to barriers of upstream dams and reservoirs <u>Reduced Stocking Alternative</u> Canyon Lake and Saguaro Lake not stocked; effects from stocking Apache Lake same as Proposed Action
Lower Salt River	This is an open river reach with barriers that limit upstream fish movement in Salt River (Stewart Mountain Dam at Saguaro Lake). Stocked trout movement is possible into the Verde River and upstream to Bartlett Dam. Fish movement is also possible downstream into two Salt River Project canals. Longfin dace, desert suckers, and Sonora suckers occupy stocking reach. Speckled dace are known from subcatchment but only in the upper portion of the Verde River near Bartlett Lake. Stocked fish would have to travel through 17 miles of river to reach speckled dace—occupied areas. Rainbow trout are proposed for stocking and are not likely to persist outside the stocking season due to the high summer water temperatures. Largemouth bass, channel catfish, smallmouth bass, flathead catfish, yellow bullhead, and green sunfish are established in the Lower Salt River.	<u>Proposed Action</u> Speckled dace— Low • Less predacious species are stocked • Stocked trout are not likely to access speckled dace habitat in high numbers because of the distance from the stocking reach Desert sucker— Moderate Sonora sucker— Moderate Longfin dace— Moderate Rationale: • Stocking less predacious species that are not likely to persist • Stocking directly into SSFS-occupied areas • Population status of these SSFS is not known <u>Reduced Stocking Alternative</u> Site not stocked

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Phoenix Metro Complex		
Chaparral Lake, Papago Ponds, Eldorado Lakes, Indian School Lake, Vista del Camino (McKellips Lake), Tempe Papago Lake, Tempe Town Lake	These lakes are open systems and are part of the Indian Bend Wash floodway. When they spill, they flow into the Salt River channel at the upper end of Tempe Town Lake, or drain into the Salt River channel immediately below Tempe Town Lake. During flood conditions, stocked fish could move into these two areas. Fish that move into Tempe Town Lake would be prevented from moving upstream by an inflatable dam at the upper end of Tempe Town Lake (there are dams at both ends of the lake). This dam is partially taken down during flood conditions, but the high flows associated with flood conditions would make fish movement upstream at that time unlikely. Fish in Tempe Town Lake and those from systems that flow into the Salt River channel below Tempe Town Lake could move downstream during flood conditions and possibly could travel as far as the Gila River confluence, where there is perennial water. However, SSFS are not known from downstream in the lower Gila River. Desert suckers and Sonora suckers are known from the canals around the Phoenix Metro area as a result of entrainment in, and transport through, the canal system from upstream locations. They may reach many of the urban lakes themselves, based on surveys in 2004, 2006, 2007, 2008, and 2009; however, speckled dace and longfin dace were not found during these surveys. Once in the canal system, the SSFS cannot get back upstream and are hence no longer part of viable populations. More and less predacious species are proposed for stocking: channel catfish, largemouth bass, bluegill, redear sunfish, and rainbow trout. These lakes have various nonnative predators established that are augmented on a regular basis from the canal system.	<u>Proposed Action</u> Desert sucker–Low Sonora sucker–Low Rationale: - Stocked fish could affect SSFS, but only if SSFS move into sites from canals or upstream locations - Individuals that move into these locations are no longer part of a viable population of SSFS and are not expected to survive long due to the established robust populations of nonnative predators within the canal system or lakes Longfin dace–No effects anticipated Speckled dace–No effects anticipated Rationale: - Longfin dace and speckled dace are not known from the canal system or these sites, based on surveys of canals <u>Reduced Stocking Alternative</u> Sites not stocked

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Phoenix Metro Complex closed systems ^{iv}	These lakes are closed systems (no outflow). Some are filled via the Salt River Project canal system, and desert suckers and Sonora suckers are known from the canals around the Phoenix Metro area as a result of entrainment in, and transport through, the canal system from upstream locations. Desert suckers and Sonora suckers may reach many of the urban lakes themselves, based on surveys in 2004, 2006, 2007, 2008, and 2009; however, speckled dace and longfin dace were not found during these surveys. Once in the canal system, the SSFS cannot get back upstream and are therefore no longer part of viable populations. More species and less predacious species are proposed for stocking: rainbow trout, channel catfish, bluegill, redear sunfish, and largemouth bass. These lakes have various nonnative predators established. For those systems with inflow from the canal, fish immigrate from the canal system on a regular basis.	<u>Proposed Action</u> Desert sucker–Low Sonora sucker–Low Rationale: • Stocked fish could affect SSFS only if SSFS move into sites from canals or upstream locations • The individuals that move into these locations are no longer part of a viable population of SSFS and are not expected to survive long due to the established robust populations of nonnative predators within the canal system and lakes Longfin dace–No effects anticipated Speckled dace–No effects anticipated Rationale: • Longfin dace and speckled dace are not known from the canal system or these sites, based on surveys of canals <u>Reduced Stocking Alternative</u> Alvord Lake, Cortez Lake, Desert Breeze Lake, Desert West Lake, Encanto Lake, Evelyn Hallman Pond, Kiwanis Lake, Rio Vista Pond, Riverview Lake, Steele Indian School Pond, Bonsall Park Lake, Discovery District Park Lakes, Granada Park Lakes, McQueen Park Lake, Roadrunner Park Lake, Selleh Park Lake, and Water Treatment Lake not stocked; effects from stocking remaining sites same as Proposed Action

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
SANTA CRUZ RIVER SUBCATCHMENT (11 sites)		
Upper Santa Cruz River Complex		
Parker Canyon Lake	The spill history is not known, but engineers estimate that the lake will fill 3 out of every 10 years (though it will not necessarily spill every time). There is potential for fish to move during a spill from Parker Canyon Lake into Parker Canyon. Parker Canyon is perennial for the first mile below the lake, then 10.5 of the next 11 miles are ephemeral to its confluence with the Santa Cruz River in Mexico. Longfin dace were found between the lake and the Mexican border in Parker Canyon in 2004, and longfin dace, Sonora suckers, and desert suckers were found in the mainstem Santa Cruz River in Arizona upstream from the confluence with Parker Canyon during surveys prior to 2000; none was detected in 2003 and 2009. Longfin dace (the only fish present) are known from a tributary spring below Parker Canyon Lake—Neighbor Spring. Speckled dace were also found in Sonoita Creek, a tributary of the Santa Cruz River downstream from the confluence with Parker Canyon in Arizona (after the river turns back north, for a total of 45 miles, 27 miles of which flow through developed agricultural areas in Mexico). It is not known what species occur in the Santa Cruz River in Mexico. Rainbow trout (stocked since 1963), channel catfish (stocked since 1965), redear sunfish, and bluegill are proposed for stocking. Redear sunfish, bluegill, and largemouth bass are found in the lake as a result of illegal stocking. In the perennial habitat immediately below the lake, largemouth bass and bluegill were found in 1997 and largemouth bass and longfin dace in 2004. No stocked species have been collected in the Santa Cruz River in Arizona upstream of Parker Canyon confluence in more than 14 sampling events over the past 22 years.	<u>Proposed Action</u> Longfin dace—Moderate Rationale: • Stocking more predaceous species • Though stocked species, with the exception of bluegill, have not been detected below Parker Canyon Lake, largemouth bass and possibly other nonnatives were found with longfin dace below Parker Canyon Lake dam in 2004, indicating that movement from Parker Canyon is possible Sonora sucker—Low Desert sucker—Low Rationale: • Stocking more predaceous species • Movement is possible, but stocked species have never been detected during surveys in the Santa Cruz River in Arizona upstream of the Parker Canyon confluence • Bluegills were found during a 1997 survey, but no stocked species were found during a 2004 survey in Parker Canyon downstream of the lake despite stocking rainbow trout and channel catfish in this lake since the 1960s and bluegill and redear sunfish being present in the lake for an unknown time

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Parker Canyon Lake (continued)		<u>Proposed Action</u> Speckled dace—Low Rationale: • Stocking more predaceous species • Movement to speckled dace—occupied location in Sonoita Creek is not likely to occur due to the extensive distance (more than 45 miles) and stream channel conditions (ephemeral portions and through agricultural lands) <u>Reduced Stocking Alternative</u> Site not stocked

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Peña Blanca Lake	Fish can spill from the reservoir during flood events. The first mile downstream contains pool habitat that is suitable for trout, except in summer months due to the high summer water temperatures. The nearest SSFS locations are in the mainstem of the Santa Cruz River, about 8 ephemeral miles downstream from Peña Blanca Lake via Agua Fria Canyon, portions of which flow through wide sandy bottoms, and an active gravel mine with significantly modified stream reaches. Rainbow trout are proposed for stocking. Rainbow trout may spill out of the lake but have never been detected in the mainstem Santa Cruz River, where the SSFS have been documented based on 11 surveys in 12 years.	<u>Proposed Action</u> Longfin dace–Low Sonora sucker–Low Desert sucker–Low Speckled dace–Low Rationale: - Stocking less predaceous species that are not likely to move to occupied SSFS habitat due to the ephemeral nature of the channel and transport conditions - Several surveys have not detected stocked species near SSFS-occupied areas <u>Reduced Stocking Alternative</u> Site not stocked
Patagonia Lake	Fish can spill from the reservoir during flood events. Five miles of stream below the lake are perennial or interrupted perennial. SSFS were found prior to 2004 within this reach but were not detected in 2004. Longfin dace, speckled dace, Sonora suckers, and desert suckers have been found above the lake in Sonoita Creek and tributaries. Rainbow trout (stocked since 1976) are proposed for stocking. The area below the lake (Sonoita Creek) is not suitable for trout survival in the summer months due to the high temperatures, and at least 12 surveys over the past 20 years have not detected the presence of stocked rainbow trout in this area. However, most surveys were conducted in summer months. The reach immediately upstream of Patagonia Lake contains no suitable habitat for rainbow trout. Only one rainbow trout has been documented above the lake in the early 1990s² and no other rainbow trout have been found in later surveys.	<u>Proposed Action</u> Longfin dace–Low Sonora sucker–Low Desert sucker–Low Speckled dace–Low Rationale: - Stocking less predaceous species that could move into SSFS-occupied areas, but habitat is not suitable for survival outside the stocking season due to warm water temperatures - Several surveys have not detected rainbow trout downstream of the lake and have only detected one rainbow trout upstream of the lake <u>Reduced Stocking Alternative</u> Site not stocked

² D. Mitchell, AGFD Fisheries Biologist, personal communication via e-mail to David Boyarski, AGFD Gila River Basin Native Fishes Conservation Coordinator, on January 24, 2011.

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Middle Santa Cruz River Complex		
Fagen Tank	This is a closed system, and no SSFS are known from the site.	<u>Proposed Action</u> Site not stocked <u>Reduced Stocking Alternative</u> No effects anticipated
Rose Canyon Lake	Stocked trout can escape from Rose Canyon Lake when it overflows. The nearest occurrence of SSFS is 13 miles downstream to Rillito Creek, then about 20 miles back upstream into Pantano Wash and Cienega Creek. However, trout would have to survive a 50-foot drop onto a concrete splash pad into Rose Canyon, 4.5 miles to Sycamore Reservoir and another 18-foot drop onto exposed bedrock coming out of Sycamore Reservoir, making it unlikely that trout would survive. Rainbow trout (stocked since 1958) and brown trout (stocked since 1972) are proposed for stocking. No suitable habitat exists in the ephemeral channels connecting Rose Canyon Lake to known locations for the SSFS due to high temperatures and high sediment load following the Aspen fire in 2003.	<u>Proposed Action</u> No effects anticipated because known locations of SSFS are downstream and then back upstream, where stocked species are not likely to travel due to the extensive distance of ephemeral streambed. <u>Reduced Stocking Alternative</u> Site not stocked
Tucson Santa Cruz Complex		
Sahuarita Lake	This is a closed system, and no SSFS are known from the site.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated
Kennedy Park Lake, Silverbell Lake	Fish can spill from the lake during flood events. It is ephemeral for 3.5 miles to a perennial section of the Santa Cruz River. Occurrence of SSFS in the mainstem Santa Cruz River or tributaries that join it in and around Tucson have not been documented. Nearest SSFS are in the Santa Cruz River, more than 40 miles upstream via ephemeral channels. Rainbow trout, channel catfish, bluegill, redear sunfish, black crappie (Silverbell Lake only) and largemouth bass are proposed for stocking. Perennial water in this section of the Santa Cruz is due to wastewater discharge. If stocked fish made it to the perennial water, the poor water quality associated with the treated effluent, irregular flows, and high water temperatures during the summer would prohibit long-term survival.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because known locations of SSFS are upstream, where stocked species are not likely to travel due to the extensive distance of ephemeral streambed.

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effectsⁱ	Magnitude of Potential Effects
Lakeside Lake	The lake is subject to overflow events one to two times a year. During an overflow event, the possibility exists for stocked fish or offspring of stocked fish to move over the spillway into the ephemeral washes below. The nearest occurrence of SSFS is in Cienega Creek, which is 14 miles upstream of the ephemeral Pantano Wash near the Del Lago diversion dam, which acts as a barrier to movement farther upstream. No nonnative has been detected in this SSFS-occupied area during three surveys in the past 8 years. Rainbow trout (stocked since 1986), channel catfish (stocked since 1986), bluegill (stocked since 1986), redear sunfish, and largemouth bass (stocked since 1986) are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because known locations of SSFS are upstream, where stocked species are not likely to travel due to the distance of ephemeral streambed, and surveys have not detected stocked species.
Pantano Wash–Rillito River		
Arivaca Lake	Fish can spill from Arivaca Lake after heavy summer rains; this occurred twice in the past 10 years. No SSFS species are documented from the drainage below the lake for more than 60 miles of mostly ephemeral channel. Channel catfish, bluegill, and redear sunfish are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because of the extensive distance of ephemeral streambed.
Tucson Santa Cruz FIN		
Reid Park Lake	This is a closed system, and no SSFS are known from the site.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
VERDE RIVER SUBCATCHMENT (23 sites)		
Big Chino Wash Complex		
Garret Tank, Shucking Tank, Presley Tank	These are open systems. Garret Tank spilled in 2005 and Shucking and Presley tanks are not known by the AGFD to spill. Speckled dace, longfin dace, desert suckers, and Sonora suckers are found in upper Verde River and in tributaries downstream—more than 50 miles of ephemeral streambed. Channel catfish, black crappie, bluegill, and rainbow trout are proposed for stocking at all sites, and largemouth bass are proposed for stocking at Shucking and Presley tanks. With the exception of channel catfish, these species are not expected to be able survive transport due to the extended length of ephemeral stream channel to reach SSFS-occupied areas and poor water quality conditions during flow events, including low dissolved oxygen and high turbidity. Movement to SSFS-occupied areas is presumed to be not possible for all species except channel catfish. It is not likely that channel catfish could move through these stream systems, but it is possible. If movement occurred, it would be on those rare occasions when they spill, likely in low numbers. Channel catfish are established in the upper Verde River.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace—Low Longfin dace—Low Desert sucker—Low Sonora sucker—Low Rationale: • Stocking more predacious species • Movement to SSFS-occupied areas is presumed to not be possible due to stream conditions, with the possible exception of channel catfish, which, if moved, would only be on rare occasions and likely in low numbers • This species is established in the upper Verde River and would not establish a new population
Stone Dam	Spill history is not known. Speckled dace, longfin dace, desert suckers, and Sonora suckers are known from the upper Verde River and tributaries downstream—more than 39 miles of ephemeral streambed. Channel catfish, bluegill, redear sunfish, and largemouth bass are proposed for stocking. With the exception of channel catfish, these species are not expected to be able survive transport due to the extended length of ephemeral stream channel to reach SSFS-occupied areas and poor water quality conditions during flow events, including low dissolved oxygen and high turbidity. Movement to SSFS-occupied areas is presumed to not be possible for all species except channel catfish. It is not likely that channel catfish could move through these stream systems for the reasons above, but it is possible. If movement occurred, it would likely be in low numbers. Channel catfish are established in the upper Verde River.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace—Low Longfin dace—Low Desert sucker—Low Sonora sucker—Low Rationale: • Stocking more predacious species • Movement to SSFS-occupied areas is presumed to be not possible due to stream conditions, with the exception of channel catfish, which, if moved, would likely be in low numbers • This species is established in the upper Verde River and would not establish a new population.

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Granite Basin Lake	This is an open lake that spilled in 2005 and 2008. If Granite Basin were to spill, fish leaving the lake would fall 30 feet onto bedrock. Longfin dace are known from Mint Wash downstream—approximately 8 miles of interrupted perennial streambed. Speckled dace are known from Walnut Creek—approximately 16 miles of interrupted perennial streambed to Williamson Valley Wash and then approximately 13 miles upstream in a tributary. Additional longfin dace and speckled dace, and desert suckers and Sonora suckers, are found in the upper Verde River downstream—an additional approximately 15 miles from Williamson Valley Wash. Fish movement to most SSFS-occupied areas is not likely due to the extended distance of the ephemeral and interrupted stream channel. The exception is longfin dace—occupied areas, for which movement to these areas is possible. Largemouth bass and bluegill are proposed for stocking. Areas occupied by SSFS are prone to flash floods and extreme summer temperatures and are generally not suitable habitat for stocked species. Largemouth bass have been present in Granite Basin Lake since the 1950s and have not yet become established in downstream Williamson Valley Wash, based on two fish surveys that did not detect this species.	<u>Proposed Action</u> Speckled dace—Low Longfin dace—Low Desert sucker—Low Sonora sucker—Low Rationale: • Stocking more predacious species • Movement not likely due to stream conditions or, in the case of the longfin dace—occupied area, is possible • Habitat in SSFS-occupied areas is likely not suitable for stocked species • Surveys have not detected largemouth bass in downstream perennial Williamson Valley Wash despite this species being present there since the 1950s <u>Reduced Stocking Alternative</u> Site not stocked
Sycamore Complex		
Elk Tank, JD Dam Lake, White Horse Lake, Middle Tank, Perkins Tank	This is a closed complex, and no SSFS are known from these sites.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated
Middle Verde Complex		
Deadhorse Lake	This is a closed system, and no SSFS are known from this site.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Oak Creek	This is an open stream reach, and speckled dace, longfin dace, desert suckers, and Sonora suckers occupy the stocking reach. Rainbow trout (stocked since 1933) are proposed for stocking. Rainbow trout are established in upper Oak Creek, but rainbow trout stocked into lower Oak Creek would not likely persist outside the stocking season due to the high summer water temperatures. Speckled dace are abundant and Sonora suckers and desert suckers persist in upper Oak Creek, based on several surveys. Longfin dace are present only in the downstream end of the stocking reach, presumably because of habitat preference. Population status is unknown due to limited surveys in this area.	<u>Proposed Action</u> Speckled dace—Low Rationale: • Stocking less predacious species that will not establish new populations • Stocking directly into speckled dace—occupied reach, but survey data suggest speckled dace are abundant despite stocking rainbow trout since 1933 Desert sucker—Moderate Sonora sucker—Moderate Longfin dace—Moderate Rationale: • Stocking less predacious species that will not establish new populations • Stocking directly into SSFS-occupied reach • SSFS populations are apparently not abundant <u>Reduced Stocking Alternative</u> Site not stocked

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Wet Beaver Creek	Open stream reach and speckled dace, desert suckers, and Sonora suckers occupy the stocking reach. Longfin dace are known from approximately 10 miles downstream (perennial), and movement of stocked fish to this area is probable but likely only in moderate numbers. Rainbow trout proposed for stocking are not likely to persist outside the stocking season due to the high summer water temperatures. During several surveys, the only rainbow trout captured have been stocked fish, indicating that rainbow trout do not reproduce in this stream.	<u>Proposed Action</u> Speckled dace–Moderate Desert sucker–Moderate Sonora sucker–Moderate Rationale: • Stocking less predacious species that will likely not survive outside the stocking season • Stocking directly into occupied area • SSFS populations are apparently not abundant Longfin dace–Low Rationale: • Stocking less predacious species that will likely not survive outside the stocking season • Movement is probable but likely only in moderate numbers due to extended distance <u>Reduced Stocking Alternative</u> Site not stocked
Mingus Lake	The lake probably spills only during spring due to heavy snowpack, but a specific spill history is not known. Speckled dace, desert suckers, Sonora suckers, and longfin dace are known from Verde River, which is downstream approximately 12 miles. The stream channel between Mingus Lake and the Verde River is steep, rocky, and ephemeral. Fish movement to SSFS-occupied areas not likely due to stream conditions. Rainbow trout, black crappie, and bluegill are proposed for stocking. Black crappie not likely to survive in downstream SSFS-occupied areas because this species requires extensive low-flowing or non-flowing habitat, which is not available in SSFS-occupied areas. Rainbow trout could survive in downstream SSFS-occupied areas but only seasonally due to the high summer temperatures.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace–Low Longfin dace–Low Desert sucker–Low Sonora sucker–Low Rationale: • Stocking less predacious species that will likely not move to SSFS-occupied areas due to stream conditions • If they were to move, they would not survive outside the stocking season

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Huffer Lake	This is an open system, and a spill history is not known, but it only spills in response to spring runoff or storm events. Speckled dace, desert suckers, Sonora suckers, and longfin dace are found approximately 30 miles downstream in West Clear Creek. Fish movement to SSFS-occupied areas is possible, but if they did move, it would likely only be in limited numbers due to the extensive distance to SSFS-occupied areas. Rainbow trout are proposed for stocking. Rainbow trout are established in West Clear Creek in the vicinity of the SSFS-occupied area.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace–Low Longfin dace–Low Desert sucker–Low Sonora sucker–Low Rationale: • Stocking less predacious species that will not establish new populations • Movement is possible but, if it were to occur, would likely only be in limited numbers due to the extensive distance to SSFS-occupied areas
West Clear Creek	This is an open stream reach, and speckled dace, desert suckers, Sonora suckers, and longfin dace are known from the stocking reach. Rainbow trout (stocked since 1981) are proposed for stocking. Rainbow trout are established in upper West Clear Creek. Speckled dace, Sonoran suckers, and desert suckers are abundant in upper and middle West Clear Creek (based on several surveys). Longfin dace are present only in the downstream end of the stocking reach and were found in low abundance, presumably because of habitat preference and/or abundance of other nonnative predators, including green sunfish, bullhead, and smallmouth bass.	<u>Proposed Action</u> Speckled dace–Low Desert sucker–Low Sonora sucker–Low Rationale: • Stocking less predacious species that will not establish new populations • Survey data suggest these SSFS are abundant despite stocking trout since 1981 Longfin dace–Moderate because species is not abundant in the stream and because of stocking into occupied reach <u>Reduced Stocking Alternative</u> Site not stocked

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Middle Verde River	This is an open stream reach, and longfin dace, desert suckers, and Sonora suckers occupy the stocking reach. Speckled dace are only known from the upstream mainstem and tributaries, including Oak Creek. Barriers (irrigation structures) limit upstream movement within the mainstem Verde River, and various vertical and ephemeral stream stretch barriers prevent or limit movement to occupied areas, except for Oak Creek, where there is a perennial connection with no known barriers (a speckled dace-occupied area is more than 30 miles upstream from the stocking reach). Movement into speckled dace-occupied areas is not likely due to barriers and/or the extensive distance to speckled dace-occupied areas. Rainbow trout proposed for stocking are not likely to persist outside the stocking season due to the high summer water temperatures.	<u>Proposed Action</u> Speckled dace—Low Rationale: • Movement is not likely due to barrier and/or extensive distance to speckled dace-occupied areas • Stocking less predacious species that is not likely to persist due to the high summer water temperatures Longfin dace—Moderate Desert sucker—Moderate Sonora sucker—Moderate Rationale: • Stocking into occupied habitat • Stocking less predacious species that are not likely to persist due to the high summer water temperatures <u>Reduced Stocking Alternative</u> Site not stocked

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Granite Creek Complex		
Goldwater Lake, Watson Lake, Willow Creek Reservoir	These are open systems, and spill history is not known but is presumed to be infrequent. Water topped both Watson and Willow dams during the flood events of December 2004 to January 2005 and flowed all the way to the Verde River. The City of Prescott currently uses these lakes as aquifer recharge, minimizing potential spills. The closest SSFS known are found in lower Granite Creek and the upper Verde River downstream, more than 23 miles of ephemeral streambed. Several sand and gravel mining operations would be barriers and would limit fish movement downstream if a spill occurred. Longfin dace are known from lower Granite Creek and farther downstream in the upper Verde River, and speckled dace, desert suckers, and Sonora suckers are known from the upper Verde River. Movement to SSFS-occupied areas is not likely due to the extensive distance of ephemeral streambed and barriers. Rainbow trout, bluegill, and black crappie are proposed for stocking at all sites, and largemouth bass are proposed for stocking at Goldwater Lake. Black crappie and bluegill are not likely to survive in downstream SSFS-occupied areas because these species require extensive low-flowing or non-flowing habitat, which is not available in SSFS-occupied areas. Rainbow trout could survive in downstream SSFS-occupied areas but only seasonally due to the high summer temperatures. Largemouth bass could survive in the upper Verde River if they were able to move. This species is established near SSFS-occupied areas.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace–Low Longfin dace–Low Desert sucker–Low Sonora sucker–Low Rationale: • Stocking more species • Stocking less predacious species that will not likely move to SSFS-occupied areas due to extensive distance and stream conditions • If stocked fish were to move, black crappie and bluegill would not likely survive due to lack of habitat • Rainbow trout would likely only survive seasonally due to the high summer water temperatures • Largemouth bass are established near SSFS-occupied areas

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Lower Verde River Complex		
East Verde River	This is an open stream reach and speckled dace, desert suckers, Sonora suckers, and longfin dace are known from the stocking reach. Rainbow trout are proposed for stocking. Rainbow trout are established in the upper East Verde River. Limited surveys have been conducted of stocking reach, and no recent surveys have been completed. Status of SSFS populations in this reach is not known.	<u>Proposed Action</u> Speckled dace–Moderate Longfin dace–Moderate Desert sucker–Moderate Sonora sucker–Moderate Rationale: • Stocking less predacious species that will not establish a new population • Stocking into SSFS-occupied habitat • The population status of SSFS is not known <u>Reduced Stocking Alternative</u> Site not stocked

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Green Valley Lake	This is an open system. The lake probably spills on an annual basis. Speckled dace, desert suckers, Sonora suckers, and longfin dace are known from the East Verde River downstream, approximately 7 miles (ephemeral). Movement to SSFS-occupied areas is possible. Rainbow trout are proposed for stocking under the Proposed Action. Rainbow trout and channel catfish are proposed for stocking under the Reduced Stocking Alternative. Rainbow trout could survive in downstream SSFS-occupied areas but only seasonally due to the high summer temperatures. It is unknown whether channel catfish could survive and establish a new population. Currently, channel catfish have not been detected in the middle and upper East Verde River where there are SSFS. Though channel catfish have never been stocked in these lakes by the AGFD, they have established a population in these lakes since at least 2006.	<u>Proposed Action</u> Speckled dace–Low Longfin dace–Low Desert sucker–Low Sonora sucker–Low Rationale: • Movement into SSFS-occupied habitat is possible • Only less predacious rainbow trout being stocked • Rainbow trout would not survive year-round in downstream locations <u>Reduced Stocking Alternative</u> Speckled dace–Moderate Longfin dace–Moderate Desert sucker–Moderate Sonora sucker–Moderate Rationale: • Movement into SSFS-occupied habitat is possible • It is not known whether channel catfish could establish a new population

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
BILL WILLIAMS RIVER SUBCATCHMENT (14 sites)		
Santa Maria Complex		
Bass Tank, Blue Tank	These are open tanks. Spilling has not been documented by the AGFD at Bass Tank. Blue Tank spilled in 2007. Longfin dace, desert suckers, and Sonora suckers are found in Sycamore Creek, which is downstream more than 7 miles of ephemeral/intermittent stream channel (Loco Creek) that is characterized by a high-gradient, bedrock-dominated stream channel that does not provide adequate habitat for fish. Movement to SSFS-occupied areas is not likely because of stream characteristics. Bluegill and redear sunfish are proposed for stocking under the Proposed Action. Areas occupied by SSFS are prone to flash floods and extreme summer temperatures and are generally not suitable habitat for stocked species.	<u>Proposed Action</u> Longfin dace–Low Desert sucker–Low Sonora sucker–Low Rationale: • Stocking only less predacious species • Movement is not likely due to stream characteristics • The habitat in SSFS-occupied areas is not suitable for stocked species Speckled dace–No effects anticipated^v <u>Reduced Stocking Alternative</u> Sites not stocked
Granite Mountain 1, Granite Mountain 2	These are open tanks, but spills have not been documented by the AGFD and there are no spillways present. Longfin dace, desert suckers, and Sonora suckers are found in the Santa Maria River, which is downstream more than 9 miles of ephemeral stream channel that is characterized by a high-gradient, bedrock-dominated stream channel that does not provide adequate habitat for fish. Fish movement to SSFS-occupied areas is not likely because of stream characteristics. Bluegill and redear sunfish are proposed for stocking. Areas occupied by SSFS are prone to flash floods and extreme summer temperatures and are generally not suitable habitat for stocked species.	<u>Proposed Action and Reduced Stocking Alternative</u> Longfin dace–Low Desert sucker–Low Sonora sucker–Low Rationale: • Stocking less predacious species • Movement not likely due to stream characteristics • Habitat in SSFS-occupied is not suitable for stocked species Speckled dace–No effects anticipated^{iv}
Burro Creek Complex		
Coor's Lake	This is a closed system with no SSFS located at the site.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Carter Tank, Antelope Tank, Harmon Tank 2	These are open tanks, but spills have not been documented by the AGFD and there are no spillways present. Speckled dace, longfin dace, desert suckers, and Sonora suckers are found downstream in Burro, Francis, and Conger creeks. These tanks flow into Pine Creek, where there is a bedrock dam that retains water. From this dam, it is more than 8 miles of intermittent streambed, of which approximately 5 miles is steep, rocky, canyon bound, and prone to flash flooding. During connecting events, the stream would likely have a high sediment load and high velocity that would limit fish survival. Then there is approximately 10 miles of perennial streambed followed by 1–2 miles of intermittent/ephemeral streambed to SSFS-occupied areas. Fish movement is not likely because of stream characteristics. Under the Proposed Action, bluegill and redear sunfish would be stocked at all three sites. Under the Reduced Stocking Alternative, proposed stocking would be channel catfish at Carter Tank; largemouth bass, channel catfish, bluegill, and redear sunfish at Antelope Tank; and bluegill and redear sunfish at Harmon Tank 2. Areas occupied by SSFS are prone to flash floods and extreme summer temperatures and are generally not suitable habitat for largemouth bass, bluegill, and redear sunfish. Carter Tank was stocked with channel catfish three times throughout the 1970s, and Antelope Tank was stocked with channel catfish four times from 1974 to 2003 and has had largemouth bass present since at least 1998. Multiple surveys of downstream Burro, Francis, and Conger creeks have not detected channel catfish or largemouth bass.	<u>Proposed Action</u> Speckled dace—Low Longfin dace—Low Desert sucker—Low Sonora sucker—Low Rationale: • Stocking only less predacious species • Movement not likely due to a downstream dam that limits movement and due to stream characteristics • Habitat in the SSFS-occupied areas is not suitable for stocked species <u>Reduced Stocking Alternative</u> Speckled dace—Low Longfin dace—Low Desert sucker—Low Sonora sucker—Low Rationale: • Stocking more predacious species • Movement not likely due to a downstream dam that limits movement and due to stream characteristics • Habitat in the SSFS-occupied areas is not suitable for stocked species, except possibly channel catfish • Multiple surveys have not detected channel catfish or largemouth bass in SSFS-occupied areas, despite past stocking history

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Bar 37 Tank	This is an open tank and its spill history is not known, but it has a small watershed and there is not a spillway present. Speckled dace, longfin dace, desert suckers, and Sonora suckers are found downstream in Burro, Francis, and Conger creeks. If it spills, this tank would flow downstream more than 9 miles of intermittent streambed, of which approximately 5 miles is steep rocky, canyon-bound, and prone to flash flooding. During connecting events, the stream would likely have a high sediment load and high velocity that would limit fish survival. The water would then flow approximately 10 miles of perennial streambed followed by 1–2 miles of intermittent/ephemeral streambed to reach SSFS-occupied areas. Fish movement is not likely because of stream characteristics. Bluegill and redear sunfish are proposed for stocking under the Proposed Action. Largemouth bass, channel catfish, bluegill, and redear sunfish are proposed for stocking under the Reduced Stocking Alternative. Bar 37 Tank was stocked with channel catfish in 2003, and surveys in 2004, 2004, 2007, and 2009 of various reaches in downstream Burro, Francis, and Conger creeks did not detect channel catfish.	<u>Proposed Action</u> Speckled dace–Low Longfin dace–Low Desert sucker–Low Sonora sucker–Low Rationale: • Stocking only less predacious species • Movement is not likely due to downstream stream characteristics • Habitat in the SSFS-occupied areas is not suitable for stocked species <u>Reduced Stocking Alternative</u> Speckled dace–Low Longfin dace–Low Desert sucker–Low Sonora sucker–Low Rationale: • Stocking more predacious species • Movement is not likely due to downstream stream characteristics • Multiple surveys have not detected channel catfish in SSFS-occupied areas despite past stocking history

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Little Antelope Tank	This is an open tank that spilled in 2004. When it does spill, it flows into another stock tank and then approximately 6.5 miles of ephemeral/intermittent streambed to areas occupied by speckled dace, desert suckers, Sonora suckers, and longfin dace. Stream channel conditions during flood events (steep rocky canyon, high sediment load, and high velocity) likely limit survival of any stocked fish during transport. Fish movement is possible and, if it occurred, would likely only be few in number because of stream characteristics. Bluegill and redear sunfish are proposed for stocking under the Proposed Action. Largemouth bass, bluegill, and redear sunfish are proposed for stocking under the Reduced Stocking Alternative. Areas occupied by SSFS are prone to flash floods and extreme summer temperatures and are generally not suitable habitat for stocked species. Surveys of SSFS-occupied areas in 1998 and 2004 (post-spill) did not detect largemouth bass despite largemouth bass being present at this stocking location since at least 1988 and despite stocking additional largemouth bass in 2003 and the tank spilling in 2004.	<u>Proposed Action</u> Speckled dace–Low Longfin dace–Low Desert sucker–Low Sonora sucker–Low Rationale: • Stocking only less predacious species • Movement is possible but habitat in SSFS-occupied areas is not suitable for stocked species <u>Reduced Stocking Alternative</u> Speckled dace–Low Longfin dace–Low Desert sucker–Low Sonora sucker–Low Rationale: • Stocking more predacious species • Movement is possible but habitat in SSFS-occupied areas is not suitable for stocked species • Survey data suggest either stocked fish did not move to occupied areas or did not persist when a spill occurred

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Harman Tank	This is an open tank that spilled in 2004. When it spills, it flows down approximately 2.5 miles of ephemeral streambed and more than 15 miles of interrupted perennial streambed to reach areas occupied by longfin dace, desert suckers, and Sonora suckers. Speckled dace are known from farther downstream in Burro Creek. Fish movement to SSFS-occupied areas is possible but would be rare and likely in low numbers due to the extended length of the stream channel to SSFS-occupied areas. Bluegill and redear sunfish are proposed for stocking under the Proposed Action. Channel catfish are proposed for stocking under the Reduced Stocking Alternative.	<u>Proposed Action</u> Speckled dace–Low Longfin dace–Low Desert sucker–Low Sonora sucker–Low Rationale: • Stocking only less predacious species • Movement is possible but movement would be rare and in low numbers due to stream characteristics • Habitat in SSFS-occupied areas is likely not suitable for stocked species <u>Reduced Stocking Alternative</u> Speckled dace–Moderate Longfin dace–Moderate Desert sucker–Moderate Sonora sucker–Moderate Rationale: • Stocking more predacious species • Movement is possible but movement would be rare and in low numbers due to stream characteristics • Channel catfish could potentially survive in SSFS-occupied areas that have not been sufficiently surveyed to determine habitat suitability

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Stubb's Tank	This is an open tank that spilled in 2007 due to dam failure, but otherwise spill is not known by the AGFD. When it does spill, it flows down approximately 2 miles of ephemeral streambed and more than 15 miles of interrupted perennial streambed to reach areas occupied by longfin dace, desert suckers, and Sonora suckers. Speckled dace are known from farther downstream in Burro Creek. Fish movement to SSFS-occupied areas are possible but would be rare and likely in low numbers due to the low spill potential and the extended length of stream channel to SSFS-occupied areas. Bluegill and redear sunfish are proposed for stocking under the Proposed Action. Largemouth bass, bluegill, and redear sunfish are proposed for stocking under the Reduced Stocking Alternative. Areas occupied by SSFS are prone to flash floods and extreme summer temperatures and are generally not suitable habitat for stocked species.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace–Low Longfin dace–Low Desert sucker–Low Sonora sucker–Low Rationale: • Movement is possible but would be rare and would likely be in low numbers due to stream characteristics • Habitat in SSFS-occupied areas is likely not suitable for stocked species
McElhaney Tank	This is an open tank that spilled in 2004. When it does, it flows down approximately 9 miles of streambed (probably intermittent) and more than 15 miles of interrupted perennial streambed to reach areas occupied by longfin dace, desert suckers, and Sonora suckers. Speckled dace are known from farther downstream in Burro Creek. Fish movement to SSFS-occupied areas is possible but would be rare and likely in low numbers due to the extended length of stream channel to SSFS-occupied areas. Bluegill and redear sunfish are proposed for stocking under the Proposed Action. Largemouth bass, bluegill, and redear sunfish are proposed for stocking under the Reduced Stocking Alternative. Areas occupied by SSFS are prone to flash floods and extreme summer temperatures and are generally not suitable habitat for stocked species.	<u>Proposed Action and Reduced Stocking Alternative</u> Speckled dace–Low Longfin dace–Low Desert sucker–Low Sonora sucker–Low Rationale: • Movement is not likely due to stream conditions • Habitat in SSFS-occupied areas is likely not suitable for stocked species

Table L. Analysis of potential impacts to other special status fish species (SSFS) resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Swale Tank	This is an open tank that spilled in 2004 and probably in 1993. There is 3.7 miles of ephemeral streambed to areas occupied by speckled dace, desert suckers, Sonora suckers, and longfin dace. Fish movement to SSFS-occupied areas is probable because of the limited distance of stream channel. Bluegill and redear sunfish are proposed for stocking under the Proposed Action. Channel catfish are proposed for stocking under the Reduced Stocking Alternative. A survey of the SSFS-occupied stream reach in 1993 (after a spill occurred) after stocking catfish in 1992 did not detect channel catfish.	<u>Proposed Action</u> Speckled dace–Low Longfin dace–Low Desert sucker–Low Sonora sucker–Low Rationale: • Stocking only less predacious species • Movement is probable; however, habitat in SSFS-occupied areas is likely not suitable for stocked species <u>Reduced Stocking Alternative</u> Speckled dace–Moderate Longfin dace–Moderate Desert sucker–Moderate Sonora sucker–Moderate Rationale: • Stocking more predacious species • Movement is probable; however, survey data suggest either fish did not move to SSFS-occupied areas or did not persist when a spill occurred

ⁱ For a more detailed description of site characteristics, please refer to the Biological Assessment of the Sport Fish Stocking Program. Information in this column was obtained from the Biological Assessment and/or analysis of the various databases, unless otherwise noted.

ⁱⁱ This species is not known to occur in this subcatchment.

ⁱⁱⁱ Longfin dace are not known from the upper Black River drainage, and the closest known records are in the middle Salt River downstream more than 100 miles from any of these sites. Stocked species are not anticipated to be able to move to longfin dace-occupied areas. Longfin dace could be present in the middle and lower Black and the White River on the White Mountain Apache Indian Reservation, but occurrence data are not available.

^{iv} Sites include Alvord Lake, Cortez Lake, Crossroads Park, Desert Breeze Lake, Desert West Lake, Encanto Lake, Evelyn Hallman Pond, Kiwanis Lake, Red Mountain Lake, Rio Vista Pond, Riverview Lake, Steele Indian School Pond, Surprise Lake, Veterans Oasis Lake, Water Ranch Lake, Bonsall Park Lake, Discovery District Park Lakes, Freestone Park Lakes, Granada Park Lakes, McQueen Park Lake, Pacana Park Lake, Roadrunner Park Lake, Selleh Park Lake, and Water Treatment Lake.

^v Speckled dace are not known from the Santa Maria drainage. To reach speckled dace, fish stocked in the Santa Maria drainage would have to go through Alamo and then upstream to the Burro Creek. This would be highly unlikely and, therefore no effects to speckled dace from these sites are anticipated.

APPENDIX L

Analysis of Potential Impacts to Lowland Leopard Frogs

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Magnitude of Potential Effects and Summary of Determining Factors
BILL WILLIAMS RIVER SUBCATCHMENT		
Santa Maria Complex		
Bass Tank, Blue Tank	Lowland leopard frogs (LLFs) are not known from these sites or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. These are open tanks, but spills have not been documented by the Arizona Game and Fish Department (AGFD) at Bass Tank. Blue Tank spilled in 2007. LLFs are known from downstream locations in the Santa Maria River and tributaries. From Blue Tank, it is approximately 7 miles downstream ephemeral/intermittent Loco Creek and then approximately 7.5 miles down intermittent Sycamore Creek, which turns into Santa Maria River at the Kirkland/Sycamore Creek confluence. Bass Tank is approximately 4.5 miles upstream (ephemeral) from Blue Tank. There are other LLF records farther downstream in the Santa Maria River and tributaries. Loco Creek is characterized by a high-gradient, bedrock-dominated stream channel that does not provide adequate habitat for fish. Fish movement through Loco Creek would be during spring runoff events and flash floods that create increased sediment loads, high turbidity, rapid currents, altered habitat conditions, increased stress levels of organisms in transport, altered fish behavior, and mortality, all of which limit the ability of survival during transport. Redear sunfish and bluegill are proposed for stocking under the Proposed Action. Largemouth bass, redear sunfish, and bluegill are proposed for stocking under the Reduced Stocking Alternative. A survey of Loco Creek and Sycamore Creek downstream of the mouth of Loco Creek in 2009 did not detect largemouth bass despite their presence at these tanks since at least 1988. Largemouth bass (two individuals) were detected at the Kirkland/Sycamore confluence in 1999, but origins cannot be determined because there are other possible sources in the watershed. Areas occupied by LLF are prone to flash floods and extreme summer temperatures and are generally not suitable habitat for stocked species.	<u>Proposed Action and Reduced Stocking Alternative</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, and movement of stocked fish to LLF-occupied areas is not likely due to the distance (more than 14.5 miles) and stream channel characteristics, and LLF-occupied habitat not likely suitable for stock species. A recent survey did not detect largemouth bass in downstream Loco and Sycamore creeks despite existing populations of this species in these tanks since at least 1988.

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Magnitude of Potential Effects and Summary of Determining Factors
Granite Mountain 1, Granite Mountain 2	LLFs are not known from these sites or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. These are open tanks, but spills have not been documented by the AGFD, and there are no spillways present. LLFs are known downstream, with the closest to Granite Mountain 1 being in Little Ship Wash (approximately 5.5 miles downstream) and the closest to Granite Mountain 2 being in Iron Ship Wash (approximately 6.5 miles downstream). These locations are ephemeral, and stocked species would not be able to survive long-term if they were able to move into LLF-occupied areas. There are also other LLF records from farther downstream in the Santa Maria River and tributaries; these are more than 9 miles downstream in an ephemeral stream channel that is characterized by a high-gradient, bedrock-dominated stream channel that does not provide adequate habitat for fish. Bluegill and redear sunfish are proposed for stocking. Areas occupied by LLFs are prone to flash floods and extreme summer temperatures and are generally not suitable habitat for stocked species.	<u>Proposed Action and Reduced Stocking Alternative</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas. Sites are not known to spill. Even if stocked fish did move, they would not survive long in the areas of the nearest LLF records due to the ephemeral nature of the habitat. Stocked fish are not likely to move farther downstream to occupied areas in the Santa Maria due to the distance (more than 9 miles) of ephemeral channel and stream channel characteristics limiting the survival of escaped fish.
Burro Creek Complex		
Coor's Lake	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. The site is closed to fish movement.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Magnitude of Potential Effects and Summary of Determining Factors
Carter Tank, Antelope Tank, Harmon Tank #2	LLFs are not known from these sites or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. LLFs are known from downstream in Burro Creek and tributaries. Spills at these tanks have not been documented by the AGFD, and there are no spillways present. If tanks were to spill, they would flow into Pine Creek, where there is a bedrock dam that retains water. From this dam, it is more than 8 miles of intermittent streambed to Burro Creek, of which approximately 5 miles is steep, rocky, canyon-bound, and prone to flash flooding. The closest LLFs are approximately 6 miles downstream (perennial) in Burro Creek. Under the Proposed Action, bluegill and redear sunfish would be stocked at all three sites. Under the Reduced Stocking Alternative, proposed stocking would be channel catfish at Carter Tank; largemouth bass, channel catfish, bluegill, and redear sunfish at Antelope Tank; and bluegill and redear sunfish at Harmon Tank #2. Areas occupied by LLFs are prone to flash floods and extreme summer temperatures and are generally not suitable habitat for largemouth bass, bluegill, and redear sunfish. Carter Tank was stocked with channel catfish three times throughout the 1970s, and Antelope Tank was stocked with channel catfish four times from 1974 to 2003 and has had largemouth bass present since at least 1998. Multiple surveys of downstream Burro, Francis, and Conger creeks have not detected channel catfish or largemouth bass.	<u>Proposed Action and Reduced Stocking Alternative</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, and stocked fish are not likely to move downstream due to the extensive distance, intervening dam, and ephemeral reaches. Surveys have not detected channel catfish or largemouth bass in downstream locations despite past stocking of these two species. Also, LLF-occupied habitat not likely suitable for stocked species.

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Magnitude of Potential Effects and Summary of Determining Factors
Bar 37 Tank	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. LLFs are known from downstream in Burro Creek and tributaries. Spill history is not known, but the tank has a small watershed and there is not a spillway present. If it spills, this tank would flow downstream more than 9 miles of intermittent streambed to Burro Creek; approximately 5 miles of this is steep, rocky, canyon-bound, and prone to flash flooding. The closest LLFs are approximately 6 miles downstream (perennial) to Burro Creek. During connecting events, the stream would likely have high sediment load and high velocity that would limit fish survival. Bluegill and redear sunfish are proposed for stocking under the Proposed Action. Largemouth bass, channel catfish, bluegill, and redear sunfish are proposed for stocking under the Reduced Stocking Alternative. Bar 37 Tank was stocked with channel catfish in 2003, and surveys in 2004, 2007, and 2009 of various reaches in downstream Burro, Francis, and Conger creeks did not detect channel catfish. Areas occupied by LLF are prone to flash floods and extreme summer temperatures and are generally not suitable habitat for stocked species.	<u>Proposed Action and Reduced Stocking Alternative</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, and stocked fish are not likely to move downstream due to the extensive distance, intervening ephemeral reaches, and transport conditions if connections would occur. Several surveys have not detected channel catfish in downstream locations despite past stocking history. Also, LLF-occupied habitat not likely suitable for stock species.

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Magnitude of Potential Effects and Summary of Determining Factors
Little Antelope Tank	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. This is an open tank that spilled in 2004. The closest downstream records of LLFs are in Burro Creek and tributaries. To reach Burro Creek, it is more than 2 miles downstream of an ephemeral stream bed to a stock tank at the confluence of Conger Creek, then approximately 13 miles down Conger Creek, 3 miles of which are perennial. From the confluence of Conger Creek, LLFs are known in Burro Creek approximately 4 miles upstream and more than 11 miles downstream. LLFs are also known from a downstream tributary, Francis Creek, which from the mouth of Conger Creek is approximately 3 miles downstream. LLFs have been recorded approximately 1 mile up Francis Creek. Bluegill and redear sunfish are proposed for stocking under the Proposed Action. Largemouth bass, bluegill, and redear sunfish are proposed for stocking under the Reduced Stocking Alternative. Areas occupied by LLFs are prone to flash floods and are generally not suitable habitat for stocked species. Surveys of Conger Creek in 1998 and 2004 (post-spill) did not detect largemouth bass despite largemouth bass being present at this stocking location since at least 1988 and despite an additional stocking of largemouth bass in 2003.	<u>Proposed Action and Reduced Stocking Alternative</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, and stocked fish are not likely to move downstream due to the extensive distance and intervening ephemeral reaches. Two surveys have not detected largemouth bass in Conger Creek despite past stocking of this species. Also, LLF-occupied habitat not likely suitable for stock species.

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ¹	Magnitude of Potential Effects and Summary of Determining Factors
Harman Tank	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. This is an open tank that spilled in 2004. The closest known LLF records are from Boulder Creek (approximately 2.5 miles downstream of ephemeral Stubb's Wash to Boulder Creek and approximately 1.5 miles downstream interrupted perennial Boulder Creek). Bluegill and redear sunfish are proposed for stocking under the Proposed Action. Channel catfish are proposed for stocking under the Reduced Stocking Alternative. Areas occupied by LLFs are prone to flash floods; are dry during the dry seasons, except for small pools; have extreme summer temperatures; and are generally not suitable habitat for stocked species. However, channel catfish are a hardy species, and it is not known whether they would be able to survive the harsh conditions of Boulder Creek near LLF occurrences. Spot-check surveys in Boulder Creek downstream from this site and two others (Stubb's and McElhaney tanks) using nets in pools and backpack electrofishing in 2009 at seven locations failed to detect any of the species stocked in those tanks (Cummings 2009).¹	<u>Proposed Action</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas. LLFs are known from downstream approximately 4 miles (ephemeral/interrupted perennial), and fish movement to that location is possible but habitat in this location not likely suitable for stock species. <u>Reduced Stocking Alternative</u> Moderate because LLFs are not present within the 1-, 3-, and 5-mile areas. LLFs are known from downstream approximately 4 miles (ephemeral/interrupted perennial), and fish movement to that location is possible. It is not known whether channel catfish could survive the harsh stream conditions present in Boulder Creek near the LLF-occupied areas (only small intermittent pools during the dry season and extreme summer water temperatures).
Stubb's Tank	LLFs are not known from this site but are known from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. LLFs are known from downstream approximately 3 miles (mostly ephemeral) in Boulder Creek, and movement of LLFs into this site is possible. This is an open tank that spilled in 2007 due to dam failure but a spill is not otherwise known by the AGFD. The dam was repaired. Stubb's Tank is near the top of a small contributing watershed and is a comparatively large tank. Bluegill and redear sunfish are proposed for stocking under the Proposed Action. Largemouth bass, bluegill, and redear sunfish are proposed for stocking under the Reduced Stocking Alternative. Areas occupied by LLFs are prone to flash floods and extreme summer temperatures and are generally not suitable habitat for stocked species.	<u>Proposed Action and Reduced Stocking Alternative</u> High because LLFs are present approximately 3 miles downstream from the site, and LLFs could move to this stocking site. Stocked fish could move to LLF-occupied areas; however, stocked species are not likely to survive in LLF-occupied areas (only small intermittent pools during the dry season and extreme summer water temperatures).

¹ Cummings, G. 2009. Spot-check survey results for Boulder Creek in GMU 18b and 17b, April 13 and 14, 2009.

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Magnitude of Potential Effects and Summary of Determining Factors
McElhaney Tank	LLFs are not known from this site but are known from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. LLFs are known from Connell Gulch downstream approximately 4 miles, and it is not known whether this reach is perennial. The tank spilled in 2004. Bluegill and redear sunfish are proposed for stocking under the Proposed Action. Largemouth bass, bluegill, and redear sunfish are proposed for stocking under the Reduced Stocking Alternative. Areas occupied by LLFs are prone to flash floods and extreme summer temperatures and are generally not suitable habitat for stocked species.	<u>Proposed Action and Reduced Stocking Alternative</u> High because LLFs are present approximately 4 miles downstream from site, and LLFs could move to this site. Stocked fish could move to LLF-occupied areas; however, stocked species are not likely to survive in LLF-occupied areas (only small intermittent pools during the dry season and extreme summer water temperatures).
Swale Tank	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. This is an open tank that spilled in 2004 and probably in 1993. The closest known LLF records are downstream in Francis Creek (2.7 miles downstream of ephemeral Black Canyon to Francis Creek, then 5 miles to occupied reach) and a tributary (an additional 7 miles upstream from Francis Creek). Bluegill and redear sunfish are proposed for stocking under the Proposed Action. Channel catfish are proposed for stocking under the Reduced Stocking Alternative. A survey of downstream Francis Creek in 1993 (after a spill occurred) after stocking catfish in 1992 did not detect channel catfish.	<u>Proposed Action</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, but LLFs are known from downstream approximately 7.7 miles, and movement of stocked fish to that location is possible. However, movement would be limited due to the limited spilling and distance between the stocking location and LLF-occupied areas. Also, LLF-occupied habitat not likely suitable for stocked species. <u>Reduced Stocking Alternative</u> Moderate because LLFs are not present within the 1-, 3-, and 5-mile areas but are known from downstream approximately 7.7 miles, and movement of stocked fish to that location is possible due to the hardiness of channel catfish. However, movement would be limited due to the limited spilling and distance between the stocking location and LLF-occupied areas.

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Magnitude of Potential Effects and Summary of Determining Factors
UPPER GILA SUBCATCHMENT		
Upper Gila Complex		
Frye Mesa Lake	There are LLFs known from upstream tributaries of the Gila River. However, if Frye Mesa Lake spilled, the water would not reach the Gila River. The water would travel down ephemeral Frye Creek approximately 5 miles before entering a subdivision and golf course built directly in the drainage bottom. Water entering the golf course would likely inundate and spread out, becoming sheet flow rather than a channelized flow. Once water leaves the golf course and developed urban areas, it flows approximately 1.5 miles, where all flow is stopped and contained by a 15- to 20-foot-tall flood control dike built and maintained by Graham County. The flood control dike prevents water from reaching the Gila River.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because a flood control structure prevents any spilling water from this site from entering the Gila River.
Cluff Pond #3, Dankworth Pond, Roper Lake, Graham County Fairgrounds	Closed systems and LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Magnitude of Potential Effects and Summary of Determining Factors
AGUA FRIA RIVER SUBCATCHMENT		
Agua Fria River Complex		
Fain Lake, Lynx Lake	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. LLFs are known from more than 30 miles (perennial, ephemeral, and interrupted perennial reaches) downstream in the Agua Fria River. These two lakes are open systems that spill periodically in response to precipitation events. Lynx Lake is upstream from Fain Lake, and any spills flow through it. Water diversions exist that bypass Fain Lake via canals and other ponds during normal summer releases. Lynx Creek and the Agua Fria River are ephemeral/intermittent streams flowing seasonally during high-precipitation events. Stocked species have never been documented in the Agua Fria River area of LLF occurrence records. Other LLF occurrence records exist within the subcatchment in the upper reaches of tributaries to the Agua Fria River, where stocked fish would not be expected to be able to access. Species stocked at Fain Lake are largemouth bass, bluegill (since 2007), white crappie, rainbow trout (since 1997), brook trout (since 2007), brown trout, cutthroat trout, and channel catfish (since 1997). Species stocked at Lynx Lake are largemouth bass (since 2006), bluegill (since 1992), white crappie, rainbow trout (since 1963), brook trout (since 1964), brown trout (since 1971), cutthroat trout (since 1972), and channel catfish (since 2004).	<u>Proposed Action and Reduced Stocking Alternative</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, and stocked fish are not likely to move to LLF-occupied areas due to the extensive distance and intervening ephemeral reaches.
Horsethief Basin Lake	This is a closed system, and LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated
SALT RIVER SUBCATCHMENT		
Black River Complex		
Big Lake, Crescent Lake, East Fork Black River, West Fork Black River, Ackre Lake	The closest known LLF occurrences are downstream in the Salt River, which is more than 120 miles away.	<u>Proposed Action</u> No effects anticipated because of the extreme distance to LLF-occupied areas. <u>Reduced Stocking Alternative</u> East Fork Black River, West Fork Black River, and Big Lake not stocked; effects from stocking Crescent Lake and Ackre Lake same as Proposed Action

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effectsⁱ	Magnitude of Potential Effects and Summary of Determining Factors
Canyon Creek Complex		
Canyon Creek	The nearest known LLF occurrence is more than 50 miles downstream from the stocking site in the mainstem Salt River and in tributaries of the Salt River (Ash Creek, Cherry Creek, and Coon Creek).	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because of the extreme distance to LLF-occupied areas.
Workman Creek Complex		
Workman Creek	The nearest known occurrence of LLFs is in tributaries that flow into Roosevelt Lake, which is 14 miles from the confluence of Workman Creek and Salome Creek. Stocked fish (rainbow trout) would have to reach the lake and then migrate into these ephemeral tributaries to reach the occupied LLF locations.	<u>Proposed Action</u> No effects anticipated because of intervening Roosevelt Lake between stocking reach and LLF locations. <u>Reduced Stocking Alternative</u> Site not stocked
Tonto Creek Complex		
Tonto Creek, Christopher Creek, and Haigler Creek	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. The nearest LLF occurrence is in the mainstem of Tonto Creek, more than 25 miles downstream from the nearest proposed stocking site (Tonto Creek). The other two sites are farther away. All three creeks are perennial. The species stocked is rainbow trout, which has been stocked since 1933. Several surveys have detected only one rainbow trout in middle Tonto Creek, downstream of Hell's Gate (LLF occurrences are downstream of Hell's Gate).	<u>Proposed Action</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, and stocked fish are not likely to move to LLF-occupied areas due to the extensive distance. Surveys have not detected rainbow trout in the vicinity of the LLF locations despite past stocking of this species. <u>Reduced Stocking Alternative</u> Sites not stocked
Lower Salt River Complex		
Apache Lake	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. The nearest known LLF occurrences are in tributaries of Canyon and Saguaro lakes. LLFs are known from approximately 1 mile upstream of Canyon Lake in ephemeral tributaries La Barge Creek and Tortilla Creek. LLFs are also known from approximately 5 miles upstream of Canyon Lake in Fish Creek, which is ephemeral in its first 5 miles above the lake. To reach these areas, fish would have to move over the dam at Apache Lake into Canyon Lake and then upstream to LLF-occupied areas. Apache Lake has spilled two of the last 20 years and has deep water releases for power generation. Walleye, channel catfish, smallmouth bass, largemouth bass, black crappie, and rainbow trout are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, and stocked fish are not likely to move to LLF-occupied areas due to the limited spilling and only deepwater releases for power generation. If the stocked fish did move, they would have to travel through the Apache Lake dam and then upstream in the ephemeral streams of Canyon Lake to get to LLF-occupied areas.

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Magnitude of Potential Effects and Summary of Determining Factors
Canyon Lake	LLFs are not known from this site but are known from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. LLFs are known from approximately 1 mile upstream in tributaries La Barge Creek and Tortilla Creek. LLFs are also known from approximately 5 miles upstream in Fish Creek. Walleye, channel catfish, smallmouth bass, largemouth bass, black crappie, and rainbow trout are proposed for stocking. Channel catfish, smallmouth bass, largemouth bass, and black crappie are established in reservoirs, as are flathead catfish, yellow bass, green sunfish, and yellow bullhead. Surveys in 2005 and 2006 found fathead minnow and Gila topminnow in Tortilla Creek near LLF locations but no other fish. Fish Creek was surveyed in 1993 and 1996, and the only reported fish species was longfin dace. It is not known whether any fish are present in La Barge Creek because of the lack of survey information. Walleye, black crappie, and rainbow trout would not be able to survive near LLF-occupied areas because these areas are prone to flash floods, have dry to interrupted habitat, and have high summer water temperatures. It is likely that channel catfish, largemouth bass, and smallmouth bass would not survive, but survival is possible.	<u>Proposed Action</u> Moderate because LLFs are present only 1 mile from the stocking location, and stocked species could move into LLF-occupied areas. However, habitat near LLF-occupied areas is not suitable for walleye, rainbow trout, or black crappie. Surveys in two of the areas have not detected largemouth bass, smallmouth bass, or channel catfish despite these species being present in the reservoirs since at least 1950. LLFs could also move down into the reservoir, but those frogs would not be considered a viable population due to the existing predator community present at Canyon Lake that would soon eliminate any migrating frogs. <u>Reduced Stocking Alternative</u> Site not stocked

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Magnitude of Potential Effects and Summary of Determining Factors
Saguaro Lake	LLFs are not known from this site but are known from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. LLFs are known from approximately 2.5 miles upstream in Cottonwood Creek. LLF records are also known from approximately 4 miles downstream in the Salt River. Saguaro Lake has spilled two of the past 20 years and has deep water releases for power generation. Fish movement is possible over the spillways but is unlikely through deep water turbine releases. To reach LLFs in Cottonwood Creek, stocked fish would have to travel upstream through an approximately 2.5-mile ephemeral reach; however, several surveys conducted since 1976 have not detected nonnative species near the closest occupied area in Cottonwood Creek. Walleye, channel catfish, smallmouth bass, largemouth bass, black crappie, and rainbow trout are proposed for stocking. Channel catfish, smallmouth bass, largemouth bass, and black crappie are established in reservoirs, as are flathead catfish, yellow bass, green sunfish, and yellow bullhead. Largemouth bass, smallmouth bass, and channel catfish are established in the Lower Salt River. Black crappie are not likely to survive in the Lower Salt River because they require lake- or pond-like habitat that is not present downstream of the reservoirs. Rainbow trout are not likely to survive beyond seasonally due to the warm summer water temperatures in the Lower Salt River. Walleye could potentially survive longer but have not been documented to reproduce in these reservoirs or the Lower Salt River. Annual surveys of the Lower Salt River have only documented rare occurrences of walleye.	<u>Proposed Action</u> Low because movement of stocked species into LLF-occupied areas in the Lower Salt River is possible but is based on spill information. Movement would be expected to be infrequent. All stocked species are either established downstream in the Lower Salt River (largemouth bass, channel catfish, and smallmouth bass) or not likely to establish based on habitat and survey information (walleye, rainbow trout, and black crappie). Stocked species do not likely reach LLF-occupied areas in Cottonwood Creek, based on several surveys not detecting nonnative fish. LLFs present in Cottonwood Creek could move downstream into the lake, but those frogs would not be considered a viable population due to the existing predator community present at Saguaro Lake that would soon eliminate any migrating frogs. <u>Reduced Stocking Alternative</u> Site not stocked
Lower Salt River	There is an occurrence record for LLFs from 1991 within the stocked river reach, at Blue Point Picnic Area. LLFs are not known from other areas within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. Based on the occurrence of a single record, it is unlikely that the complement of nonnatives would allow establishment or persistence of LLFs at this site. Rainbow trout proposed for stocking are not likely to persist beyond seasonally due to the high summer water temperatures. Largemouth bass, channel catfish, smallmouth bass, flathead catfish, yellow bullhead, and green sunfish are established in the Lower Salt River.	<u>Proposed Action</u> Low because LLFs were detected within the stocking reach but were detected only one time and likely do not persist in this nonnative fish-dominated stream. <u>Reduced Stocking Alternative</u> Site not stocked

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Magnitude of Potential Effects and Summary of Determining Factors
Phoenix Metro Complex		
31 locations ²	There are no LLF occurrences within 5 miles of any of the Salt River subcatchment lakes. Twenty-four of the lakes are closed systems from which stocked fish cannot escape. The remaining lakes drain into Tempe Town Lake or the Lower Salt River below Tempe Town Lake via Indian Bend Wash. Movement of stocked fish is limited to downstream only from Tempe Town Lake and then downstream only toward the Gila River, where no LLFs are known to occur.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated
VERDE RIVER SUBCATCHMENT		
Big Chino Complex		
Garret Tank, Presley Tank, Shucking Tank, Stone Dam	The closest known LLF occurrence to any site within the subcatchment is more than 50 miles downstream and back upstream to the headwaters of Walnut Creek, a tributary of Big Chino Wash that is ephemeral at its confluence.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because of the extreme distance to LLF-occupied areas.
Granite Basin Lake	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. This is an open lake that spilled in 2005 and 2008. The nearest LLF occurrence is in the headwaters of Hitt Wash. It is about 16 miles downstream of Mint Wash to the confluence with Hitt Wash, then about 11 miles upstream in Hitt Wash to the occurrence. Hitt Wash is believed to be an ephemeral channel. Largemouth bass and bluegill are proposed for stocking. Between the stocking site and the LLF occurrence area, where Hitt Wash and Mint Wash join Williamson Valley Wash, is a perennial area of Williamson Valley Wash. Largemouth bass have been present in Granite Basin Lake since the 1950s and were not detected in this perennial habitat during four surveys conducted between 1990 and 2003.	<u>Proposed Action</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, and stocked fish are not likely to move to LLF-occupied areas due to the extensive distance. Multiple surveys have not detected stocked species in downstream perennial areas. <u>Reduced Stocking Alternative</u> Site not stocked
Granite Creek Complex		
Willow Creek Reservoir, Watson Lake, Goldwater Lake	The nearest LLF occurrence from the lakes is 43 miles downstream from the confluence of Granite Creek with the Verde River. There are more than 23 miles of ephemeral and intermittent stream channels between these sites and the Upper Verde River, which contains several water diversion structures and sand and gravel operations that may inhibit water and fish movement.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because of the extreme distance to LLF-occupied areas and the intervening water diversion structures.

² Alvord Lake, Cortez Lake, Crossroads Park, Desert Breeze Lake, Desert West Lake, Encanto Lake, Evelyn Hallman Pond, Kiwanis Lake, Red Mountain Lake, Rio Vista Pond, Riverview Lake, Steele Indian School Pond, Surprise Lake, Veterans Oasis Lake, Water Ranch Lake, Bonsall Park Lake, Crossroads Park, Discovery District Park Lakes, Freestone Park Lakes, Granada Park Lakes, McQueen Park Lake, Pacana Park Lake, Roadrunner Park Lake, Selleh Park Lake, Water Treatment Lake, Chaparral Lake, Papago Ponds, Eldorado Lakes, Indian School Lake, Vista del Camino (McKellips Lake), Tempe Papago Lake, and Tempe Town Lake

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effectsⁱ	Magnitude of Potential Effects and Summary of Determining Factors
Sycamore Creek Complex		
Elk Tank, JD Dam Lake, White Horse Lake, Middle Tank, Perkins Tank	Closed systems and LLFs are not known from these sites or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated
Middle Verde River Complex		
Deadhorse Lake	Closed system and LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas.	<u>Proposed Action</u> No effects anticipated <u>Reduced Stocking Alternative</u> Site not stocked
Oak Creek	LLFs are known from the stocking reach and from 1.75 miles up Spring Creek, a tributary that joins Oak Creek 3.7 miles downstream from the end of the stocking reach. Rainbow trout are proposed for stocking and have been stocked since 1933. Rainbow trout are established in upper Oak Creek, and stocked trout could persist in this reach. However, rainbow trout stocked into lower Oak Creek would not likely persist beyond seasonally due to the high summer water temperatures. Smallmouth bass, channel catfish, brown trout, green sunfish, red shiner, carp, rock bass, flathead catfish, and bullhead catfish are all known from the stocking reach downstream of Grasshopper Point. Brown trout are established upstream of Grasshopper Point. LLF-occupied areas are near Grasshopper Point and upstream of Grasshopper Point in Oak Creek.	<u>Proposed Action</u> High because LLFs are present in the stocking reach, and stocked fish could persist through the summer in the upper end of the stocking reach. There is a robust community of nonnative fish in Oak Creek that could prey upon LLFs before rainbow trout would have a chance to do so. <u>Reduced Stocking Alternative</u> Site not stocked
Wet Beaver Creek	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. The nearest known LLF occurrence is more than 16 ephemeral miles downstream to the Verde River and then an additional 11 miles to the occupied site. Stocked rainbow trout are not likely to persist beyond seasonally due to the high summer water temperatures.	<u>Proposed Action</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, and stocked fish are not likely to move to LLF-occupied areas due to the extensive distance and inability to persist during summer. <u>Reduced Stocking Alternative</u> Site not stocked

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Magnitude of Potential Effects and Summary of Determining Factors
Mingus Lake	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. The nearest known LLF occurrence is downstream approximately 12 miles to the Verde River, and then an additional 10 miles upstream of the Verde River to the occupied tributaries. The stream channel between Mingus Lake and the Verde River is steep, rocky, and ephemeral. Fish movement to LLF-occupied areas is not likely due to stream conditions. Rainbow trout, black crappie, and bluegill are proposed for stocking. Black crappie are not likely to survive in downstream Verde River because this species requires extensive low-flowing or non-flowing habitat, which is not available. Rainbow trout could survive in the Verde River but only seasonally due to the high summer temperatures. Bluegill could persist in this portion of the Verde River and maintain an existing population, though not in abundant numbers.	<u>Proposed Action and Reduced Stocking Alternative</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, and stocked fish are not likely to move to LLF-occupied areas due to the extensive distance and stream channel conditions.
Huffer Lake	This stocking site is in the headwaters of West Clear Creek and is approximately 54 miles to the known LLF location.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because of the extreme distance to LLF-occupied areas.
West Clear Creek	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. This is an open stream system, and the closest location is in the Verde River, approximately 4 miles downstream of West Clear Creek to the confluence with the Verde River, and then approximately 4 miles downstream. Rainbow trout are proposed for stocking and have been stocked since 1981. Rainbow trout are established in upper West Clear Creek.	<u>Proposed Action</u> Moderate because LLFs are not present within the 1-, 3-, and 5-mile areas, but LLFs are known from approximately 8 miles downstream. Movement to that location is possible due to the perennial connection and the open stream system. <u>Reduced Stocking Alternative</u> Site not stocked

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Magnitude of Potential Effects and Summary of Determining Factors
Middle Verde River	LLFs are not known from this stocking reach but are known from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. This is an open stream system, and the closest location is in Bitter Creek, less than 3 ephemeral miles from the stocking reach. Stocked fish would not likely move into the wetland habitat occupied by the LLFs, but LLFs could move into the stocked reach. LLFs are also known from the Verde River downstream of the stocking reach by approximately 9 miles and approximately 13 miles upstream of the stocking reach in Spring Creek (a tributary of Oak Creek). Rainbow trout proposed for stocking are not likely to persist beyond seasonally due to the high summer water temperatures.	<u>Proposed Action</u> Moderate because LLFs are present less than 3 miles from the stocking reach in an area connected by an ephemeral stream channel, and LLFs could move to this stocking reach; however, stocked fish are not likely to persist throughout the summer. <u>Reduced Stocking Alternative</u> Site not stocked
Lower Verde Complex		
Green Valley Lake	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. This is an open system. The nearest documented LLF occurrence is in Rock Creek, a tributary of the East Verde River. The occurrence is 4.6 miles down ephemeral American Gulch and then more than 10 miles down the perennial or interrupted perennial East Verde River, then up into Rock Creek approximately 0.5 mile. There are also occurrences in the East Verde River, approximately 11 miles upstream from the confluence with American Gulch. Other distant occurrences in the subcatchment are in Verde River tributaries upstream and downstream of the confluence with the East Verde River; the Verde River is more than 20 miles downstream from the confluence of American Gulch and the East Verde River. Rainbow trout are proposed for stocking under the Proposed Action. Rainbow trout and channel catfish are proposed for stocking under the Reduced Stocking Alternative. Rainbow trout could survive in the downstream East Verde River but only seasonally due to the high summer temperatures. It is unknown whether channel catfish could survive and establish a new population. Currently, channel catfish have not been detected in the middle and upper East Verde River. Though channel catfish have never been stocked in these lakes by the AGFD, they have established a population in these lakes since at least 2006. Channel catfish are established in the Verde River.	<u>Proposed Action</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, and stocked fish are not likely to move to LLF-occupied areas due to the extensive distance and stream channel conditions. <u>Reduced Stocking Alternative</u> Moderate because LLFs are not present within the 1-, 3-, and 5-mile areas, and stocked fish are not likely to move to LLF-occupied areas due to the extensive distance and stream channel conditions. However, it is not known whether channel catfish could establish a new population in the East Verde River.

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effectsⁱ	Magnitude of Potential Effects and Summary of Determining Factors
East Verde River	LLFs are known from within an open stocking reach and immediately downstream. Rainbow trout are proposed for stocking. Rainbow trout are established in the upper East Verde River, and stocked rainbow trout could persist throughout the summer. Yellow bullhead, goldfish, red shiner, green sunfish, and smallmouth bass are all known from the stocking reach and are in the vicinity of the LLF-occupied area in the East Verde River.	<u>Proposed Action</u> High because stocking takes place directly into the occupied reach, and stocked fish could persist through the summer. However, there is a robust community of nonnative fish that could prey upon LLFs before rainbow trout have a chance to do so. <u>Reduced Stocking Alternative</u> Site not stocked
SANTA CRUZ RIVER SUBCATCHMENT		
Upper Santa Cruz River Complex		
Parker Canyon Lake	The nearest known LLF occurrence downstream from Parker Canyon Lake is in a tributary of the Santa Cruz River more than 70 stream miles away.	<u>Proposed Action</u> No effects anticipated because of the extreme distance to LLF-occupied areas. <u>Reduced Stocking Alternative</u> Site not stocked
Patagonia Lake	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. The nearest LLF occurrence is in a tributary that joins Sonoita Creek about 4.5 miles upstream of the lake, and then an additional 9 miles up that ephemeral canyon. There are also locations downstream, in a tributary of the Santa Cruz River. From Patagonia Lake, it is approximately 8 miles downstream to the Santa Cruz and then approximately 10 mile downstream to the tributary, then approximately 3 miles upstream of the tributary to get to the LLF-occupied areas. Rainbow trout are proposed for stocking and have been stocked since 1976. The area below the lake (Sonoita Creek) is not suitable for trout survival in the summer months due to the high temperatures, and at least 12 surveys over the past 20 years have not detected the presence of rainbow trout in this area, though most surveys were conducted in summer months. The reach immediately upstream of Patagonia Lake contains no suitable habitat for rainbow trout. Only one rainbow trout has been documented above the lake in the early 1990s,³ and no other rainbow trout have been found in later surveys.	<u>Proposed Action</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, and stocked fish are not likely to move to LLF-occupied areas due to the distance (more than 13.5 miles to upstream locations and more than 21 miles to downstream locations). Several surveys have not detected rainbow trout downstream of the lake and have detected only one rainbow trout upstream of the lake. <u>Reduced Stocking Alternative</u> Site not stocked

³ D. Mitchell, AGFD Fisheries Biologist, personal communication via e-mail to David Boyarski, AGFD Gila River Basin Native Fishes Conservation Coordinator, on January 24, 2011.

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Magnitude of Potential Effects and Summary of Determining Factors
Peña Blanca Lake	There are numerous documented occurrences of LLFs within 5 miles of the lake, all of which are upstream. Some are within 1 mile overland from the lake; many others are within 3 miles along intermittent or interrupted perennial channels. LLFs were documented at the lake in 2009. This site was recently drained for a contaminant-removal project. This caused the elimination of the existing nonnative warmwater fish community, including sport fish, some of which will be restocked as part of this restoration project (U.S. Department of Agriculture Forest Service [FS] Biological Assessment [BA]). The AGFD and the FS, along with partners, took advantage of this situation and removed bullfrogs from this site and nearby tanks and may have eliminated this key stressor from this site and nearby areas. It is not known whether LLFs will establish at this site because chytrid fungus is present and may persist even in the absence of bullfrogs and this site will be restocked with some species of warmwater sport fish (separate from this action). Prior to draining and renovation, the shore areas of Peña Blanca Lake had abundant emergent vegetation, submergent vegetation, and underwater cover in the form of downed and standing trees, and it is expected that the vegetation will return after filling.⁴ In the absence of bullfrog (an important stressor to LLFs), this complex habitat may allow for the persistence and establishment of LLFs at this site and coexistence with nonnative warmwater fish. Rainbow trout are proposed for stocking. It is unlikely that stocked hatchery fish could move upstream due to the presence of a small fish barrier created by Arizona State Route 289, which crosses Peña Blanca Canyon just above the lake and creates a fish barrier with a 3- to 4-foot drop. Fish can spill from the reservoir during flood events. The first mile downstream contains pool habitat that is suitable for trout, except in summer months when it gets too warm. Rainbow trout are stocked during the cooler months and do not survive through the summer because the lake becomes too warm.	<u>Proposed Action</u> Moderate because LLFs are known from within 1 mile of the lake and from the lake. However, it is not known whether LLFs will establish or have begun establishing at this lake. The shore areas of the lake are expected to reestablish with emergent and submergent aquatic vegetation and to have complex habit which, in the absence of bullfrogs, may enable successful persistence of LLFs with nonnative warmwater fish. These complex shoreline areas would also likely limit rainbow trout predation on LLFs (mainly tadpoles). Stocked trout do not survive through the summer and, therefore, there is potential overlap with larval frogs only during the cooler months. Predation by the stocked rainbow trout will be less than predation from the reestablished warmwater sport fish. <u>Reduced Stocking Alternative</u> Site not stocked

⁴ D. Mitchell, AGFD Fisheries Biologist, personal communication via e-mail to David Boyarski, AGFD Gila River Basin Native Fishes Conservation Coordinator, on January 24, 2011.

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Magnitude of Potential Effects and Summary of Determining Factors
Upper and Middle Santa Cruz, Pantano-Rillito River, Tucson Santa Cruz, and Tucson Santa Cruz FIN Complexes		
Fagen Tank, Sahuarita Lake, Reid Park Lake	Closed systems and LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas.	<u>Proposed Action</u> Fagen Tank not stocked; effects from stocking remaining sites same as Reduced Stocking Alternative. <u>Reduced Stocking Alternative</u> No effects anticipated
Kennedy Park Lake	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. The nearest LLF occurrence is in the Santa Cruz River. From this site, it is approximately 3.5 miles of ephemeral stream channel to the Santa Cruz River and then approximately 5 miles of ephemeral stream channel up to the occupied area. Rainbow trout, channel catfish, bluegill, redear sunfish, and largemouth bass are proposed for stocking. Precipitation events that fill the lake to overflowing are infrequent, occurring on average at 3- to 7-year intervals. During an overflow event, stocked fish or offspring of stocked fish could potentially move over the spillway into the ephemeral washes below. Any fish caught in these episodic flooding events would be subjected to a variety of environmental and physical stressors, including turbulence, high sediment loads, drop structures, physical damage, clogged gills, and disorientation. The only persistent aquatic habitat available is approximately 10 miles downstream on the Santa Cruz River, below the Roger Road wastewater treatment discharge site. Perennial water in this section of the Santa Cruz River is due to wastewater discharge. If stocked fish made it to the perennial water, the poor water quality associated with the treated effluent, irregular flows, and high water temperatures during the summer would prohibit long-term survival.	<u>Proposed Action and Reduced Stocking Alternative</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, and stocked fish are not likely to move to LLF-occupied areas due to the distance (approximately 8.5 miles) and the ephemeral nature of stream channels.

Table M. Analysis of potential impacts to lowland leopard frogs resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Magnitude of Potential Effects and Summary of Determining Factors
Silverbell Lake	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. The nearest LLF occurrence is in the Santa Cruz River, about 12 miles upstream of the confluence of the wash, coming from Silverbell Lake. Rainbow trout, channel catfish, bluegill, redear sunfish, black crappie, and largemouth bass are proposed for stocking. The water level of the lake is controlled by pumping and has the potential to spill only in the case of accidental overpumping, which would be rare. If the lake spilled, it would flow into the Santa Cruz River, which is perennial near this site. Perennial water in this section of the Santa Cruz River is due to wastewater discharge. If stocked fish made it to the perennial water, the poor water quality associated with the treated effluent, irregular flows, and high water temperatures during the summer would prohibit long-term survival.	<u>Proposed Action and Reduced Stocking Alternative</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, and stocked fish are not likely to move to LLF-occupied areas due to the low spill potential and the distance (approximately 12 miles) to LLFs.
Rose Canyon Lake	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. The nearest LLF occurrence is downstream in Tanque Verde Wash. From the stocking site, it is approximately 4.5 miles downstream to Bear Canyon, then approximately 5 miles downstream to Sabino Canyon, then approximately 3 miles downstream to Tanque Verde Wash. The occupied area is approximately 3.5 miles upstream from the confluence of Sabino Canyon and the Tanque Verde Wash. All these stream segments are ephemeral. Rainbow and brown trout are proposed for stocking.	<u>Proposed Action</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, and stocked fish are not likely to move to LLF-occupied areas due to the distance (approximately 16 miles) to LLFs and the ephemeral nature of stream channels. <u>Reduced Stocking Alternative</u> Site not stocked
Lakeside Lake	LLFs are not known from this site or from within the 1-, 3-, and 5-mile (overland, ephemeral, perennial) areas. The nearest occurrences of LLFs are in Tanque Verde Wash. From the stocking site, it is approximately 7 miles down Pantano Wash and then about 7 miles back upstream in Tanque Verde Wash. There is no perennial habitat in these ephemeral channels. There are also records in another downstream tributary of Tanque Verde Wash. Rainbow trout, channel catfish, bluegill, redear sunfish, and largemouth bass are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> Low because LLFs are not present within the 1-, 3-, and 5-mile areas, and stocked fish are not likely to move to LLF-occupied areas due to the distance (approximately 14 miles) to LLFs and the ephemeral nature of stream channels.
Arivaca Lake	There are no known LLF occurrences in the watershed flowing into Arivaca Lake. The nearest occurrence is more than 40 miles downstream via Arivaca Wash and Brawley Wash near Three Points.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because of the extreme distance to LLF-occupied areas.

ⁱ For a more detailed description of site characteristics, please refer to the Biological Assessment of the Sport Fish Stocking Program. Information in this column was obtained from the Biological Assessment and/or analysis of the various databases, unless otherwise noted.

APPENDIX M

Analysis of Potential Impacts to Western Narrow-mouthed Toads

Table N. Analysis of potential impacts to Western narrow-mouthed toads resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Exposure Potential
SANTA CRUZ RIVER SUBCATCHMENT		
Upper Santa Cruz River Complex		
Parker Canyon Lake	The nearest known Western narrow-mouthed toad occurrence is downstream from Parker Canyon Lake in a tributary of the Santa Cruz River more than 60 stream miles away.	<u>Proposed Action</u> No effects anticipated because of extreme distance to Western narrow-mouthed toad-occupied areas. <u>Reduced Stocking Alternative</u> Site not stocked
Patagonia Lake	Fish can spill from the reservoir during flood events. Five miles of stream below the lake is perennial or interrupted perennial. The nearest known Western narrow-mouthed toad occurrences are downstream in the Santa Cruz River and in a tributary of the Santa Cruz River. From Patagonia Lake, it is approximately 8 miles downstream to the Santa Cruz River. From there, it is approximately 10 miles downstream to the mainstem areas occupied by the Western narrow-mouthed toad and approximately 8 miles up a small tributary to other areas occupied by the Western narrow-mouthed toad. Rainbow trout are proposed for stocking and have been stocked since 1976. The area below the lake (Sonoita Creek) is not suitable for trout survival in the summer months due to the high temperatures. At least 12 surveys over the past 20 years have not detected the presence of rainbow trout in this area, though most surveys were conducted in the summer months.	<u>Proposed Action</u> Low exposure because of the long distance between the stocking location and Western narrow-mouthed toad occurrences. Also, several surveys have not detected rainbow trout downstream of the lake despite the lake having been stocked since 1976. <u>Reduced Stocking Alternative</u> Site not stocked
Peña Blanca Lake	There are numerous documented occurrences of Western narrow-mouthed toads, including at this site, upstream, and in adjacent stream systems. Rainbow trout are proposed for stocking. During periods of flooding, it is unlikely that stocked hatchery fish could move upstream due to the presence of a small fish barrier created by Arizona State Route 289 that crosses Peña Blanca Canyon just above the lake and creates a fish barrier with a 3- to 4-foot drop. Fish can spill from the reservoir during flood events. The first mile downstream contains pool habitat that is suitable for trout, except in summer months when it gets too warm.	<u>Proposed Action</u> High exposure because Western narrow-mouthed toads are known from this site and several nearby areas. <u>Reduced Stocking Alternative</u> Site not stocked
Upper Santa Cruz, Middle Santa Cruz, Pantano-Rillito River, Tucson Santa Cruz, and Tucson Santa Cruz FIN Complexes		
Fagen Tank	This is a closed system, and the closest known location of Western narrow-mouthed toads is approximately 10 miles away.	<u>Proposed Action</u> Site not stocked <u>Reduced Stocking Alternative</u> No effects anticipated

Table N. Analysis of potential impacts to Western narrow-mouthed toads resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effects ⁱ	Exposure Potential
Sahuarita Lake, Reid Park Lake	These are closed systems, and Western narrow-mouthed toads are known from approximately 2 miles from Sahuarita Lake and approximately 3.5 miles from Reid Park Lake. Rainbow trout, channel catfish, bluegill, redear sunfish, and largemouth bass are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> Low exposure because Western narrow-mouthed toads are known from several nearby areas. They potentially could reach this stocking location, but known locations are beyond the known dispersal ability by this species, and sites are closed to fish movement.
Kennedy Park Lake	The nearest Western narrow-mouthed toad occurrence is approximately 0.5 mile downstream. Precipitation events that fill the lake to overflowing are infrequent, occurring on average at three- to seven-year intervals. During an overflow event, stocked fish or offspring of stocked fish could potentially move over the spillway into the ephemeral washes below. Stocked fish would not persist in an area occupied by Western narrow-mouthed toads because these areas are ephemeral. The only persistent aquatic habitat available is approximately 10 miles downstream on the Santa Cruz River below the Roger Road wastewater treatment discharge site. Perennial water in this section of the Santa Cruz River is due to wastewater discharge. If stocked fish made it to the perennial water, the poor water quality associated with the treated effluent, irregular flows, and high water temperatures during the summer would prohibit long-term survival. Rainbow trout, channel catfish, bluegill, redear sunfish, and largemouth bass are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> Moderate exposure because Western narrow-mouthed toads are known from 0.5 mile away and from several nearby areas, and they potentially could reach this stocking location
Silverbell Lake	Western narrow-mouthed toads are known from within 0.2 mile of this stocking location and in upstream tributaries of the Santa Cruz River. Rainbow trout, channel catfish, bluegill, redear sunfish, black crappie, and largemouth bass are proposed for stocking. The water level of the lake is controlled by pumping and has the potential to spill only in the case of accidental overpumping, which would be rare. If the lake spilled, it would flow into the Santa Cruz River, which is perennial near this site. Perennial water in this section of the Santa Cruz River is due to wastewater discharge. If stocked fish made it to the perennial water, the poor water quality associated with the treated effluent, irregular flows, and high water temperatures during the summer would prohibit long-term survival.	<u>Proposed Action and Reduced Stocking Alternative</u> High exposure because Western narrow-mouthed toads are known from close proximity to this site.

Table N. Analysis of potential impacts to Western narrow-mouthed toads resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Relevant Site and Subcatchment Characteristics for Determining Potential Effectsⁱ	Exposure Potential
Rose Canyon Lake	The closest known occurrences of Western narrow-mouthed toads are from tributaries of the Santa Cruz River. To reach these locations, it is approximately 22 miles downstream (ephemeral) to the Santa Cruz River and then approximately 2.5 miles upstream from there.	<u>Proposed Action</u> No effects anticipated because of the long distance between the stocking location and the Western narrow-mouthed toad-occupied area and because of the ephemeral nature of connecting stream channels. <u>Reduced Stocking Alternative</u> Site not stocked
Lakeside Lake	The closest known occurrences of Western narrow-mouthed toads are from tributaries of the Santa Cruz River. To reach these locations, it is approximately 18 miles downstream (ephemeral) to the Santa Cruz River and then approximately 2.5 miles upstream from there.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because of the long distance between the stocking location and the Western narrow-mouthed toad-occupied area and because of the ephemeral nature of connecting stream channels.
Arivaca Lake	The closest known occurrences of Western narrow-mouthed toads are approximately 4.5 miles overland in unconnected ephemeral areas. Western narrow-mouthed toads are also known from a nearby tributary. To reach this location, fish would have to travel downstream approximately 13 miles of mostly ephemeral stream channel and then upstream approximately 6 miles of mostly ephemeral stream channel. Arivaca has spilled twice in the past 10 years.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because of the long distance between the stocking location and the Western narrow-mouthed toad-occupied area and because of the ephemeral nature of connecting stream channels.

ⁱ For a more detailed description of site characteristics, please refer to the Biological Assessment of the Sport Fish Stocking Program. Information in this column was obtained from the Biological Assessment and/or analysis of the various databases, unless otherwise noted.

APPENDIX N

Analysis of Potential Impacts to California Floaters and White Mountain Water Penny Beetles

Table O. Analysis of potential impacts to California floaters and White Mountain water penny beetles resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Explanation of Determining Factors for Potential Effects¹	Magnitude of Potential Effects
LOWER COLORADO RIVER SUBCATCHMENT¹		
Lower Colorado River Above Lyman Complex		
Pratt Tank, Carnero Lake	These are closed systems, and California floaters and White Mountain water penny beetles are not known from these locations.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated
Hulsey Lake, Nelson Reservoir	These are open systems. Hulsey Lake fills and spills annually during spring runoff and eventually runs into Nelson Reservoir. Nelson Reservoir spills when there is sufficient snowpack (spilled 5 of the past 10 years). California floaters are known 13 miles downstream (perennial) of Nelson Reservoir in the Lower Colorado River. White Mountain water penny beetles are found approximately 10 miles upstream in the Lower Colorado River. Stocking strategies are in place that limit the movement of stocked fish by stocking catchable-sized rainbow trout only after lake levels have subsided—when just a few inches of water are spilling over the spillway at Hulsey and after spilling has stopped at Nelson Reservoir. Rainbow trout are proposed for stocking and are established in Nutrioso Creek upstream of Nelson Reservoir and in at least one tributary downstream. Annual surveys to detect stocked trout have been completed for 11 years, starting in 1996, and have detected 23 rainbow trout downstream of Nelson Reservoir in Nutrioso Creek.	<u>Proposed Action</u> California floaters—Low exposure White Mountain water penny beetles—Low exposure Low exposures because of the distance between stocking locations and California floater-occupied areas and White Mountain water penny beetles; the management strategy; and the limited number of stocked fish found downstream during 11 years of surveys <u>Reduced Stocking Alternative</u> Sites not stocked

¹ In the Lower Colorado River subcatchment, the White Mountain water penny beetle is only known from the upper Lower Colorado River. Fish stocked in White Mountain, Schoen's, Chevelon Creek, Black Canyon Lake, Clear Creek, Clear Creek Reservoir, Jack's Canyon, Canyon Diablo, and Walnut Creek complexes cannot reach the upper Lower Colorado River because of the dam at Lyman Lake. Therefore, stocking at all sites in these complexes will not affect the White Mountain water penny beetle.

Table O. Analysis of potential impacts to California floaters and White Mountain water penny beetles resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Explanation of Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Becker Lake	This is an open system that does not spill; however, water is released for irrigation purposes through a 14- to 16-inch-diameter outlet pipe that flows into an open ditch and into the Lower Colorado River. The valve on the pipe is only opened to 1 inch during releases to limit fish escapement, and a gabion fish barrier is present upstream of the site that prevents fish movement upstream. California floaters are known from this site and in the nearby Lower Colorado River. White Mountain water penny beetles are found approximately 10 miles upstream from the point that the outflow enters the Lower Colorado River, in the Lower Colorado River. Rainbow trout, Apache trout, and Arctic grayling are proposed for stocking. Rainbow trout likely do not persist beyond seasonally in the downstream Lower Colorado River, based on two surveys in 1993 and one in 1999 that detected only three rainbow trout in that area despite established populations upstream. This is likely due to the high summer water temperatures. Apache and Arctic grayling have similar temperature requirements and would likely not survive downstream in the Lower Colorado River.	<u>Proposed Action and Reduced Stocking Alternative</u> California floaters–High exposure because stocking directly into California floater–occupied site White Mountain water penny beetles–Low exposure because of the limited opportunity to escape the lake due to the 1-inch limited opening on the release valve and because of the distance between stocking locations and White Mountain water penny beetles
Lyman Reservoir	This is an open system. California floaters are known from upstream (more than 15 miles perennial) in the Lower Colorado River (the occurrence previously described near Becker Lake). White Mountain water penny beetles are found approximately 10 miles upstream in the Lower Colorado River. Rainbow trout, which are not likely to survive beyond seasonally in the upstream Lower Colorado River stretch between the reservoir and California floater locations, are proposed for stocking based on two surveys in 1993 and one in 1999 that detected only three rainbow trout in that area despite established populations upstream. This is likely due to the high summer water temperatures.	<u>Proposed Action</u> California floaters–Low exposure White Mountain water penny beetles–Low exposure Because of the distance between stocking locations and California floater–occupied areas and White Mountain water penny beetles and because of the limited numbers of rainbow trout detected near California floater–occupied areas during three surveys <u>Reduced Stocking Alternative</u> Site not stocked

Table O. Analysis of potential impacts to California floaters and White Mountain water penny beetles resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Explanation of Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
West Fork Lower Colorado River		
White Mountain Reservoir	This is an open system and spills annually during summer irrigation releases into Hall Creek. California floaters are known from downstream in the Lower Colorado River, and White Mountain water penny beetles are known from downstream in a tributary of the Lower Colorado River—South Fork Lower Colorado River. To reach the Lower Colorado River, fish would have to move through several private small impoundments. The total distance includes 2.9 miles of ephemeral streambed immediately below the reservoir and 3.1 miles of perennial streambed in lower Hall Creek. If stocked fish made it to the Lower Colorado River, they would have to travel approximately 12 miles downstream (perennial) to reach California floater-occupied areas and approximately 3.5 miles downstream to reach White Mountain water penny beetle-occupied areas. Rainbow trout are proposed for stocking and are established in the Lower Colorado River near the confluence with Hall Creek.	<u>Proposed Action and Reduced Stocking Alternative</u> California floaters—Low exposure White Mountain water penny beetles—Low exposure Because of the intervening impoundments between this and other stocking locations and because of the distance between the stocking location and California floater and White Mountain water penny beetle-occupied areas
Lee Valley Lake, West Fork Little Colorado River at Sheep's Crossing, West Fork Little Colorado River at Greer, Tunnel Reservoir, River Reservoir	These are open systems that all drain into River Reservoir, which spills annually during high water. California floaters are known from downstream Lower Colorado River (approximately 15 miles downstream from River Reservoir) and White Mountain water penny beetles are known from a tributary of the Lower Colorado River, South Fork Lower Colorado River (approximately 6 miles downstream). The beetle occurrence, documented in 1993, is in the vicinity of the South Fork Lower Colorado River Apache trout fish barrier. It is unknown whether current beetle distribution occurs above and/or below the fish barrier. Upstream of the barrier is a recovery population of Apache trout that is also an open system and can contribute trout downstream and into the Lower Colorado River. Rainbow trout, Apache trout, and/or Arctic grayling are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> California floaters—Low exposure White Mountain water penny beetles—Low exposure Because stocked fish could move during spilling or releases, and because of the distance between stocking locations and California floater and White Mountain water penny beetle-occupied areas limits exposure

Table O. Analysis of potential impacts to California floaters and White Mountain water penny beetles resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Explanation of Determining Factors for Potential Effectsⁱ	Magnitude of Potential Effects
Bunch Reservoir	This is an open system that drains into lower Hall Creek and then into the Lower Colorado River during annual summer irrigation releases. California floaters are known from downstream Lower Colorado River (approximately 15 miles downstream/mostly perennial), and White Mountain water penny beetles are known from a tributary of the Lower Colorado River—South Fork Lower Colorado River (approximately 6 miles downstream). Rainbow trout and Apache trout are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> California floaters—Low exposure White Mountain water penny beetles—Low exposure Because stocked fish could move during spilling or releases and because of the distance between stocking locations and California floater-occupied areas and White Mountain water penny beetles
Mexican Hay Lake	This is an open system that does not spill. Water can be released for irrigation but currently is not used for irrigation, nor is irrigation planned. If water is released, the stocked fish could move into the South Fork Lower Colorado River and then into the Lower Colorado River. California floaters are known from the Lower Colorado River (more than 15 miles downstream/mostly perennial) and White Mountain water penny beetles are known from South Fork Lower Colorado River (approximately 5 miles downstream). Apache trout are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> California floaters—Low exposure White Mountain water penny beetles—Low exposure Because the lake does not spill, water is not released, and there are no planned irrigation releases
Upper Lower Colorado River Complex		
Little Ortega, Concho Lake	These are closed systems, and California floaters and White Mountain water penny beetles are not known from the sites.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated
White Mountain Complex		
Sponseller Lake	This is a closed system, and California floaters are not known from the site.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated
Silver Creek, Little Mormon Lake	These are open sites that flow into the Silver Creek drainage, from which California floaters are not known. To reach California floater-occupied areas, fish would have to travel down Silver Creek (more than 9 miles and through White Mountain Reservoir), then into Show Low Creek and back upstream (more than 12 miles, mostly ephemeral, with intervening flood-control dams such as Schoen's Dam that serve as fish barriers to upstream movement).	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because of the extensive distance and barriers that include ephemeral reaches, reservoirs, and dams

Table O. Analysis of potential impacts to California floaters and White Mountain water penny beetles resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Explanation of Determining Factors for Potential Effectsⁱ	Magnitude of Potential Effects
Whipple Lake, Long Lake	These are open sites, but fish movement is only possible between lakes and California floaters are not known from these lakes.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated
Schoen's Complex		
Woodland Lake, Mountain Meadow Recreation Complex, Rainbow Lake, Show Low Lake, Show Low Creek	These are open sites with various spill histories that all drain into Show Low Lake, which has spilled five times since 1996. Water is released annually for irrigation purposes. California floaters are known from downstream in Show Low Creek (approximately 9 miles downstream to Fool Hollow Lake and then downstream of Fool Hollow dam). Stocking at these waters includes various combinations of rainbow trout, Apache trout, bluegill, largemouth bass, channel catfish, cutthroat trout, and/or brook trout.	<u>Proposed Action and Reduced Stocking Alternative</u> Low exposure because of the limited spilling, the distance between stocking locations and California floaters, and the intervening reservoir that the fish must pass through
Scott's Reservoir	This is an open site that spills annually during winter and spring, and water is also released during summer irrigation. California floaters are known from downstream in Show Low Creek (approximately 9 miles downstream to Fool Hollow Reservoir and then downstream of Fool Hollow dam). Rainbow trout, channel catfish, and bluegill are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> Low exposure because of the frequent spilling and movement that is limited by distance between stocking locations and California floaters, and because of the intervening reservoir the fish must pass through that is also stocked with these species
Fool Hollow Lake	This is an open site. Show Low Creek flows into Fool Hollow Lake. Fool Hollow Lake spilled five of the last 14 years, but water is not released for irrigation. No fish assemblage data are available between Fool Hollow dam and the location of the California floater occurrence, which is about 2 miles downstream from the dam. Stocking includes rainbow trout, Apache trout, bluegill, channel catfish, cutthroat trout, and brook trout in Fool Hollow Lake only.	<u>Proposed Action and Reduced Stocking Alternative</u> Moderate exposure because of the limited spilling, but there is limited distance between California floater-occupied areas and the stocking location
Chevelon Creek Complex		
Long Tom Tank, Willow Springs, Woods Canyon,	It is not known whether Long Tom Tank spills because it has a small ephemeral watershed and no outlet. Willow Springs and Woods Canyon spill annually during spring runoff. These sites are upstream of Chevelon Canyon Lake by more than 9 miles of mostly perennial stream channel. California floaters are known from downstream of Chevelon Canyon Lake by approximately 4 miles. Rainbow trout are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> Low exposure because of the distance between the stocking locations, the California floaters, and the intervening reservoir the fish must pass through that is also stocked with these species

Table O. Analysis of potential impacts to California floaters and White Mountain water penny beetles resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Explanation of Determining Factors for Potential Effectsⁱ	Magnitude of Potential Effects
Chevelon Canyon Lake	The lake spills most years during spring runoff into Chevelon Creek. California floaters are known from downstream by approximately 4 miles. Rainbow trout (which have been stocked since 1966) and Arctic grayling (which have been stocked three times since 1968) are proposed for stocking. Several surveys have not detected Arctic grayling downstream. Rainbow trout have been detected during several surveys in downstream Chevelon Creek (seven trout from all surveys, but usually not detected).	<u>Proposed Action and Reduced Stocking Alternative</u> Moderate exposure because of frequent spilling, but surveys detect only low numbers of rainbow trout downstream
Black Canyon Complex		
Black Canyon Lake	The site spills during spring runoff only during years with a heavy snowpack or heavy winter precipitation. The downstream reach is ephemeral for more than 50 miles before it reaches Chevelon Creek. California floaters are known from Chevelon Creek.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because of the extensive distance of ephemeral streambed
Clear Creek Complex		
C.C. Cragin Reservoir	The lake spilled three of the past 10 years. Water is also released continuously through a 2-inch pipe. Water releases and spills go into East Clear Creek, which turns into Clear Creek downstream. California floaters are known from 5 miles downstream of C.C. Cragin Dam in East Clear Creek and 17 miles downstream in Clear Creek. Rainbow trout, which have been stocked since 1965, are proposed for stocking. Several surveys downstream have detected only one stocked rainbow trout (stocked fish were marked), but wild rainbow trout were present in higher numbers.	<u>Proposed Action</u> Low exposure because of survey data indicating low movement of stocked fish into areas occupied by California floaters <u>Reduced Stocking Alternative</u> Site not stocked
Knoll Lake	The lake spills during spring runoff into East Leonard Canyon, then into Leonard Canyon, then into East Clear Creek. California floaters are known from about 15 miles downstream in Clear Creek (same occurrence as the more distant one described for C.C. Cragin). Rainbow trout, which have been stocked since 1963, are proposed for stocking. Stocked rainbow trout were not detected downstream during prestocking surveys in 2005 and 2007.²	<u>Proposed Action</u> Low exposure because of annual spilling; movement is limited based on distance (more than 15 miles perennial) and a survey that did not detect any stocked trout downstream in Leonard Canyon <u>Reduced Stocking Alternative</u> Site not stocked

² Benedict, C., M. Rinker, and G. Fabian. 2007. Blue Ridge & Knoll Reservoir's Trip Report–2007 Fish Sampling and Creel Season.

Table O. Analysis of potential impacts to California floaters and White Mountain water penny beetles resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Explanation of Determining Factors for Potential Effectsⁱ	Magnitude of Potential Effects
Bear Canyon Lake	The lake spills annually during spring runoff into mostly ephemeral Bear Canyon for 4.2 miles, then into Willow Creek, then into Clear Creek (a total distance of more than 25 miles downstream to Clear Creek). California floaters are known from downstream in East Clear Creek and Clear Creek. Rainbow trout (which have been stocked since 1984) and Arctic grayling (which have been stocked since 1965). A survey of Bear Canyon in 1997 captured one rainbow trout and no Arctic grayling, and four surveys of Willow Creek from 1991 to 2009 did not detect any rainbow trout or Arctic grayling.	<u>Proposed Action and Reduced Stocking Alternative</u> Low exposure because of annual spilling; movement is limited based on distance (more than 25 miles ephemeral/ perennial), and several downstream surveys captured only one rainbow trout and no Arctic grayling
Clear Creek Reservoir		
Clear Creek Reservoir	The reservoir is connected annually to the upstream watershed, and California floaters are found approximately 63 miles upstream.	<u>Proposed Action</u> No effects anticipated because of the extensive distance <u>Reduced Stocking Alternative</u> Site not stocked
Jack's Canyon Complex		
Soldiers Annex, Long Lake (Diablo), Soldiers Lake, Tremaine Lake	The lakes are open, but California floaters are not known from the immediate drainage. To reach California floater-occupied areas, stocked fish would have to move over 10 miles of a complex series of ditches and tanks to reach Diablo Canyon, which is ephemeral for 46 miles before entering the Lower Colorado River. Then stocked fish would have to move upstream to Clear Creek or other upstream tributaries, which all have additional associated distances and ephemeral reaches.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because of the extensive distance of ephemeral streambed and the intervening complex system of ditches
Canyon Diablo Complex		
Kinnikinick Lake, Morton Lake, Mud Tank, Frances Short Pond	All of these sites drain into Canyon Diablo and into the Lower Colorado River, which is 40 miles or more downstream. California floaters are known from upstream Lower Colorado River tributaries, of which the closest (Clear Creek) is an additional 46 miles upstream; most of this is ephemeral or interrupted perennial stream channel. Under the Proposed Action, rainbow trout, brown trout, brook trout, cutthroat trout, and Arctic grayling are proposed for stocking at Kinnikinick Lake, and rainbow trout are proposed at Morton Lake, Mud Tank, and Frances Short Pond. Under the Reduced Stocking Alternative, only Frances Short Pond would be stocked and this site would be stocked with rainbow trout and channel catfish.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because of the extensive distance

Table O. Analysis of potential impacts to California floaters and White Mountain water penny beetles resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Explanation of Determining Factors for Potential Effectsⁱ	Magnitude of Potential Effects
Ashurst Lake, Coconino Lake	These sites are in a closed system, and California floaters are not known from this system.	<u>Proposed Action</u> No effects anticipated <u>Reduced Stocking Alternative</u> Sites not stocked
Walnut Creek Complex		
Mormon Lodge Pond, Marshall Lake, Upper Lake Mary, Lower Lake Mary	The Walnut Creek Complex is considered a closed system, and California floaters are not known from this system.	<u>Proposed Action</u> No effects anticipated <u>Reduced Stocking Alternative</u> Sites not stocked
SALT RIVER SUBCATCHMENT³		
Black River Complex		
Big Lake, Crescent Lake	Open lakes can spill. Big Lake has not spilled since 1993, and Crescent Lake has not spilled in the past 15 years. When these lakes spill, fish could travel down an unnamed tributary to the North Fork of the East Fork of the Black River, from which California floaters are known. The White Mountain water penny beetles are known from further downstream of the East Fork of the Black River and tributaries. Rainbow trout, cutthroat trout, brook trout, and Apache trout are proposed for stocking into Big Lake, and rainbow trout and brook trout into Crescent Lake. All of these species have been stocked into both lakes since 1930 to 1940. Several surveys of the unnamed tributary and the North Fork of the East Fork of the Black River in 2000 and 2001 did not detect any of the stocked trout species. However, a survey of the unnamed tributary in 1995 captured one rainbow trout that likely came from Big Lake or Crescent Lake.	<u>Proposed Action</u> California floaters–Low exposure White Mountain water penny beetles–Low exposure Because of limited spilling and because several downstream surveys only detected one stocked fish <u>Reduced Stocking Alternative</u> Big Lake not stocked; effects of stocking Crescent Lake same as Proposed Action

³ In the Salt River subcatchment, the California floater and White Mountain water penny beetle are only known from the upper Black River drainage (Black River Complex). Fish stocked in the other complexes in the Salt River subcatchment would not be able to reach the upper Black River due to approximately 100 miles of upstream travel required. Therefore, stocking at all sites in these complexes will not affect the California floater or White Mountain water penny beetle.

Table O. Analysis of potential impacts to California floaters and White Mountain water penny beetles resulting from the implementation of proposed sport fish stocking within subcatchments where they are known to occur.

Stocking Location	Explanation of Determining Factors for Potential Effects ¹	Magnitude of Potential Effects
East Fork Black River	It is an open stream reach, and California floaters and White Mountain water penny beetles occupy the stream reach. Apache and rainbow trout are proposed for stocking. Apache trout have been stocked in this reach since 1996, and rainbow trout since 1933. Surveys in 1988, 1996, and 2009 found few stocked trout outside of the stocking reach and no stocked trout that have survived beyond 2 months after stoking.	<u>Proposed Action</u> California floaters–High exposure White Mountain water penny beetles–High exposure Because stocking directly into California floater and White Mountain water penny beetle–occupied areas <u>Reduced Stocking Alternative</u> Site not stocked
West Fork Black River	This is an open stream reach, and California floaters occupy the stream reach approximately 2 miles downstream. Apache trout have been stocked since at least 1995. Records state that “native trout” were stocked beginning in 1938, which were likely Apache trout. Numerous tributary streams maintain recovery populations of Apache trout, but they are not established in the stocking reach. Surveys in 1988, 1989, and 2002 found few stocked trout downstream of the stocking reach, with only two rainbow trout captured in 1989 (rainbow trout were stocked then) and one Apache trout in 2002.	<u>Proposed Action</u> California floaters–Moderate exposure because stocking is in close proximity to California floater–occupied areas, but past surveys have found only a few trout outside of the stocking reach White Mountain water penny beetles–High exposure Because stocking directly into White Mountain water penny beetle–occupied areas <u>Reduced Stocking Alternative</u> Site not stocked

¹ For a more detailed description of site characteristics, please refer to the Biological Assessment of the Sport Fish Stocking Program. Information in this column was obtained from the Biological Assessment and/or analysis of the various databases, unless otherwise noted.

APPENDIX O

Analysis of Potential Impacts to Page Springs Caddisflies and Balmorhea Saddle-case Caddisflies

Table P. Analysis of potential impacts to Page Springs caddisfly and Balmorhea saddle-case caddisfly resulting from the implementation of proposed sport fish stocking in the subcatchment where they are known to occur (Verde River).

Stocking Location	Explanation of Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
VERDE RIVER SUBCATCHMENT		
Big Chino Wash and Granite Creek Complexes		
Garret Tank, Shucking Tank, Presley Tank, Stone Dam, Granite Basin Lake, Goldwater Lake, Watson Lake, Willow Creek Reservoir	These are open systems that are all upstream of the upper Verde River. It is between 23 and 50 miles between these sites and the upper Verde River. The Page Springs caddisfly and Balmorhea saddle-case caddisfly are known from Oak Creek, more than 60 miles farther downstream.	<u>Proposed Action</u> No effects anticipated because of the extensive distance to Page Springs caddisfly and Balmorhea saddle-case caddisfly–occupied areas. <u>Reduced Stocking Alternative</u> Granite Basin Lake not stocked; effects of stocking the other sites same as Proposed Action.
Sycamore Complex		
Elk Tank, JD Dam Lake, White Horse Lake, Middle Tank, Perkins Tank	This is a closed complex, and Page Springs caddisfly and Balmorhea saddle-case caddisfly are not known from sites.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated
Middle Verde Complex		
Dead Horse Lake	This is a closed system, and Page Springs caddisfly and Balmorhea saddle-case caddisfly are not known from site.	<u>Proposed Action</u> No effects anticipated <u>Reduced Stocking Alternative</u> Site not stocked
Oak Creek	This is an open stream reach, and Page Springs caddisfly and Balmorhea saddle-case caddisfly occupy the stocking reach. Rainbow trout are proposed for stocking (which have been stocked since 1933). Rainbow trout are already established in upper Oak Creek, but rainbow trout stocked into lower Oak Creek would not likely persist beyond seasonally due to the high summer water temperatures.	<u>Proposed Action</u> High exposure because of stocking into Page Springs caddisfly and Balmorhea saddle-case caddisfly–occupied areas. <u>Reduced Stocking Alternative</u> Site not stocked
Wet Beaver Creek	This is an open stream reach. The Page Springs caddisfly and the Balmorhea saddle-case caddisfly are known from Oak Creek (more than 16 miles downstream to the Verde River, then approximately 12 miles upstream of the Verde River, then more than 15 miles up Oak Creek). Rainbow trout proposed for stocking are not likely to persist beyond seasonally due to the high summer water temperatures. During several surveys, the only rainbow trout captured have been stocked fish, indicating that rainbow trout do not reproduce in Wet Beaver Creek.	<u>Proposed Action</u> No effects anticipated because of the extensive distance to Page Springs caddisfly and Balmorhea saddle-case caddisfly–occupied areas. <u>Reduced Stocking Alternative</u> Site not stocked

Table P. Analysis of potential impacts to Page Springs caddisfly and Balmorhea saddle-case caddisfly resulting from the implementation of proposed sport fish stocking in the subcatchment where they are known to occur (Verde River).

Stocking Location	Explanation of Determining Factors for Potential Effects ⁱ	Magnitude of Potential Effects
Mingus Lake	The lake probably spills only during spring due to heavy snowpack, but specific spill history is not known. The Page Springs caddisfly and the Balmorhea saddle-case caddisfly are known from Oak Creek, which is downstream approximately 12 miles to the Verde River and then more than 15 miles up to Oak Creek. Rainbow trout, black crappie, and bluegill are proposed for stocking.	<u>Proposed Action and Reduced Stocking Alternative</u> No effects anticipated because of the extensive distance to Page Springs caddisfly and Balmorhea saddle-case caddisfly–occupied areas.
Huffer Lake, West Clear Creek	These are open systems. Huffer Lake is in the upper West Clear Creek drainage. The Page Springs caddisfly and the Balmorhea saddle-case caddisfly are known from Oak Creek (Oak Creek enters the Verde River more than 22 miles upstream from the mouth of West Clear Creek).	<u>Proposed Action</u> No effects anticipated because of the extensive distance to Page Springs caddisfly and Balmorhea saddle-case caddisfly–occupied areas. <u>Reduced Stocking Alternative</u> West Clear Creek not stocked; effects of stocking Huffer Lake same as Proposed Action
Middle Verde River	This is an open stream reach, and Page Springs caddisfly and Balmorhea saddle-case caddisfly are known from Oak Creek, which enters the Verde River within this stocking reach. To reach Page Springs caddisfly and Balmorhea saddle-case caddisfly, stocked fish would have to travel more than 15 miles up Oak Creek (perennial). Rainbow trout proposed for stocking are not likely to persist beyond seasonally due to the high summer water temperatures.	<u>Proposed Action</u> Low exposure because of the distance between the stocking location and Page Springs caddisfly and Balmorhea saddle-case caddisfly–occupied areas. <u>Reduced Stocking Alternative</u> Site not stocked
Lower Verde River Complex		
East Verde River, Green Valley Lake	These are open systems that are in the East Verde River drainage. From the mouth of the East Verde River, it is approximately 45 miles upstream to the mouth of Oak Creek, then more than 15 miles up Oak Creek to Page Springs caddisfly and Balmorhea saddle-case caddisfly–occupied areas.	<u>Proposed Action</u> No effects anticipated because of the extensive distance to Page Springs caddisfly and Balmorhea saddle-case caddisfly–occupied areas. <u>Reduced Stocking Alternative</u> Sites not stocked

ⁱ For a more detailed description of site characteristics, please refer to the Biological Assessment of the Sport Fish Stocking Program. Information in this column was obtained from the Biological Assessment and/or analysis of the various databases, unless otherwise noted.

APPENDIX P

Comments on the Draft Environmental Assessment and Responses

Comment letters and emails on the Draft EA were received from 577 persons, some representing agencies, organizations, and clubs. Of the 577 responders, 376 commented solely on the Take-a-Kid-Fishing Program and associated stocking at La Paz County Lake.

The following Comment Log lists the names of the persons who provided comments, their affiliations (if applicable and provided), and the date of the comment. A distinct reference number has been assigned to each commenter.

A summary of the pertinent comments received on the Draft EA and responses to these comments prepared by the FWS and the AGFD follows the Comment Log. The applicable commenter reference numbers are noted within brackets for each comment summary. Comments are organized by general topics. Similar comments are grouped together; one response is provided for all grouped comments.

Table Q. Comment log.

Reference Number*	Commenter	Date	Method
1	Barkley, Daryl	3/10/2011	Email
2	Cook, Monte	3/10/2011	Emails (2)
3	Fuerst, William R.	3/10/2011	Email
4	Higgs, Bob	3/10/2011	Email
5	Humphrey, Alan	3/10/2011	Email
6	Jensen, Robert	3/10/2011	Email
7	Las, Isla	3/10/2011	Email
8	Leanne	3/10/2011	Email
9	Stutler, Jeremy	3/10/2011	Email
10	Trottier, Thomas	3/10/2011	Email
11	Williams, Elijah	3/10/2011	Email
12	Payson Flycasters and Trout Unlimited, Gila Trout Chapter: Robert Youtz	3/10/2011	Email
13	Crockett, Mike	3/11/2011	Emails (2)
14	Krebs, Mike	3/11/2011	Email
15	<i>Duplicate</i>	–	–
16	Halver, Mark	3/12/2011	Email
17	Young, Teresa	3/12/2011	Email
18	Schildmacher, Andrew G.	3/17/2011	Email
19	Deats, Stewart	3/14/2011	Email
20	Stefferd, Sally	3/14/2011	Email
21	Anderson, Denny	3/15/2011	Email
22	Biesemeyer, Brian	3/15/2011	Email
23	Borquez, Chris	3/15/2011	Email
24	Cook, Gary	3/15/2011	Email, Letter
25	Cook, Jerry	3/15/2011	Letter
26	Kliner, Mark	3/15/2011	Emails (2)
27	Minckley Ph.D, C.O.	3/15/2011	Email
28	Lyons, Mike	3/16/2011	Email
29	Martinez, Gabriel	3/16/2011	Email, Letter
30	McAdams, Lyndon M.	3/16/2011	Email
31	Ricci, Ed	3/16/2011	Email
32	Rinker, Janet	3/16/2011	Email
33	Faulkinbury, William M.	3/17/2011	Email
34	Kendall, Dave	3/17/2011	Email
35	Martinez, Gregory	3/17/2011	Email
36	Price, Joel Matthew	3/17/2011	Email
37	Roberts, Lenny	3/17/2011	Email
38	Rohmer, John	3/17/2011	Email
39	Schmidbauer, Laura and Bill	3/13/2011	Email
40	Tipton, James	3/17/2011	Email
41	Hounshell, David J.	3/18/2011	Email
42	Ronco, Tresa	3/18/2011, 3/28/2011	Emails (2)
43	Bowers, Robert	3/19/2011	Email
44	Chuck	3/19/2011	Email

Table Q. Comment log.

Reference Number*	Commenter	Date	Method
45	Reichard, John	3/19/2011	Email
46	Weitz, Paul	3/20/2011	Email
47	Voigt, Bruce	3/21/2011	Email
48	Bishop, Dr. Stephen	3/22/2011	Email
49	Bustamente, R.E.	3/22/2011	Email
50	Savage, Eric	3/22/2011	Email
51	Shontz, Walter	3/22/2011	Letters (3)
52	Styvaert, Michael	3/22/2011	Emails (2)
53	Hanno, Nancy E.	3/22/2011	Email
54	Wolf, Ken	3/18/2011	Letter
55	Bunger, Samuel	3/23/2011	Email
56	Flanagan, Jeremy	3/23/2011	Email
57	Hodges, Wayne	3/23/2011	Email
58	Ludwig, Courtney	3/23/2011	Letter
59	Maynard, Amy	3/23/2011	Letter
60	McLomalk, Jeff	3/22/2011	Letter
61	Unsigned	3/22/2011	Letter
62	Unsigned	3/22/2011	Letter
63	Young, Stacy	3/22/2011	Letter
64	Andrews	3/22/2011	Letter
65	Benjamin, Brittaney Jo	3/22/2011	Letter
66	Brault, Allayzia	3/22/2011	Letter
67	Chad	3/22/2011	Letter
68	Christensen, Vincent	3/22/2011	Letter
69	Christina	3/22/2011	Letter
70	Doe, John	3/22/2011	Letter
71	Duncan, Jack	3/22/2011	Letter
72	Escoto, Guillermo	3/22/2011	Letter
73	Esquerra, Hanavaa	3/22/2011	Letter
74	Fisher, Shane	3/22/2011	Letter
75	Fisher, R.	3/22/2011	Letter
76	Kristalyn	3/22/2011	Letter
77	Larraga	3/22/2011	Letter
78	Lee, Stephanie	3/22/2011	Letter
79	Leivas, Dayleen	3/22/2011	Letter
80	Luther, Martina	3/22/2011	Letter
81	McCowan, Narcisse	3/22/2011	Letter
82	Miller, S.	3/22/2011	Letter
83	Purser, Jordan	3/22/2011	Letter
84	Ramos, Elizabeth	3/22/2011	Letter
85	Rodarte, Brianna	3/22/2011	Letter
86	Rodriguez, Jessica	3/22/2011	Letter
87	Sanchez, Rosio	3/22/2011	Letter
88	Saucedo, Jose	3/22/2011	Letter
89	Parker High School: Dr. Le Roy Shontz	3/22/2011	Letter

Table Q. Comment log.

Reference Number*	Commenter	Date	Method
90	<i>Illegible</i>	3/22/2011	Letter
91	Vasquez, Laura	3/22/2011	Letter
92	Frieh, Cameron	3/24/2011	Email
93	Watkins, Anthony	3/24/2011	Email
94	Skutecki, Ron	3/25/2011	Email
95	White, Andrew	3/25/2011	Email
96	Adams, Steve	3/26/2011	Email
98	Densmore, Cade	3/28/2011	Email
99	Adrian	3/22/2011	Letter
100	Sidles, Craig	3/28/2011	Email
101	Amador, Alayna	3/22/2011	Letter
102	Anderson, Justin	3/22/2011	Letter
103	Angelica	3/22/2011	Letter
104	Barrios, Lisa	3/22/2011	Letter
105	Barrios, Marcella	3/22/2011	Letter
106	Bear Don't Walk, Raven	3/22/2011	Letter
107	Bear Don't Walk, Tabitha	3/22/2011	Letter
108	Beckham, Cody	3/22/2011	Letter
109	Beckham, Miranda	3/22/2011	Letter
110	Bednarzle, Billie Jean	3/22/2011	Letter
111	Bennet, Magical	3/22/2011	Letter
112	Bernal, Andre	3/22/2011	Letter
113	Bernal, Emily	3/22/2011	Letter
114	Briceno, Gabriela	3/22/2011	Letter
115	Briedo, Danielle	3/22/2011	Letter
116	Brown, Sonya	3/22/2011	Letter
117	Butler, Blake	3/22/2011	Letter
118	Campos, Alfredo	3/22/2011	Letter
119	Candelario, Francheska	3/22/2011	Letter
120	Carter, Shawn	3/22/2011	Letter
121	Castaneda, Laura	3/22/2011	Letter
122	Cerrantes, Beatriz	3/22/2011	Letter
123	Chambers, Brooke	3/22/2011	Letter
124	Chavez, Maria L.	3/22/2011	Letter
125	Clay, Nik	3/22/2011	Letter
126	Competh, Austin	3/22/2011	Letter
127	Cordova, Esther	3/22/2011	Letter
128	Crispin, Katie	3/22/2011	Letter
129	Cruz, Alisha	3/22/2011	Letter
130	Davalos, Jeremy	3/22/2011	Letter
131	Dawson, Frankie	3/22/2011	Letter
132	DeLeon, Lizzly	3/22/2011	Letter
133	Delgado, Anthony	3/22/2011	Letter
134	Diaz Jr., Adrian	3/22/2011	Letter
135	Dick, Cece	3/22/2011	Letter

Table Q. Comment log.

Reference Number*	Commenter	Date	Method
136	Dinneen, Molly	3/22/2011	Letter
137	Drennan, Marshea	3/22/2011	Letter
138	Dyer, Michael	3/22/2011	Letter
139	Edey, Shane	3/22/2011	Letter
140	Edwards, Keerstyn	3/22/2011	Letter
141	Espinoza, Luis	3/22/2011	Letter
142	Essex, Austin	3/22/2011	Letter
143	Evans, Stephen	3/22/2011	Letter
144	Evanston, Jesse	3/22/2011	Letter
145	Ferber, Samuel	3/22/2011	Letter
146	Field, Josh	3/22/2011	Letter
147	Fisher, Irie	3/22/2011	Letter
148	Fisher, Jeremy	3/22/2011	Letter
149	Flam, Erika	3/22/2011	Letter
150	Flood, Hazel	3/22/2011	Letter
151	Flores, Jesus	3/22/2011	Letter
152	Flores, Michell	3/22/2011	Letter
153	Fosbinden, William	3/22/2011	Letter
154	Frausto, Diego	3/22/2011	Letter
155	Fredricksen, Shelby	3/22/2011	Letter
156	Golding, Cheyenne	3/22/2011	Letter
157	Gonzalez, Gio	3/22/2011	Letter
158	Gonzalez, Karen J.	3/22/2011	Letter
159	Gonzalez, Luis	3/22/2011	Letter
160	Gonzalez, Taylor	3/22/2011	Letter
161	Gonzalez, Yanira	3/22/2011	Letter
162	Grafton, Sara Anne	3/22/2011	Letter
163	Greenwood, Fenix	3/22/2011	Letter
164	Hall, Ashlie	3/22/2011	Letter
165	Haros, Robert	3/22/2011	Letter
166	Harper, Andrea	3/22/2011	Letter
167	Harper, Ashley	3/22/2011	Letter
168	Harper, Sydney	3/22/2011	Letter
169	Harper, Tylor	3/22/2011	Letter
170	Heanes, Haily	3/22/2011	Letter
171	Hernandez, Ignacio	3/22/2011	Letter
172	Hernandez, Lorenzo	3/22/2011	Letter
173	Hill, Cody	3/22/2011	Letter
174	Holquin, Cali	3/22/2011	Letter
175	Honadick, Sam	3/22/2011	Letter
176	Huntt, William	3/22/2011	Letter
177	Iker, Alyssa	3/22/2011	Letter
178	<i>Illegible</i>	3/22/2011	Letter
179	<i>Illegible</i>	3/22/2011	Letter
180	Iniguez, Omar	3/22/2011	Letter

Table Q. Comment log.

Reference Number*	Commenter	Date	Method
181	Laakso, Kayla	3/22/2011	Letter
182	James, Toby	3/22/2011	Letter
183	Jimenez, Ashley	3/22/2011	Letter
184	Jimenez, Jose	3/22/2011	Letter
185	Joey	3/22/2011	Letter
186	Jokkel, Kyle	3/22/2011	Letter
187	Jones, Elizabeth	3/22/2011	Letter
188	Jones, Justina Marie	3/22/2011	Letter
189	Karina	3/22/2011	Letter
190	Katrina	3/22/2011	Letter
191	King, Nancy	3/22/2011	Letter
192	Labuguen, Chaslynn	3/22/2011	Letter
193	Laffoar, Shawni	3/22/2011	Letter
194	Laffoon, Lorenzo	3/22/2011	Letter
195	LaPresti, Taylor	3/22/2011	Letter
196	Larraga, Mabel	3/22/2011	Letter
197	Lattin, Kristen	3/22/2011	Letter
198	Leandro, Andrea	3/22/2011	Letter
199	Leivas, Danielle	3/22/2011	Letter
200	Liliana	3/22/2011	Letter
201	Lopez, Karely	3/22/2011	Letter
202	Lucano, Crystal	3/22/2011	Letter
203	Lucas, Jesse	3/22/2011	Letter
204	Magana, Lizette	3/22/2011	Letter
205	Maldonado, Carlos	3/22/2011	Letter
206	B., Mari	3/22/2011	Letter
207	Martin, Marti	3/22/2011	Letter
208	Martinez, Nick	3/22/2011	Letter
209	McCabe, Allison	3/22/2011	Letter
210	Mejia, Fernanda	3/22/2011	Letter
211	Mendoza, Amailly	3/22/2011	Letter
212	Mendoza, Lia	3/22/2011	Letter
213	Mercado, Rosa	3/22/2011	Letter
214	Merritt, Chessica	3/22/2011	Letter
215	Miller, Les	3/22/2011	Letter
216	Moore, Stefany	3/22/2011	Letter
217	Moreno, Diego	3/22/2011	Letter
218	Moza, Erika	3/22/2011	Letter
219	Munoz, Mary	3/22/2011	Letter
220	Murphy, Alex	3/22/2011	Letter
221	Neel, Trisha	3/22/2011	Letter
222	Newman, Mitchell	3/22/2011	Letter
223	Newton, Jeremy	3/22/2011	Letter
224	Nicollette	3/22/2011	Letter
225	Nizhoni	3/22/2011	Letter

Table Q. Comment log.

Reference Number*	Commenter	Date	Method
226	Olivares, Vanessa	3/22/2011	Letter
227	Panuco, Ricardo	3/22/2011	Letter
228	Paton, Danny	3/22/2011	Letter
229	Penaloca, Javier	3/22/2011	Letter
230	PHS Student	3/22/2011	Letter
231	Pizarro, Ande	3/22/2011	Letter
232	Potter, Dalton	3/22/2011	Letter
233	Quintana, Clarisa	3/22/2011	Letter
234	Ramirez, Patrick	3/22/2011	Letter
235	Redfoot, Alex	3/22/2011	Letter
236	Rebmann, Nicholas	3/22/2011	Letter
237	Reyes, Vayda	3/22/2011	Letter
238	Rodrigo	3/22/2011	Letter
239	Rodriguez, David Jr.	3/22/2011	Letter
240	Rodriquez, Joseph	3/22/2011	Letter
241	Russell, Zoe	3/22/2011	Letter
242	Sal	3/22/2011	Letter
243	Salazar, Gisell	3/22/2011	Letter
244	Salazar, Lorena	3/22/2011	Letter
245	Salcedo, Ana	3/22/2011	Letter
246	Sanchez, Denisha	3/22/2011	Letter
247	Sanchez, Perla	3/22/2011	Letter
248	Santos, Itzel	3/22/2011	Letter
249	Scott, Andrea	3/22/2011	Letter
250	Scott, Brandi A.	3/22/2011	Letter
251	Scott, Breanna	3/22/2011	Letter
252	Shrewsbury, Callee Ann	3/22/2011	Letter
253	Sepulveda, Mary	3/22/2011	Letter
254	Serrato, Isabel	3/22/2011	Letter
255	Setter, Joshua	3/22/2011	Letter
256	Sharp, Jessica	3/22/2011	Letter
257	Sherrill	3/22/2011	Letter
258	Skoglund, Jose	3/22/2011	Letter
259	Smith, Kirsten	3/22/2011	Letter
260	Sorenson, Ryker	3/22/2011	Letter
261	Sportel, Rochelle	3/22/2011	Letter
262	Speeriko, Lucas	3/22/2011	Letter
263	Tahbo Jr., Lorenzo	3/22/2011	Letter
264	Tanno, Christopher	3/22/2011	Letter
265	Toler, Nicole	3/22/2011	Letter
266	Torres, Charlee	3/22/2011	Letter
267	Unknown	3/22/2011	Letter
268	Valadez, Sefora	3/22/2011	Letter
269	Van Steenberg, Gabrielle	3/22/2011	Letter
270	Vazquez, Alvaro Amador	3/22/2011	Letter

Table Q. Comment log.

Reference Number*	Commenter	Date	Method
271	Vindiola, Annalie	3/22/2011	Letter
272	Vintez, Anthony	3/22/2011	Letter
273	Vrager, Chance	3/22/2011	Letter
274	Walrod, Annalizzia	3/22/2011	Letter
275	Welch, Sterling	3/22/2011	Letter
276	Wilson, Alex	3/22/2011	Letter
277	Wilson, Victoria	3/22/2011	Letter
278	Wixon, Anthony	3/22/2011	Letter
279	Wyckoff, Melissa	3/22/2011	Letter
280	Zych, Rachel	3/22/2011	Letter
281	Pulu, Brittany	3/23/2011	Letter
282	Scott, Tyler	3/23/2011	Letter
283	Weimer's Class	3/29/2011	Letter
284	Alexis	3/30/2011	Letter
285	Calvin	3/30/2011	Letter
286	Elias	3/30/2011	Letter
287	Elly	3/30/2011	Letter
288	Emmit, John	3/30/2011	Letter
289	Falicity	3/30/2011	Letter
290	Frigga	3/30/2011	Letter
291	Kaiden	3/30/2011	Letter
292	Malissa	3/30/2011	Letter
293	Marcos	3/30/2011	Letter
294	Megan	3/30/2011	Letter
295	Mesia, Mario	3/30/2011	Letter
296	Townsend, Katlynn	3/30/2011	Letter
297	Victoria	3/30/2011	Letter
298	Jones, Brian	4/5/2011	Email
299	Alicia	3/25/2011	Letter
300	Alter, Dean	none	Letter
301	Alvarado, Alex	3/30/2011	Letter
302	Andress, Jo	3/29/2011	Letter
303	Aranjo, Nicolas	3/30/2011	Letter
304	Baker, Clarence D. and Shirley	3/28/2011	Letter
305	Barbieux, Xoteki	3/25/2011	Letter
306	Bautista, Cesar	3/30/2011	Letter
307	Bear, Sarek	3/25/2011	Letter
308	Bernal, Jorge	4/8/2011	Letter
309	Blake, Joshua	3/25/2011	Letter
310	Booth, Alec	3/30/2011	Letter
311	Breann	3/25/2011	Letter
312	Federation of Fly Fishers: Richard J. Brown	3/21/2011	Letter
313	Buchen, Andrea Rebeca	3/25/2011	Letter
314	Carlisle, Feehix	3/25/2011	Letter
315	Castillo, Priscila	3/25/2011	Letter

Table Q. Comment log.

Reference Number*	Commenter	Date	Method
316	Castillo, Reyna	4/8/2011	Letter
317	Soroptimist International: Nina Chumley	3/23/2011	Letter
318	Cisneros, Stephanie	4/4/2011	Letter
319	Clark, Crystal	3/25/2011	Letter
320	La Paz Regional Hospital: Victoria M. Clark	3/28/2011	Letter
321	Cooper, Ryan	3/31/2011	Letter
322	D., Hunter	4/4/2011	Letter
323	D., Nick (<i>last name illegible</i>)	4/4/2011	Letter
324	Davis, Taylor	3/25/2011	Letter
325	Deleon, Emily Ann	3/25/2011	Letter
326	Drennan, Marcus	3/30/2011	Letter
327	Eddy, Andrea	4/4/2011	Letter
328	Eddy, Trevor	3/30/2011	Letter
329	Esquerra, Cody	4/8/2011	Letter
330	Esquerra, Tyson	3/30/2011	Letter
331	Evans Jr., Robert	3/25/2011	Letter
332	Falconer, Russell	4/8/2011	Email
333	Figueroa, Rocio	3/31/2011	Letter
334	Fisher, Riley	4/8/2011	Letter
335	Frazier, Jordan	3/30/2011	Letter
336	Fugate, Angelina	4/4/2011	Letter
337	Fullerton, Bob	4/4/2011	Email
338	Garcia, Alexis	3/30/2011	Letter
339	Gibney, Desiree	4/4/2011	Letter
340	Golden, Richard	4/1/2011	Letter
341	Gonzalez, Celynda	3/30/2011	Letter
342	H., Frankie	4/4/2011	Letter
343	Parker Area Tourism: Mary Hamilton	3/29/2011	Letter
344	Hannah	3/25/2011	Letter
345	Sky Island Alliance: Trevor Hare	4/11/2011	Email, Letter
346	Harmon, Donnie	3/28/2011	Letter
347	Parker Area Chamber of Commerce: Randy Hartless	3/24/2011	Letter
348	Hatch, Brad Lee	4/5/2011	Letter
349	Hernandez, Adriana	4/8/2011	Letter
350	Hernandez, Lucero	4/8/2011	Letter
351	Isaac	4/4/2011	Letter
352	J., Jasmine	4/4/2011	Letter
353	Jackson, Devante	4/8/2011	Letter
354	Jeffery IV, Brooks	3/25/2011	Letter
355	Jones, Jimmy	3/25/2011	Letter
356	Kiana	3/25/2011	Letter
357	Kimberlin, Nicole	4/4/2011	Letter
358	Kristian	4/4/2011	Letter
359	L., Ruby	4/4/2011	Letter
360	Leal-Hanlon, Chris	3/25/2011	Letter

Table Q. Comment log.

Reference Number*	Commenter	Date	Method
361	Liston, Larry	3/25/2011	Letter
362	Logan, Lisa	4/8/2011	Letter
363	Longanecker Family	3/28/2011	Letter
364	Longanecker, Ashley	3/25/2011	Letter
365	Lopez, Yomira	4/8/2011	Letter
366	Lopez, Yulissa	3/31/2011	Letter
367	Parker Unified School District No. 27: James B. Lotts	3/30/2011	Letter
368	La Paz County Sheriff: Sheriff Don Lowery	3/23/2011	Letter
369	Lua, Luis	4/4/2011	Letter
370	Maciel, Juan	4/8/2011	Letter
371	Malave, Camila	3/25/2011	Letter
372	Marquez, Ronnie	3/25/2011	Letter
373	Martin, Bobby Jo	3/25/2011	Letter
374	Martin, Mark Anthony	3/25/2011	Letter
375	Mason, Gyna	3/25/2011	Letter
376	Matern, Madison	3/25/2011	Letter
377	McClenning, Josef	4/4/2011	Letter
378	McConnell, Brandon L.	4/4/2011	Letter
379	McKee, Kaleb	3/25/2011	Letter
380	McTarsney, Ana	3/25/2011	Letter
381	Mejia, Lourdes	4/4/2011	Letter
382	Melendez, Omar	4/5/2011	Letter
383	Metarsnerg, David	3/25/2011	Letter
384	Miller, Brannon	3/25/2011	Letter
385	Moore, Jessica	4/8/2011	Letter
386	Morgan, Jimmie	3/25/2011	Letter
387	Morgan, Levi	3/25/2011	Letter
388	Munfrada, Jack	3/28/2011	Letter
389	Murphy, Nancyann C.	3/29/2011	Letter
390	Naranjo, Dawnique	4/8/2011	Letter
391	Nelson, Jacque	3/28/2011	Letter
392	<i>Unsigned</i>	3/25/2011	Letter
393	Pacheco, David	4/8/2011	Letter
394	Patterson, Daymon	3/25/2011	Letter
395	Priest, Kate-lynn	3/25/2011	Letter
396	Rangel, Marisol	3/30/2011	Letter
397	Rashelle	3/25/2011	Letter
398	Riley	3/25/2011	Letter
399	Rodriguez, Francisco	3/8/2011	Letter
400	Rodriquez, Adilene	3/30/2011	Letter
401	Rodriguez, Estephania	4/8/2011	Letters (2)
402	Ronk, Chris	3/25/2011	Letter
403	Ross, Janet	4/5/2011	Emails (2)
404	Saenz, David	4/4/2011	Letter
405	Salazar, Adrianna	4/8/2011	Letter

Table Q. Comment log.

Reference Number*	Commenter	Date	Method
406	Salcedo, Noemi	3/30/2011	Letter
407	Sanchez, Alcides	4/8/2011	Letter
408	Sanchez, Ulysses	4/8/2011	Letter
409	Saucedo, Ceclia	3/30/2011	Letter
410	Schifo, Mark	3/30/2011	Letter
411	Scogin, Michael Chance	4/4/2011	Letter
412	Serrato, Samuel	4/8/2011	Letter
413	Sharp, Corbin	3/25/2011	Letter
414	Sharp, Destiny	3/25/2011	Letter
415	Shooter, Senator Don	4/4/2011	Letter
416	Silvia, Kelten	4/4/2011	Letter
417	Skylar	3/25/2011	Letter
418	Smith, Holly	4/4/2011	Letter
419	Soroptimist International: Ellen Solper	3/23/2011	Letter
420	Sopresti, Mark	4/4/2011	Letter
421	Sorenson, Ryan S.	3/25/2011	Letter
422	Stacia	4/4/2011	Letter
423	Stewart, Emily	3/25/2011	Letter
424	Sutton, Sara	4/8/2011	Letter
425	Swick, Destinee Rae	3/30/2011	Letter
426	T., Jenna	4/4/2011	Letter
427	T., Treasure	4/4/2011	Letter
428	Tillman, Shania	3/25/2011	Letter
429	Townsend, Aaron	4/4/2011	Letter
430	Uintus, Traviias	3/25/2011	Letter
431	Unknown	3/25/2011	Letter
432	Vazquez, Keyla	3/31/2011	Letter
433	Villescaz, Robert	3/30/2011	Letter
434	Weimer, Elaina	3/28/2011	Letter
435	Williams, Gabrielle	4/4/2011	Letter
436	Wilson, Patrick	3/28/2011	Letter
437	Zach	3/25/2011	Letter
438	La Paz County Board of Supervisors: John Drum, Holly Irwin, and Sandy Pierce	4/4/2011	Letter
439	Kaibetony, Larain	4/11/2011	Letter
440	Lopez, Omar	4/11/2011	Letter
441	Pulido, Adrian	3/30/2011	Letter
442	Shirley, Samantha	4/11/2011	Letter
443	Shontz, Harold L.	4/8/2011	Letter
444	Tuchawena, Marcus	4/11/2011	Letter
445	Villafana, Delissia	4/11/2011	Letter
446	Winterboer, Beverly (<i>illegible</i>)	4/4/2011	Letter
447	Batcheller, Ernie	3/20/2011	Email
448	Chambers, John	3/17/2011	Email
449	Chaney, Russell	4/13/2011	Email

Table Q. Comment log.

Reference Number*	Commenter	Date	Method
450	Dean, Denise	3/18/2011	Email
451	Gilliland, Mike	3/23/2011	Email
452	Guerrette, Andrea	3/20/2011	Email
453	Gustafson, Jamie and Wendy	3/28/2011	Email
454	U.S. Department of Interior, Bureau of Reclamation: Beverley Heffernan	4/13/2011	Letter
455	Hipskind, Travis	4/4/2011	Email
456	LaBranche, Leo	3/24/2011	Email
457	Loners, Tim	3/26/2011	Email
458	Cocopah Indian Tribe, Cultural Office: Jill H. McCormick	3/28/2011	Email
459	Shepherd, Greg	3/25/2011	Email
460	Stinson, L. Gary	3/31/2011	Email
461	Navajo County Board of Supervisors: David Tenney	4/12/2011	Letter
462	Wolters, Sandy	3/26/2011	Email
463	Butcher, George and Sirik	4/21/2011	Email
464	Harrop, Larry	4/21/2011	Email
465	Barteag, Jerry	4/14/2011	Email
466	Desert Flycasters: Gerald Wiemelt	4/21/2011	Email
467	Concerned Sportsman and Arizona resident (<i>name not provided</i>)	4/15/2011	Email
468	Resident Arizona Taxpayer (<i>name not provided</i>)	4/15/2011	Email
469	Eckel, Jake	4/21/2011	Email
470	Moore, Greg	4/19/2011	Letter
471	Clements, Mike	4/26/2011	Email
472	Colville, Jim	4/27/2011	Email
473	Wolf, Cynthia Lee	4/28/2011	Email
474	DuVall, Jerry and Leigh	5/2/2011	Email
475	Lee, Yohan	4/30/2011	Email
476	Marsh, Paul C.	4/27/2011	Email, Letter
477	Melcher, M. Allen	4/21/2011	Email
478	Mumpower, Michael	4/28/2011	Email
479	Wheat, Michael	4/27/2011	Email
480	Drake, Bob	5/5/2011	Email
481	Felish, Joe Jr.	5/4/2011	Email
482	Harris, Allan	5/4/2011	Email
483	Inmon, Richard L.	5/4/2011	Email
484	Macafee, Wallace	5/4/2011	Email
485	G., Mark	5/3/2011	Email
486	Marshall, Steve	5/3/2011	Email
487	Mohave County Board of Supervisors: Buster Johnson	5/2/2011	Letter
488	Murphy, Richard	5/4/2011	Email
489	Nied, Ed	5/4/2011	Email
490	Pogreba, Lynn	5/4/2011	Email
491	Pollick, Rob and Anne	5/3/2011	Email
492	Ristow, Jim	5/4/2011	Email
493	Scholz, W.	5/5/2011	Email

Table Q. Comment log.

Reference Number*	Commenter	Date	Method
494	Skutnik, Robert Jr.	5/4/2011	Email
495	Sudac, Ed	5/5/2011	Email
496	Villa, Luis	5/4/2011	Email
497	White Mountain Apache Tribe: John Caid	5/3/2011	Letter
498	Arizona State Parks: Renee E. Bahl	5/3/2011	Letter
499	American Fisheries Society, Arizona–New Mexico Chapter: S. Jason Kline	5/6/2011	Letter
500	Barshak, Mark	5/6/2011	Email
501	DeAngelis, Todd	5/9/2011	Letter
502	Heguy, J.R.	5/8/2011	Email
503	Johnson, Michael	5/7/2011	Email
504	Pinetop-Lakeside Chamber of Commerce and Visitors Center: Beverly Stepp	5/6/2011	Letter
505	Pingree, Marni Rezzonico	5/6/2011	Email
506	Scatolini, Christopher	5/6/2011	Email
507	Tilley Jr., James W.	5/7/2011	Email
508	Tipton, Matt	5/8/2011	Email
509	Vallejos, Chris and Jolene	5/6/2011	Email
510	Abbott, Bill	5/9/2011	Email
511	Armstrong, Junardi	5/11/2011	Email
512	Blalock, James N. and Darlene K.	5/8/2011	Letter
513	Brown, Wayne	5/4/2011	Email
514	Chacon, Victor	5/4/2011	Email
515	Croche, Matt	5/3/2011	Email
516	Dancho, Jim	5/9/2011	Email
517	Doumas, Sandy	5/10/2011	Email
518	Ellsworth, Ric G.	5/3/2011	Email
519	George, Brian R.	5/4/2011	Email
520	Greco, David	5/4/2011	Email
521	Hanson, Larry	5/4/2011	Email
522	Himel, Phillip	5/4/2011	Email
523	James, Byron	5/10/2011	Email
524	Jordan, Will	5/10/2011	Email
525	Karppinen, Andrew	5/9/2011	Email
526	McDonough, Bob	5/10/2011	Email
527	Munoz-Weingarten, Sandy	5/3/2011	Email
528	Okamoto, Larry	5/4/2011	Email
529	Peyton, Eric	5/4/2011	Email
530	Pugh, Dennis	5/4/2011	Email
531	Rickell, Norm	5/4/2011	Email
532	Schumacher, Jon	5/4/2011	Email
533	Sitarzewski, Joe	5/10/2011	Email
534	Skeeter and Lenora	5/4/2011	Email
535	Stubbs, Tom	5/5/2011	Email
536	Walker, James and Nadine	5/10/2011	Letter
537	Watson, Patti Rae	5/11/2011	Email

Table Q. Comment log.

Reference Number*	Commenter	Date	Method
538	Wesley, Tony	5/3/2011	Email
539	Wilburn, Terry	5/4/2011	Email
540	Woods, Dave	5/4/2011	Email
541	Center for Sustainable Development: Hugh Holub	5/10/2011	Letter
542	Arizona Rivers: Michelle T. Harrington	5/11/2011	Letter
543	Bleser, Nicholas J.	5/11/2011	Email
544	Brito, Robert	5/9/2011	Email
545	Britt, Tom	5/11/2011	Email
546	Buse, Walt	5/6/2011	Email
547	Calhoun, Lee	5/6/2011	Email
548	Center for Biological Diversity: Robin Silver	3/11/2011, 5/11/2011	Email, Fax
549	Churchill, Tom	5/11/2011	Email
550	City of Tucson Parks and Recreation Department; John R. Sefton, Jr.	5/6/2011	Letter
551	Dukes, Gordon	5/6/2011	Email
552	Dysoner (no first name)	5/6/2011	Email
553	Grand Canyon National Park: Martha G. Hahn	5/11/2011	Fax
554	Lyman, Jacob	5/7/2011	Email
555	McVie, Christina	5/11/2011	Email
556	The Nature Conservancy: Tom Callazo	5/11/2011	Letter
557	Nelson, Jon T.	5/8/2011	Email
558	Pebworth, Ethan	5/11/2011	Email
559	Rosen, Philip C.	5/11/2011	Email
560	Sabellico, Fred and Anita	5/6/2011	Email
561	Sierra Club, Grand Canyon Chapter: Sandy Bahr	5/11/2011	Letter
562	Smith, Ben	5/9/2011	Email
563	Southern Arizona Cattlemen's Protective Association: Cindy Copping	5/12/2011	Letter
564	Taylor, Syndi	5/11/2011	Email
565	Watt, Patrick	5/8/2011	Email
566	WildEarth Guardians: Nicole J. Rosmarino, Ph.D.	5/11/2011	Letter
567	Apache-Sitgreaves National Forest: Chris Knopp	5/10/2011	Faxed Letter
568	Eastern Arizona Counties Organization: Mark C. Herrington	4/29/2011	Letter
569	Trout Unlimited-Zane Grey Chapter: Phil Fernandez, Ph.D.	5/11/2011	Email
570	Rodriguez, Isidro	5/11/2011	Letter
571	Rodriguez, Sorova	5/11/2011	Letter
572	Ortega, Gisselle	5/11/2011	Letter
573	Rodriguez, Manuel	5/11/2011	Letter
574	U.S. Department of the Interior, Bureau of Reclamation: Bruce D. Ellis	5/12/2011	Letter
575	Miller, Jan and Megan Mosby	5/13/2011	Email
576	Reimus, Chris	5/22/2011	Email
577	Pima County Office of Sustainability and Conservation: Brian Powell, M.S.	4/15/2011	Letter
578	Sky Island Alliance: Jenny Neeley	5/11/2011	Email

Summary of Pertinent Comments Received on Draft EA, and FWS and AGFD Responses

Note: The FWS provided the BA and draft BCO to the members of the public who requested them during the comment period to facilitate understanding of the analysis presented in the Draft EA. When releasing these documents, the FWS did not invite public comment on the analyses presented in these documents. Consultation under Section 7 of the ESA does not undergo public comment and review. Consultation is between federal agencies and the FWS or the National Oceanic and Atmospheric Administration, depending on which agency has jurisdiction over the species considered in the consultation. In this case, intra-service consultation is between two offices in the FWS: the WSFR and the AESO.

Level of NEPA Documentation

Comment 1 [548]: We identify shortcomings in the Draft EA and expect that these shortcomings will be remedied in the legally mandated EIS that must accompany such a historic, provocative and controversial action with such significant impacts on the environment.

Comment 2 [542]: NEPA requires federal agencies to prepare a detailed EIS for all “major Federal actions significantly affecting the quality of the human environment” 42 U.S.C. § 4332(2)(C). The Proposed Action will have significant impacts on a number of species, including those listed under the ESA and resulting in “take,” and affects the entire state. We therefore believe that an EIS should be prepared to address the significant impacts of the Proposed Action.

In a similar instance, California’s Department of Fish and Game completed an EIR/EIS last year for their Hatchery and Stocking Program. See www.dfg.ca.gov/news/pubnotice/hatchery/.

Comment 3 [561]: Because this action will have significant and harmful impacts on a number of species, including those listed under the ESA, and affects a very large scale, including most of Arizona’s watersheds, an EIS is warranted. NEPA requires federal agencies to prepare a detailed EIS for all “major Federal actions significantly affecting the quality of the human environment” (42 U.S.C. § 4332[2][C]). If an agency decides not to prepare an EIS, it must supply a “convincing statement of reasons” to explain why the project’s impacts will be insignificant (*Blue Mountains Biodiversity Project*, 161 F.3d at 1212). “The statement of reasons is critical to determining whether the agency took a ‘hard look’ at the potential environmental impact of a project” (*Id.*).

Based on the information provided in the EA, the project’s impacts will be far from insignificant, will affect a large number of and wide diversity of species and other factors of the human environment, and will affect the entire state of Arizona as well as areas outside of the state’s boundaries (due to waterway connectivity).

NEPA and the regulations promulgated to implement the act (42 U.S.C. § 4321, *et seq.*, 40 CFR § 1500.1, *et seq.*) mandate that the FWS assess and evaluate the environmental impacts of the proposed Sport Fish Stocking Program and that reasonable alternatives be considered (42 U.S.C. § 4332 102 C). FWS, as the lead agency for this project, must consider cumulative impacts as

well as direct and indirect impacts of the proposed project (40 CFR ~ 1508.7). As noted above, due to the scale of this project and its likely harmful environmental impacts, it certainly warrants an EIS.

Response: An EA provides evidence/analysis for determining whether an action will cause significant impacts (40 CFR 1508.9).¹ The FWS will determine whether the preparation of an Environmental Impact Statement (EIS) is warranted based on the analysis completed and documented in the EA. If it is determined that there will be no significant impacts as a result of the Proposed Action, the EA fulfills the agency's compliance with NEPA. Current CEQ regulations allow mitigation to be used to offset significant effects as part of an EA (Federal Register 2011).²

As to the geographic scale of the action, the subcatchments that include the stockings sites comprise approximately 23 percent of the state by area, though we recognize that stocked fish could move beyond that area. The effects of the Proposed Action were analyzed within subcatchments as described in Section 4.1.2 of the Draft EA. The analysis included such factors as distance from stocking site to sensitive species, whether stocked species would be likely to move out of the stocking site or sensitive species would be likely to move into the stocking site, how often that might happen, how many stocked fish would be expected to move, conditions of transport, barriers to movement, and species biology. As part of the Proposed Action, the CAMP has been developed to minimize and offset the effects of stocking on the human environment.

Agency and Public Outreach

Comment 4 [525]: There has been almost no coverage of this in the media so many will not have their voices heard.

Response: Chapter 7 of the EA provides a summary of the coordination and public involvement process undertaken for the AGFD Sport Fish Stocking EA. The agencies sought early public input for development of the alternatives, including three public scoping meetings. The agency and public scoping notice and the Draft EA Notice of Availability were each distributed through notices to various media contacts including television, general-distribution newspapers, postings on agency websites and on-line listings, electronic distribution of e-mail notices to tens of thousands of e-mail addresses and LISTSERVs, and through electronic distribution of e-newsletters. The Draft EA was featured in a number of newspaper articles and in a news segment on ABC15 newscast and website.

¹ CFR, Title 40, Part 1508.9, Chapter 5, "Council on Environmental Quality, Subchapter A, Accidental Release Prevention Requirements; Risk Management Programs Under the Clean Air Act Section 112(r)(7); Distribution of Off-site Consequence Analysis Information Environmental Assessment."

² Federal Register, 2011, "Final Guidance for Federal Departments and Agencies on the Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Finding of No Significant Impact (40 CFR 1500–1508)," 76:3843.

Comment 5 [553]: Grand Canyon National Park received email notification by the AGFD and the FWS of the scoping and Draft EA for review; however, no mention of NPS involvement is shown in Section 7.0 (Coordination and Public Involvement).

Response: Grand Canyon National Park was added to the list of agencies contacted in the Final EA, Section 7.1, Agency and Public Scoping.

Comment 6 [553]: Advance coordination with fisheries and wildlife staff from Grand Canyon National Park is requested when there is potential for AGFD or FWS activities to impact native species within the park.

Response: Comment noted.

Comment 7 [553]: Grand Canyon National Park is culturally significant to eleven Traditionally Associated Indian Tribes. The document does not identify consultation requests were made for four of these Tribes (cf. page 117, Draft EA), including the Pueblo of Zuni, Moapa Band of Paiute Indians, Paiute Indian Tribes of Utah, and the Las Vegas Paiute Tribe. The Pueblo of Zuni, in particular, have been engaged in fisheries management activities within waters connected to Grand Canyon National Park, which they view as sacred (including the Little Colorado River where additional non-native sport fish stocking is proposed). It is requested that the FWS initiate consultation with these additional tribes.

Response: Per CEQ guidance, “when the proposal may affect an Indian reservation, the agency should consult with the Indian tribe.” An offer of government to government consultation was mailed to 22 Native American tribes on June 10, 2009. On March 19, 2011, when the Draft EA was made available for public review, a notice of availability and an offer of consultation were mailed to 33 Native American tribes, including the Pueblo of Zuni, Moapa Band of Paiute Indians, Paiute Indian Tribes of Utah, and the Las Vegas Paiute Tribe.

Public Review Period of Draft EA

Comment 8 [20]: Insufficient time was provided for the public to review the EA and associated documents, some of which were not made available until part-way through the public review period.

Comment 9 [563]: We are requesting a deadline extension of at least an additional 60 days to July 11, 2011 for additional substantive public comment submissions. Although the deadline for comments was already extended from a 30-day comment period to 60, we nevertheless find the time allotted for public comments woefully inadequate.

The Draft EA and its numerous appendices span no less than 397 pages. Even so, that plethora of words inadequately addresses the AGFD’s plans for mitigation and native fish restoration that are integral to the permitting process. To find even a fraction of the information necessary to make substantive comments, we have had to contact private biological consultants, meet with AGFD personnel, and spend countless hours searching for missing but critical information.

In addition to the issues listed above, our members, many of whose grazing allotments are managed under Coordinated Resource Management Plans, are currently working closely with our local Natural Resources Conservation Districts as they engage in the coordination process with the FWS on the recently published decisions and proposals published by the Service regarding the jaguar, the Spike Dace and Loach Minnow, and the Sonoran Desert Tortoise.

Response: The AGFD Sport Fish Stocking Draft EA was initially made available for a 30-day public review period, as is typical for Draft EAs. However, requests were made by members of the public for a time extension based on the length of the Draft EA and supporting documentation. In response, the FWS, as the lead federal agency, extended the public review period to 60 days. The FWS considers the 60-day review period of adequate length. In comparison, an EIS requires a 45-day public comment period.

The FWS provided the BA and draft BCO to the members of the public who requested them during the comment period in order to facilitate understanding of the analysis presented in the Draft EA. When releasing these documents, the FWS did not invite public comment on the analyses presented in these documents. Consultation under Section 7 of the ESA does not undergo public comment and review. Consultation is between federal agencies and the FWS or the National Oceanic and Atmospheric Administration, depending on which agency has jurisdiction over the species considered in the consultation. In this case, intra-service consultation is between two offices in the FWS: the WSFR and the AESO.

Purpose and Need/Balancing Sport Fish Management and Native Fish Conservation

Comment 10 [20]: As the purpose and need statement clearly sets forth, no balance is proposed. Instead the proposed project is solely focused on the sport fishing mandate, with adverse effects to the native species conservation mandate recognized, albeit poorly.

Response: The purpose and need under NEPA is tied to the specific action or undertaking—in this case, sport fish stocking. The need for an action under NEPA can include social or recreational objectives. The federal action requiring NEPA review is the provision of funding by the WSFR to the AGFD for sport fish stocking, consistent with the mandates of the Sport Fish Restoration Act.

Comment 11 [20]: Both involved agencies, the FWS and the AGFD, have mandates to conserve native fish and wildlife, but the purpose and need defined for the proposed project is to “...*meet the current and future need and demand for angling opportunities...*” Aside from the unaddressed question of what segment of the Arizona angling public has an actual *need* to angle (presumably implying subsistence or commercial fishing) it would seem that the dual mandates of the two agencies would require a *balancing* of their function to provide recreational fishing with their function to protect and enhance native fish and wildlife.

With most of the native species addressed in the Draft EA in serious decline, the proposed ongoing imposition of serious threats by the Federal and State agencies charged with conserving those species bodes poorly for preventing loss of many of the native species. Combined with the

wildly optimistic, vague, and parsimonious mitigation program proposed, the draft EA presents a strong statement that neither the FWS nor the AGFD is committed to protecting or recovering Arizona's imperiled native fishes.

Comment 12 [542]: The dual goals of both conserving and restoring wildlife while providing increased sport fishing opportunities, as currently implemented, are neither complementary nor compatible. The agency uses its resources to stock more fish to provide angler user days; the stocked nonnative fish prey on and compete with the state's native fish species, further depleting populations and pushing them to the brink of extinction; then the agency along with federal agencies and non-governmental organization (NGOs) use their resources to try to save the species that the AGFD is harming with the sport fish stocking.

Comment 13 [542]: The FWS continued aiding and abetting of the ongoing taking of endangered and threatened native fish, aquatic, and semi-aquatic species works at direct cross purposes of its mission and its mandates of conservation through the ESA. None of the alternatives provided in the Draft EA fulfills the missions of the AGFD or the FWS as they do not conserve, enhance, protect, or restore Arizona's diverse native wildlife species for the benefit of present and future generations of Arizonans or the American people. Instead, the alternatives only benefit a small group of citizens to the severe detriment of native species.

Comment 14 [561]: The AGFD's mission is "to conserve, enhance, and restore Arizona's diverse wildlife resources and habitats through aggressive protection and management programs, and to provide wildlife resources and safe watercraft and off-highway vehicle recreation for the enjoyment, appreciation, and use by present and future generations" (emphasis added). The FWS's mission is "to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people" (emphasis added). Neither of the action alternatives fulfills these missions as they do not conserve or enhance—and they certainly do not protect or restore—Arizona's diversity of native wildlife species.

Comment 15 [555]: How can you think of trying to justify stocking of nonnative species in waters where there are state species of concern or any federally listed candidate, threatened, or endangered species or where they might be managed for and reintroduced as noted at 1.5.2? It defies the best available science and is counter to the constitutional responsibility granted to the AGFD to manage the wildlife of the state of Arizona for current and future generations.

Response: As stated in the Draft EA, consideration was given to the mandates of both agencies in the development of sport fish stocking alternatives for this Draft EA. The Proposed Action attempts to balance dual agency mandates because it reflects elimination of some sites stocked historically, selective stocking of certain species, and incorporation of a suite of mitigation measures in order to address effects to native species. After the public comment period, the Proposed Action was further revised, resulting in the following changes:

Modifications to Proposed Action

Stocking Site	Species Proposed for Stocking -Draft EA	Species Proposed for Stocking -Final EA
Fagen Tank (Santa Cruz River–Middle Santa Cruz)	Bluegill sunfish Redear sunfish	Stocking site eliminated from Proposed Action
Green Valley Lake (Verde River–Lower Verde River Complex)	Rainbow trout Channel catfish	Rainbow trout
Kinnikinick (Little Colorado River–Diablo Complex)	Rainbow trout Brown trout Brook trout Cutthroat trout Arctic grayling Channel catfish	Rainbow trout Brown trout Brook trout Cutthroat trout Arctic grayling
Morton (Little Colorado River–Diablo Complex)	Rainbow trout Channel catfish	Rainbow trout
Mud Tank (Little Colorado River–Diablo Complex)	Rainbow trout Channel catfish	Rainbow trout
Bass Tank (Bill Williams River–Santa Maria Complex)	Bluegill sunfish Redear sunfish Largemouth bass	Bluegill sunfish Redear sunfish
Blue Tank (Bill Williams River–Santa Maria Complex)	Bluegill sunfish Redear sunfish Largemouth bass	Bluegill sunfish Redear sunfish
Carter Tank (Bill Williams River–Burro Creek Complex)	Channel catfish	Bluegill sunfish Redear sunfish
Antelope Tank (Bill Williams River–Burro Creek Complex)	Bluegill sunfish Redear sunfish Largemouth bass Channel catfish	Bluegill sunfish Redear sunfish
Bar 37 Tank (Bill Williams River–Burro Creek Complex)	Bluegill sunfish Redear sunfish Largemouth bass Channel catfish	Bluegill sunfish Redear sunfish
Harman Tank (Bill Williams River–Burro Creek Complex)	Channel catfish	Bluegill sunfish Redear sunfish
Little Antelope Tank (Bill Williams River–Burro Creek Complex)	Bluegill sunfish Redear sunfish Largemouth bass	Bluegill sunfish Redear sunfish
McElhaney Tank (Bill Williams River–Burro Creek Complex)	Bluegill sunfish Redear sunfish Largemouth bass	Bluegill sunfish Redear sunfish
Stubbs Tank (Bill Williams River–Burro Creek Complex)	Bluegill sunfish Redear sunfish Largemouth bass	Bluegill sunfish Redear sunfish
Swale Tank (Bill Williams River–Burro Creek Complex)	Channel catfish	Bluegill sunfish Redear sunfish

Though the purpose and need does not include the conservation of native species, this is addressed through agency mandates, requirements under the ESA, and the mitigation program developed for the Proposed Action.

Comment 16 [476]: No case is made to justify a need to meet the expected future demand for sport fishing opportunities in Arizona. This is not done with terrestrial wildlife that is harvested

for recreational purposes, in fact; there is a sophisticated permitting program that allocates limited supplies of certain wildlife (for example, big-game species) among authorized users. Other wildlife is simply “out there” and available for harvest, with no programs to artificially enhance populations through stocking just so they can be exploited. Furthermore, it may be unreasonable to expect sport fish supply to meet future demand because of the acknowledged damage to native fauna associated with sport fish stocking, and that damage will only increase if sport fish stocking is expanded.

Comment 17 [20]: Stocking of artificial populations of nonnative fish species into natural waters to accommodate a demand for sport fishing is an archaic practice. This kind of artificial wildlife management ended years ago for terrestrial animals, for which hunting is now a matter of managing demand rather than supply. The same principles must now be turned to aquatic species and a new program instituted to manage recreational fishing demand at a level that can be supported by the natural environment without artificial supplementation and adverse impacts. The AGFD and the FWS have made a good start at this with the urban lakes fishing program, which manages demand by steering it to artificial waters with artificially produced animals. Now is the time to take it a step further and cease entirely the stocking of nonnative warm water fish outside of the urban lakes and lower Colorado River. Stocking of nonnative trouts into natural waters should be restricted to only certain drainages, with adequate protections emplaced to prevent their movement into waters occupied by and managed for native species. This is the future that the AGFD and FWS should be working toward, rather than the continuation of business-as-usual embodied in the proposed project of the Draft EA.

Comment 18 [548]: EA fails to analyze the differential treatment of sport fishing versus exotic species hunting. For example, elk, like sport fish, are a habitat/native species damaging exotic that are managed by the AGFD. The AGFD does not continue to dump more elk in sensitive areas to provide for more hunter demand. Instead, AGFD controls permit numbers. Why are fish managed differently? This is very controversial to say the least.

Response: Fish and wildlife are held in trust for the public. Feedback from the public indicates a desire for angling opportunities throughout the State of Arizona. This constitutes a need to manage angling opportunities through the sport fish stocking program to meet current and future demand.

Stocking of sport fish is an accepted fish management practice with recreational and economic value and remains broadly used.^{3,4}

Sport fishing in Arizona differs from hunting in a couple of substantive ways that result in different management approaches. Hunting is based on a permit system that is intended to provide fair and equitable opportunity to lawfully harvest and prevent overharvest of animals whose population numbers are limited in size and distribution. With some exceptions, hunted game species exist as self-sustaining populations that are generally not

³ Cowx, I.G., R. Arlinghaus, and S.J. Cooke. 2010. “Harmonizing Recreational Fisheries and Conservation Objectives for Aquatic Biodiversity in Inland Waters.” *Journal of Fish Biology* (2010) 76, 2194–2215.

⁴ Halverson, M.A. 2008. “Stocking Trends: A Quantitative Review of Governmental Fish Stocking in the United States, 1931 to 2004.” *Fisheries* 32(2):60–75.

supplemented and therefore the “supply” dictates the number of permits issued. In contrast, many sport fish in Arizona (particularly trout, which are the species primarily proposed for stocking under the Proposed Action), do not exist as self-sustaining populations, and fishing opportunities would be substantially reduced or eliminated without stocking. Therefore, through a sport fish stocking program, “supply” can be tailored more closely to “demand.” Second, fish are managed differently because they produce thousands or hundreds of thousands of eggs per individual and they can be readily produced in a cost-effective fashion and in a form desirable to the recreating public, and lastly, sport fishing is a popular recreational activity because it is relatively easy to learn and to be successful; it doesn’t require a lot of expensive or technical equipment, and appeals to a much broader user group (wide range of ages and physical abilities).

It should be noted that many of the proposed stocking sites are not natural waters. They are primarily man-made constructed habitats such as reservoirs and stock tanks that did not exist naturally on the landscape. Though artificial waters of the urban lakes provide expanded angling opportunities, urban lakes alone cannot meet the angling demand for the state as a whole. Limiting the stocking of nonnative warm-water species to only the urban lakes and the lower Colorado River would eliminate substantial recreational opportunity in other waters, particularly in waters unsuitable for cold-water stockings due to thermal conditions or habitat. This approach would fail to fully meet angler demand and need, would result in substantial loss of economic benefit for local communities, and may encourage illegal stocking of potentially less desirable or more damaging species. The effects of stocking warm-water species, as outlined in the Proposed Action, have been analyzed in detail in the Draft EA, BA, and draft BCO and mitigation commitments have been incorporated into the Proposed Action to address the potential adverse effects to native fishes.

Comment 19 [476]: The EA contends explicitly that sport fish management and effective native fish conservation can occur at the same time and place. However, this is not possible because the two activities are incompatible, as attested by the imperiled status of most of Arizona’s native fishes. Sport fish and native fish must be spatially segregated if native fish are to be conserved. There currently is no alternative.

Comment 20 [561]: In order for special status species to recover, AGFD and FWS need to focus on a watershed approach to their recovery. This must be considered when addressing any sport fish stocking program. It will take time to recover native fishes throughout their natural range, but immediate actions to begin the process of phasing out nonnative fishes and associated stocking is essential. We suggest that the agencies consider working watershed by watershed to recover native fishes and eliminative nonnatives and stocking of those nonnative fishes.

We would also support the designation and aggressive segregation of watersheds or sub-watersheds managed for native fish from those managed for nonnative sport fish. We believe science supports that the only way for native fish recovery to occur is for nonnative fish to be removed and managed separately.

Comment 21 [476]: Sport fish management and native fish conservation are conflicting and incompatible practices in the southwestern United States and native fish conservation cannot be successful in places occupied by nonnative sport fishes. According to the Draft EA, the AGFD wishes to have it both ways—an active (even expanded) sport fish stocking program superimposed on effective native fish conservation. This is not possible and such a scenario will result only in the continued deterioration of Arizona’s native fishes. AGFD needs to confront the reality of incompatibility between sport fish management and native fish conservation, and develop and implement strategies that spatially segregate the two activities. This is the only way to accomplish both sport fish stocking and effective native fish conservation.

Comment 22 [574]: The well-documented negative impacts of nonnative sport fish stockings on native fishes are noted extensively in the Draft EA, but it is not stated strongly enough that nonnative fishes now are considered by native fish experts to be the primary hindrance to conservation and recovery of native fishes in the American southwest. It is widely accepted that native and nonnative fishes cannot coexist together with any expectation that natives will thrive or even survive.

Response: The imperiled status of native fish in Arizona is described in the Draft EA. Though historical sport fish stocking practices have been an important factor contributing to the decline of these native fishes, it is not the only factor, and other human activities such as water diversion and impoundment have also contributed to their decline.

The statement that native and nonnative species cannot coexist does not consider the unique biological and ecological characteristics of the various native and nonnative fish species nor does it consider the unique situations present at the various stocking locations. The Draft EA considers these details and unique biological characteristics of the analyzed species and is based substantially on in-depth analysis completed as part of the BA. The analysis in the BA and the available data do not support the statement that all nonnative and native fish must be spatially segregated in all locations for successful conservation of the latter. For example, Canyon Creek, upper Oak Creek, and lower Tonto Creek continue to support populations of native fishes after over 60 years of stocking of nonnative fishes in their watersheds. Trout have been present in Upper Oak Creek since the 1930s, and this reach continues to support apparently stable populations of speckled dace and native suckers. Though a detailed and long-term study has not been conducted on this system, long-term monitoring reports show a persistence of native fish species despite the presence of nonnative brown and rainbow trout. This is in contrast to the lower reaches of Oak Creek, where trout do not persist year-round but where a suite of other nonnatives have invaded, including green sunfish, smallmouth bass, flathead catfish, bullhead, and rock bass, and where fewer native fish are present.

The CAMP includes development of watershed-based fish management plans aimed to address conflicts between sport fish management and native fish conservation, including a Watershed Management Planning Process. The AGFD shall apply its Watershed-based Fish Management Process (AGFD 2009)⁵ to develop aquatic species management plans for all priority watersheds in the state. The planning process will include consideration

⁵ AGFD. 2009. “Statewide Fish Management Team Final Report.” Phoenix, Arizona.

for special status species and identify conservation opportunities for incorporation within the planning framework. Special status species will benefit through identification of focal management areas and restoration needs that can be prioritized into multiple land management programs and funding sources in a coordinated approach.

Comment 23 [574]: The AGFD sport fish stocking program as presented in the Proposed Action does little to minimize the interactions between native and nonnative fishes, and the proposed mitigation measures do little to counteract the results of such interactions.

Response: We disagree that the Proposed Action does little to minimize the interactions between native and nonnative fishes or minimize or offset the result of such interactions. The BA and EA analyzed the possible impacts to consultation and other special status species and, except for a few stocking sites, the impacts to these species were unlikely because of type of fish stocked, distance, conditions of transport, barriers, and other factors. However, we acknowledge that over 10 years impacts may occur. The draft BCO⁶ provided information about the expected effects to all consultation species, and we then developed the CAMP to minimize and offset these effects. Per CEQ regulations, mitigation includes (1) avoiding impacts by not taking actions, (2) minimizing an impact by limiting the degree or magnitude of the action, (3) rectifying and impact by repairing, rehabilitating or restoring the effected environment, or reducing or eliminating an impact over time through preservation and maintenance operations during the life of the action, and compensating for an impact by replacing or providing substitute resources or environments (40 CFR §1508.20).⁷ We avoided impacts by forbearing stocking (please see response to Comment 15). We minimized impacts during informal consultation, when species considered “more predacious” were removed from many stocking sites (the list is available in the administrative record for this EA). In addition, the CAMP has specific requirements to remove stocked fish from surveyed stream reaches (reducing or eliminating an impact). The CAMP also has requires that multiple populations of six focal species be secured or established (replacement). In addition to the actions mentioned in this response, the CAMP includes other mitigation activities, which fall into the various categories of mitigation. Mitigation actions have also been tied directly to recovery and conservation plans in an effort to contribute toward recovery for several species.

Comment 24 [542]: AGFD should cease stocking all habitats currently occupied by imperiled native fish and wildlife species and put their full force and weight behind protecting existing populations of imperiled species.

Response: See response to comments 11–15.

Comment 25 [561]: We strongly object to stocking of any nonnative species in habitats either currently occupied by or designated for management of special status species. One of the greatest

⁶ FWS. 2011. “Draft Biological and Conference Opinion for Arizona Sport Fish Stocking Program.” FWS, Phoenix.

⁷ CFR. Title 40. Part 1508.20. Chapter 5. “Council on Environmental Quality. Subchapter A, Accidental Release Prevention Requirements; Risk Management Programs Under the Clean Air Act Section 112(r)(7); Distribution of Off-site Consequence Analysis Information. Mitigation.”

impediments to the conservation and recovery of native fishes is the presence and continued stocking of nonnative species. In fact, many scientists consider nonnative fishes as the number one barrier to conservation of imperiled native fishes.

Response: Comment noted.

Range of Alternatives/Comparison of Alternatives

Comment 26 [460]: The Proposed Action provides the greatest economic benefit and the best recreational outfit with no discernable negative effect of substance on the environment, flora and fauna. The plan provides for monitoring and adjustments where needed to mitigate potential damage in line with the ESA and good management practices. The Reduced Stocking Alternative fails to maximize benefit because of fewer stocking sites, 101 versus 167, while bringing no greater mitigation or protection than the Proposed Action. And in fact, may drive lesser protections due to potential revenue and public participation loss in fee derivatives and conservation actions. The No Action alternative does not meet recreational needs and may result in fewer protections to flora and fauna.

Response: Comment noted. Effects to the environment, flora, and fauna were identified in the EA analysis of the Proposed Action, and mitigation would be implemented to address those effects.

Comment 27 [20]: The Draft EA fails to consider the full range of alternatives as required under NEPA. Only three alternatives are fully considered, and one of those, the “no action” is a straw-dog, as is explained on page 22 of the Draft EA.

Comment 28 [574]: We believe there are other alternatives that could significantly reduce adverse effects of the stocking program while preserving sport fishing opportunities.

Comment 29 [476]: The no action alternative is unrealistic; the purpose for its inclusion is simple formality.

Comment 30 [533]: The No Action alternative most always means the status quo. Since stocking has already been occurring for many decades the elimination of stocking would be something radically different from the current activity.

Response: The FWS must consider a range of reasonable alternatives. Reasonable alternatives include those that are practical or feasible from technical and economic standpoints. Per CEQ guidance, “the phrase “range of alternatives” refers to the alternatives discussed in environmental documents. It includes all reasonable alternatives, which must be rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them.” The three alternatives in the Draft EA represent a range of stocking intensities and associated environmental and socioeconomic effects, ranging from stocking at 166 sites, 101 sites, and 0 sites (No Action Alternative). Two alternatives were also considered but discarded: the Expanded Stocking Alternative and the Minimal Stocking Alternative.

The No Action alternative represents a projection of current conditions and reasonably foreseeable actions to the most reasonable future conditions that could occur during the life of the project without any action alternatives being implemented. The No Action alternative provides a baseline for comparison of the environmental effects associated with the action alternatives. The decision-maker has the discretion to select the No Action alternative based on the consideration of environmental impacts, and public and agency input.

Per CEQ guidance, there are two distinct interpretations of “no action” that must be considered, depending on the nature of the proposal being evaluated. The “no action” alternative may be thought of as continuing with the present course of action until that action is changed. The second interpretation of “no action” is that the Proposed Action would not take place and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward. The No Action alternative that we chose would eliminate stocking and would be notably different from the Proposed Action. A No Action alternative that would represent the status quo would be very similar to the Proposed Action. Therefore, the interpretation of the No Action as “no stocking” is the best choice because it provides a broader range of alternatives than a no action alternative that would analyze the continued program of stocking sport fish.

Comment 31 [11]: I am concerned that the other two options in the EA (No Stocking and Reduced Stocking) would be so distasteful to recreational fishermen (if implemented) that they leave fishermen no other option than to support the Proposed Action. The makeup of the alternatives seems manipulative in this regard and not truly representative of NEPA public consultation.

Response: The three alternatives in the Draft EA represent a range of stocking intensities and associated environmental and socioeconomic effects and tradeoffs.

A No Action alternative is customarily included in any NEPA analysis to provide a baseline for comparison of environmental effects of the action alternatives. The Reduced Stocking Alternative was developed in response to concerns received during the scoping process on the effects of nonnative fish stocking on native fish and other aquatic species, and it represents a level of stocking that would fall between the No Action and the Proposed Action. This alternative allows the decision-maker and the public to evaluate how biological resources and socioeconomics could be affected by reducing the number of sites stocked. Both socioeconomic effects (including recreational sport fishing opportunities) and effects on special status species were identified during the public scoping process and are considered valid issues in developing and analyzing alternatives.

Comment 32 [577]: The commenter recommends that all stocking that takes place in non-urban Pima County meet the coldwater stocking objective only. This would provide important recreational opportunities to the citizens of Arizona and would pose less of a risk to the fragile aquatic resources within and downstream of these unique areas.

Specifically, this office recommends that no stocking take place in Fagan Tank and that it be dropped from the list of sites for both the preferred and reduced stocking alternatives. In the EA, Fagan Tank is considered a "closed system" and that no leopard frogs have been found within 5 miles from the site. In fact, your EA suggests that Fagan Tank is in the same biological setting as Reid Park Lake in central Tucson. Nothing could be further from the truth; this tank is very close to Davidson Canyon (0.4 miles), which drains into Cienega Creek not far from Fagan Tank. Cienega Creek is one of the last few perennial creeks in southern Arizona without any non-native fish. Cienega Creek (and to a lesser extent Davidson Canyon) contain robust populations of lowland leopard frogs and Fagan Tank is not far from sites on the Coronado National Forest that contain the threatened Chiricahua leopard frog. The presence of crayfish and the continued stocking of Fagan Tank with warm-water fish could threaten Cienega Creek's fish and leopard frog populations. Further, Pima County questions the need to stock Fagan Tank for sport fishing because the site receives virtually no sport fishing activity. For example, one website listing 352 tanks and lakes in Pima County where fishing may be possible does not even mention Fagan Tank and a web search found that only one angler wrote anything about the tank. That angler wrote an unflattering account of the spot and noted that none of his angling friends had ever heard of it.

If Fagen Tank remains on the list, then commenter would like to collaborate with the AGFD by using some of the mitigation resources identified in Chapter 5 of the Draft EA to rehabilitate the site to rid the tank of crayfish, which pose an even greater threat to the downstream systems than the non-native fish.

Commenter has similar concerns about continuing to stock Arivaca Lake with nonnative warm-water species, particularly in view of the bioaccumulation of mercury; however we acknowledge the popularity of the site for recreational purposes. Improved lake management strategies could include shifting to cold-water stocking, and managing the lake for more through-put and drawdown during the summer months to achieve other objectives such as recharge and mercury management.

Response: Three nonurban stocking sites in Pima County are included in the Proposed Action. Rose Canyon Lake is proposed for stocking with rainbow and brown trout. The remaining two sites, Arivaca Lake and Fagen Tank, were proposed for stocking with warm-water species in the Draft EA.

Following the review of public comments received on the Draft EA, the WSFR, the AESO, and the AGFD eliminated Fagen Tank from the list of waters to be stocked under the Proposed Action. The Final EA reflects this change.

The AGFD objective for Arivaca Lake is to maintain a year-round fishery to meet local angler demand. Arivaca Lake represents the highest number of AUDs (22,936 AUDs in 2001) in Pima County (Final EA, Table 23). Arivaca Lake was initially constructed by the AGFD with SRFA funding for the purpose of creating a sport fishery.

Arivaca Lake could not support trout year-round. Management of Arivaca Lake under cold-water stocking objectives only would not provide for year-round recreational objectives. Establishment of a put-and-take trout fishery would be possible for the fall,

winter, and spring months, but they would die out every summer due to unsuitable water quality (pH and dissolved oxygen and high temperature). There are very few angling opportunities in southern Arizona, of which Arivaca Lake provides one of the best bass and catfish opportunities in the region. Maintaining a put-and-take fishery at this lake would likely not be cost-effective because of the distance from AGFD hatcheries and the time and number of fish needing to be stocked. Maintenance of a self-sustaining warm-water fishery is cost-effective and meets local angler demands. Water management of the lake for more throughput and drawdown would drastically harm the existing aquatic community, especially if done through the summer, and would likely result in a partial or total fish-kill due to poor water quality. Management of water in Arivaca Lake must fall within the guidelines of the AGFD's existing water storage right under Arizona state water laws.

Regarding the EA analysis, no other special status fish species have been documented below Arivaca Lake for more than 60 miles of mostly ephemeral channel, and this lake has spilled only twice in the past 10 years. Lowland leopard frog is known from approximately 5 miles away, but these occupied locations are outside of the watershed. The nearest occurrence of lowland leopard frogs within the watershed is more than 40 miles downstream via Arivaca Wash and Brawley Wash near Three Points.

The comment about the presence of mercury is noted. There is currently a “do not consume fish and other aquatic organisms” advisory at the lake.

Comment 33 [20]: The Draft EA should include an alternative that considers an altered suite of species to be stocked. This alternative would eliminate all warm water fish species from the proposed stocking with the exception of the lower Colorado and Gila River sites and the Phoenix and Tucson urban lake sites. As can be clearly seen from Table A of Appendix F of the Draft EA, the warm water species make up the bulk of the “more predacious” species to be stocked⁸ and their elimination would result in a substantially different level of adverse environmental effects, while not substantially reducing angling opportunity.

Response: Stocking of warm-water species only in the lower Colorado and Gila River sites and the Phoenix and Tucson urban lake sites would eliminate angling opportunities in a considerable number of locations in Arizona that are not appropriate for stocking cold-water fish due to unsuitable thermal conditions or habitat. This approach would fail to fully meet the purpose and need of the action, would result in substantial loss of economic benefit associated with angling for local communities, and may encourage illegal stocking of potentially less desirable or more damaging species.

The purpose and need of the action, as directed by the SFRA, is to “provide federal aid to states for the management and restoration of fish having material value in connection with sport or recreation in the marine and/or fresh waters of the United States” (16 U.S.C. Sections 777–777l, August 9, 1950, as amended 1956, 1959, 1960, 1970, 1976, 1980,

⁸ Bluegill (*Lepomis macrochirus*), which is included in the “less predacious” column, may be “less predacious” when pure, but it interbreeds freely with very predacious and highly detrimental green sunfish (*Lepomis cyanellus*), and stocks of bluegill are generally composed of varying levels of hybrids between the two species.

1984, 1986, 1988, 1990, and 1992).⁹ Material value of a specific species relates to the willingness of anglers to pursue certain species of sport fish. Species of fish are not equally desirable by the angling public (Pringle 2004,¹⁰ Behavioral Research Center 2007¹¹). Available research into angler preferences and willingness to pay for pursuit of sport fish indicates that the warm-water species proposed for stocking are the species that the angling public desires for their recreational pursuits. The AGFD does not believe that exclusive stocking of less desirable species would garner the public's support and would provide a similar level of "material value."

Comment 34 [20]: Most of these warm water nonnative fish proposed for stocking have been implicated in the ongoing declines of native fish. They have been targeted in many places for reduction or removal to allow native fish to survive or recover. It appears that a number of agencies and organizations may be wasting time and money in efforts to control the same six nonnative warm water fish species that FWS and AGFD are now proposing to continue introducing.

Response: Many of the warm-water species proposed for stocking are not the same nonnative species identified for removal or reduction. Largemouth bass, redear sunfish, bluegill, and black crappie, for example, do not maintain populations in most desert streams at levels that have been documented to adversely affect populations of native fishes, except in the largest river systems. The nonnative species in these smaller stream systems that cause the adverse impacts are green sunfish, bullhead catfish, red shiner, and smallmouth bass. The AGFD no longer stocks, and does not propose to stock under this action, green sunfish, bullhead catfish, and red shiner anywhere in the state. The AGFD proposes to stock smallmouth bass only in Apache, Canyon, and Saguaro lakes.

Some waters are only suitable for stocking warm-water fishes because their thermal regimes do not support cool- or cold-water fishes. As such, in order to provide angling opportunity in some areas, only warm-water fish are appropriate for stocking. In those cases where the AGFD proposes to stock both warm- and cold-water fishes, the intent is to provide a broader temporal range for angling opportunities throughout the year.

Comment 35 [20]: We recommend addition of an alternative entirely removing certain reaches of basins (catchments, subcatchments, complexes) from stocking and designating them as "native only." This would not preclude angling or its management from these areas, but any management of sport species would be for natives and removal and control of nonnatives would be ongoing. Over the past two decades, the concept of dividing nonnative and native fish into separate areas and devoting some areas solely to native fish conservation has been repeatedly discussed. AGFD has been working on a plan to implement this concept for over a decade, with the first effort released in 2001 (Young et al. 2001 as cited in appendix P). The Draft EA gives

⁹ U.S. Code. Title 16, Section 777-777l. "Conservation, Chapter 10B. Fish Restoration and Management Projects. State Use of Contributions."

¹⁰ Pringle, Todd. 2004. "Statewide Survey of 2001 Arizona Anglers." Fisheries Technical Report 03-01. Statewide Fisheries Investigations, AGFD, Phoenix, Arizona.

¹¹ Behavior Research Center. 2007. "Angler Preference and Validation Survey." Report prepared for AGFD, Phoenix.

lip service to the concept, but the only substantive provision is a mitigation item to continue that process, referred to as “...*planning using a watershed approach...*” This would “...*apply its (AGFD) Watershed-based Fish Management Process to develop aquatic species management plans for all priority watersheds in the state...*” with “...*consideration for special status species*” and identification of “*conservation opportunities for incorporation within the planning framework.*” It is implied that this planning process would result in some areas being set aside as “native only,” but carries no decisions or guarantees as to the outcome. Despite an uncertain outcome, and with some probability of an adverse outcome for native fishes, it is included in the Draft EA, BO, and BA as a beneficial action that would mitigate a portion of the threat from the stocking.

This alternative would go further than the planning of the proposed monitoring program, and would include actual immediate implementation of a program to designate certain watersheds or streams as native only. This would provide the public with a much clearer statement about what this “watershed-based fish management process” entails, and would allow the public to review and comment on the plan rather than it being unilaterally formulated and implemented by AGFD outside the formal NEPA review process.

Comment 36 [574]: Justification for segregating nonnative sport fish waters from native waters has been published in the scientific literature and accepted by the AGFD and the FWS in the 2008 “Gila River Basin Native Fishes Conservation Program Revised Strategic Plan 2008-2012.” Foremost of those actions are construction of fish barriers to segregate native fishes from nonnatives, and elimination of nonnatives from stream reaches upstream of fish barriers. The success of those actions in conserving native fishes are readily apparent from their extensive use in the Apache and Gila trout recovery programs, and at warm water sites such as Fossil Creek, Sabino Canyon, O'Donnell Canyon, and other ongoing projects. Although expensive, such projects are technically and logistically feasible and are the only known means by which native fish populations have been improved.

Dedication of waters for sole use as either native or nonnative fisheries can better focus limited resources toward the betterment of each, and may largely remove environmental compliance conflicts between the two. As advocated in the literature, large mainstem rivers and reservoirs currently sustain the greatest nonnative warm water fisheries, and they likely should be devoted as such given the intractable solution to restoring them for natives. On the other hand, smaller rivers and streams support only minor angler use and still retain native fish components that might be protected and restored. This approach seems a reasonable compromise on the part of both native and nonnative fishing interests. We believe that by resolving such conflicts now by implementing segregated fisheries, long-term costs to both programs can be minimized, and incorporation of such provisions into the stocking program EA is the appropriate place to start.

Comment 37 [542]: Commenter supports aggressive segregation of native and nonnative fisheries. Again, we believe science supports that the only way for native fish recovery to occur is for nonnative fish to be removed and managed separately. (Bonar 2004; Clarkson 2005; Lassus 1995; Tyus 2000).

Comment 38 [574]: The stocking of warm water nonnative fishes should be discontinued in all waters that are occupied by or have potential connections with streams occupied by native

species. Unless drainages are identified for segregation of native and nonnative waters (see below), and physically isolated with barriers or other means, the impacts of warm water nonnative fish stockings to natives are too large to justify. With catch-and-release regulations in place, fishing for native chubs of the genus *Gila* could help compensate for this switch if managed carefully.

Response: Management of wildlife, including fish, falls under the authority of the AGFD as per ARS Title 17.¹² Any decisions to designate certain areas for “native only” stocking would come from the AGFD through the Watershed Based Fish Management Planning Process (identified in the CAMP). The CAMP states that “The AGFD shall contribute to the conservation of other special status aquatic and semi-aquatic species through planning using a watershed approach. The AGFD shall apply its Watershed-based Fish Management Process (AGFD 2009)⁵ to develop aquatic species management plans for all priority watersheds in the state. The planning process will include consideration for special status species and identify conservation opportunities for incorporation within the planning framework. Special status species will benefit through identification of focal management areas and restoration needs that can be prioritized into multiple land management programs and funding sources in a coordinated approach.”

Comment 39 [567]: The Watershed-based Fish Management Process is an excellent concept provided all affected land management agencies are involved in the planning process.

Response: Comment noted.

Comment 40 [20]: The reduced stocking areas alternative should, at a minimum, exclude the following locations from any stocking of nonnative species and from management to maintain or enhance nonnative species. It should also include mandatory construction of barriers to upstream fish movement (where not already present) to preclude reinvasion of nonnative fish from downstream, and subsequent removal of existing nonnative fish species upstream.

- Upper Verde River watershed from its ridgelines downstream to a barrier to be constructed near Sycamore Canyon;
- Little Colorado River watershed from its ridgelines downstream to the dam at Lyman Reservoir;
- Chevelon Creek watershed from its ridgelines downstream to a barrier to be constructed upstream of Clear Creek Reservoir;
- North and West Forks of the Black River watersheds from the ridgelines downstream to a barrier to be constructed downstream of the confluence of the East and West Fork;
- Tonto Creek watershed from its ridgelines downstream to a barrier to be constructed somewhere below the mouth of Spring Creek.
- Sabino and Bear Canyon watersheds from their ridgelines downstream to existing natural and constructed barriers in the lower portions of both streams

¹² ARS, Title 17. Game and Fish, General Provisions.

- Sonoita Creek watershed from its ridgelines downstream to a constructed barrier near the upper end of Patagonia Lake;
- Oak Creek watershed from its ridgelines downstream to a constructed barrier near the mouth;
- Wet Beaver Creek watershed from its ridgelines downstream to a constructed barrier near its mouth;
- West Clear Creek watershed from its ridgelines downstream to a constructed barrier near its mouth.

This list of stream reaches to be dedicated to native-only conservation is not inclusive of all areas within Arizona that should be protected for native-only conservation. The list is related to the proposed stocking program and does not include a variety of other stream reaches throughout the state that should be considered native-only, such as Aravaipa Creek, Blue River, etc.

Response: If the watersheds referenced by the commenter were eliminated from the Proposed Action but all other proposed stocking sites were retained, a total of 124 sites would be stocked. Compared with the Proposed Action, such an alternative would result in major reductions in AUDs and loss of associated economic benefit. The commenter's suggestions regarding not stocking in certain watersheds to limit effects to native species is an approach that does not consider the unique factors of the stocking locations. This approach would unnecessarily eliminate stockings sites with little chance of exposure to native fish (e.g., closed Pratt Tank in the upper Little Colorado River and several closed sites in the Sycamore Creek watershed in the upper Verde watershed) and, therefore, was not used in the development of alternatives. The Reduced Stocking Alternative, which was developed considering the unique factors of the stocking locations and was based on potential exposure to consultation aquatic and semi-aquatic species, removes or reduces the number of stocking locations in many of the watersheds suggested by the commenter without unnecessarily eliminating stocking sites.

Installing barriers on all of these streams and subsequently removing upstream nonnative species would be cost-prohibitive and represent a much larger level of mitigation than that required to offset the effects of the stocking action. For these reasons, such an alternative is not practical.

The commenter is recommending management actions that fall outside of the scope of this analysis. During the implementation of the CAMP, we will ascertain what actions we might take, in addition to those specified in the CAMP, and we will consider these management recommendations. In addition, when developing the watershed management approach, these recommendations will be taken under consideration.

Comment 41 [20]: We recommend that the Draft EA include an alternative that would stock only native fish species throughout Arizona. At present three native species have been designated as “sport fish” by the State of Arizona—two coldwater (Apache and Gila trouts) and one warm water (roundtail chub). In addition, fishing is permitted on headwater chub in Fossil Creek incidental to fishing for roundtail chub. Surprisingly, the proposed action does not include the use of roundtail chub in the stocking program and all three native fish are underutilized in the AGFD stocking program. There is no mandate that sport fish stocking use nonnative species. If

FWS and AGFD are serious about protecting and restoring Arizona's native fish fauna, then this alternative is the logical long-term plan. Hatchery facilities now dedicated to raising nonnative sport fish would become available to raise the native species for both sport and conservation purposes. The formidable AGFD outreach program can be turned to promoting sport fishing on native species not just the existing three, but other native chubs and suckers as well may be developed for recreational fishing. This would turn FWS and AGFD resources to a huge advantage by using the same funds to meet both the mandates for recreational fishing and native fish conservation, and would eliminate that troubling conflict of interest found in the dual mandates to both conserve native species while promoting a major threat to their existence.

Conversion of all Arizona sport fisheries to native species would not entirely avoid adverse effects. The dangers of hatchery fish and their contribution to decline of native stocks has been well documented for salmon and trout and would apply to any native species being domesticated and stocked out for angling use. However, with careful planning and implementation, a native-only fish stocking program would have far fewer adverse impacts than nonnative stocking and might contribute to native species conservation.

Comment 42 [561]: Rather than focusing on stocking nonnative species, which is very costly both economically and environmentally, we recommend that AGFD focus instead on stocking and maintaining native species only. With adequate attention and resources, populations of native fishes could soon be recovered to the point where more of these species could be part of the sport fish program. Not only could these species be removed from the Endangered Species list or other special-status lists, but they would also provide economically-viable recreation opportunities while maintaining the ecological integrity of our state.

Recovery of native fishes and sport fishing of only native species should be the ultimate goal. Rather than continuing to jeopardize native species and ecological integrity for the benefit of only a small portion of Arizona's citizens, AGFD and FWS need to work toward recovering native species to the point where they can be removed from the ESA and can become a viable part of the sport fish program.

Comment 43 [470]: Why can't we have a fishery that doesn't require introducing nonnative fish.

Comment 44 [561]: The EA states that "[t]he purpose of the proposed activity is to meet the current and future need and demand for angling opportunities through the continued use of SFRA funds to rear sport fish at AGFD hatcheries, acquire sport fish from outside sources, and stock sport fish into selected waters of Arizona...." While we do not object to providing for angling opportunities, the focus on doing so should be via the recovery of native fishes, and we strongly object to the methods the agencies plan to use to fulfill this purpose and need. While we understand that the SFRA funds must be used for management and restoration of fish having value in connection with sport or recreation, we do not agree that these dollars should be focused primarily on nonnative species and, therefore, on extermination of native fishes or the further relegation of native fishes to isolated refugia. Instead, this purpose and need should be fulfilled using native fish species. By removing the stress of nonnative species, native fish recovery will be greatly benefited, leading to more self-sustaining native populations and species that can be incorporated into the sport fish program. This purpose and need statement should be modified to

say “. . . to rear *native fishes, including native sport fish* at AGFD hatcheries and to stock *native fishes, including native sport fish*, into selected waters of Arizona....” (modifications in italics).

Comment 45 [574]: Enhancement of native trout fisheries should be implemented to help minimize impacts of the sport fish program to native fishes. We understand that considerable progress is being made in improving propagation success for native trouts, and thus a switch from nonnative trout stockings to native trouts should be made expeditiously. Carrying capacity issues would remain with this recommendation, however, but at least the stocking impacts would be reduced through discontinued use of nonnative species. If harvest (and thus the need to stock) could be reduced through catch-and-release and other management restrictions, impacts of the stocking program could be further ameliorated.

Comment 46 [473, 511, 537]: Most of the goals and objectives of the Sport Fish Stocking Program can be achieved through supporting and continuing to fund native fish populations.

Comment 47 [517]: Instead of stocking nonnative fish into Arizona waters, emphasize efforts to restore native fish and their habitat and educate anglers on the merits of our unique native fish species.

Response: Though the FWS and the AGFD actively promote native species angling opportunities at present, the exclusive use of native fish species would not meet the purpose and need of the action for the following reasons:

Apache trout: Apache trout will be stocked into several locations, where appropriate, and possibly as part of the Proposed Action to provide angling opportunities. In addition, the FWS and the AGFD are working to recover this species, which, when recovered, will result in a number of additional fishing opportunities for this species. However, the primary reason that Apache trout could not be feasibly substituted for nonnative trout species is related to their biology. Apache trout evolved primarily in stream systems and do not do well in lentic systems (ponds, lakes or reservoirs). Catch rates of Apache trout by anglers in lentic systems are very low, growth of Apache trout in lentic systems is limited, and the species is intolerant of high pH levels found in many Arizona lakes. If all trout stocking in the historic range were replaced with Apache trout, catch rates and angler satisfaction would decrease substantially.

The AGFD has attempted stocking of Apache trout into several different lakes and has since discontinued it at Becker, Bear Canyon, and Big Lake due to extremely low catch rates by anglers and low survival rates through winter. The AGFD has continued to stock Apache trout, as the primary species, into Ackre Lake and Lee Valley Lake because these lakes drain directly into recovery streams above the fish barriers. These lakes experience extremely poor catch rates on Apache trout in the summer months because the Apache trout quit feeding when pH levels get high.

Another reason that this is not feasible at present is the absence of an adequate source of eggs for this species or adequate resources to support a brood stock program. The AGFD has no brood stock salmonids (of any species) and is entirely dependent on other sources for obtaining salmonid eggs. Currently, the only brood stock for Apache trout exists at the Williams Creek unit of the Alchesay-Williams Creek National Fish Hatchery

Complex. For the AGFD to obtain enough eggs to cover stocking across the historic range of Apache trout, Williams Creek Hatchery would need to substantially increase its Apache trout egg production and agree to provide those to the AGFD. Alternatively, the AGFD would need to develop its own broodstock program, which would require substantial additional funding and hatchery space, neither of which are currently available. An additional consideration would be higher mortality rates of Apache trout in hatcheries and greater difficulty in raising them compared with nonnatives like rainbow trout. This would substantially increase AGFD's operating costs, impair its ability to have a consistent stocking program from year to year, reduce overall production of trout, and thereby impair its ability to meet angler demand and satisfaction.

If it became feasible to obtain increased egg output from the Williams Creek Hatchery or for the AGFD to develop its own broodstock, replacement of all nonnative trout stockings with Apache trout would not meet current and future angler demand. Many anglers would likely oppose such an approach due to the associated low catch rates compared with rainbow trout. This reduction in angler satisfaction and opportunity would likely adversely affect local economies that depend on summer visitors.

Gila trout: Constraints associated with the rearing and stocking of Gila trout are similar to those discussed for Apache trout. The FWS Mora National Fish Hatchery and Technology Center in New Mexico is currently the only hatchery that produces Gila trout. This hatchery currently produces Gila trout for recovery purposes only—they do not produce Gila trout for recreational purposes. They occasionally have excess trout, however, that need to be moved off-station (e.g., excess broodstock, overproduction of certain age classes), and those fish may be available to stock for recreational purposes in non-recovery streams within the historical range of Gila trout. The AGFD stocked excess Gila trout into Frye Mesa Reservoir in 2010 and 2011. Broodstock fish, however, are very large (greater than 19 inches) and are not suitable for stocking into Arizona streams. Excess Gila trout of the appropriate size for stocking have not consistently been available. If they become more readily available in the future, and the FWS dedicates a portion of the Gila trout produced at Mora hatchery for recreational purposes, the AGFD may consider stocking more Gila trout for recreational fishing within their historical range. However, large-scale conversion of AGFD hatcheries to Gila trout production is not feasible due to limited availability of eggs, difficulty in rearing this species, lack of resources, including space and funding, and resulting decrease in overall trout production to meet angler demand.

Roundtail chub: The inability to use roundtail chub to help meet angler demand is related to production capacity/limitations, genetic issues, and angler preference and acceptance. The AGFD has limited production capacity for fish in its hatchery system. The husbandry of roundtail chub is only in its infancy, and production procedures (broodstock, egg production, hatching, grow-out) have only been marginally developed for this species. It is highly unlikely that the AGFD would be able to produce enough fish of appropriate and acceptable quality to replace all rainbow trout stockings with roundtail chub.

With regard to genetic considerations, the best available information on the *Gila* complex (species in the *Gila* genus) indicates that there are numerous populations of roundtail

chub that are genetically unique to the watershed in which they are found and that the species may interbreed with other species within the genus. Developing, tracking, and maintaining broodstock for roundtail chub for a broad stocking program across the watersheds of Arizona would be a very complex and difficult undertaking, and the AGFD does not have the capacity to maintain such broodstock and production facilities to avoid contaminating the unique genetic diversity of roundtail chubs across the lower Colorado River basin.

With regard to angler preference and acceptance, it should be noted that many anglers desire to eat what they catch. Many others prefer catch and release. Behavior Research Center (2007)¹¹ reports that 65 percent of Arizona trout fisherman catch and keep some/all of their catch for consumption as opposed to 35 percent that practice catch and release. Among largemouth bass fisherman, 58 percent practice catch and release and 42 percent eat their catch. As with other members of the Cyprinidae family (minnow family), roundtail chub has never been a preferred food fish for anglers. It is generally bony, and the meat is not of a preferred texture.

Stocking only native fish would eliminate preferred warm-water fish species as an option for catch and keep anglers, thus providing a recreational opportunity only for catch and release angling of stocked fish. Assuming that roundtail chub would not be a suitable replacement for rainbow trout and largemouth bass as food fish, a large segment of the angling and recreating public would lose its preferred recreational activity.

Comment 48 [559]: Although the EA states (page 10) that “the demand for recreational angling cannot be met alone by the three native sport species in Arizona (Apache trout, Gila trout, roundtail chub),” I suspect more could be done. Given that trout reproduce insufficiently to provide adequate angling to meet demand, it may be that swamping exotic populations with native stocking might be more effective than has been recognized in existing programs. A prime candidate would be flooding systems with hatchery Roundtail Chub, which is a sport fish that is associated with some remaining, highly threatened populations of the Narrow-headed Gartersnake (a species that may well become federally listed). Chubs can obtain high abundance due to their omnivorous diet, behavior, and relatively limited intra-specific aggressive behavior. They may, in some circumstances at least, be a significant predator affecting crayfish abundance. They are an excellent food source for gartersnakes, among other riparian species. Combining these facts suggests that significant mitigation could be achieved by substituting chub propagation for trout in some cases.

Response: The ability to provide roundtail chub of suitable genetic integrity to “flood systems with hatchery roundtail chub” without doing irreparable harm does not currently exist. Even if all AGFD hatcheries were dedicated to production of only native species of sport fish (Apache trout, Gila trout, and roundtail chub), limitations inherent in the husbandry of these species currently prevent them from being a viable option. In addition, the public acceptance of these species by anglers as replacements for the traditionally stocked species would quite likely be low.

Comment 49 [542]: We would support stocking recognized native sport fish within their historic ranges as well as the stocking of nonnative sport fish in closed or appropriate systems with sufficient monitoring and enforcement against transport to other water-bodies.

Response: Comment noted.

Comment 50 [574] As the Draft EA states, natural reproduction by warm water nonnative fishes sustains many of those fisheries anyway, so there should be no need to consider additional stockings. Unless they fall within a designated nonnative drainage (see below), catastrophic loss of a warm water fishery should not be replaced, and in fact its loss would be a benefit to native species.

Response: Some waters are only suitable for stocking warm-water fish because their thermal regimes do not support cool- or cold-water fishes. As such, in order to provide angling opportunity in some rural areas, only warm-water fish are appropriate for stocking. In those cases where the AGFD proposes to stock both warm- and cold-water fishes, the intent is to provide a broader temporal range for angling opportunities throughout the year.

The AGFD is seeking approval for stockings of some sustained yield fisheries under some circumstances, such as in response to full or partial loss of a fishery due to catastrophic events or to support fishing clinics and angler recruitment events. Stocking sites where warm-water species are proposed were analyzed in detail with regard to effects on native fish and amphibians in the BA, the draft BCO, and the EA.

Comment 51 [473, 511, 537, 564]: Does not support the introduction of nonnative fish/other nonnative species into waters/habitats in Arizona. Nonnative species are wrecking our native habitats and out-competing our native wildlife, resulting in alarming, if not irreversible damage.

Response: Comment noted.

Comment 52 [517]: Do not support funding for stocking of nonnative fish into Arizona waters' fragile aquatic ecosystems. These ecosystems face threats from many other sources.

Response: Comment noted.

Comment 53 [473, 511, 537]: All government agencies, and without exception, the FWS, should fund and support only native species.

Response: The Sport Fish Restoration Act (16 U.S.C. 777–777k, 64 Stat. 430), as amended, directs the FWS to provide federal aid to the states for management and restoration of fish having “material value in connection with sport or recreation in the marine and/or fresh waters of the United States.” The FWS analyzed the effects of this action to native species and, with the AGFD, developed the CAMP to minimize its impacts.

Comment 54 [473, 511, 537]: Anglers should be given the opportunity to learn how important the native species are to these sensitive and fragile water systems in the Southwest and why supporting/fishing these species could create a beneficial situation instead of one of detriment.

Response: The FWS and the AGFD actively promote native species angling opportunities. One of the primary goals for the native trout program in Arizona is to recover Apache trout and Gila trout populations to the point where there is no longer a need for federal protection (i.e., they are no longer in danger of becoming endangered or extinct). Another primary goal is to improve the species status and the condition of their aquatic habitats so that recreational opportunities for native trout anglers exist in Arizona. Apache trout have been propagated for recreational use and occasionally recovery use for decades at federal and state hatcheries in Arizona and are stocked in popular angling areas in the White Mountains for anglers to enjoy

In February 2011, the first sport fishery for Gila trout in Arizona history opened at Frye Mesa Reservoir. Because three streams adjacent to Frye Mesa Reservoir in the Pinaleno Mountain range are under development as Gila trout recovery streams, this was an excellent opportunity to create a recreational fishery in the area to promote the conservation and future angling opportunities for Gila trout in Arizona.

Additional angling opportunities for native fish include the roundtail chub sport fishery at Fossil Creek, which opened to catch-and-release angling in 2009. The opening of this fishery was a unique opportunity to promote fishing as well as conservation of a native fish species other than a trout. These opportunities are investigated and considered when the appropriate conditions are present within specific fish populations of native trout and roundtail chub. These fisheries are able to promote awareness of native fish conservation and the balance of sport fish and native fish management in Arizona.

Comment 55 [555]: Based on three alternatives proposed, commenter supports the Reduced Stocking Alternative. While recreational fishing is a good thing, so is ecosystem management that fosters resilience and adaptation of native species and preservation of endemic biodiversity, especially in the face of foreseeable changed circumstances due to climate change—these Best Management Practices and goals can best be accomplished by stocking native species. Minimize the harm you do by greatly reducing the stocking of nonnative fish and adopting the Reduced Stocking Alternative.

Response: Comment noted.

Comment 56 [555]: Please keep nonnative species, which contaminate, predate, compete with, or outcompete our native fish, amphibian, and semi-aquatic reptile species, out of our waterways to the maximum extent practicable—the best case scenario is to not stock nonnative fish.

Response: Comment noted.

Comment 57 [476]: Stocking fish to artificially meet recreational fishing demand is bad biology and bad management, but it also seems a foregone conclusion that some level of stocking is likely to occur. With that in mind, there are two major problems with the Draft EA that must be resolved before the document can be acceptable. Neither of the two action alternatives is

acceptable because neither adequately avoids impacts on native fishes of sport fish stocking, and because proposed mitigation falls far short of bridging the gap between detrimental effects on native fishes of sport fish stocking and beneficial effects of mitigation. Conservation status of native fishes is certain to deteriorate further if the proposed action and mitigation are approved, and such status change will result in listing of new species as threatened or endangered (under the federal Endangered Species Act), up-listing from threatened to endangered of species already listed, additional range contractions and populations losses of all species, and intensification of the conflict between sport fish management and native fish conservation. These undesirable consequences of sport fish stocking can be ameliorated at least in part by offering an acceptable sport fish stocking alternative and by providing meaningful mitigation that directly and tangibly benefits native fishes.

Response: With regard to the Proposed Action causing further decline of native species, this was analyzed in detail in the Draft EA, the BA, and the draft BCO. It should be noted that NEPA does not restrict an action from occurring if it affects a listed or sensitive species. NEPA does require that potential impacts be identified. We have developed the CAMP to mitigate for these impacts. The FWS has determined in its draft BCO that the Proposed Action would not jeopardize the continued existence of any listed, candidate, or proposed candidate species. Conservation measures outlined in the draft BCO that will reduce and offset impacts to consultation species have been incorporated into the CAMP associated with the Proposed Action. This program also includes conservation measures that will reduce and offset impacts to other species status aquatic and semi-aquatic species. The CAMP has been revised in the Final EA to better explain the benefits of the mitigation measures to native species.

Comment 58 [476]: The proposed action represents a significant, unnecessary, and unacceptable expansion of the sport fish stocking program.

Response: See Comment 94 for response regarding expansion of the stocking program.

Comment 59 [542]: The Reduced Stocking Alternative inexplicably removes stocking of urban lakes and ponds in the Phoenix area (approximately 20 sites appearing on the map on page 21 of the Draft EA) even though they draw the most economic advantages and create none or lessened conflicts with native fish populations.

Comment 60 [574]: The Reduced Stocking Alternative is provided in an attempt to better minimize the impacts of the sport fish stocking program by ceasing stockings in waters that have potential negative impacts to native fishes. This alternative, however, unnecessarily eliminates at least 23 Phoenix-area urban fisheries presumably because of their water-to-water connections to Salt River Project (SRP) canals that occasionally harbor roundtail chub. Those canals, however, are mortality sinks for chub, and they have never been considered important to conservation and recovery of that species. As we stress below, waters such as urban lakes that have minimal impacts to native fishes are exactly the type of fisheries that should be stressed and further developed by the AGFD to satisfy angler demand where it is greatest. The Reduced Stocking Alternative should be modified to remove such urban waters from the list of waters where sport fish stockings are proposed for elimination.

Comment 61 [476]: The reduced stocking alternative makes no sense, for example, why are urban lakes, which have no potential to impact native fishes, removed as part of this alternative? Where and with which native species, specifically, do urban fishing sites interfere?

Comment 62 [298]: The past actions section of the Draft EA discusses the deleterious effects of introducing non-native species on native species, yet a number of the stocking sites that would be eliminated under the reduced alternative are city parks with no connectivity to natural ecosystems where native species would be affected. I do not understand the reasoning that was used to eliminate locations from the stocking list. It would seem most appropriate to stock waters that have little or no connectivity to habitat where native species currently exist or where quality habitat exists to support the reintroduction of native species. The priority for elimination of stocking sites should be those for which non-native species are potentially or actually most detrimental to native species. That would not include locations such as Encanto Lake, Kiwanis Lake, and a number of others which are currently on the list to be removed from the stocking program under the Reduced Stocking Alternative.

Response: The Reduced Stocking Alternative was developed by eliminating stocking at locations where a potential interaction with a listed species would be reasonably likely to occur. The Reduced Stocking Alternative was developed prior to the issuance of the draft BCO. In the Draft EA, it is stated that: The sites eliminated from the Proposed Action to create the Reduced Stocking Alternative were those that could result in the stocking of sport fish into waters known to support one or more threatened, endangered, or candidate species of fish, amphibians, or semi-aquatic reptiles. Inclusion of these sites would have the potential to result in the greatest likelihood of exposure between the stocked species and threatened, endangered, and/or candidate species of fish, amphibians, or semi-aquatic reptiles. Sites were also eliminated where stocking had a potential to result in overlap of species with threatened, endangered, and/or candidate species of fish, amphibians, or semi-aquatic reptiles from movement of the stocked species out of the stocking area or the protected species into the stocking area. The urban lakes that were removed from the Proposed Action to develop the Reduced Stocking Alternative are all fed directly by the SRP canal system. Roundtail chub have been documented in the SRP canal system, and it was a reasonable assumption that roundtail chub may be transported with the water supplies to those urban lakes, where they would be subject to predation by stocked sport fish. Thus, those urban lakes were removed from the Proposed Action in the development of the Reduced Stocking Alternative.

The Reduced Stocking Alternative eliminates stocking from many of the sites identified in the draft BCO as having potential effects on consultation species and some of the sites identified in the EA where stocking would impact other (non-consultation) species. Initial informal consultation discussions with the ESO also indicated that the Phoenix urban lakes were of concern for the roundtail chub, and these sites were removed in formation of the Reduced Stocking Alternative for the reasons described above. However, subsequent analysis and evaluation by the ESO in the draft BCO conclude that effects to the roundtail chub from stocking of sport fish in the Phoenix urban lakes would not be substantial. Therefore, a socioeconomic analyses is provided in response to these Draft EA comments that suggested variations on the Reduced Stocking Alternative, including the suggestion to put urban lakes back into the Reduced Stocking Alternative. A specific

variation on the Reduced Stocking Alternative was subsequently developed based on these comments and a socioeconomic analysis was completed for comparison purposes to provide additional information for the public and the federal decision-maker.

For this variation, those urban lakes that were removed in the development of the Reduced Stocking Alternative were reviewed. Eighteen of these urban lakes were considered to be closed systems (i.e., have inlet but no outlet) and were added back to the Reduced Stocking Alternative under this variation. These lakes are listed as follows:

- Alvord Lake at Cesar Chavez Park
- Cortez Lake
- Desert Breeze Lake
- Desert West Lake
- Encanto Lake
- Evelyn Hallman (formerly Canal) Pond
- Kiwanis Lake
- Rio Vista Pond
- Riverview Lake
- Steele Indian School Pond
- Bonsall Park Lake
- Crossroads Park Lake
- Discovery District Park Lakes
- Granada Park Lakes
- McQueen Park Lake
- Roadrunner Park Lake
- Selleh Park Lake
- Water Treatment Lake

Adding the additional 18 urban lakes to the Reduced Stocking Alternative would increase the estimated AUDs by 0.24 million and increase the annual economic value by 79.4 million. This would result in 1.05 million AUDs, compared with 0.81 million AUDs with the Reduced Stocking Alternative and 2.14 million AUDs with the Proposed Action. The annual economic value of this variation would be \$253.7 million, compared with \$174.3 million with the Reduced Stocking Alternative and \$542.5 million with the Proposed Action. With this variation, angling use and economic benefit would fall between those of the Reduced Stocking Alternative and the Proposed Action. This evaluation indicates that though the inclusion of the 18 urban lakes does provide an additional \$79.4 million in economic value, the Proposed Action provides for an additional \$300 million in economic value beyond that provided with the inclusion of

these 18 lakes, indicating these lakes do not draw “the most economic advantages” as suggested by Comment 59.

Comment 64 [476]: An acceptable stocking alternative substantially decreases the number of sites to be stocked compared with the Proposed Action. Stocking should be focused on local, high use areas where interference with native fish populations is absent. Stocking would not occur (1) into habitats occupied by or needed for recovery of species listed federally or by the state as endangered, threatened, candidate, of special concern, or otherwise recognized as imperiled, (2) into habitat designated as critical for any endangered or threatened species, (3) into habitat that is necessary for the conservation and recovery of endangered, threatened, or other imperiled species, (4) into habitats where self-sustaining populations of sport fish already are found, and (5) into any waters that have five or fewer angler users per day¹³. Stocking would occur into other suitable habitats, primarily cold water trout streams and warm water urban lakes, as described in the EA.

Where ever possible within their respective historical ranges, native Apache trout or Gila trout would be stocked instead of nonnative trouts. There would be no stocking of channel catfish, bluegill sunfish, redear sunfish, or largemouth bass except into urban lakes.

Response: See response to comments regarding the feasibility of using native species only for stocking (Comments 41–47).

The Reduced Stocking Alternative was developed by eliminating stocking at locations where a potential interaction with a listed species would be reasonably likely to occur, eliminating stocking at 66 sites. This alternative also results in elimination of stocking in any critical habitat of threatened or endangered aquatic species. This alternative meets many of the commenter’s suggestions. This alternative was analyzed and not selected because it did not meet the purpose and need for the project, which is to meet the current and future need and demand for angling opportunities in Arizona.

Neither the Proposed Action nor the Reduced Stocking Alternative considered the elimination of stocking into habitats where self-sustaining populations of sport fish are already found. Based on the AGFD management approach for sustained yield fisheries, the agency is seeking approval for stockings of some sustained yield fisheries under certain circumstances, such as in response to full or partial loss of a fishery due to catastrophic events, where production is insufficient to meet angler demand, and to support special events (e.g., fishing clinics).

With regard to elimination of stocking into any waters that have five or fewer angler users per day, neither the Proposed Action nor the Reduced Stocking Alternative considered the elimination of stocking into any waters that have five or fewer angler users per day. Waters that are stocked or are proposed for stocking but provide less than five angler use/day are generally remote waters that provide the only local fishing

¹³ There are 15 waters listed in Table 23 of the Draft EA that have fewer than about five angler users per day, and these total 8,161 angler users per day or less than one-half of 1 percent (0.38 percent) of the total of 2,143,541 AUDs associated with sport fish stocking.

opportunity, provide a special or unique angling opportunity, or are stocked to minimize potential for illegal introduction of other more injurious species. Limiting stocking to local, high-use areas with no interaction with native fishes would drastically reduce the angling opportunities outside urban areas. Those anglers desiring a remote angling experience would either have very limited opportunities or would be required to angle at those locations with self-sustaining populations. Given the level of angling desire demonstrated by the public (Southwick Associates 2007), reliance on self-sustaining fisheries would not provide adequate opportunity (geographic, or for preferred species), fishing pressure on these systems would be expected to increase and possibly result in the suppression of these fisheries due to being overfished. For these reasons, the elimination of stocking sites based solely on angler use could overlook local and unique circumstances, and this approach was not used in the development of alternatives.

Apache trout are proposed for stocking in several locations in the Black River and Little Colorado River watersheds within the historical range of this species. Gila trout are proposed for sport fish stocking at one site within its historical range (Frye Mesa Reservoir). Apache trout sport fish stockings would provide angling opportunities under the ESA 4(d) special rule. With the Proposed Action, Apache trout stockings identified in Appendix A, Table E, of the Draft EA would be in lieu of rainbow trout stockings. See response to Comments 41–47 that explains why opportunity to stock Gila trout and Apache trout is limited by hatchery capabilities, broodstock availability, and other considerations. It should be noted that impacts of native trout on other native species are expected to be similar to effects of nonnative trout. Therefore, stocking of native trout would not eliminate predatory and competition effects on other native species.

With regard to the stocking of warm-water species in urban lakes only, this would eliminate angling opportunities in a considerable number of locations in Arizona that are not appropriate for stocking cold-water fish due to unsuitable thermal conditions or habitat. This alternative would not satisfy angler demand, would result in substantial loss of recreational/economic opportunity for local communities, and would likely encourage illegal stocking of potentially less desirable or more damaging species.

Comment 65 [298]: It would also seem desirable to remove from stocking those bodies of water that are conducive to actually removing nonnative fish and thus benefiting native species. The likelihood of removing non-native species from Saguaro and Canyon Lakes, for example, must be extremely low, and since those are lakes highly used by anglers, it doesn't appear to make sense to remove them from the stocking list unless, of course, it is felt that the sport fish population in those lakes is self-supporting, which means they don't need to be stocked under the preferred alternative either.

Response: Stocking sites eliminated under the Reduced Stocking Alternative include those sites that have the potential for aquatic or semi-aquatic consultation species to move into them. For this reason, Saguaro Lake and Canyon Lake are not proposed to be stocked under the Reduced Stocking Alternative. Endangered Gila topminnows occur at Hidden Water Springs, connected by a relatively short ephemeral drainage to Saguaro Lake. Existing Gila topminnow populations also occur in two drainages that connect to Canyon Lake. Though these populations are protected from upstream migration of

nonnative sport fish (by natural barriers and other physical factors), the potential exists for individuals of these consultation species to be transported into Saguaro Lake and Canyon Lake where they would be subject to high levels of predation by nonnative sport fish.

Comment 66 [574]: As currently written, the only alternative is to accept the Reduced Stocking Alternative, which bluntly eliminates many waters from stocking (such as urban lakes) that have minimal impacts to natives, and unnecessarily creates the impression that the Proposed Action is the only reasonable alternative to achieve the purpose and need of the program.

Comment 67 [542]: Given that around 20 of the 66 locations eliminated from the Proposed Action to create the Reduced Stocking Alternative are Phoenix metro urban ponds and lakes, which species would be benefited by the removal of the Phoenix metro urban ponds and lakes? Why were these sites chosen for exclusion when clearly other sites would provide greater benefit?

The Reduced Stocking Alternative creates an unfair and insupportable comparison, giving clear advantage to the Proposed Action. The AUDs of measured sites Proposed versus Reduced is 2,143,541 vs. 810,762, and the economic value is \$542.5 million for the Proposed versus \$174.3 million for the Reduced. (See Table 28, page 93; Table 29, page 94) Without providing clear benefit, the Reduced Stocking Alternative provides a 62 percent reduction in angler use days and a 68 percent reduction in economic value (for measured sites). The 33 fewer sites in the Reduced Stocking Alternative from the current stocking program, which has 134 sites, is only a 25 percent reduction in the number of sites, yet cuts out a disproportionately large amount of economic value. The Reduced Stocking Alternative seems arbitrary with a goal of causing significant economic harm such that it would be thrown out as an alternative.

Comment 68 [556]: In general, we support the Reduced Stocking Alternative due to its lower impact on native aquatic species although we see no rationale for eliminating 25 stocking sites that are part of the Urban or Fishing in Neighborhood programs with no obvious connection to natural water bodies or native species. It appears that the Reduced Stocking Alternative could retain those sites, providing urban fishing opportunities and stocking 126 sites, instead of the 101 sites proposed here.

Response: See response to Comments 58–62.

Comment 69 [566]: We object to any stocking of sport fish in areas that provide current and/or critical habitat for aquatic species that are listed under the ESA and are adversely affected by such stocking.

Response: Comment noted.

Comment 70 [542]: From page 33 of the Draft EA: “Nonnative aquatic species now dominate much of the aquatic habitats found in Arizona and have been recorded in 132 of the 167 stocking sites considered in the Proposed Action. Habitat losses and resident nonnative aquatic species constitute primary stressors influencing consultation and other special status species.” Why would stocking be expanded into 35 areas not currently stocked or documented as already being inhabited by nonnative aquatic species? The Proposed Action provides a 25 percent increase of

33 sites to the current stocking regime of 134 sites. This significant increase in stocking will further jeopardize imperiled native fish and wildlife species.

Comment 71 [476]: Page 33, last paragraph. What is the rationale under the Proposed Action for stocking nonnative sport fishes into 35 sites that are not presently occupied by nonnative aquatic species?

Response: The public has expressed an interest for fishing opportunities at these sites. The reference to 132 sites in the Draft EA is in error. Based on the data presented in the BA, a total of 142 (rather than 132) sites have recently recorded occurrences of nonnative aquatic species. Specifically, at 114 of the stocking sites, nonnative species are already established that are as predacious as, or more predacious than, the species being stocked at those sites. Of the remaining 53 sites, 14 are closed systems with no established special status aquatic species at the site and another 17 have existing populations of nonnative species that are as predacious as, or more predacious than, the stocked species at the nearest occupied location of special status aquatic species. These existing nonnative communities at many of these sites include highly predacious species that would not be stocked under the Proposed Action and would continue to persist despite the elimination of stocking. The remaining 21 sites have all been stocked in the past. Potential effects to native species of concern at the 22 sites for which nonnatives have not been documented are included in the analysis in Section 4.1.4 of the EA, and mitigation measures to minimize or offset effects to these species are identified in Section 5.0 of the EA.

Comment 72 [574]: To better mitigate environmental impacts created by stockings that exceed carrying capacity, we recommend greater emphasis be placed on stocking urban areas that have both high angler demand and relatively low impact to native fishes and their environments. We could better support a revised Reduced Stocking Alternative that judiciously eliminates stocking sites with large impacts to native species but does not also eliminate the low-impact sites in urban areas. Such a shift toward increased urban-area angling could potentially better meet angler demand where it is greatest while also reducing the effects of stockings on native fishes and their environments.

Response: The commenter suggests support for a Reduced Stocking Alternative that would shift emphasis to urban-area angling and judiciously eliminate stocking sites with large impacts to native species. It is acknowledged that many anglers take advantage of urban lakes, and some rely solely on these lakes for their fishing opportunities; however, urban lakes alone cannot meet the angling demand for the state as a whole. Many anglers prefer fishing in remote areas because they want to get away from urban settings and experience nature. Switching to more of an urban-centric approach would not provide the desired experience and social/health benefits that many anglers are seeking. The reduction of some additional non-urban stocking sites, as suggested, would affect the number, distribution, and type of angling opportunities/experiences available around the state and the economic benefits generated through these opportunities—the degree of effect would be dependent on the number, distribution, and relative importance of the sites eliminated.

Refer to response to Comment 68 for the results of effects on annual AUDs and economic benefits with a variation of the Reduced Stocking Alternative, which would add in 18 of the urban lakes that had been eliminated with this alternative.

Comment 73 [Ellis]: Movement toward increased implementation of catch-and-release fisheries is another approach to better mitigate environmental impacts created by stockings that exceed carrying capacity.

Response: Comment noted. Modification of fishing regulations is not part of the action.

Comment 74 [476]: No warm water sport fish stocking should be done in any water occupied by any member of the *Gila* complex (i.e., Gila chub *Gila intermedia*, headwater chub *Gila nigra*, or roundtail chub *Gila robusta*). Existing populations of all three species are in need of protection to prevent ongoing losses in range and number, or preclude local extirpation, which could limit future management options and compromise potential for successful conservation and recovery.

Response: Under both the Proposed Action and Reduced Stocking Alternative, there would be no warm-water sport fish stockings in any water occupied by *Gila* complex species. In addition, following the review of public and agency comments, the WSFR, the AESO, and the AGFD decided to modify the Proposed Action with the following changes:

- In the Bill Williams watershed, largemouth bass and channel catfish have been removed from the list of species proposed for stocking.
- Green Valley Lake in the Lower Verde, channel catfish have been removed from the list of species proposed for stocking.

In several watersheds, warm-water fish are proposed for stocking into man-made pooled habitats (stock tanks or reservoirs) that are upstream from stream systems occupied by *Gila* spp. Development of the Reduced Stocking Alternative resulted in the removal of some of those sites from the Proposed Action when the potential for escapement, transport, and persistence of the stocked species was reasonably certain to occur and was reasonably certain to result in adverse effects to listed, candidate, or potential candidate species. In many, but not all, of these stream systems, the presence, persistence, and establishment of several of the warm-water species proposed for stocking has not been documented despite their repeated stocking in lentic man-made habitats upstream from those systems. For example, bluegill sunfish, channel catfish, largemouth bass, and black crappie have never been found in the collection record for the Agua Fria Watershed downstream from the three lakes that are stocked (Fain, Lynx, and Horsethief Basin) or in the many first- or second-order desert stream systems despite their occurrence of stocked species in these lakes for many years. The only exception is that they have been found immediately downstream and very near Lake Pleasant. The best available data on these records were presented in the BA.

Comment 75 [548]: EA fails to provide a full range of alternatives. Alternatives including no stocking of warm water exotic fish species, designation/restoration of native-only streams/reaches, native only stocking, urban-concentrated exotic stocking, etc., are not included.

Response: Per CEQ guidance, the agency must consider a range of reasonable alternatives. Reasonable alternatives include those that are practical or feasible from technical and economic standpoints. The alternatives proposed by the commenter are not within the range of reasonable alternatives for the following reasons:

- No stocking of warm-water exotic fish species—The angling public has expressed a desire in the past, and continuing into the future, to angle for specific species of warm-water exotic fish in Arizona, primarily largemouth bass, channel catfish and black crappie, to name a few. Failure to provide for this public demand is not reasonable and fails to meet the purpose and need for the action.
- *Designation/restoration of native-only streams/reaches.* The Proposed Action includes the CAMP. The CAMP identifies the implementation of watershed-based fish management planning by the AGFD to accomplish this objective. Incorporation of this objective as an alternative would fail to meet the purpose and need of the action, and does not fall within the scope of authority of the action agency; therefore, is not reasonable. See also response to Comments 35–38 and 19–22.
- *Native-only stocking.* Such an alternative is not technically or biologically feasible. See response to Comments 41–47. Additionally, because of the desires of the angling public regarding preferred species, this alternative would have significant negative economic impacts, especially to rural communities.
- *Urban concentrated exotic stocking.* This alternative is not reasonable because it would have significant adverse economic effects to rural communities and fails to use an analysis approach that recognizes the potential (or lack of) exposure between stocked species, responses from native species, and the effects resulting from the action. See also response to Comment 72.

The three alternatives in the Draft EA represent a range of stocking intensities and associated environmental and socioeconomic effects and tradeoffs. The Proposed Action would provide a similar level of recreational angling that is currently available to the recreating public. The Reduced Stocking Alternative was developed to address concerns of effects of sport fish on federally listed or candidate native fishes and according to criteria identified in the Draft EA.

Comment 76 [574]: We recommend the Proposed Action be revised to (1) minimize stockings by managing angler demand, (2) further switch to use of native species for stockings, and (3) continue and enhance segregation of sport fish waters and native fish waters.

Response: The purpose of this NEPA analysis is to meet the current and future need and demand for angling opportunities through the continued use of SFRA funds to rear sport fish at AGFD hatcheries, acquire sport fish from outside sources, and stock sport fish into selected waters of Arizona, thereby fulfilling the SFRA legislative mandate and continuing to support the AGFD Mission. Managing angler demand would not meet the purpose and need.

The analysis in this Draft EA takes into account the variable predation potential of various stocked species, and the Proposed Action strives to meet angler demand while

stocking with species that have the least potential to affect native species (this is one of many management and stocking strategies taken to reduce potential effects).

See responses to Comments 41–47 related to the use of native species for stocking and the response to Comment 75 for segregation of sport fish waters and native fish waters.

Comment 77 [561]: Of the alternatives provided in the EA, we support the No Action alternative, which would not provide funding for stocking of nonnative fishes into Arizona’s waters, as that is the alternative that will have least negative impacts on Arizona’s native fish species. However, we would have liked to see a fourth alternative offered that did not allow for stocking of nonnative species but did provide funding and resources for recovery of native fisheries and other special status species.

Response: As described in the Draft EA, the SFRA directs the FWS to provide federal aid to states for the “material value in connection with sport or recreation in the marine and/or fresh waters of the United States.” Under the SFRA, sport fish are defined as “aquatic, gill-breathing, vertebrate animals bearing paired fins and having material value for sport or recreation.” Apache and Gila trout, both native species, are considered sport fish under this definition, and stocking of those species have been included as part of the Proposed Action.

Other than stocking of Apache and Gila trout, and implementation of mitigation measures, this funding cannot be used for the recovery of special status species that are not pursued for sport.

Comment 78 [561]: In our scoping comments, we requested that a conservation alternative that promotes recovery of native fishes be included. However, the only alternatives that provide funding and resources to address recovery of native species were the action alternatives – the Proposed Action and the Reduced Stocking Alternative, both of which place native species further in peril by continuing to stock nonnative stressors. The No Action alternative, which is the only one that has the potential to actually reduce these stressors and promote recovery of native species, does not include such funding. This is counterintuitive as the action alternatives will *increase* stressors to native species and have the potential to drastically *reduce* native populations, except in very specific management areas. The No Action alternative, on the other hand, will reduce stressors in some areas but does nothing to address the populations of nonnative species present in waters throughout our state, including in areas that are critical for recovery of native species.

Response: See responses to Comments 77 and 242. The intention of the CAMP is to offset impacts from the Proposed Action. The Reduced Stocking Alternative is intended to minimize exposure to listed species while providing some level of angling opportunity. The No Action alternative would not reduce *existing* stressors to the areas identified for stocking. In the absence of stocking, recovery of native species would still not be possible without affirmative actions because of the current widespread distribution of nonnative species that are not part of the proposed stocking action. Other habitat stressors on the landscape, such as water use and withdrawal, wildfires, groundwater pumping, forest management, timber management, grazing management, and development, would be expected to continue to negatively impact native fish habitat into the foreseeable future.

Comment 79 [542]: Table 6 on page 64 of the Draft EA has a list of the nonnative sport fish to be stocked breaking the list into “more” and “less” predacious. Commenter suggests that AGFD cease stocking the nonnative sport fish listed as “more predacious” and/or only stock them into closed or appropriate systems with sufficient monitoring and enforcement against transport to other water-bodies.

Response: Under the Proposed Action, 56 of the 166 sites would be stocked with only species considered to be less predacious. The effects of stocking of the remaining sites with more predacious species is analyzed in detail in the EA, the BA, and the draft BCO and would be offset, as needed, through implementation of the CAMP.

Comment 80 [567]: We are in support of the Reduced Stocking Alternative. Given the decline and precarious nature of many listed species, reductions in nonnative aquatic species would be prudent to improve conditions. The Preferred Alternative would continue stocking nonnative sport fish at all current locations across the state. The EA states the scoping comments received concerned one primary overarching issue--the impacts of stocking nonnatives on the survival and recovery of native aquatic species. The Reduced Stocking Alternative addresses these concerns and issues directly by not stocking in many locations with listed species. Whereas, the Proposed Action would Likely Adversely Effect 14 listed species, seven with designated critical habitat and two with proposed critical habitat, four candidate species, and two species being considered or candidate status.

Response: Comment noted.

Comment 81 [533]: I believe the number of alternatives identified (including those dropped from further consideration) to be too limiting. The Reduced Stocking Alternative is an unreasonably limiting proposal. No way would the anglers in Arizona endorse the reduction in stocking locations as proposed. A significant percentage of businesses in northern and east-central Arizona depend on anglers and hunters for their livelihood and for the AGFD to propose an alternative that endangers their businesses is irresponsible. I assume this was done to placate those radical elements who would like to see all undeveloped areas in the state devoid of humans.

Response: The alternatives analyzed in the document attempt to provide a range over which the differential effects on socioeconomics and native species (the two primary issues identified during initial public scoping) can be examined. Both issues are valid and warrant consideration in the development and analysis of alternatives. The alternatives analyzed are a reasonable range of alternatives, and the socioeconomic effects of the Proposed Action and other alternatives were fully analyzed.

Comment 82 [32, 54, 562]: With the Reduced Stocking Alternative or the No Action alternative, there would be a loss of fishing opportunity and fishing interest, extra pressure on other lakes, long-term reduced quality of unmanaged lakes, increased illegal stocking, impact on native fish reintroduction efforts, loss of AGFD funding from licenses, other state economic impacts, and loss of jobs.

Response: Comment noted.

Specific Elements of or Questions on Proposed Action

Comment 83 [535]: Support continued stocking but do not support the stocking/ introduction of large predatory fish like northern pike and striped bass.

Response: Neither the Proposed Action nor the Reduced Stocking Alternative propose the stocking of Northern pike or striped bass.

Comment 84 [538]: Is the price of stocking covered mainly by licensing fees?

Response: One quarter of the cost of the stocking program is paid for by state funds, which include license and stamp fees. The remaining cost is paid for by the federal government as a result of the Federal Aid in Sport Fish Restoration Act of 1950 (i.e., SFRA funds). Funds distributed to the states under SFRA are derived from a 10 percent excise tax on certain items of sport fishing tackle; a 3 percent excise tax on fish finders and electric trolling motors; import duties on fishing tackle, yachts, and pleasure craft; a portion of motorboat fuel tax revenues and small engine fuel taxes; and interest earned on the account.

Comment 85 [345]: Provide a list of what nonnative fish will be stocked in each stocking location and when. You only give a list of all the possibilities, divided by more and less predatory.

Response: Table E, Appendix A, of the Draft EA provides a list of the stocking locations and identifies the species that would be approved for stocking at each site under the Proposed Action. Not every species would be stocked every year at every site. Appendix A of the BA identifies the locations and species as well as the timing and quantities of fish to be stocked under the Proposed Action. A copy of the stocking table was provided to the commenter.

Comment 86 [485]: Why is the Proposed Action for only 10 years?

Response: The 10-year period was selected because it was long enough to provide regulatory certainty to AGFD's Sport Fish Stocking Program but a short enough window that the AESO felt it could do an extensive analysis of the effects of the action on listed, candidate, and proposed species. As described in the CAMP, robust analysis of the program will take place at the end of years 3 and 6 and in year 10, and the FWS will be continually monitoring any changes that would result in reconsultation or amendments to the consultation.

Comment 87 [454]: Appendix A, Table 10, and EA page 16: Some clarification is requested regarding the green highlighted text, subscript #1, and the text in the Draft EA (page 16). There are some instances where species proposed for stocking appear in green and also have a subscript #1 (for example, see Havasu Creek, City Reservoir, largemouth bass, bluegill, redear sunfish). According to the footnote of Table E, green text indicates that the stocking of that species "would only occur in an attempt to recover a population in response to a partial or total loss." Subscript #1 furthermore indicates that the "species is not known to be present historically or currently in water body." A species "not known to be present historically or currently in water body" cannot also be subject to a partial or total loss; please clarify.

Response: Based on the AGFD management approach for sustained yield fisheries, the agency is seeking approval for infrequent or low-level stockings of some sustained yield fisheries under certain circumstances, such as in response to full or partial loss of a fishery due to catastrophic events, where production is insufficient to meet angler demand, and to support special events (e.g., fishing clinics). In Appendix A, Table E, species proposed for stocking indicated in green text only are species that currently occur at the site but would be approved for stocking as needed.

Species indicated in green text that also have the superscript 1 are those that are not currently present at the site but would be stocked initially as part of the action to establish them. After the initial stocking, these species would not be stocked again except in response to a catastrophic event, or to support fishing clinics, etc. The Table E footnotes were revised in the Final EA to clarify.

Comment 88 [454]: Some clarification in this regard is also sought on page 16, which refers to the text indicated in green in Table E, but instead of referring to loss of a “species” or “population,” it refers to loss of a “fishery” (in our view, these terms are not interchangeable). Does this mean, for example, if a rainbow trout fishery is lost due to water quality problems, that it can be replaced with another, more tolerant species (i.e., largemouth bass)? The commenter hopes this is not the intent of the document as such a practice could result in additional source populations of problematic warm-water non-native fish, which, as in the case with City Reservoir, could theoretically access the Colorado River in Grand Canyon and have consequences for native fish.

Response: The intent was to seek environmental approval to stock only those species listed by site in Table E and evaluated in this EA. The Final EA was revised to clarify this intent and now states “At some high-use angling sites, the Proposed Action would also allow for stocking of specific sport fish species (as identified by site in Table E) in response to catastrophic events, such as toxic algae blooms or lethal water temperatures that have resulted in a full or partial loss of a fishery.”

Comment 89 [553]: The Grand Canyon National Park contains habitat for several native fish species that are of management concern, as well as the largest remaining population of federally endangered humpback chub in the Colorado River basin. Native fish, including humpback chub, continue to be threatened by non-native sport fish; therefore, the continued stocking of sport fish in waters potentially connected to those of Grand Canyon National Park and the Colorado River is of great interest and concern.

It is unclear whether any additional stocking of exotic sport fish would occur outside of those activities described in the draft BA and funded through the FWS-administered Sport Fish Restoration Act (SFRA). The Draft EA mentions on page 1, the last sentence of the opening paragraph of Section 1.3 that “... the FWS proposes to fund, *in part* (emphasis added), the AGFD’s Sport Fish Stocking Program”; however, future stocking that is not being funded by the SFRA program is not mentioned or analyzed in the cumulative effects section of the document. Please clarify whether additional sport fish will be stocked outside of this program, and if so, please address additional sport fish stocking effects on native species and other resources in the cumulative effects section.

Response: The “in part” phrase refers to the fact that SFRA funds must be matched by state funds and, therefore, the SFRA funds only a portion (75 percent) of the stocking program. Two additional sites are currently being evaluated for stocking outside this consultation: Pena Blanca (BO# AESO/SE 22410-2010-F-0279) and Biscuit Tank (a closed tank in north Phoenix). If additional stocking actions are contemplated in the future, they will undergo similar effects analysis through the NEPA and ESA processes. The Pena Blanca consultation is included in the Cumulative Effects section of the Final EA.

Comment 90 [476]: Page 18, Table 1. What is the rationale for stocking 18 species? Why are seven different salmonids to be stocked instead of six (or five, or two)? Why are two warm- and seven cool water species to be stocked? Why is a forage species (threadfin shad) to be stocked? The purpose and need for each species at each site (Table E in Appendix A) should be provided for the readers’ evaluation. Why is native roundtail chub *Gila robusta* not included?

Comment 91 [548]: EA fails to discuss the rationale for the choice of which exotics are proposed for introduction.

Response: The 18 species for stocking under the Proposed Action are proposed based on suitability for Arizona waters and angler demand for specific species as well as for a variety of sport fish species. Sixteen of those are technically a sport fish. The seven salmonid, two warm-water, and seven cool-water species proposed are those that have been traditionally stocked by the AGFD with success (biologically suitable for our streams and lakes and desired by Arizona anglers).

Threadfin shad are proposed for stocking at only one site—Dead Horse Lake. Threadfin shad are established in this lake and provide forage for sport fish. This species would be stocked only if events occurred that required their reestablishment at this site. White amur are stocked for vegetation control in some sites.

The statement of purpose and need—to meet the current and future need and demand for angling opportunities—refers to the state as a whole. The individual stocking sites together comprise a “program,” which provides a variety of angling opportunities geographically distributed around the state. The purpose and need is not met from any one stocking site; therefore, development of separate statements of purpose and need for each site was not undertaken.

There currently isn’t a measure for roundtail propagation in place that would be sufficient to support a stocking program for recreation. In addition, there is no management approach in place for roundtail yet. The AGFD will not undertake stocking for recreation until both of these are developed. Stocking may be proposed in the future, and compliance would be completed at that time. Any stocking that takes place for conservation purposes will be addressed separately and not included in this Proposed Action.

Comment 92 [567]: We are opposed to the stocking of Apache trout in Greer Lakes, Mexican Hay Lake, and Big Lake because they are not needed for species recovery. The stocking of these

lakes with a Threatened species will likely impact the management of them as well as surrounding Forest lands. Stocking of listed species into new waters requires consultation of all ongoing Forest activities.

Response: Apache trout stocked for recreational purposes as part of the Proposed Action are considered excess to the survival and recovery of the species. The stocking of Apache trout for recreational fishing was included as a compatible action that contributes to the conservation of the species in the 1975 downlisting rule for Apache trout. As such, these proposed stockings should not affect the management of these lakes.

Though stocking of hatchery Apache trout into the Greer Lakes and Big Lake is not necessary for species recovery, this does not preclude the proposed use of Apache trout to meet recreational angling needs. There is a recreational demand for diversity of species from anglers, and this would help meet that demand. Also, there is a desire by some in the public to use more native fishes to meet angler demand. Though stocking Apache trout could not meet all angler demand, it could help meet a portion while contributing greatly to the diversity of opportunities and garnering support for, and value in, Apache trout as a native sport fish. Also, hatchery Apache trout are already present in the Greer Lakes and Big Lake. The AGFD has stocked Apache trout into Big Lake since at least 1999, and this would not, therefore, be a new action. Though the proposed stocking of Apache trout into the Greer Lakes would be a new action, Apache trout are already present there. The AGFD has stocked hatchery Apache trout into the Little Colorado River in Greer since 1999 as part of efforts to stock primarily a native trout into stream habitat. This stream stocking location is a very short distance downstream of all three Greer lakes, and hatchery Apache trout have been documented in the reservoirs. For these reasons, the proposed stocking of Apache trout in the Greer Lakes would not be expected to change the current distribution of the species.

Mexican Hay Lake is on a tributary of the South Fork Little Colorado River, which is an Apache trout recovery stream. The only other option to stocking Apache trout in Mexican Hay Lake would be rainbow trout, cutthroat trout, brook trout, or brown trout, all of which would conflict directly with Apache trout recovery in the South Fork by introducing the potential for hybridization, competition, and predation. Therefore, the proposed stocking of Apache trout in Mexican Hay Lake would protect an important recovery population of Apache trout from such effects and would contribute toward recovery.

Comment 93 [567]: We support the stocking of Apache trout but not of rainbow trout in the East Fork Black River given the populations of threatened, endangered, and candidate species present within this river system are all in decline. While the stocking of sterile individuals will decrease hybridization with Apache trout, the potential for predation upon loach minnow, Chiricahua leopard frogs, and roundtail chub would still occur. Apache trout are native to the drainage and efforts should be made to make Black River a stocking priority over secondary sites such as Ackre Lake.

Response: The biological effects to non-trout species from stocking Apache trout are similar to triploid sterile rainbow trout. Apache trout is just as likely to prey upon, or

compete with, loach minnow, Chiricahua leopard frogs, and roundtail chub. The AGFD objective is to stock Apache trout in the East Fork Black River, but only if sufficient numbers are available to meet all stocking objectives. Occasionally, higher than expected mortality or lower than expected egg production in the hatcheries results in insufficient numbers of Apache trout to meet all the stocking objectives. AGFD's first priority for hatchery Apache trout is to use them in the critical waters that are connected directly to recovery populations of Apache trout, such as Ackre Lake. Ackre Lake drains directly into upper Fish Creek, which has a recovery population. Rainbow trout cannot be stocked here without some potential for hybridization with Apache trout (use of triploid rainbows cannot guarantee 100 percent of the fish are sterile). Therefore, if insufficient hatchery Apache trout are available after stocking the priority waters directly connected to Apache trout recovery streams, the AGFD proposes to stock sterile rainbow—with very similar biological impacts to hatchery Apache trout—into the East Fork Black River.

Comment 94 [567]: The number of sites in the Proposed Action needs clarification. Page 22, Table 2 – The EA states that the Proposed Action is the existing condition (134 sites) plus 22 new sites equaling a total 156 stocking sites. Table 2 shows 167 stocking sites as the Proposed Action, therefore it does not match the written Proposed Action description and should be clarified.

Response: The Proposed Action in the Draft EA was to stock up to 167 sites, but does not include all of the 134 sites approved for stocking under the existing program (2009–2010 stocking year). As described in Section 3.2 of the Draft EA, the 134 sites of the current AGFD stocking program were used as a starting point for the development of the Proposed Action. Potential new angling opportunities were added to this list, and others were removed based on stocking feasibility, resulting in an interim total of 169 sites under the Proposed Action. During the Section 7 consultation process, however, two sites were removed from the Proposed Action to eliminate potential impacts on the Northern leopard frog at these two sites and because these sites are not expected to provide substantial recreational opportunity (Draft EA, Section 3.2). In addition, following review of public comments, an additional site, Fagen Tank, was removed. The elimination of these three additional sites resulted in a new total of 166 stocking sites with the Proposed Action.

Comment 95 [567]: The difference between Apache trout recovery populations open to angling and those that are closed should be disclosed. Stating the number of each would be helpful to determine the affects of recreational angling to recovery of the species.

Response: In the Draft EA, we analyzed the effects of stocking Apache trout for recreational angling only. Stocking of Apache trout for recovery purposes and the management of these recovery populations with regard to angling are generally separate actions and are therefore not included as part of this Proposed Action or the analysis in this Draft EA. Most stream reaches where Apache trout are stocked to maintain or establish recovery populations (29 recovery populations in total at this time) are closed to angling. The one recovery stream that is part of this Proposed Action (West Fork Little Colorado River at Sheep's Crossing) is proposed to be stocked with hatchery Apache trout and would be open to angling. The U.S. Forest Service requested that this stream

remain open when reestablishing Apache trout because so many other recovery streams are closed to angling. The presence of the popular sport fishery at Sheep's Crossing on this stream, plus a popular hiking/backpacking trail up Mt. Baldy along the stream, were the key factors that the Forest Service used to make this request. The AGFD agreed with this approach.

Comment 96 [533]: I suggest you allow for the addition to stocking locations in your final document so that as newly constructed/identified features are added during the life of the Decision the Department is not precluded from stocking of the new sites. One that comes to mind is the lake to be constructed in the Town of Eagar. If the new lake is to have angling (which I understand it will) then the ability to do this should be addressed in the final document. Now is the time to address this kind of modification that undoubtedly will be necessary in the future. I am sure the Department may have additional proposals for new angling sites that would benefit from this kind of foresight.

Response: Future potential stocking sites will require evaluation on a case-by-case basis. It is not possible, at this time, to complete an accurate assessment of all potential future stocking sites.

Comment 97 [556]: The following sites should be eliminated due to potential effects on special status species:

- Dead Horse Lake – this site is in the floodplain of the Verde River, and has clear potential for direct connection to the river which is a critical site for several native fish species. While nonnatives are already present in the river, further introductions of channel catfish and largemouth bass can only compound the problem.
- Green Valley Lake – channel catfish could escape from this site to occupy the East Verde and Verde rivers, affecting native fish and frogs.
- Bass Tank, Blue Tank – the proximity to native fish populations in Sycamore Creek make these inappropriate sites to stock largemouth bass.
- Antelope Tank, Bar 37 Tank, Harmon Tank #2, Little Antelope Tank, McElhaney Tank, Swale Tank – the proximity to native fish populations in Burro Creek make these inappropriate sites to stock largemouth bass and channel catfish. Among these, Swale Tank is particularly close to the mainstem of Burro Creek.
- Parker Canyon Lake – stocking nonnatives, especially channel catfish, is inappropriate here, given the proximity of the Santa Cruz River headwaters with its native fish populations, and the importance of the San Rafael Valley to native amphibians.
- Patagonia Lake – while rainbow trout are probably not a significant threat to the upstream native fish populations, we are concerned about continuing to promote a sport fishery there without provision of a barrier to upstream movement. We manage an upstream portion of Sonoita Creek for native species, and have a strong interest in reducing the threat of nonnative fish predation.
- Fagen Tank – this site is too close to Davidson Canyon and Cienega Creek, which host important populations of native fish and frogs.

Response: Following review of public comments, the WSFR, the AESO, and the AGFD have modified the Proposed Action, affecting some of the sites mentioned by the commenter. See the following paragraphs for information with regard to specific stocking sites.

Deadhorse Lake—Deadhorse Lake is a series of three lagoons fed by a canal with a concrete drop preventing stocked fish from moving upstream out of the first lagoon. The overflow out of the last lagoon drains into the sandy alluvium and has no surface connection to the Verde River. During a flood, the inflow is shut off to prevent excess water from entering the lagoons. The lake is considered a closed system.

Green Valley Lake—Channel catfish will not be stocked at Green Valley Lake, and the species was removed from this site in the final Proposed Action.

Bass Tank and Blue Tank—Largemouth bass will not be stocked at Bass Tank and Blue Tank, and the species was removed from these sites in the final Proposed Action.

Antelope Tank, Bar 37 Tank, Harmon Tank #2, Little Antelope Tank, McElhaney Tank, Swale Tank—Largemouth bass and channel catfish will not be stocked at these sites, and the species were removed from these sites in the final Proposed Action.

Parker Canyon Lake—The Proposed Action for Parker Canyon Lake is to stock catchable rainbow trout from October through April. Channel catfish, bluegill, and redear sunfish will be stocked to augment or to recover the fishery as needed. Shortly before the confluence of Parker Canyon and the Santa Cruz River, the drainage gets very broad, and several small channels could allow fish to reach the Santa Cruz River during periods of low sustained flows. However, during heavy flows typically associated with a monsoon, fish and water would likely become spread on the agricultural fields directly in the confluence of Parker Canyon and the Santa Cruz River. Though dispersing Chiricahua leopard frogs could reach Parker Canyon Lake, the loss of these individuals would not impinge on the success of the reintroduced population in the secure area, as determined in the draft BCO. Stocking of rainbow trout, channel catfish, redear sunfish, and bluegill into Parker Canyon Lake was determined to potentially affect four other special status fish species (longfin dace, desert sucker, Sonora sucker, and speckled dace). In particular, longfin dace are known from a relatively close spring tributary downstream of the lake.

Surveys have never detected channel catfish downstream of the lake, despite being in the system since 1965. However, surveys have detected largemouth bass (not stocked but present in the lake) and bluegill, so stocked fish may have the potential to move. The analysis concluded a moderate effect on longfin dace. Speckled dace, desert sucker, and Sonora sucker are all found farther downstream and, therefore, the analysis concluded low effects to these three species.

No effects are anticipated to the lowland leopard frog because the nearest known location within the watershed is more than 70 stream miles away.

Patagonia Lake—There are no barriers to prevent fish from moving upstream into Sonoita Creek; however, the reach immediately upstream of Patagonia Lake dries nearly

every summer, and the perennial reach farther upstream contains no suitable habitat for rainbow trout (the only species being proposed for stocking at this site).

Fagen Tank—Fagen Tank will not be stocked and was removed from the final Proposed Action.

The effects to other (non-consultation) species at these sites have been identified in this Draft EA, and mitigation for these effects is part of the Proposed Action. Specifically to mitigate for these effects, the Proposed Action CAMP includes removing key stressors, implementing the watershed planning process for key watersheds, and other measures to benefit these species.

Proposed Action

Comment 98 [499]: The commenter notes that the sport fish stocking program is vital to Arizona citizens who enjoy angling. Maintaining fish species diversity and mitigating impacts that nonnative fish stocking has on native fish populations is also of upmost importance, and is seriously considered in the Draft EA. As fisheries biologists we understand that providing angling opportunities and conserving native fishes can often be competing objectives, and many biologists from our membership work on this complex problem on a day-to-day basis.

Maintaining spatial boundaries through minimizing the overlap between native fish and nonnative sport fish, and minimizing the migration of nonnative sport fish from stocking sites into native fish habitat will be critical. The commenter supports the Proposed Action, and commends the AGFD and the FWS in their efforts to balance angling demand in Arizona, and native fish conservation.

Response: Comment noted.

Comment 99 [466]: The commenter has numerous fishing outings throughout the year. Without the current stocking schedule of the AGFD, these outings would not be possible. These clubs are also strong supporters of the Casting for Recovery program, which is a nationwide support program for women recovering from breast cancer. Without the current stocking schedule of the AGFD, this would be much more difficult.

Response: Comment noted.

Comment 100 [56]: Support Proposed Action because it would benefit both native species and anglers.

Response: Comment noted.

Comment 101 [11]: I am in support of the Proposed Action provided the proposed mitigation program for native species does not represent an expansion beyond any mitigation program that has been done previously. The EA has not considered one obvious alternative—leave the stocking and conservation programs as they are and have been in the past. The three alternatives considered in the EA do not truly represent the full range of alternatives that should be developed

per NEPA requirements because the option to continue the stocking and conservation programs as they are currently is not available.

Response: The Proposed Action is a refinement of the existing stocking program and was developed in consideration of public demand, stocking feasibility, and environmental concerns. Given these considerations, the existing stocking program is not a practicable alternative and, therefore, was not evaluated in the Draft EA.

The action alternatives have the potential to impact consultation species (federally listed threatened and endangered species and their designated or proposed critical habitat, candidate species, and proposed candidate species considered in the ESA Section 7 consultation) and other special status species (sensitive species and species of special or conservation concern). In order to provide federal funds to the AGFD for sport fish stocking, the FWS, as the lead federal agency, must ensure compliance with the Endangered Species Act. The mitigation and conservation program associated with the Proposed Action was developed with the AESO, in part, to comply with this act by avoiding, reducing, or otherwise minimizing environmental impacts to consultation species, and to address potential impacts to other special status species.

The FWS and the AGFD recognize that the ability to continue to provide sport fishing opportunities is closely tied to the continued conservation of native aquatic species.

Comment 102 [550]: The commenter and the Arizona Game and Fish Department have partnered since 1982 to provide an Urban Fishing Program at Tucson's three recreational lakes. This program includes the biweekly stocking of fish in our three urban lakes: Silverbell Lake (13 acres); Kennedy Lake (10 acres); and Lakeside Lake (14 acres). As evidenced by the 9,000+ permits issued in Tucson annually, the community has fully embraced this program. Thousands of people have enjoyed the opportunity to fish for almost three decades. The commenter deems this program as a valuable recreational activity to the overall community.

Our citizens are fortunate to have an urban lake within a twenty-minute drive. Urban fishing is not only relaxing and peaceful, but it is very affordable. For many Arizonans, urban fishing provides a unique opportunity to experience the outdoors. With the current economic situation, fishing has become even more important as a tool for people to relieve their stress and enjoy life.

The Urban Fishing Program is financed by the sale of Urban Fishing Licenses and annual fees by various City Parks and Recreation Departments. On May 10, 2011, the City of Tucson and the Arizona Game and Fish Department entered into a four-year Intergovernmental Agreement for payment of associated annual fees. In Fiscal Year 2011 and 2012, the City contribution is \$34,780. The contribution for Fiscal Years 2013 and 2014 will be \$36,630.

The Proposed Action (Section 3.2 - Proposed Action - page 15) as presented is supported by this department. The Reduced Stocking and No Action alternatives are not beneficial to the department, the citizens or the visitors of the Tucson area.

Response: Comment noted.

Comment 103 [497]: The commenter has a long history of working cooperatively with the FWS Arizona Fish and Wildlife Conservation Office on management of the our fisheries. In addition, we have a long-standing commitment of working with the FWS and the AGFD on Apache trout conservation and recovery efforts.

We support the Proposed Action in the Draft EA, and we have no concerns with how the Proposed Action may negatively affect any aquatic species populations on tribal lands resulting from the State's stocking into waters that flow onto Reservation waters. Specifically, the Proposed Action for stocking in Canyon Creek (which flows onto the Reservation), and in lakes/streams in the White Mountains that ultimately flow into the Black River onto the Reservation are consistent with how the Tribe is managing those waters (i.e. sport fisheries).

We do have some concern about the Reduced Stocking Alternative. The economic impacts resulting from the Reduced Stocking Alternative would have a significant effect on tourism in the White Mountains of Arizona. Many of the people that travel to the White Mountains to fish also buy Tribal permits to fish on Tribal lands, and without these visitors, the economy (hotels, casino, restaurants, etc.) of the Reservation would suffer significantly. In addition, the Reduced Stocking Alternative would significantly impact native aquatic species because 1) less resources would be available for the mitigation program, 2) the likelihood of people illegally stocking waters with fish would likely increase which could have negative effect on native aquatic species, as the fish often illegally stocked (green sunfish, northern pike, etc.) are more detrimental to native species than the fish species proposed for stocking (see the species interaction documents), and 3) other species that rely on stocked (primarily trout) fish, such as bald eagles, ospreys, and gartersnakes, would be negatively affected by the Reduced Stocking Alternative.

Response: Comment noted.

Comment 104 [487]: Sport fishing is an important activity for Arizona's citizens and non-residents alike. With over 400,000 anglers who spend annually over four million days pursuing this sport, it is obvious that a stocking program must occur in Arizona to keep up with the demand.

The commenter believes that the AGFD, which is in charge of the stocking programs in Arizona, and who also manages our native fish programs, have sufficient conservation and mitigation actions in place to offset any potential impacts that the stocking program may incur.

Fishing is also a \$1.3 billion dollar industry in this state, and in Mohave County, many jobs are supported by the sport fishing industry.

With over 1,000 miles of shoreline along the Colorado River in Mohave County, along with Lakes Mead, Mohave, Havasu, and Alamo we are lucky to have a tremendous amount of fishable water for anglers. However other areas in the state are not so fortunate and a regular stocking program is warranted.

Considering all of the potential impacts and actions, we are in support of the Proposed Action listed in the Draft EA.

Response: Comment noted.

Comment 105 [568]: The commenter has a long history of working on natural resource issues. We have a definite interest in the State's Fish Stocking Program. In addition to housing many of the sport fishery sites in the State, we are home to some of the AGFD fish hatcheries involved in the Sport Fish Restoration program under review. We are proud to be associated with these hatcheries.

We unanimously support the "Proposed Action," as outlined in the EA, because that is the action that will assure continuation of the current stocking program in Arizona. We fully realize that the vast majority of fish released from hatcheries are non-native fish, but given the dearth of native species and the history of sport fishing in Arizona, that is the most realistic option. The AGFD has developed a highly sophisticated program for stocking the respective angling-available waters of Arizona, one that guarantees that the residents of the ECO counties have opportunities to enjoy recreational fishing.

The EA does not delve into the composition of anglers, but it should be noted that fishing is a very egalitarian activity. One can spend considerable money on fishing equipment; and conversely, an inexpensive rod-and-reel will suffice. A stocked trout, for example, is potentially available to all segments of our population. Thus, the continuation of the AGFD Fish Stocking Program will allow residents from all income strata to pursue this unique recreational opportunity.

Part of our economic base of the is tourism and many of those tourists travel from the Phoenix metropolitan area explicitly to take advantage of the many angling opportunities available around the Mogollon Rim. Thus, the Fish Stocking Program has a very marked multiplier effect because the anglers eat in area restaurants, stay in area motels, shop in area stores, etc. Your EA depicts quite well some of these positive economic impacts. Selecting the Proposed Action and continuing this popular program will assure continuation of these economic benefits.

We are cognizant that funds collected both in the form of Arizona fishing licenses and in the federal excise tax paid when purchasing fish tackle go to support this program. Since the funding is dependent upon user fees and the public is willing to pay for this type of program, it would make no sense to select the No Action and cause this program to cease operation.

Response: Comment noted.

Comment 106 [368]: Your consideration, concern and continued support of the Take a Kid Fishing program are invaluable to the adults and children of La Paz County. Our office and the citizens of La Paz County have participated in this event since its inception 32 years ago.

Comment 107 [438]: We support the *Proposed Action* alternative, which would continue to stock 167 waters with one or more of 18 different species, including La Paz County Park Lagoon. We oppose the *Reduced Stocking Alternative*, which eliminates 66 stocking sites including the La Paz County Park Lagoon. We also oppose the *No Action Alternative*, which eliminates stocking of any waters.

Our Annual Take a Kid Fishing event has been held at the La Paz County Park Lagoon for 32 years is always well attended by participants and their families. This year, at the 32nd Annual event in February 2011, 751 youth attended along with 668 “others” which included family members, friends and teachers, totaling 1,419 for a 2 day event. Participants and those accompanying them came from different areas of La Paz County and Mohave County—Bouse, Ehrenberg, Parker, Quartzsite, Salome, Parker Dam and Lake Havasu City.

The Take a Kid Fishing program is essential for youth to understand the art of fishing such as knot tying, casting, baiting the hook, learning about different types of fish and taking care of the outdoor environment.

Further, fishing is a major part of residents and visitors alike who come to La Paz County to take advantage of the mild climate and the Colorado River. The La Paz County Park is host to 2000 campers during the winter months, many of whom enjoy the sport of fishing.

Comment 108 [89]: Commenter notes that the Take a Kid Fishing program serves the community of Parker, as well as the outlying communities (Bouse, Ehrenberg, Quartzsite, Wenden, Salome, and Parker Dam). The entire community gets involved from local businesses and service clubs to winter visitors. It is a great way for the elderly and the youth to work together in a worthwhile endeavor. This program only works because the State does its part and the community does its part. Please continue the stocking of trout in the La Paz County Lagoon.

Comment 109 [367]: For the past 32 years, the Take a Kid Fishing program has provided hundreds of children living in our community each year an opportunity to begin learning about an activity that they can be active in for the rest of their lives. It is educational. Children are taught to respect the environment, the skills and techniques of proper fishing, the different kinds of fish, and how to obey the laws and regulations governing the sport. In an age when the media and government talk about the physical inactivity of children and the breakdown of the family, it seems counterproductive to consider eliminating the minimal contribution that is asked of your agency for the continuation of this well entrenched and well deserved program.

Comment 110 [415]: Commenter encourages the continuation of the Take a Kid Fishing program. This is an important event for the youth of La Paz County and the surrounding areas, and is a great family event. This event encourages kids to take a life long interest in the great outdoors and enjoy the great American sports of hunting and fishing.

Comment 111 [51, 58–88, 90–91, 99, 101–297, 299–311, 313–330, 333–336, 338, 339, 341–344, 346–402, 404–414, 416, 418–446, 570–573]: The Take a Kid Fishing program is dependent on the AGFD stocking of La Paz County Lagoon. The elimination of this program would affect a large number of youth in Parker and surrounding areas. This program is an important educational resource and community service activity. Respondents expressed opposition to eliminating this program.

Response: Comment noted.

Comment 112 [93]: The stocking of a cattle water hole around Dog Town Lake may not be a great use of resources.

Response: It is unclear to which site this comment is referring. There are several stocking locations within 15 miles of Dog Town Lake. Some of these sites may also provide water for cattle. The stocking locations in this area are managed to provide fishing opportunity in an area with limited opportunity. Many of these stocking locations have undergone fish habitat improvements and are managed as trophy trout fisheries (e.g., JD Dam, Elk Tank, Middle Tank, and Perkins Tank).

No Action Alternative

Comment 113 [558]: There are many reasons for the decline in native fish. Deciding not to stock any sport fish, especially trout, isn't going to help their numbers.

Response: Comment noted.

Comment 114 [567]: The potential for the stocking program to continue without federal dollars should be disclosed. The EA states that the SFRP is funded just in part by federal dollars and the rest by other programs such as Heritage and wildlife grants. Subsequent verbiage in the EA states no federal funding would likely result in no stocking by AGFD. This leaves the impression that stocking could still occur, but at decreased levels.

Response: Through the SFRA, federal funds available for the sport fish stocking program are matched with state dollars (25 percent is state-funded). It is unlikely that the AGFD would continue the Sport Fish Stocking Program as it is currently managed without federal funds due to the limited financial resources that would be available to the state for this purpose. As noted by the commenter, the Draft EA states that no federal funding for stocking would likely result in no stocking by the AGFD.

Reduced Stocking Alternative

Comment 115 [8, 56, 518]: Do not support the Reduced Stocking Alternative because it would eliminate 66 lakes and anglers will crowd into the few remaining fisheries, reducing angling success and satisfaction as local fish populations are diminished. Some anglers may stop fishing, affecting the local economy.

Response: Comment noted. The Draft EA addresses potential impacts to angler satisfaction and fish populations with the Reduced Stocking Alternative.

Comment 116 [479, 510]: Commenter does not support Reduced Stocking Alternative because population of state is growing, which will result in more angling demand not less.

Response: Comment noted.

Comment 117 [298]: Support Reduced Stocking Alternative. Extensive habitat loss has made protection of native species all the more important. The paradigm shift to eliminate (or at least not promote) introduced, non-native species has reached nearly every corner of wildlife management except for fisheries.

Response: Comment noted.

Comment 118 [56]: With the Reduced Stocking Alternative and No Action, illegal stocking activities would increase in an attempt to restock the failing fisheries. The species most likely to be illegally stocked will be those that best survive transport (smallmouth bass, bullhead catfish, green sunfish, etc.). These species would be much more detrimental to native communities than the species proposed for stocking.

Response: Comment noted.

Comment 119 [567]: The beneficial effects of the Reduced Stocking Alternative to all species need to be disclosed and elaborated upon.

Response: The difference between the Reduced Stocking Alternative and the Proposed Action is described in detail for each consultation species in the Draft EA, Chapter 4, and is summarized in Table 30. Additional detail on the effect of the Reduced Stocking Alternative on other special status species can be found in the Draft EA, Tables L–P (Appendixes K–O) and is summarized in Table 30.

Comment 120 [578]: We strongly believe that the dire status of virtually all of Arizona’s native fish species is ample justification for choosing the Reduced Stocking Alternative. According to the Draft EA, of the 36 native fish species known or thought to have occurred in Arizona, 20 are now federally listed as threatened or endangered, 1 is extinct, 8 no longer occur in the wild, and 14 of the remaining 15 are all designated as special status species by AGFD and/or federal land management agencies. The native aquatic species that continue to occur in wild populations require enhanced protection against stressors such as nonnative sports fish stocking in order to stave off their continued decline.

Response: Comment noted.

Comment 121 [578]: The Reduced Stocking Alternative also fully meets the purpose and need of the project, despite the Draft EA’s assertion to the contrary. The purpose and need of this project is “to meet the current and future need and demand for angling opportunities [.]” Unfortunately, the Draft EA alleges that “the Reduced Stocking Alternative would not fully satisfy the project’s purpose and need,” a conclusion based on an economic analysis that the agency freely admits is conducted using incomplete data. As the Draft EA notes in Sec. 4.2.3, over half the stocking sites included in the Reduced Stocking Alternative have no available data regarding Angler Use Days (AUD), the primary source of data driving the economic analysis. In fact, the Draft EA notes the severe limitations on their analysis, stating that “[b]ecause the percentage of available angler use data for the Reduced Stocking Alternative is 10 percent less than for the Proposed Action, some level of bias may be introduced that may overstate the difference in economic value between the two action alternatives.” Draft EA at 90.

Despite the fact that no data exists for over half the stocking sites included in the Reduced Stocking Alternative, the Draft EA still estimates the economic value of this alternative to be approximately \$174.3 million per year. Considering this number would be significantly higher with complete data for all stocking sites, and considering this alternative continues to stock over 100 sites around the state for recreational fishing, the angling opportunities provided under the

Reduced Stocking Alternative are more than sufficient to meet the legislative mandate found in the Sport Fish Restoration Act (SFRA) and support the AGFD mission.

Response: The Draft EA states that “though the Reduced Stocking Alternative would provide some support to AGFD’s efforts to meet the current and anticipated future need/demand for recreational fishing opportunities, the level of stocking and the resultant decrease in quality and diversity of recreational fishing opportunities associated with this alternative would represent a notable decrease from the existing condition. For this reason, the Reduced Stocking Alternative would not fully satisfy the project’s purpose and need. With 66 fewer stocking sites, the beneficial effects of the Reduced Stocking Alternative to fishing recreation would be notably less than the Proposed Action.” The conclusion that the Reduced Stocking Alternative would not “fully” meet the purpose and need was not based on economic analysis. Economic benefit is identified as an effect of the stocking program, not a part of its purpose and need.

The Draft EA uses the best available data for the economic analysis and fully discloses the limitations on the data used. Though the AUD and dollar amounts used in the analysis are 2001 numbers, they are intended to be an approximation of current conditions for use in comparing the relative impacts of the alternatives, rather than an exact accounting of current conditions.

The 2001 angler use data came from a statewide survey of licensed anglers intended to characterize the ongoing angling activity at stocking sites across the state. The economic data referenced in the Draft EA were based on this survey. The only comprehensive data on angler use more recent than that of the 2001 survey were generated from creel surveys undertaken at limited stocking sites. A creel survey, also known as a catch assessment survey, involves interviews with anglers at a given fishing site, including inspections of individual catches, and does not generate economic information. No angler preference surveys more recent than 2001 have been developed that would fully characterize the ongoing angling activity and associated economic information at stocking sites across the state.

The AGFD is aware that there is angler demand at sites where no actual survey data are available. Substantial population growth has occurred in Arizona since the time of the survey. For these reasons, it is assumed that actual angler use and demand and associated socioeconomic benefit may be underestimated in the Draft EA. This underestimation, however, would apply to both the Proposed Action and the Reduced Stocking Alternative.

The AGFD Wildlife 2012 Strategic Plan, as implemented through its Operation Planning, has identified these sport fish objectives: (1) annually provide sport fishing opportunities to accommodate 1.6 million cold-water and 4.4 million warm-water angler days by 2012 and (2) achieve a 70 percent satisfaction rating among Arizona’s angling public (i.e., 70 percent of Arizona’s anglers indicating they were satisfied with their angling experience over the past year). Based on these objectives, the Reduced Stocking Alternative is not sufficient to meet the legislative mandate found in the SFRA and support the AGFD Mission.

Comment 122 [578]: It is important to note that the Reduced Stocking Alternative allows the agency to meet its equally important responsibilities under the Endangered Species Act, as well as state rules and regulations regarding the protection of special status species. These two obligations of the agency are not mutually exclusive; in fact, the agency must consider both together in order to prevent one from precluding the other. We believe this is best achieved by adopting the Reduced Stocking Alternative.

Response: The FWS realizes its responsibilities under the ESA and has done its due diligence in regard to the ESA. The WSFR requested that the AESO engage in ESA Section 7 consultation on the Proposed Action of providing sport fish grants to the AGFD over the next 10 years to be used for AGFD's Sport Fish Stocking Program. The analysis for each listed or candidate species and critical habitat that was provided to the WSFR by the AESO was included in the Draft EA. As a result of the analysis, the AGFD, the AESO and the WSFR developed the CAMP to mitigate adverse effects to listed and candidate species, critical habitat, and special status species that do not have federal status but are of concern.

Comment 123 [298]: It appears that most of the sites most heavily used by anglers are on the list of sites that would be eliminated under the Reduced Stocking Alternative. Sites with the highest number of Angler User Days are also almost certainly sites in which the eradication of the non-native fish already at the site would be the most difficult; therefore the continued stocking of those sites is unlikely to have much of an impact on native species. Instead, the Reduced Stocking Alternative should eliminate sites that are not highly used by anglers, thus impacting anglers and economic interests to a lesser extent while allowing more opportunities to provide native species safe havens from non-native species.

Response: Development of the Reduced Stocking Alternative was based on eliminating sites where stocking would result in potential exposure of consultation aquatic and semi-aquatic species to nonnative sport fish. Angler use and socioeconomics were not factors that were used to develop this alternative.

Comment 124 [21, 26]: Stocking revitalized Apache, Canyon, and Saguaro lakes following major fish kills. Selection of the Reduced Stocking Alternative or the No Action alternative would preclude the restocking of these lakes if another fish kill occurs. The threat of another golden alga fish kill still exists.

Response: The Proposed Action would accommodate restoration of fisheries lost due to catastrophic events (e.g., algae blooms) at up to 51 sites, including Apache, Canyon, and Saguaro lakes.

Analysis (Biology)

Biological Resources—General

Comment 125 [462]: Commenter concerned about impact on wildlife that prey on fish if stocking is not continued.

Response: Comment noted. Refer to 4.1.4, Environmental Consequences, Stocking Effects on Other Special Status Piscivorous Riparian or Aquatic Nesting Birds, for discussion of the potential for augmentation of prey base with sport fish stocking.

Comment 126 [298]: Arizona's water resources are so precious, and the native species that rely on those resources so threatened that more should be done to protect them, not only from habitat loss but also from introduced, non-native species that either directly or indirectly cause an adverse impact to them.

Response: Comment noted.

Comment 127 [29]: If stocking is stopped, the brown trout population will be quickly demolished because the angler's that harvest stocked rainbow trout will begin harvesting wild brown trout.

Response: Comment noted. It is anticipated that reducing or stopping stocking in some locations would result in a decrease in the quality of other self-sustaining fisheries due to increased angling and fish harvest from displaced anglers.

Comment 128 [492]: With nearly all bodies of water in Arizona created by man, it makes no sense to destroy an established fishery to protect non-sporting species that would not otherwise exist naturally.

Response: The Proposed Action will not destroy any established fisheries. Many of the water bodies in Arizona have been constructed by humans. However, Arizona also contains many natural streams and rivers that support established fisheries, some of which are proposed for continued stocking through the Proposed Action. Because a water body is human-created does not mean that it is not important to the special status species analyzed in this Draft EA. Arizona's aquatic habitats have been heavily impacted by varying past and current actions. In some areas, constructed water bodies are the only available habitat for any aquatic species, native or nonnative.

Environmental Baseline

Comment 129 [567]: The use of the current stocking program and additional localities in the environmental baseline requires clarification. Section 3.2., pg 15 states that current stocking program is the environmental baseline. It later states that 22 sites are being added; 11 sites that had been stocked at some time in the past and 11 sites have never been stocked. If these additional sites are not part of the environmental baseline they may potentially have adverse affects that should be disclosed.

Response: The environmental baseline is the benchmark against which the alternatives are evaluated. Effects from stocking at all proposed sites, including sites additional to the current stocking program, are analyzed in the EA.

Comment 130 [567]: The ongoing conservation efforts and benefits of these efforts that will improve the baseline status of many consultation species should be disclosed. These efforts and benefits should be assessed and disclosed in the document. (page 42).

Response: Ongoing conservation efforts and their effects on status of consultation species were considered in the draft BCO and supports, in part, the findings determinations for these species. Several past and ongoing conservation efforts in which the AGFD participated are identified in Table D in Appendix A of the EA. However, for conciseness, all conservation efforts identified in the draft BCO were not included in the EA, though they are in the administrative record supporting the EA.

Analysis Approach

Comment 131 [561]: Additionally, the EA considers only the current distribution of native special status species and does not provide consideration nor support for extended distribution and dispersal. In fact, such dispersal is not considered significant to the population status. Instead, the assumption is made that by maintaining a population in a specific area or “secure habitat” (such as is the case for the Chiricahua leopard frog, Northern leopard frog, Gila topminnow, and others), adverse impacts can be reduced. However, in order to achieve self-sustaining populations of special status species and to ultimately delist them, natural dispersal must be considered as a key element. Many of our special status species have been reduced to very small patches of their former habitat due to a variety of factors, nonnative fish included. In some cases, such as Bonita Creek, these patches must be continually manipulated in order to reduce the stressors and maintain the native population, which does not fulfill the goal of *self-sustaining* populations. Moreover, these small and fragmented habitat patches do not enhance the survival ability of the species as the populations are prone to reduction or extirpation due to stochastic events.

Response: The expansion of existing populations and the establishment of additional populations are necessary to recover many of the consultation species (e.g., Chiricahua leopard frog), and effects to areas not currently occupied but needed for recovery were considered and analyzed in the draft BCO. In addition, the CAMP will enhance conservation and recovery of many consultation species and contains many actions that are laid out in existing recovery plans and other conservation documents.

Avoidance and minimization strategies (not stocking certain locations or species) employed during informal consultation and following the comment period further decrease risk of impacts to species and their dispersal potential (e.g., removal of Stoneman Lake, Mormon Lake, removal of channel catfish from Green Valley Lake). It is also anticipated that the CAMP will result in expansion of other (non-consultation) special status aquatic species through actions such as stressor removal, reestablishment of these species in the community-based conservation approach described in the Section 5.0 of the EA, and other CAMP actions. Specific conservation actions will be identified during the annual planning process and implemented thereafter. Therefore, effects to potential future reestablished or expanded populations of other (non-consultation) aquatic species could not be and were not analyzed in the Draft EA but will be analyzed separate from this process once specific actions are identified.

Situations do exist, as exemplified by the commenter for Bonita Creek, elsewhere around the state. The continued manipulation required is the result of factors unrelated to the stocking of sport fish under the SFRA. The subcatchments that include the stocking sties comprise 23 percent of the area of the state, using the subcatchment area (as depicted in

Figure 4 of the Draft EA) divided by total area of the state. There are areas available for population expansion and other management, recovery, and conservation actions to occur that are not adversely affected by the Proposed Action. Many watersheds, such as the entire San Pedro watershed; most of the upper Gila watershed, including Bonita and Eagle creeks; the Hassayampa River watershed; the Virgin River watershed; and the Yaqui River watershed, are not directly affected by the Proposed Action.

Information to Support Effects Findings

Comment 132 [561]: Section 4.1.4 discusses effects on special status species, yet the information provided for each species is very limited. Very few scientific studies are cited or discussed for the information that is provided. Appendix F briefly discusses methods used to analyze potential effects to special status species, but it does not get into specifics for most species and does not provide any scientific research to verify or contribute to the information provided. It does, however, state that “the nature of interactions between stocked species and special status fish species is complex, can be affected by site-specific factors, and is an area in need of further research.” Without this information, how can the AGFD and FWS justify either of the action alternatives?

The EA further admits that information is unknown for many of the special status species, including overall status, population numbers, dispersal potential, interactions with nonnative species, and more. Again, without fully understanding the species that will be affected, how can the AGFD and FWS justify either action alternative? The fact that all but one native fish species and a number of other aquatic and semi-aquatic species are either listed under the ESA or listed elsewhere as special status should be convincing enough to cease all nonnative introductions as well as to seek to improve baseline conditions.

In addition to the lack of information, uncertainty in the effects of either action alternative is furthered by the predominate use of indeterminate phrases such as “unlikely,” “not anticipated,” “could,” and “might.” Using such phrases does not mean that something may or may not happen. Without clear information as to what will happen as the result of any alternative, AGFD and FWS cannot make an informed decision and, therefore, cannot justify either of the action alternatives.

Until adequate information is available for all affected species and the interactions between nonnative fish and special status species are well understood, AGFD and FWS cannot move forward with either action alternative. The purpose of NEPA is “to promote efforts which will prevent or eliminate damage to the environment” and “to enrich the understanding of the ecological systems and natural resources important to the Nation” (42 U.S.C. § 4321). The goal is to make clear, well-informed decisions regarding human actions and to be able to analyze and understand the effects of those actions on our environment. The EA clearly indicates that well-informed decisions cannot be made regarding the effects of stocking nonnative fish on native wildlife and ecosystems. Therefore, no action should be taken that could further damage those resources.

Response: The analysis of effects on special status species was completed within the development of this Draft EA. This analysis used the best available scientific information

to analyze effects to special status species, including the aquatic special status species this comment indirectly references.

In particular, the majority of the species occurrence information for the analysis was obtained through spatial analysis (Geographic Information Systems [GIS]) of the Lower Colorado River Basin Aquatic Geographic Applications for Planning Analysis Project and the AGFD HDMS and Native Fishes databases. Together, these databases are the best available resources to determine species locations in Arizona, and they contain monitoring and species locality data from the AGFD, universities, other agencies, and private individuals. For additional species occurrence, hydrological connectivity, habitat, survey, species interactions, and other details, this analysis relied on the BA developed by the AGFD and the FWS. The BA included an extensive review of scientific literature, site-specific information for each of the stocking locations and surrounding watersheds, and relevant monitoring reports and data. Additional fish species occurrences and monitoring results were used, where available, and were cited appropriately in the analysis.

As the commenter points out, the Draft EA states that, “the nature of interactions between stocked species and special status fish species is complex, can be affected by site-specific factors, and is an area in need of further research.” Though this is the case, these factors did not compromise the Draft EA analysis because, as also stated in the same paragraph, “In cases where adequate information was not available to determine the potential biological impacts, we chose the higher effects (more conservative to the special status fish species) outcome to describe the effects.” Using this analytical approach, the Draft EA accounts for the unknowns and uncertainties by using a precautionary approach in regard to the effects on special status species.

The statements from the EA highlighted and discussed in this comment and response are merely statements acknowledging data and knowledge limitations in the spirit of full disclosure under NEPA; such limitations are present in all scientific analyses.

Fish Movement

Comment 133 [454]: Page 48-49: In a letter dated March 6, 2009, in which we provided comments on development of information found in the Arizona sport fish stocking consultation, we advocated that proposals for the introduction of non-native sport fish into drainages terminating in the Colorado River in Grand Canyon National Park be thoroughly analyzed for the potential of such sport fish to escape and become established in Grand Canyon National Park. While we appreciate that our original comments were captured in Agency Scoping (1.5.1), we feel that the potential for escapement of fish from stocked source populations in the Havasu and Little Colorado River (LCR) watersheds has still not been fully evaluated in the Draft EA. While “...the spill potential from the stocking sites, the distances involved, and the physical conditions encountered” (p. 48) are cited as factors considered in evaluation of escape potential, no data is provided for each factor and there is little assurance that a detailed risk assessment was conducted (if one can be found in the ESA compliance materials, we suggest a brief summary be carried forward to the EA). One reason we feel this way is that Stone et al. (2007) suggested that fish can invade the lower Little Colorado River in Grand Canyon from source populations over 250 km (155 mi away during flood events). This conclusion is in direct conflict, for example,

with the wording found on pages 48-49 of the Draft EA, whereby it is inferred that catfish from the White Mountains could not travel 100 miles to the Little Colorado River (LCR). We suggest that evaluation of invasion risk discussed on pages 48-49 be revised to incorporate findings in Stone et al (2007), which suggest that non-native fish introduced in Havasu and LCR sub-catchments could find ample opportunity to invade the Colorado River in Grand Canyon during flood events.

Response: The BA and the draft BCO include a detailed analysis of the potential effects of stocking nonnative sport fish under the Proposed Action on native fish in the Grand Canyon National Park, particularly with regard to potential effects on humpback chub and designated critical habitat in the lower perennial reach of the Little Colorado River. This includes a thorough review and analysis of the results presented in Stone et al. (2007).¹⁴ In summary, stocking of nonnative sport fish under the Proposed Action is unlikely to have a substantial impact on the humpback chub and other native fish and their habitats in the Grand Canyon National Park for the following reasons:

- Nonnative sport fish stocked at sites in the upstream portions of the Little Colorado River watershed are unlikely to reach the lower Little Colorado River or to substantially impact native fish populations there. Of the 12 species proposed for stocking in the Little Colorado River watershed, only six species (channel catfish, largemouth bass, bluegill, redear sunfish, rainbow trout, and brown trout) are stocked at sites where escapement is a possibility. Any stocked fish surviving the approximately 70- to 150-mile journey from stocked locations to the lower Little Colorado River would be subject to heavily sediment-laden floods and the drop over Grand Falls (191 feet). It is unlikely that any salmonids, bluegill sunfish, redear sunfish, or largemouth bass could survive the journey, and it is likely that few if any channel catfish would survive. Any nonnative stocked fish that reach the lower Little Colorado River are unlikely to contribute substantial additive effects on native fish species there, given that the six nonnative species proposed for stocking that have the potential for downstream transport already occur in the lower Little Colorado River or the mainstem Colorado River.
- Though the proposed species have been stocked in the Little Colorado River Basin for over three decades, during which the lower Little Colorado River has been intensely sampled, there is no evidence of movement of the proposed stocked fish species from upstream stocking sites to the lower Little Colorado River downstream of Grand Falls. Stone et al. (2007) found nonnative fish species in pools immediately upstream and downstream of Grand Falls and, based on the assumption that Chute Falls (downstream of Grand Falls on the lower perennial reach of the Little Colorado River) is an effective barrier to upstream fish movement, suggests that these originated from reservoirs in upstream reaches of the Little Colorado River watershed. Since these findings were published, upstream movement of marked humpback chub over Chute Falls has been documented and, therefore, this upstream movement is also conceivable for other fish

¹⁴ Stone, D.M., D.R. Van Haverbeke, D.L. Ward, and T.A. Hunt. 2007. "Dispersal of Nonnative Fishes and Parasites in the Intermittent Little Colorado River, Arizona." *The Southwestern Naturalist* 52(1):130–137.

species (Stone 2009).¹⁵ Secondly, nonnative fish species recorded above and below Grand Falls were not the species proposed for stocking and may have originated from lakes not stocked by the AGFD, which are closer in proximity and, therefore, more likely sources than proposed stocking sites in the upstream portions of the Little Colorado River.

- Substantial effects on native fish in the Grand Canyon National Park from stocking sites in the upper Havasu Creek watershed would also be unlikely. Due to the limited drainage area associated with the reservoirs proposed for stocking, high-magnitude storm flows would be required to create a continuous hydrologic connection to the perennial reach of lower Havasu Creek and, ultimately, the mainstem Colorado River. Survival of stocked fish in violent and turbid flood waters over primarily boulder substrates in the ephemeral Cataract Creek and over a distance of more than 105 miles would be unlikely. Surviving fish that reach the perennial stretch of Havasu Creek below Havasu Springs then would need to navigate four major waterfalls ranging from 50 to 196 feet high to reach lower Havasu Creek and the mainstem Colorado River. The three nonnative fish species proposed for stocking at sites in the upper Havasu Creek watershed (rainbow trout, brown trout, and channel catfish) have been recorded in the lower reach of Havasu Creek during sampling from 1978 to 2003 and are known to maintain self-sustaining populations in the mainstem Colorado River and/or its tributaries. Therefore, any stocked nonnative fish that survive to reach lower Havasu Creek or the mainstem Colorado River are unlikely to have a substantial additive effect on native fish species.
- The mainstem Colorado River and the lower reach of the Little Colorado River already support (and have supported for a number of decades) a substantial assemblage of nonnative fish species, including rainbow and brown trout (Colorado River mainstem) and channel catfish (Colorado River mainstem and lower Little Colorado River). The self-sustaining populations of these nonnative fish either already present in, or much closer and with a constant (perennial) connection to the lower Little Colorado River, exert a much greater potential effect on native fish species than stocked nonnative sport fish originating from stocking sites in the upstream portions of the Little Colorado River watershed. With the exception of redear sunfish (which, in the Little Colorado River, is only proposed at Tremaine, Upper Lake Mary, Lower Lake Mary, Mormon Lodge Pond, and Francis Short Pond—all closed systems except for Francis Short Pond), species proposed for stocking at sites in the upper Little Colorado River watershed where downstream transport is possible have already been recorded in the mainstem Colorado River or the lower Little Colorado River and would not represent new nonnative species in these systems.

Comment 134 [553]: Concern remains that the continued stocking of exotic warm-water fish species in the Little Colorado River under the Proposed Action will impact humpback chub within critical habitat in the lower 1.4 kilometers of the Little Colorado River, as well as in the reach above Chute Falls where translocated juvenile humpback chub are found. A peer-reviewed, published paper by Stone et al. (2007) showed compelling evidence that exotic fish species may

¹⁵ Stone, D.M. 2009. June 2009 “Monitoring of Humpback Chub (*Gila cypha*) and Other Fishes Above Lower Atomizer Falls in the Little Colorado River, Arizona.” Trip report. FWS, Flagstaff, Arizona.

have invaded the reach above Chute Falls from sources located more than 250 kilometers upstream through intermittently dry reaches during periods of flooding. It seems likely that additional stocking of sport fish, particularly piscivorous catfish, in the watershed as proposed may result in downstream emigration to critical humpback chub habitat in the Little Colorado River and to the Colorado River through Havasu Creek.

It is requested that no additional stocking of warm-water sport fish be conducted until additional research and monitoring is implemented to determine the source of exotic fish found in the reach of the Little Colorado River above Chute Falls. The type of research that may be applied above Chute Falls is suggested in the following comment.

Similarly, several species of native fishes historically occurred in the Verde River and Wet Beaver Creek in or near the parks. However, only one species in each park have occurred within the last 20 years. The Draft EA asserts that the risk of effect is low from the stocking of non-native species because only sterile triploid rainbow trout will be stocked in the drainage and they are not expected to persist due to distances between stocking sites and occupied habitat, and high summer water temperatures. The low risk assessment is likely correct, but the risk should be carefully considered. If surveys find stocked fish in reaches of these streams outside the stocking sites, NPS would ask that consideration be given to ceasing of all stocking as well as removing escaped fish from the streams.

Response: See response to Comment 133, which discusses effects on the lower reaches of the Little Colorado River and the Colorado River below Havasu Creek. The comment regarding stocking of trout in waters along the Middle Verde River is noted.

Stone et al. (2007)¹⁶ did not provide evidence of nonnative fish invasion from any particular source or distance away from their sample sites; the study was not designed to do so. Stone et al. (2007) found nonnative fish species in pools immediately upstream and downstream of Grand Falls and, based on the assumption that Chute Falls (downstream of Grand Falls on the lower perennial reach of the Little Colorado River) is an effective barrier to upstream fish movement, suggests that these originated from reservoirs in upstream reaches of the Little Colorado River watershed. However, there are other potential sources for these nonnative fish species. Since Stone et al. (2007) was published, upstream movement of marked humpback chub over Chute Falls has been documented and, therefore, this upstream movement is also conceivable for other fish species (Stone 2009).¹⁷ Secondly, nonnative fish species recorded above and below Grand Falls may have originated from stocked lakes in upstream waters not stocked by the AGFD that are closer in proximity and, therefore, more likely sources than proposed stocking sites in the upstream portions of the Little Colorado River.

The BA and the draft BCO include a detailed analysis of the potential effects of stocking nonnative sport fish under the Proposed Action on native fish in Grand Canyon National

¹⁶ Stone, D.M., D.R. Van Haverbeke, D.L. Ward, and T.A. Hunt. 2007. "Dispersal of Nonnative Fishes and Parasites in the Intermittent Little Colorado River, Arizona." *The Southwestern Naturalist* 52(1):130–137.

¹⁷ Stone, D.M. 2009. "June 2009 Monitoring of Humpback Chub (*Gila cypha*) and Other Fishes Above Lower Atomizer Falls in the Little Colorado River, Arizona." Trip report. FWS, Flagstaff, Arizona.

Park, particularly with regard to potential effects on humpback chub and designated critical habitat in the lower perennial reach of the Little Colorado River. This includes a thorough review and analysis of the results presented in Stone et al. (2007). In summary, stocking of nonnative sport fish under the Proposed Action is unlikely to have a substantial impact on the humpback chub. The results of that analysis are summarized in the Draft EA and the BA.

Comment 135 [553]: The transition of the rainbow trout hatchery and stocking program to triploid rainbow trout is an excellent step forward to potentially limit the risk of establishment of non-native trout in additional waters in Arizona. For example, predation upon endangered humpback chub within Grand Canyon National Park by naturally-reproducing rainbow trout (established by stocking in Glen Canyon National Recreation Area) has been documented. There has been considerable discussion among the GCDAMP (Glen Canyon Dam Adaptive Management Plan) partners about how to control the movement of the rainbow trout currently established in the Lees Ferry reach of the Colorado River in Glen Canyon Recreation Area into downstream Grand Canyon National Park where they negatively impact endangered humpback chub (Runge and others 2011). One of the proposed methods of control is to stock triploid rainbow trout to help in reducing the number of young trout available for downstream emigration. This may be a valuable tool to use to control this population while maintaining the trout fishery in the Lees Ferry reach.

To minimize further effects of recreational trout fisheries on native fish species, NPS requests that the stocking plan include greater flexibility for partners to stock triploids in additional locations.

Response: Comment noted. However, no stocking is proposed at Lee's Ferry or other areas within Glen Canyon National Recreation Area under the Proposed Action or the Reduced Stocking Alternative. This EA addresses only the stocking actions of the AGFD as funded through the SFRA.

Comment 136 [20]: We are aware of the legal, regulatory, and policy constraints on how science is applied to threat analyses. However, the analyses of the draft EA, BO, and BA have been so narrowly drawn as to ensure the conclusion that the proposed project effects are not substantial. Many underlying assumptions of the analyses, particularly those regarding fish movement and colonization, are not supported by fact and are in contradiction to the body of scientific literature on fish movement and nonnative invasion and colonization.

Unsupportable assumptions regarding the ability of nonnative fish to move and colonize areas beyond the stocking site are used repeatedly to dismiss site-specific impacts.

Comment 137 [548]: EA fails to include and to acknowledge the vast body of science documenting the movement of exotic fish through intermittent stream reaches.

Response: Generalized comments such as this are difficult to address. In a review of a sampling of the "vast body of science," we looked at Levick et al (2009),¹⁸ Leprieur et al.

¹⁸ Levick, L., J. Fonseca, D. Goodrich, M. Hernandez, D. Semmens, J. Stromberg, R. Leidy, M. Scianni, D.P. Guertin, M. Tluczek, and W. Kepner. 2008. "The Ecological and Hydrological Significance of Ephemeral and

(2009),¹⁹ and Gozlan (2008, 2009).²⁰ Levick et al., relying on Minckley and Meffe 1987²¹ and Poff et al. (1997),²² stated “The natural flow regime in arid lands is a key factor favoring native species over exotics that are adapted to lake and pond conditions.” Leprieur (2009) attempted to bring clarity to the issues of scientific uncertainty and the risks associated with nonnative fish introductions and stressed that we know very little about ecological impacts associated with fish introductions and that a precautionary approach is the sensible course of action. The analysis available in the BA and the EA examines known impacts, and the Proposed Action was continually modified throughout the compliance process to remove unacceptable or unknown risks while balancing the human desire for recreational opportunity. Our review is best summed up by Gozlan (2009)²³ as “Despite knowledge of potential adverse impacts arising from non-native fish introduction, economic drivers are still pushing forward for further introductions. Gozlan’s pragmatic approach to this neo-paradox, allows using existing knowledge to characterize and discriminate ecological risks associated with fish species introduction. It confirms what many previously suspected, that the overall risk of adverse introduction is around ten percent. Considering all fish introductions to have the same level of risk is counterproductive as it does not engage with the process of risk assessment.” The process of risk assessment has been incorporated into our vast body of data, analysis, and outcomes, and does not rely on generalized statements about nonnative fish, but assesses risk specific to each species proposed for stocking, and the habitats available for it to come into contact with, and where it may have the potential to interact with, native species.

The following factors were considered regarding fish movement potential:

- Nature of hydrological connection between the stocking location and the areas occupied by special status fish species as it relates to fish movement potential.
- Presence and nature of physical barriers that would limit or preclude fish movement.
- Management strategies that would limit or preclude fish movement.
- Habitat conditions between the stocking site and special status fish species–occupied areas that would limit or preclude fish movement or survival for those specific species proposed for stocking.

Intermittent Streams in the Arid and Semi-arid American Southwest.” U.S. Environmental Protection Agency and USDA/ARS Southwest Watershed Research Center, EPA/600/R-08/134, ARS/233046.

¹⁹ Leprieur, F., S. Brosse, E. Garcí’a-Berthou, T. Oberdorff, J.D. Olden, and C.R. Townsend. 2009. “Scientific Uncertainty and the Assessment of Risks Posed by Non-native Freshwater Fishes.” *Fish and Fisheries* 10: 88–97.

²⁰ Gozlan, R.E. 2008. “Introduction of Non-native Freshwater Fish: Is It All Bad?” *Fish and Fisheries* 9:106–115.

²¹ Minckley, W.L., and G.K. Meffe. 1987. “Differential Selection by Flooding in Stream Fish Communities of the Arid American Southwest.” In *Community and Evolutionary Ecology of North American Stream Fishes*, edited by W.J. Matthews and D.C. Heins, pp. 93–104. University of Oklahoma Press, Norman, Oklahoma.

²² Poff, N.L., J.D. Allan, M.B. Bain, J.R. Karr, K.L. Prestegard, B.D. Richter, R.E. Sparks, and J.C. Stromberg. 1997. “The Natural Flow Regime: A Paradigm for River Conservation and Restoration.” *Bioscience* Vol. 47, No. 11.

²³ Gozlan, R.E. 2009. “Biodiversity Crisis and the Introduction of Non-native Fish: Solutions, Not Scapegoats.” *Fish and Fisheries* 10:109–110.

Additional factors were analyzed regarding colonization:

- The presence or absence of previously established population(s) of stocked species.
- Ability of stocked species to survive and reproduce in areas occupied by special status fish species based on the specific stocked species' biology, habitat conditions, and available survey data that are representative of past potentials for such establishments to have occurred, but did not.

Using these factors, and the best available science, each stocking site was analyzed, and the potential for movement and establishment discussed.

Comment 138 [476]: Page 45, paragraph 4. What specific documentation or data supports the statement that “The movement of stocked sport fish to occupied Gila chub habitats in the Agua Fria drainage would likely be a rare event...?”

Response: The best available data is provided in the BA and the EA. Stocked sport fish have been present in the three lakes identified in the Proposed Action since at least 1954 (bluegill and largemouth bass in Horsethief Basin Lake). No species of sport fish proposed for stocking or that has been previously stocked has ever been documented in any flowing stream system occupied by Gila chub. No species of sport fish proposed for stocking or that has been previously stocked has been caught anywhere in streams of the Agua Fria River watershed, except in tributaries immediately upstream from Lake Pleasant (Lake Pleasant is not part of the proposed stocking action).

Comment 139 [567]: For species where no effects are anticipated due to lack of connection to the river, distances to the river and flooding potential should be disclosed to validate the statement.

Response: Hydrologic connectivity and the potential for fish movement were considered in detail in the BA and in the EA analyses. The information developed in the BA is summarized in Appendix K, Table L.

Comment 140 [476]: No sport fish stocking should be done in or upstream from any confluent water occupied by a species listed as threatened or endangered. The suggestion in the EA that stocked sport fish will not or do not disperse from stocking sites and will not or do not establish new populations is not supported by case history. Stocked fish have and will move both down- and upstream from stocking sites and either establish new populations or augment and thereby help perpetuate existing ones. Moreover, factors that may preclude fish movement such as intermittent reaches are only temporary barriers that do not prevent dispersal during times of flow. Among other examples, Arizona Game and Fish Department performed only limited stocking of flathead catfish *Pylodictus olivaris* and smallmouth bass *Micropterus dolomieu* has occurred in Arizona, yet both species have dispersed far and wide and established new populations in suitable places throughout the state. Striped bass *Morone saxatilis* was intentionally stocked into the lower Colorado River and has since dispersed without further assistance into Gila River basin waters, and gizzard shad *Dorosoma cepedianum* is an example of a species that arrived unexpectedly in Arizona and dispersed widely without benefit of intentional stocking.

Response: The examples provided by the commenter demonstrate the potential for certain introduced species to disperse outside the areas where they were originally stocked and is the main reason why flathead catfish are not proposed for stocking anywhere in Arizona, and smallmouth bass are only proposed for stocking in three constructed reservoirs (i.e., Apache, Canyon, and Saguaro lakes) where dams preclude their upstream movement (Roosevelt Dam) or significantly reduce their downstream movement through power-generating turbines (Stewart Mountain Dam, forming Saguaro Lake).

The potential or likelihood for stocked sport fish to disperse from stocking locations is based on a number of factors: (1) the nature of hydrological connections between the stocking location and special status species-occupied areas, (2) the presence of physical barriers or management strategies that limit or preclude movement, and (3) the movement and persistence potential of stocked fish based on their biology. Though widespread dispersal of some introduced nonnatives has occurred, the generalization that this applies to all of the stocked species at all locations is not supported by the available data.

Comment 141 [476]: Page 30, paragraph 1. The statement that “Few individuals, if any, would be expected to reach these downstream locations due to the long distances from the stocking locations and intervening habitat and stream conditions...” fails to recognize that dispersal of only a few individuals may be all that is necessary to establish new populations. Fishes are known unequivocally to disperse long distances both up- and downstream from sources, and to somehow manage to pass through apparently inhospitable habitat and stream conditions including temporary barriers such as intermittent reaches.

Response: The statement referred to by the commenter must be viewed in the context of the entire paragraph in the Draft EA, which provides the rationale for defining the downstream end of a subcatchment for analysis purposes. Potential movement of fishes within a subcatchment is considered possible in the Draft EA (though in many cases not a probable or high-frequency occurrence due to intervening habitat conditions) and is the main reason for the use of this spatial scale of analysis. However, the relatively few stocked fish that may reach the downstream end of the subcatchment from upstream stocking locations are unlikely to substantially contribute to existing populations of nonnative fishes in these larger rivers or reservoirs (e.g., Alamo Lake, Colorado River) that define the downstream end of the subcatchments for analysis purposes.

Comment 142 [574]: Though impacts of stocked trout are limited to mostly headwater drainages, such is not the case with stocked warm water species, and it is impacts from warm water species that are of major concern to the GRBNFCP. The Draft EA acknowledges those detrimental effects in general, but in many cases it dismisses such adverse effects because of "low exposure potential." That reasoning contradicts that provided to Reclamation in the 1994, 2001, and 2008 biological opinions on transport and delivery of Central Arizona Project water to the Gila River basin, where neither extensive ephemeral river reaches nor even high dams were considered sufficient to prevent the spread of nonnative fishes. Evidence acquired since the writing of those opinions has shown that nonnative warm water fishes indeed are capable of moving long distances through ephemeral reaches (e.g., green sunfish and largemouth bass

invasion of lower O'Donnell Canyon) and past fish barriers via illegal human transport (e.g., invasion of several species of nonnatives to lower Bonita Creek).

Response: The commenter is correct that nonnative warm-water fish can move through ephemeral reaches, which was considered in the biological analysis, and fish can be illegally transported, which was considered in the cumulative effects analysis. See response to Comments 136, 137, and 140.

However, the examples provided do not demonstrate these points. The green sunfish and the largemouth bass in lower O'Donnell Canyon and tributaries may have come from nearby ponds that are occupied by the species and that can connect during a high volume precipitation event (Mosher et al. 2011)²⁴ or may have come from downstream Babocomari River, which is occupied by these species (AGFD unpublished data)²⁵. Neither one of these potential means of invasion demonstrate “moving long distances through ephemeral reaches.” The several species of nonnative fish that were found in Bonita Creek in 2009 after the renovation may have been illegally transported or may have been still present in the system (treatment may have not been 100 percent effective) or some combination of these means (e.g., some species may still have been present after treatment, and other species may have been illegally stocked).

Comment 143 [567]: Table 5, pg. 62—The summary of effects for native fish, amphibians and aquatic invertebrates states potential effects from sport fish moving out of stocked areas or listed species moving into stocked areas are less likely than interactions within the stocked area. While this is true, stocked fish can move a great distance. Please provide an average distance beyond which the effects or interactions are less likely.

Response: Movement potential is based on specific conditions associated with a stocking site and its intervening and receiving waters. This is analyzed in detail in the EA and the BA. Because each stocking site has unique characteristics or factors that affect potential movement of stocked fish, the distance beyond which effects are less likely varies, and providing an average distance is not possible. This was analyzed in detail in the Draft EA. Also see responses to Comments 136, 137, and 140.

Comment 144 [20]: The most problematic aspect of the analyses is the relatively transparent effort to downplay adverse effects to native species. We recommend that FWS and AGFD review other analyses on nonnative invasion and spread, such as the several biological opinions and assessments done over the past two decades regarding the role of Central Arizona Project (CAP) in nonnative introduction and spread. Consistency with the earlier assessments should be a goal of the current EA and accompanying BO.

Response: Comments about the CAP BO and the draft BCO are noted. The analysis to the consultation species was conducted by the FWS-AESO in the draft BCO for the Proposed Action, and the Draft EA is consistent with the draft BCO. The effects of other previously analyzed actions have been captured in the draft BCO.

²⁴ Mosher, K., C. Crowder, and A.T. Robinson. 2011. “O'Donnell and Turkey Creek Fish Surveys During 2010.”

²⁵ Unpublished Nongame technical report. AGFD, Phoenix.

The analysis of other (non-consultation) special status species was conducted for the Draft EA. This analysis used the best available scientific information to analyze effects to other special status species. In particular, the majority of the species occurrence information for the analysis was obtained through spatial analysis (GIS) of the Lower Colorado Basin Aquatic Geographic Applications for Planning Analysis Project and AGFD HDMS and Native Fishes databases. Together, these databases are the best available resources to determine species locations in Arizona, and they contain monitoring and species locality data from the AGFD, universities, other agencies, and private individuals.

See responses to Comments 136, 137, and 140 that describe the use of the best available information, including documented movement of nonnative species.

Comment 145 [20]: A real or perceived lenient attitude toward nonnative fish stocked for recreational purposes versus those introduced or spread through other mechanisms is not only damaging to conservation of native fish species, but also threatens the integrity of existing programs dealing with the nonnative issue, paving the way for weakening of future efforts.

Response: The intent in the Draft EA was to fully understand and describe all of the mechanisms that introduce and spread fish through a watershed. The analysis of fish stocking in the Proposed Action acknowledges that there would be adverse impacts to native species. Consequently, a mitigation program was developed, which is intended to ameliorate those impacts and contribute toward recovery for consultation species.

Consistency of Findings

Comment 146 [20]: The problems lie not with the overall analysis – the draft BO contains a lengthy and well done analysis concluding that on an area-wide scale “...*there is little to no uncertainty that predation, competition, and introduction and dispersal of novel parasites and diseases into Arizona is a dominant factor in the decline of native aquatic species.*” This conclusion is then systematically invalidated during site-specific analyses where it is concluded that while on the whole this is true, it is not true at any specific site, and therefore the proposed stocking program is not a significant impact.

Response: The BA contains a detailed and thorough analysis of the effects of the Proposed Action at specific sites that is based on the best scientific information and site-specific factors; this information is summarized in the EA. The Draft EA concludes that effects would occur as a result of the Proposed Action, and these are addressed through implementation of the CAMP. It should also be noted that the suite of stocking locations and species has evolved over time. The AGFD Hatchery Stocking database identifies 191 reaches of stream or impoundments that were stocked with nonnative sport fish between 1996 and 2009. Over the history of the program, stocking of certain sites and certain species has been discontinued to address impacts to native aquatic species. Consequently, the sites and species proposed for stocking under the Proposed Action are expected to have lower impacts. Those locations where there would be higher impacts are generally those that have higher value based on angler use.

Comment 147 [561]: The Endangered Species Act (ESA) prohibits “take” of any listed species without authorization. Either action alternative would result in take of various listed species on a large scale and should not be authorized. Based on the information provided in the EA, this project would also result in jeopardy to a number of listed species. Under the ESA, jeopardy occurs when an action is expected to diminish a species’ numbers, reproduction, or distribution so that survival and recovery in the wild is reduced. Section 4.1 of the EA briefly discusses each consultation and other special status species and clearly states that populations of each species could be reduced and, in many cases, the ability to disperse would be either reduced or eliminated. For these species, which are already in peril, how does introduction of additional stressors that cause reduction in numbers or ability to disperse *not* jeopardize the species? Clarkson et al. (2005)²⁶ state that the presence of nonnative fishes “is the foremost factor preventing immediate conservation and recovery of imperiled native fishes” and that “the two fishery types cannot be co-managed in sympatry if natives are to persist.” Based on this statement, there would be jeopardy to each of the species discussed from either action alternative.

Effects on Native Species

Comment 148 [567]: For species where statements are made about triploid rainbow trout being stocked having lessened affects it should be disclosed if triploid rainbow trout predate upon eggs, fry, and tadpoles.

Comment 149 [476]: Page 19, paragraph 5 (bullet item 2), and elsewhere throughout the document. Stocking of triploid trout may alleviate concerns relative to hybridization with native trout, but triploid trout will nonetheless compete with native species for resources and may eat native trout.

Response: This analysis takes into consideration that stocking only sterile triploid trout would prevent these stocked species from establishing new populations or reproductively contributing to existing established populations but does not discount any potential predation or competition effects. Sterile triploid trout could compete with native species for resources. This effect was considered in the site-by-site analysis and disclosed in the Draft EA. This will be clarified in the Final EA.

Comment 150 [574]: Though impacts of cold water trout stockings to the warm water native fishes of concern perhaps are less than the impacts of nonnative warm water fish stockings, impacts of trout to natives are significant. For example, there is known geographic overlap in ranges of stocked trout and warm water native species such as Little Colorado spinedace, loach minnow, and roundtail and headwater chubs. Even if trout may not persist through a summer season in such areas of sympatry (but there are many notable exceptions that they do), negative interactions during overwintering periods are likely strong. Winter is a period of high vulnerability of young-of-year native fishes to mortality from factors such as starvation, and predatory or competitive interactions with trout undoubtedly are additive to that vulnerability. Use of triploid rainbow trout to obviate reproduction is a positive step to reduce negative

²⁶ Clarkson, Robert W., Paul C. Marsh, Sally E. Stefferd, and Jerome A. Stefford. 2005. “Conflicts Between Native Fish and Nonnative Sport Fish Management in the Southwestern United States.” *Fisheries*, Vol. 30, No. 9:20–27. AFS.

interactions with natives, but it will not prevent such overwinter effects or carrying capacity effects that the Draft EA does not seem to address.

Response: The AESO analyzed the effects of the Proposed Action to Little Colorado River spinedace, loach minnow, headwater chub, and roundtail chub, and that analysis is summarized in the Draft EA. It should be noted, however, that the Proposed Action does not include stocking of any species directly into locations occupied by either loach minnow or Little Colorado spinedace.

The effects of stocked trout to other (non-consultation) special status fish species, including predation and competition, were analyzed in the Draft EA. Effects were not broken down by season or analyzed by season, except in the cases when the trout were not likely to persist beyond seasonally (e.g., in many warmer locations the trout do not persist into the summer and therefore there would be minimal effects during the summer). The possibility that trout could overwinter at certain sites was acknowledged and their effects analyzed.

Rainbow trout are the predominant trout species that would be stocked. Based on the detailed analysis in the BA, rainbow trout are not highly piscivorous (predacious on fish). However, in the Draft EA, some predation on fish is acknowledged and addressed in the analysis. Competition between stocked rainbow trout and native fishes was also considered in the Draft EA and addressed in the analysis. Rainbow trout and Apache trout (which has a very similar ecological role and is also not highly piscivorous) are the only species that would be stocked directly into areas occupied by other special status fish species, with one exception (Canyon Creek). Brown trout would also be stocked into Canyon Creek. However, brown trout have been stocked into Canyon Creek since 1948, and the native species present (speckled dace and desert sucker) have remained abundant based on stream surveys.

Many stream locations are managed as put-and-take fisheries, and trout would only be stocked during the summer at those sites under the Proposed Action. Most hatchery rainbow trout stocked into put-and-take fisheries in streams are caught within a few weeks (Butler and Borgeson 1965,²⁷ Fay and Pardue 1986,²⁸ Skurdal et al. 1989,²⁹ Moyle 2002,³⁰ Barnes et al. 2009³¹). In addition, AGFD surveys in 2009 were conducted on the East Fork Black River to determine stocked trout overwinter survival and did not detect

²⁷ Butler, R.L., and D.P. Borgeson. 1965. "California Catchable Trout Fisheries." Fish Bulletin 127. The Resources Agency of California Department of Fish and Game, Inland Fisheries Branch.

²⁸ Fay, C.W., and G.B. Pardue. 1986. "Harvest, Survival, Growth, and Movement of Five Strains of Hatchery-reared Rainbow Trout in Virginia Streams." *North American Journal of Fisheries Management* 6:569–579.

²⁹ Skurdal, J., O. Hegge, and T. Hesthagen. 1989. "Exploitation Rate, Survival, and Movements of Brown Trout (*Salmo trutta* L.) Stocked at Takeable Size in the Regulated Rivers Lagen and Otta, Southern Norway." *Regulated Rivers: Research and Management* Vol. 3:247–253.

³⁰ Moyle, P.B. 2002. *Inland Fishes of California*. University of California Press, Berkeley and Los Angeles, California.

³¹ Barnes, M.E., G. Simpson, and D.J. Durben. 2009. "Poststocking Harvest of Catchable-sized Rainbow Trout Enhanced by Diet Supplementation with a Fully Fermented Commercial Yeast Culture During Hatchery Rearing." *North American Journal of Fisheries Management* 29:1287–1295.

any overwinter survival of stocked trout (AGFD unpublished data). Therefore, at locations where stocking would occur during the summer months, few stocked trout would be expected to survive to winter. At other locations where trout would be stocked during the winter, predation and/or competition during the winter could affect native fishes. These effects are captured in the general analysis of effects of rainbow trout and Apache trout by acknowledging that some predation could occur.

Comment 151 [574]: Our concerns with the sport fish program in general are primarily two-fold: sport fish stockings by definition exceed the carrying capacity (the maximum number of individuals that a given environment can sustain without detrimental effects) of receiving waters and thereby impact many trophic levels via cascading effects; and sport fish stockings are primarily of nonnative species that disrupt co-evolved native community adaptations.

The practice of stocking sport fish to meet angler demand has major deleterious impacts beyond those caused by exceeding carrying capacity, which result from the fact that nearly all stocked fish are nonnative. The fact that sport fishes proposed for stocking are already established in most locations does not diminish their negative impact to ongoing recovery efforts of native species. By assuring that nonnative fishes are present in excess of carrying capacity, their impacts to native species are elevated above even their "normal" level of impact. In fact, if recovery efforts for natives are to proceed in areas affected by sport fish stocking, a reasonable case can be made that such stockings will have to be eliminated or their effects otherwise controlled.

Response: The specific definition of carrying capacity varies depending on the scientific source and, therefore, this response will not attempt to address the assertion that stocking by definition exceeds carrying capacity or address the particular definition provided in this comment. However, proposed stocking will, in some cases, exceed carrying capacity when many fish are stocked at once for angling. The impact on the trophic levels would be expected to vary based on the type of receiving waters, the type of fish stocked, and the number of fish stocked. In the analysis of interactions between stocked fish and special status fish, the impact from competition was discussed. In general, most of these stocking sites have been stocked in the past, and any ecological harm as envisioned by the commentator has already happened. In some extreme cases, a few individuals of more predacious species can cause detrimental effects to the environment and, in other cases, many fish can be sustained or stocked without detrimental effects. These effects are thoroughly analyzed in the Draft EA.

The majority of the stockings in the Proposed Action are of rainbow trout for put-and-take fisheries in artificial lake environments, and the majority of places where exposure of stocked fish to special status species would likely occur are in streams. In addition, with only one exception, rainbow trout and Apache trout are the only sport fish that would be stocked directly into occupied special status fish species habitat. Apache trout have a similar ecological role as rainbow trout. Previous research has shown that most hatchery rainbow trout stocked into put-and-take fisheries in streams are caught within a few weeks and have low overwintering survival (see information and references cited in response to Comment 150). Nevertheless, the BA acknowledged the potential for pulse effects where stocked trout would be abundant for a short time before the majority of the

fish would be harvested or die. The duration of pulse events would be highly variable and would depend on a number of site-specific factors. A thorough review of the literature did not find publications that addressed the potential impacts on native fish of multiple trout stockings into a put-and-take fishery. This pulse effect at many trout stocking sites is acknowledged here, but analyzing this effect further is not needed because the general analysis of predation and competition in the Draft EA includes all predation and competition from stocked sport fish, including those that would be part of such a pulse effect and those that would not.

The idea that stocking nonnative fish can impact trophic dynamics via cascading effects and/or disrupt native communities through ecological interactions is acknowledged in the Draft EA, and where these potential effects are known these have been identified. For example, adverse impacts to certain native fish populations can have impacts to eagle nestling survival (see comment above). Another example is identified in the California floater (a clam) analysis where impacts to native fish populations have the potential to affect California floater because this clam may depend on certain species of fish as host for its glochidia (larvae) for successful reproduction.

As required by NEPA, effects of the stocking actions have been thoroughly analyzed, disclosed, and mitigated. The CAMP provides for the mitigation necessary to minimize on-site effects (stocking of triploid rainbow trout) and off-set impacts off-site through removal of stressors and reintroduction of natives.

Comment 152 [559]: Bluegill is classified as “less predaceous” (based on predation on fish); however, it preys readily on leopard frog tadpoles but not bullfrog tadpoles, but does eat the insect predators of bullfrog tadpoles. It can thus facilitate population explosions of bullfrogs, and thus increase the dispersal radius of bullfrogs around a source population.

Response: The “less predacious” category in the Draft EA was used only in the native fish effects analysis and not the analysis for effects on amphibians. There is experimental evidence and some field evidence that bluegill can facilitate populations of bullfrogs by eating insect predators but not bullfrog tadpoles (Werner and McPeck 1994)³², (Adams et al. 2003)³³. However, other species such as largemouth bass and channel catfish prey on bullfrog tadpoles. There are 18 locations where bluegill is proposed for stocking without accompanying largemouth bass or channel catfish. Some of these sites and surrounding areas are known to harbor bullfrogs. The sites and surrounding areas that harbor bullfrogs will be considered for bullfrog removal under the CAMP measures to remove stressors. Factors that will be considered will include conservation value of a removal or reduction of bullfrogs and feasibility of success.

Comment 153 [476]: Page 63, last paragraph and Page 64, Table 6. The distinction between “less” and “more” predacious species is unclear and does not consider the role of predation on early life stages, which may be the most significant impact, and which is done by virtually all

³² Werner, E.E., and M.A. McPeck. 1994. “Direct and Indirect Effects of Predators on Two Anuran Species Along an Environmental Gradient.” *Ecology* 75(5):1368–1382.

³³ Adams, M.J., C.A. Pearl, and R.B. Bury. 2003. “Indirect Facilitation of an Anuran Invasion by Non-native Fishes.” *Ecology Letters* 6:343–351.

stocked nonnative fishes including those listed as “less predaceous.” For example, experimental data are available that document bluegill and redear sunfish as intense predators on native fish larvae.

Response: Table 5 of the EA provides a summary of the potential effects of stocking nonnative sport fish and states “Potential direct impacts from stocking of nonnative sport fish species include predation on eggs, young, and adults, and competition for food and space.” Thus, the analysis in the EA considered the role of predation. Appendix F provided the analysis methods for interactions between stocked nonnative sport fish and native species. It identifies that predation is possible and was considered and that some species are more predacious than others.

The “more” and “less” predacious categories are used in the analysis to determine relative general predation potential of the stocked species. All stocked species, except for threadfin shad, have some potential to prey on larval and juvenile native fish. However, based on an extensive review of scientific literature, the species in the “more predacious” category have higher predation rates on fish, and those in the “less predacious” category have lower rates of predation on fish.

The species given as an example in this comment, bluegill and redear sunfish, are widely documented to be less predacious on fish. Available literature regarding bluegill predation on juvenile Arizona native fish has been reviewed. Two studies (Mueller and Burke 2005,³⁴ Mueller 1995³⁵) were cited in Marsh and Pacey (2005)³⁶ as demonstrating direct evidence of predation by sunfish (presumably not green sunfish because green sunfish were in another category in this article) on native fish. Mueller and Burke (2005) identified bluegill and redear sunfish as possible predators on juvenile native fish, but the study was inconclusive in this regard because the effects of other species, such as largemouth bass and green sunfish, could not be discerned. Mueller 1995 reported that divers witnessed *Lepomis* species preying on juvenile razorback sucker larvae. The authors did not distinguish what *Lepomis* species were witnessed preying on the razorback sucker larvae. The *Lepomis* genus contains a green sunfish as well as redear sunfish and bluegill. Green sunfish are a known predator on Arizona native species and are recognized as a contributor to native fish declines (green sunfish will not be stocked

³⁴ Mueller, G.A., and T. Burke. 2005. “Survival of Young Razorback Sucker (*Xyrauchen texanus*) in Relation to Stocking Rates (fish/ha) and in the Presence or Absence of Predator Communities in Lake Mohave, Arizona-Nevada.” In *Proceedings of Two Symposia: Restoring Native Fish to the Lower Colorado River: Interaction of Native and Non-native Fishes*, pp. 155–163. July 13–14, 1999. Las Vegas, Nevada. FWS, Southwest Region, Albuquerque, New Mexico.

³⁵ Mueller, G. 1995. “A Program for Maintaining the Razorback Sucker in Lake Mohave.” AFS Symposium 15:127–135.

³⁶ Marsh, P.C., and C.A. Pacey. 2005. “Immiscibility of Native and Non-native Fishes.” In *Proceedings of Two Symposia: Restoring Native Fish to the Lower Colorado River: Interactions of Native and Non-native Fishes*, edited by M.J. Brouder, C.L. Springer, and S.C. Leon, pp. 59–63. July 13–14, 1999, Las Vegas, Nevada, and *Restoring Natural Function Within a Modified Riverine Environment: The Lower Colorado River*. July 8–9, 1998. FWS, Southwest Region, Albuquerque, New Mexico.

as part of this action). Carpenter and Mueller (2008)³⁷ compared predation rates of various nonnative species on razorback sucker in an aquarium setting and did observe direct predation from bluegill on razorback sucker larvae though the estimated predation rate was lower for bluegill than for all other species in the experiments except threadfin shad and fathead minnow, thus supporting the development and use of “less” and “more” predacious categories for analysis of predation effects.

Comment 154 [559]: The analysis may change for the Santa Cruz River when water quality improves under the soon to be established new sewage treatment system in the Tucson reach. At that time, several fish species, including natives, could occupy the river, and effects of stocked sport fishes could be significant. Similar reasoning applies to the Santa Cruz River downstream of the Nogales sewage treatment plant, which has already been modernized.

Response: If over the 10-year period of this consultation, water quality improves and consultation species occupy these river reaches, we will request reconsultation for the stocking at sites that could affect consultation species.

Additive Effects on Native Fishes

Comment 155 [20]: The EA also capitalizes on the question of “novel” and concludes that since the proposed species to be stocked are already present in the State, and since most Arizona streams already have one or more nonnative fish present, therefore, adding to the problem by stocking additional nonnative fish will not increase the adverse effects. This argument is specious and ignores many factors. However, one of the most striking omissions from this argument is the question of how existing and future efforts to control nonnative fish and recover native fish (including mitigation for this proposed project) can succeed in the face of an ongoing program that adds nonnative fish to native fish habitats on a regular basis. Inhibiting or precluding recovery may be the most overwhelming adverse impact of the proposed stocking, but is never addressed by the EA or BO.

Response: The intent in the Draft EA was to acknowledge the incremental impact of stocked fish to the nonnative assemblage that already exists in some waters. The site analyses consider the occurrence of nonnative fishes at stocking sites or in downstream waters with regard to the relative contribution of stocking on effects to native species. See response to Comment 137 for list of all factors considered in analyzing effects to other special status native fish species in the Draft EA.

The relative effects of stocking vary based on the location and the sport fish species proposed to be stocked. For example, some sport fish exhibit a higher degree of predation than others. Though it varies by species and age class, trout and grayling are generally less predaceous than warm-water species. Trout and grayling stockings in many cases represent put-and-take where there is little or no survival of fish beyond the stocking season. The planned use of triploid trout for future stockings would further reduce the effects of any fish that manage to survive and successfully escape to downstream waters. Other factors were considered as well to minimize or eliminate impacts to native species, including management of water bodies (timing and size of stockings), physical conditions

³⁷ Carpenter, J., and G.A. Mueller. 2008. “Small Nonnative Fishes as Predators of Larval Razorback Suckers.” *The Southwestern Naturalist* 53(2):236–242.

affecting fish movement, and multiple years of fish survey data on the occurrence of native and nonnative species in potential receiving waters. Though the addition of nonnative sport fish could have an additive effect on native species, this depends on the species stocked and the conditions of the site, and an adverse effect cannot be categorically concluded.

In no cases would any of the alternatives result in stocking the same problem nonnative species into native aquatic species habitat that the AGFD or another management authority is attempting to eradicate. In some cases, the Proposed Action would result in stocking less predacious nonnative sport fish species into locations that have native species, and these situations were analyzed in the Draft EA. This does not preclude the possibility of future actions to protect and conserve such populations of native species, including control or eradication of some of the most problematic nonnative species such as green sunfish. The analysis in the Draft EA takes into account the variable predation potential of various stocked species, and the Proposed Action strives to meet angler demand while stocking with species that have the least potential to affect native species (this is one of many management and stocking strategies taken to reduce potential effects). This is a common approach taken by fish and wildlife management agencies in Western states and recommended in Johnson et al. (2009)³⁸. See Comments 19–22 for discussion of compatibility of nonnative sport fisheries and native fish populations.

Recovery of listed species is considered in the draft BCO.

See response to Comment 242 regarding impacting future conservation of other special status species.

Comment 156 [548]: EA fails to heed logic in concluding that further and/or increased contamination of a contaminated system will not result in increased harm. If nothing else, continued contamination of a system by exotics precludes recovery of the system and its dependent native fish.

Comment 157 [482]: The Draft EA appears to significantly downplay the threats posed by sport fish stocking to native fish populations despite years of scientific evidence that show it to be a primary factor in their demise and a clear obstacle to their recovery. (Bonar 2004; Clarkson 2005; Lassuy 1995; Tyus 2000) The premise that previously stocked sport fish or other nonnatives are the real culprits in the adverse impacts to native fish and other sensitive species/focal species is patently ridiculous. Because the victim is already lying on the floor bloody and battered, it won't do more harm to kick him in the gut and shoot him in the head? The continued stocking of nonnative sport fish in native fish and wildlife habitats causes further peril to native species and precludes their recovery.

Comment 158 [563]: The Proposed Action embraces and increases the key stressor that is driving native fish species to extinction. Many species of native fish from the southwestern

³⁸ Johnson, B., M.R. Arlinghaus, and P.J. Martinez. 2009. "Are We Doing All We Can to Stem the Tide of Illegal Fish Stocking?" *Fisheries* 43(8):389–394.

United States, including those in the Gila River basin in Arizona and New Mexico, are critically imperiled primarily because of the introduction and establishment of nonnative fishes.

Response: See response to Comment 155. The analysis in the Draft EA considers many factors and considers contribution and potential contribution of stocked sport fish to connected systems even if the connected system already contains established nonnative species. The presence or absence of previously established population(s) of stocked species is one of many factors used in the analysis. In particular, addition of a relatively small number of individuals of stocked sport fish (by movement from distant upstream stocking locations through variable habitat conditions, including ephemeral stream reaches, flood flows, etc.) to a system that already has an established population of that particular species would not substantially increase effects to native species. This is because the contribution of those few individuals would not substantially alter the total numbers of the already established population.

Consistency with ESA Mandates

Comment 159 [561]: The effect on native species was the primary concern raised in our scoping comments, and it was also the primary concern received from numerous agencies and the public (as discussed in Section 1.5). Although much of the EA focuses on this concern, the effects to native species are not adequately addressed in this EA. For every native species discussed, the EA states that the Proposed Action would affect that species and its critical habitat (if critical habitat has been designated for that species) and that stocking of the nonnative species would have low to high impact on that species. However, the EA also states that the Proposed Action is not likely to jeopardize any species (Section 4.1.4) and would result in neutral or net positive effects (Section 6.5) to the native species. These statements are a direct contradiction to each other.

Response: The statements are not contradictory when viewed as a complete picture. For sensitive species that are not federally listed or do not have candidate status, an analysis was completed that determined whether one would expect a low, medium, or high impact to a species from each stocking site based on site-specific attributes. Those effects were aggregated, and mitigation measures were developed to counteract those effects. We also determined what kind of effect would be expected to a listed or candidate species and critical habitat from stocking at each site, after which the AESO rolled those effects up to a determination of jeopardy/no jeopardy. No jeopardy was reached because of the conservation measures and mitigation measures that were included as part of the Proposed Action. The intent of the conservation and mitigation measures is to offset any adverse effects and to contribute to recovery of the consultation species. See the CAMP in the EA (Chapter 5), which has been modified to better explain the benefits to the CAMP species.³⁹

Comment 160 [561]: To determine effects on native species, the AGFD and FWS cannot just take into account changes to the baseline condition. Instead, the purpose of the ESA must be considered “to provide a means whereby the ecosystems upon which endangered species and

³⁹ CAMP species are consultation species identified in the draft BCO and sensitive aquatic species identified in the Draft EA for which activities in the CAMP are targeted.

threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section” (16 U.S.C. § 1531).

The goal of the ESA is to recover species to the point where they are not on the brink of extinction and to establish and maintain robust, self-sustaining populations throughout much of their habitat. Many of the species discussed in the EA have been determined by the FWS to be on the brink of extinction, and the others are considered to be in danger of reaching that point. Continued introductions and stocking of nonnative species can only make this situation worse and will not provide the opportunity for robust, self-sustaining native populations.

Response: Following our analysis and a review of public comments, the WSFR, the AESO, and the AGFD removed a site from the Proposed Action (Fagen Tank), and some species of sport fish were removed from stocking at 14 sites due to lack of angler use, or to reduce or eliminate potential impacts to consultation species. In addition, conservation measures designed to further reduce impacts to native species were included as part of the Proposed Action, as were mitigation measures.

Comment 161 [566]: The commenter, and our members, have similar concerns for other aquatic species in Arizona that are either listed under the ESA, are listed and have critical habitat designations, are candidates for listing, or have been petitioned for listing. We believe that the EA’s “Reduced Stocking Alternative” (pp. 19–20) or “Minimal Stocking Alternative” (p. 23) are more likely to comply with the ESA and other federal laws than the Proposed Action.

Response: Comment noted.

Effects on Spikedace

Comment 162 [20]: The draft BO makes a case that no incidental take [of Federally-listed as threatened spikedace in the upper Verde River] will occur because nonnative fish already in the river due to earlier stocking efforts by the two action agencies (and others) – but which as past actions are not subject to the current effects analysis – are more likely to eat or kill spikedace before the fish stocked under this proposed action get the chance. If one accepts this rather bizarre premise, then one would reasonably conclude that a) the nonnative predator load in the upper Verde River is already having a major negative effect on spikedace, b) any addition to the nonnative load would be seriously adverse, and c) actions should be taken to reduce the number and species of nonnative fish. However, the draft BO instead concludes that adding to the nonnative population through the proposed stocking will not jeopardize the continued existence of spikedace, because they are already in such trouble and such low numbers that any likelihood they will be present to encounter a nonnative stocked as a result of this proposed action is so small as to be discountable.

Under NEPA it may be permissible to discount adverse effects because the affected entity (species) is so imperiled that additional adverse effects will not substantially change the likely outcome. But, spikedace is a Federally-threatened species currently proposed for uplisting to endangered. The taxonomically unique spikedace of the Verde River is in severe decline, and the EA and BO conclude that adverse effects from nonnative species are a major factor in this

decline. Therefore, under ESA Federal agencies are supposed to take actions to prevent extinction by reducing nonnative impacts, with particular emphasis on preventing increases in the threat. No stocking of nonnative fish, for any reason, should be permitted in the upper Verde River basin (including the mainstem, tributaries, lakes, ponds, etc). Nonnative stocking in the middle Verde River basin should be permitted only after installation of a barrier to prevent nonnatives from moving upstream into the upper basin. Any such stockings should result in a finding of jeopardy, including those of the action proposed in this EA.

Comment 163 [20]: Despite recognition of a seriously deteriorated environmental baseline, imposition of a steady input of predators and competitors, and a mitigation program of doubtful effectiveness, the FWS and AGFD have concluded that effects to Verde River spokedace are not significant.

Response: Effects on the spokedace were analyzed in the draft BCO, which concludes that the Proposed Action, including implementation of the CAMP, would not jeopardize the continued existence of this species. This determination was made for the following reasons:

For the upper Verde River, the low number of documented individuals of stocked sport fish species in spokedace habitat, combined with the low number of spokedace present, would likely result in limited opportunities for competition and predation. Furthermore, because the species proposed for stocking are already present in the Granite Creek drainage, and survey information over 20 years has not documented many individuals of bluegill (3) or largemouth bass (19) and no black crappie, it is likely that these species would, based on the limited opportunity for them to access the upper Verde River from Granite Creek, establish populations in the time frame covered by this consultation. Though there could be some predation and competition between spokedace and any escaped sport fish, the magnitude or frequency of such events would be unlikely to have a meaningful effect on the size or distribution of the spokedace population in the upper Verde River.

The ability of the spokedace population in the San Francisco River to establish a self-sustaining population would not likely be substantially impacted by the Proposed Action at Luna Lake. It would be unlikely that any rainbow trout from Luna Lake would reach proposed critical habitat. However, any that did could affect proposed and designated critical habitat, and while they are present, they would use space and some of the available food base provided by the critical habitat that could reduce the amount of resources available to the spokedace. The transition to triploid rainbow trout would essentially eliminate any support from stocking in Luna Lake to maintain wild trout populations within the critical habitat. The conservation value of critical habitat could be improved if such support is removed from the wild trout populations and they decline as a result.

The status of in the designated and proposed critical habitat in the upper Verde River would not be significantly altered by the occasional presence of individuals of stocked sport fish species in the critical habitat that could result in competition between spokedace and the stocked sport fish for resources such as food and shelter. This infrequent

circumstance would not preclude restoration of full functionality of the critical habitat to meet this due to the infrequency of occurrence and the lack of persistence of the stocked sport fish in the critical habitat. Though escaped fish may not persist, while they were present they would use space and some of the available food base provided by the critical habitat that would reduce the amount of resources available to the spokedace. This effect would be minor and would not alter the ability of the critical habitat to provide for survival and conservation of the spokedace.

Minor effects on proposed critical habitat in the Verde River below Tapco Diversion could occur from the presence of stocked rainbow trout. The presence of these trout would be additive to the existing nonnative fish community. However, rainbow trout would not persist in most of the units, and their additive effect on the ability of the proposed critical habitat to provide for survival and conservation of the spokedace would be minor.

Effects on proposed critical habitat in the Tonto Creek would be unlikely due to the short time any rainbow trout would likely be present in the units.

The Proposed Action would not result in additional effects from stocked sport fish that are not already part of the environmental baseline. These effects would be expected to continue at their current level over the 10-year period covered by this consultation.

Comment 164 [20]: The currently proposed stocking in Arizona ... proposes to add warm and coldwater nonnative fish regularly throughout 10 years, thus driving spokedace further down the road toward extinction. Required mitigation proposed for those increased adverse impacts would be to use triploid rainbow trout (reducing but not eliminating adverse effects from that species), monitor (no resulting change in adverse effects), remove any nonnative, stocked, sport fish captured during monitoring (minor reduction in adverse effects), and continue work on a watershed management plan first proposed more than 10 years ago (no change to adverse effects). In addition, there is to be an undefined “addressing” of two unidentified “stressors” at some time during the 10-year period. As discussed later, it is not clear if either FWS or AGFD have authority to implement this last requirement, and its vague wording makes it impossible to determine if the mitigation would result in any changes to adverse effects. Overall the effects from the required mitigation are minor.

Response: Management of wildlife, including fish, falls under the authority of the AGFD as per ARS Title 17.¹² The extent of mitigation is commensurate with the magnitude of the effects. The finding of effects in the draft BCO and the Draft EA to consultation and other special status species provided the basis for development of the CAMP. The AGFD and the FWS concluded that the CAMP funding obligation of \$5 million over 10 years is sufficient to complete the activities identified in the CAMP.

Comment 165 [567]: Spokedace, pg. 59 –The EA states there are low numbers of Spokedace in the Verde River and though there may be some predation and competition from sport fish, the potential losses would not be enough to result in reduction of population size or distribution. If the spokedace population is already low due to existing stressors, it seems reasonable to assume that continued or increased predation could potentially adversely affect the species.

Response: This conclusion was reached because the low number of sport fish that are documented in spokedace habitat and the low number of spokedace in the Verde River would make it unlikely that the two would intersect.

Comment 166 [476]: Page 107, Table 32. In the section on spokedace, does the AGFD also propose to remove other previously-stocked and now established nonnative fishes that occur in spokedace habitat in the upper Verde River such as smallmouth bass and flathead catfish?

Response: For the mandatory spokedace action identified in the CAMP, “The AGFD shall continue monitoring of the Upper Verde River to evaluate native and nonnative fish populations. Any individuals of the stocked sport fish species captured during such monitoring shall be removed from the river.” For clarification, during Upper Verde River surveys, the AGFD commits only to remove sport fish species stocked during the current Proposed Action. This would not include smallmouth bass or flathead catfish, neither of which is proposed for stocking in the Verde River watershed.

Effects on Headwater Chub

Comment 167 [20]: Another example of biased and inaccurate analyses in the EA and supporting BO is headwater chub in the East Verde River. This is one of two sites where rainbow trout are being stocked directly on top of populations of this imperiled, Federal-candidate species. This site is one of the five chub populations the analysis concedes will be affected by the proposed stocking, while other sites are excluded based on a misguided and incorrect belief that nonnative species have limited ability to move. Based on the EA’s highly optimistic conclusions regarding limitation of adverse effects, and depending on how a “site” or “population” is defined, 22-50 percent of the known sites/populations of headwater chub will be adversely affected by the proposed stocking.

Response: Following review of public comments, the WSFR, the AESO, and the AGFD have removed the stocking of Green Valley Lake with channel catfish; only rainbow trout will be stocked at this site.

As part of the CAMP, the AGFD will introduce or secure three populations of headwater chub; decrease angler impacts to headwater chub, which are not a legal sport fish; through an information campaign, make it a priority to stock only triploids in the East Verde River and Tonto Creek in order to reduce augmentation to existing wild populations; and assess head water populations in the East Verde River, Tonto Creek, and Haigler Creek drainage. The latter will provide information, as a first step, to determine reestablishment opportunities and opportunities to remove threats.

See response to Comment 172 for the reasons the non-jeopardy determination was made in the draft BCO.

Comment 168 [20]: The draft EA and BO analyses conclude that status of the East Verde River headwater chub population is essentially unknown.⁴⁰ The Draft EA and BO call this population

⁴⁰ The Arizona Statewide Conservation Agreement for roundtail chub (*Gila robusta*), headwater chub (*Gila nigra*), flannelmouth sucker (*Catostomus latipinnis*), Little Colorado sucker (*Catostomus* sp.), bluehead sucker (*Catostomus*

“unstable threatened,” but based on secondhand anecdotal reports passed verbally from anglers to AGFD staff, who then communicated them verbally to FWS, the EA and BO then conclude that the status of the population is improving and may warrant being classified as “stable-threatened.” The 2009 petition for emergency listing and listing priority restoration for headwater chub concludes that the status of the species in the East Verde River is “imperiled-threatened,” a classification that recognizes a deteriorating status.”

Response: The FWS did not adopt the “imperiled-threatened” status category suggested by the petition, but chose to use the categories that were historically used. The commenter is essentially correct that implementation of the Conservation Agreement (see Footnote 16) has lagged because of lack of funding. The CAMP is an opportunity to implement the recommendations of the Conservation Agreement through authorization to expend federal sport fish funds on the CAMP.

Comment 169 [20]: Given the paucity of information on the status of the headwater chub population in the East Verde River, we recommend that at least minimal surveys and studies should be conducted to determine the status and trend of the headwater chub population before beginning implementation of the proposed nonnative stockings. This is standard practice for other projects where there may be adverse impacts to poorly-known resources.

Response: The AGFD conducted some initial surveys of the East Verde River in June 2011. The proposed stocking actions in the East Verde River include stocking rainbow trout in the East Verde River. This site has been stocked with rainbow trout in the past, and stocking in the future with rainbow trout would not be a new action. Any information gained from the June 2011 East Verde River surveys or the East Verde River surveys implemented with the CAMP would be used in an adaptive management approach to guide stocking and other fisheries management action within the East Verde River watershed.

If the Proposed Action is selected, one of the CAMP measures is that “the AGFD shall undertake an assessment of headwater chub populations in the East Verde River, Tonto Creek, and the Haigler Creek drainage to determine population structure and extent, nonnative species present as stressors, sites for potential reestablishment, and identification of specific research needs. This assessment shall tier off the Arizona Statewide Conservation Agreement and Strategy (AGFD 2006)⁴¹ for headwater chub and five other native fish species, because that document contains considerable information

discobolus), and Zuni bluehead sucker (*Catostomus discobolus yarrowi*) was signed in 2006, and calls for surveys and monitoring to determine population status. In the intervening 5 years, little implementation of this agreement has occurred, and even rudimentary surveys to determine the status of headwater chub in the East Verde River have not been conducted. Continued stocking of nonnative sport fish into this population has continued through those 5 years. However, this abortive agreement is now considered in the draft EA and BO as part of the mitigation that ameliorates adverse effects from continued nonnative sport fish stocking.

⁴¹ AGFD. 2006 “Arizona Statewide Conservation Agreement for Roundtail Chub (*Gila robusta*), Headwater Chub (*Gila nigra*), Flannelmouth Sucker (*Catostomus latipinnis*), Little Colorado River Sucker (*Catostomus* spp.), Bluehead Sucker (*Catostomus discobolus*), and Zuni Bluehead Sucker (*Catostomus discobolus yarrowi*).” AGFD Wildlife Management Division, Nongame Branch, Native Fish Program, Phoenix.

on the conservation needs and a strategy to address those needs. The assessment shall serve as a guidance document for implementing conservation actions for the headwater chub.”

Comment 170 [476]: Page 47, last paragraph. This paragraph is confusing. Exactly which populations are “recently discovered?” Genetic evaluation does not define the several chub species of the genus *Gila*, rather such discrimination is based on published morphological characters. It is arguable that status and other data for headwater chub are as good as or better than those for other consultation species because of numerous recent and on-going studies of this species, which are not considered here.

Response: The recently discovered populations are in The Gorge and Pine Creek in the East Verde River drainage. Defining species in the genus *Gila* is based on morphological and genetic evaluation. The best available studies and monitoring data were used in the analysis of headwater chub in the BA and the draft BCO. The Draft EA summarized the analysis of the draft BCO, and those details were not included in the Draft EA for conciseness.

Comment 171 [20]: Because of the lack of information, the draft EA and BO conclude that effects of the proposed action to headwater chub in the Verde River are unclear -- but that the fact they are thought to still be reproducing and recruiting, together with anecdotal angler stories of frequent chub bycatch, are adequate to conclude that adverse effects are not sufficient to reach a level of jeopardy. The analysis concludes that weekly placement of 1500-2000 adult rainbow trout into the same habitat as the chub for the five months from April to August will not have significant adverse effects to the headwater chub because the trout numbers “...*may not be sufficient to overload the capacity of the habitat to provide at least shelter...*” for the chub. While assuming that chub require only “shelter” to survive the stressful low-flow period of early summer in this small stream, the analysis does concede that individual chub may experience competition from the 32,000 stocked rainbow trout, resulting in degraded health, lower fecundity, and lower chance of survival over the winter for the chub. In addition there is expected to be predation by rainbow trout on young chub, along with predation from five other predatory nonnative species present. Plus, about 10 percent of the headwater chub will also die annually from mortality due to being caught by anglers during the “*high intensity fishery*” to be supported by the proposed action. The analysis recognizes that the adverse effects of the proposed stocking are additive to numerous habitat modification and other threats affecting the East Verde River headwater chub population, including a new diversion coming on line during the 10 year life of the project that will further deplete the river flow by approximately 20-25 percent. Nevertheless, FWS and AGFD “...*do not believe the level of mortality is sufficient to cause declines in the overall numbers of headwater chub...*” in the East Verde River.

Comment 172 [567]: Headwater chub, pg. 47 –states headwater chub would be directly impacted (affected) by the Proposed Action, but does not disclose how or what those affects would mean to the species.

Response: Effects on the headwater chub were identified and analyzed in the draft BCO, which concludes that the Proposed Action, including implementation of the CAMP,

would not jeopardize the continued existence of this species. This determination was made for the following reasons:

- The overall status of the headwater chub is not clearly understood. Recent survey data for most populations in Arizona are significantly lacking; however, some recent (post-2008) survey and anecdotal information exists to assist in reviewing the status in those streams. Trends in New Mexico show declines in those populations. The assignment of recently discovered populations in the East Verde River drainage and the Verde River drainage to headwater chub has not been verified by genetic and morphometric evaluations.
- The Proposed Action could affect five of the 23 extant occupied streams for headwater chub. All of these proposed stocking sites involving headwater chub would be continuing sites, not new ones, so there would be continuing adverse effects but no additional effects.
- The Proposed Action would directly affect headwater chub in the East Verde River (including lower Ellison Creek) and Webber Creek because rainbow trout would be stocked into the occupied habitat. Effects would be related to increased competition for food and pool habitats and potential predation on juvenile headwater chub. These occupied areas are currently rated as “unstable-threatened,” but recent anecdotal information indicates headwater chub are common with multiple age classes in the stocking reach, which may warrant a change in rating to “stable-threatened.” The magnitude of the effects of stocked rainbow trout on headwater chub is unclear; however, recent information indicates the species is maintaining a recruiting population in the presence of wild and stocked rainbow trout.
- Indirect effects could occur in Tonto Creek, Haigler Creek, and possibly Marsh Creek if rainbow trout move out of the proposed stocking sites into these occupied streams. Effects would be related to increased competition for food and pool habitats, and potential predation on juvenile headwater chub. Tonto Creek is currently rated “unstable-threatened,” and the other sites are rated “stable-threatened.” Surveys in Tonto Creek documented few rainbow trout present and multiple age classes of headwater chub. The number of stocked rainbow trout that would move out of the stocking sites is unknown; however, due to angling pressure at the stocking sites, it may not be a large number, and effects would not be substantial. Recent information indicates the species is maintaining a recruiting population in the presence of wild and stocked rainbow trout.
- Effects from stocking rainbow trout at Green Valley Lake would be unlikely due to isolation of the Pine Creek and The Gorge occupied areas from the East Verde River and the limited amount of time any rainbow trout could be present in the system if they did escape from the lake.
- The transition to triploid rainbow trout by 2013 would eliminate any augmentation of the wild rainbow trout populations that may have occurred in the past in the East Verde River, Tonto Creek, or Haigler Creek.
- The renovation of Fossil Creek provided significant on-the-ground conservation for headwater chub that may be lost if the newly discovered smallmouth bass cannot be

eliminated. Surveys in Arizona and New Mexico provide documentation of populations, and genetics work enables identification of populations of the species.

- Angler bycatch of headwater chub, particularly at the East Verde River proposed stocking site, could result in some mortality to captured individuals. Data on hooking mortality are unavailable; however, the level of mortality is likely insufficient to cause declines in the overall number of headwater chub present at the proposed stocking site. Additional angler education efforts are included in the conservation measures that are part of the Proposed Action.
- The AGFD would secure three existing populations or establish three new populations (or a combination thereof) in areas without nonnative fish species as a conservation measure as part of the Proposed Action.

Comment 173 [548]: EA fails to acknowledge the fact that headwater chub is not listed owing to (1) USFWS ignoring science supporting listing and (2) USFWS/AGFD politics. The fact that AGFD will be dumping exotic predators on top of the East Verde headwater chub population is insane and immoral. It is, needless to say, controversial. This situation is not adequately analyzed.

Response: See responses to Comments 169 and 172. The headwater chub is currently a candidate species, meaning that the FWS determined that listing the species is justified but precluded by higher-priority listing actions.

Comment 174 [548]: EA fails to address AGFD's (and USFWS') conduct in risking the Fossil Creek assemblage of native fish to provide use for "46 anglers" reported at the February 2, 2009, Fossil Creek meetings. These actions speak volumes about AGFD's (and USFWS') motivation/strategies to protect/recover native fish. The controversy and the failure to heed experts' concerns cannot be discounted.

Response: Neither the Proposed Action nor the Reduced Stocking Alternative proposes to stock Fossil Creek.

Comment 175 [20]: (paraphrased). The EA, including proposed mitigation and associated documentation fail to acknowledge "the elephant in the room" that it is not politically possible to stop or curtail recreational fishing even if it results in adverse effects to native species. This prevents a complete and accurate assessment of nonnative sport fish stocking impacts on native species and makes it difficult to assess what mitigation is necessary and appropriate.

Response: The impacts from nonnative sport fish stocking on native species are biological and were analyzed independently of other non-biological factors in the Draft EA. The Proposed Action was developed to provide a balance between the resource concerns, economics, and socioeconomic factors, while meeting the purpose and need.

Effects on Bonytail

Comment 176 [548]: EA fails to acknowledge, much less analyze, failure of the Upper Colorado River Endangered Fish Recovery Program (UCREFRP) to establish recruiting populations of Bonytail in Colorado, Utah, and Wyoming.

Response: It is assumed that the comment is referring to the conservation measure of establishing new populations of focal species to offset effects. Establishing new populations of species is sometimes difficult and results are uncertain. Therefore, the populations established as part of the CAMP would be monitored to ensure success and the success reported in the annual, 3- and 6-year sufficient progress reviews (see response to Comments 287 and 288). In order for a population to be considered established for the purpose of the CAMP, the population would have to be persisting at the end of the project period (10 years) and contributing toward recovery and/or conservation of the species. Establishing or reestablishing populations of animal species is an accepted practice; it is an action identified in many recovery plans and conservation plans; and it has been shown to be successful (e.g. Apache trout recovery, Gila topminnow recovery, desert pupfish recovery, Chiricahua leopard frog recovery). In particular, it is an action identified in the loach minnow and Chiricahua recovery plans (both focal species); the Arizona Statewide Conservation Agreement for roundtail chub, headwater chub, flannelmouth sucker, Little Colorado River sucker, bluehead sucker, and Zuni bluehead sucker (headwater and roundtail chub are both focal species); and an action supported by the Gartersnake Conservation Working Group (V. Boyarski, personal communication, 2011) and the Arizona State Wildlife Action Plan (*in draft*) for northern Mexican and narrow-headed garter snake (both focal species).

Comment 177 [548]: EA fails to acknowledge, much less analyze, failure of the Lower Colorado River Multi-Species Conservation Plan (LCR MSCP) to (1) establish recruiting populations of Bonytail in the lower Colorado River of Arizona, California, and Nevada, and (2) failure to successfully follow and implement USFWS' April 2005, Management Plan for the Big River Fishes of the Colorado River Basin.

Response: The *Management Plan for the Big-River Fishes of the Lower Colorado River Basin: Amendment and Supplement to the Bonytail, Humpback Chub, Colorado Pikeminnow, and Razorback Sucker Recovery Plans* (FWS 2005)⁴² is a supplement to the recovery plans of these species.

The Little Colorado River Multi-Species Conservation Plan is only 5 years into its 50-year program and continues to work to establish recruiting bonytail populations through targeted research and stocking actions; therefore, it is premature to conclude that it has failed. However, the success or failure of the Little Colorado River Multi-Species Conservation Plan is unrelated to this NEPA analysis. Potential future reintroductions were mentioned in the cumulative effects analysis in the Draft EA. Reintroduction of species has been, and continues to be, a tool with widespread use for conservation and has resulted in successful outcomes for many species (e.g., Apache trout, Gila chub, Gila topminnow, and others).

⁴² USFWS. 2005. "Management Plan for Big River Fishes of the Colorado River Basin: Amendment and Supplement to the Bonytail Chub, Colorado Pikeminnow, and Razorback Sucker Recovery Plans." Albuquerque, New Mexico.

Effects on Gila Chub

Comment 178 [578]: Gila chub (Endangered) and Critical Habitat (Draft EA at 45): We disagree with the no jeopardy finding in light of this statement: "...effects to Gila chub in the vulnerable Silver Creek population would be additive to that from existing nonnative species present." The Silver Creek population is already considered "vulnerable" and is already suffering from the impacts resulting from existing nonnative species. In light of the cumulative impacts to this population resulting from the continued deliberate introduction of nonnative species, the "no jeopardy" finding is unsupported in the Draft EA. We ask that the agency more thoroughly analyze these cumulative impacts and provide additional explanation for their findings regarding this species.

Response: Commented noted. Effects on Gila chub were analyzed in the draft BCO, which concludes that the Proposed Action, including implementation of the CAMP, would not jeopardize the continued existence of this species. This determination was made for the following reasons:

- In all cases, stocked sport fish would have to leave the stocking area to access occupied habitats of the Gila chub. It is not anticipated that the number of such fish accessing occupied habitat over the 10-year period covered by this consultation would represent a significant effect on the status of the Gila chub populations. The movement of stocked sport fish to occupied Gila chub habitats in the Agua Fria drainage would likely be a very rare event, and effects on Gila chub in the vulnerable Silver Creek population would be additive to that from existing nonnative species present. Rainbow trout in Oak Creek and Wet Beaver Creek would be more likely to reach occupied habitats in Spring Creek and Red Tank Draw; however, they would not persist in these areas due to high temperatures, so their effect on young Gila chub would be of limited duration and not sufficient to affect recruitment, particularly because such events may not occur every year. Trout from Rose Canyon Lake would also be very rare in Gila chub habitat in Bear Canyon and Sabino Canyon, and the sites accessed are not where the main body of the population exists in Sabino Creek, which would not be affected.
- Spills from Granite Basin Lake could introduce largemouth bass to the limited habitat present in Williamson Valley Wash. Largemouth bass have not been documented at the site, and the likelihood of largemouth bass reaching the site would be low. If largemouth bass were to reach the occupied habitat, there could be significant adverse effects on Gila chub. However, this potential for loss of this population due to the Proposed Action would be limited due to the exposure potential as described.
- Gila chub could be exposed to stocked sport fish if they move out of occupied habitats into areas where the sport fish may be found. This would be most likely to occur in Oak Creek and Wet Beaver Creek, where the stocking site is proximal to the occupied habitats. The effects of trout on Gila chub would be limited in duration and, though trout are predators on fish, the additive contribution of this predation over that which occurs in these streams due to warm-water fish, frog, and crayfish predation would not be sufficient to alter the recruitment potential for Gila chub in these streams. Gila chub that move out of the Agua Fria tributary habitats would be at risk of exposure during the limited time stocked sport fish could be present; however, the additive predation on

young Gila chub would not be sufficient to alter the recruitment potential in the Agua Fria River.

- The limited potential for the short-term presence of stocked sport fish in Gila chub critical habitats at Red Tank Draw, Sabino Creek, and Spring Creek would be unlikely to substantially alter conditions such that the critical habitat could no longer function to provide conservation benefits to the species. The invasion events would likely be few, with few fish involved, and would be of short duration due to summer temperatures that would eliminate the trout. Rainbow trout would not establish populations in these critical habitat units, so additional substantial effects on the existing condition would not occur, therefore not compromising the ability of these critical habitat units to support conservation of the species. The potential invasion of the Williamson Valley Wash critical habitat unit by largemouth bass could alter conditions there sufficiently to reduce or eliminate its conservation value. The level of uncertainty about the potential for this invasion to occur does not allow for a definitive statement on the result of stocking in Granite Basin Lake and the ability of the Williamson Valley Wash critical habitat unit to meet its conservation role for the species. However, there is no current information to suggest that sport fish stocking in Granite Basin Lake would substantially reduce the conservation value of this unit of critical habitat due to the limited opportunity for nonnative species to reach this critical habitat unit.
- The Proposed Action would not result in additional effects from stocked sport fish that are not already part of the environmental baseline. These effects would be expected to continue at their current level over the 10-year period covered by this consultation.

Comment 179 [476]: Page 46, paragraph 1 (first bullet item). What specific documentation or data supports the statement that “The low likelihood and short-term presence of stocked sport fish in Gila chub critical habitats at Red Tank Draw, Sabino Creek, and Spring Creek would be unlikely to alter physical and biological factors such that the critical habitat could no longer function to provide conservation benefits to the species?”

Response: Effects on Gila chub were analyzed in the draft BCO, which concludes that the Proposed Action, including implementation of the CAMP, would not jeopardize the continued existence of this species. The findings of the draft BCO are not open to public comment here. See Comment 178.

Comment 180 [476]: Page 107, Table 32. Which Spring Creek is referred to in the section on Gila chub? What barrier on Spring Creek is referred in this section? What documentation verifies the presence of Gila chub in this system?

Response: In the Gila chub analysis summary and the mitigation measure specifically referring to Gila chub, the “Spring Creek” mentioned is a tributary of Oak Creek, which is a tributary of the Verde River. The apparent barrier is an irrigation diversion structure

on Forest Service land. The most recent survey that verified the presence of Gila chub was conducted in 2002.⁴³

Effects on Bald Eagle

Comment 181 [548]: EA fails to acknowledge, much less analyze the negative effect of continued introduction and maintenance of exotic fish populations within Desert Nesting Bald Eagle territories, where loss of native fish has negative influenced eagle productivity. (See pages 19 and 20 of AGFD's July 2006, Program Technical Report 173, Conservation Assessment and Strategy for the Bald Eagle in Arizona.)

Response: The potential for fish stocking to affect native prey base and indirectly affect bald eagles is acknowledged and analyzed in the Draft EA (page 78). The AGFD Technical Report 173, *Conservation Assessment and Strategy for Bald Eagles in Arizona* (Driscoll et al. 2006)⁴⁴ was considered in the Draft EA. The particular information from that report that is referred to in this comment is the situation in the upper Salt River. From the late 1980s to the late 1990s, there was an increase in relative abundance of flathead catfish commensurate with a decrease in relative abundance of native chubs and suckers. This accompanied a decrease in bald eagle productivity on the upper Salt River. In other Arizona river systems where flathead have occurred for over 40 years (Verde River above and below Horseshoe Lake), there has not been a similar dominance of flathead catfish, and bald eagles continue to successfully breed, fledge young, and establish additional breeding territories.

The invasion of flathead catfish into the upper Salt River resulted in a substantial decline in the abundance of native chubs and suckers. Flathead catfish are a highly piscivorous species and were not considered for stocking in any of the alternatives. However, some of the stocking actions may still affect native species, including chubs and suckers. The effects to chubs (humpback, bonytail, roundtail, headwater, and Gila chub) and one sucker (razorback sucker) are analyzed in the draft BCO, and the effects to suckers (Little Colorado River, bluehead, desert, Sonoran, and flannelmouth sucker) are analyzed in the Draft EA. The stocking actions proposed in both action alternatives would not result in a similar effect to the native fish populations as in the upper Salt River with the invasion of flathead catfish. There may be a benefit of an additional forage species through stocking of rainbow trout and other sport fish species. There are many successful bald eagle breeding areas on reservoirs that contain almost 100 percent nonnative species.

Effects on Lowland Leopard Frogs

Comment 182 [561]: The Proposed Action is anticipated to have a moderate to high magnitude of effect on the lowland leopard frog in several areas. This conclusion is based on incomplete information, including information for a completely different species because movement and

⁴³ Bagley, B.E. 2002. "Survey of Verde River Drainage, Arizona, for Loach Minnow (*Tiaroga cobitis*).” Final report to FWS, Phoenix, Arizona, in fulfillment of Federal Contract No. 22410-0-M525.

⁴⁴ Driscoll, James T., Kenneth V. Jacobson, Greg Beatty, Jorge S. Canaca, and John G. Koloszar. 2006. "Conservation Assessment and Strategy for the Bald Eagle in Arizona." Nongame and Endangered Wildlife Program Technical Report 173. Produced for AGFD, Phoenix, Arizona.

dispersal of lowland leopard frogs is not known. Appendix F states that interactions between stocked species and lowland leopard frogs is not well understood and that uncertainties are complicated and may never be understood. With these uncertainties as well as the knowledge that a high degree of negative impacts may occur, the agencies need to take a conservative or precautionary approach, and any actions that could affect this species should not be permitted.

Response: The comment correctly states that the movement and dispersal capabilities of the lowland leopard frog are not known. The Draft EA used a movement potential of 1 mile over dry land, 3 miles through an ephemeral waterway, and 5 miles through a perennial waterway, which was based on movement and dispersal information of the related Chiricahua leopard frog, Northern leopard frog, Plains leopard frog, and Rio Grande leopard frog obtained from several scientific studies and field observations. See USDA Forest Service Southwestern Region 2004 Chiricahua Leopard Frog Recovery Plan 2007 and references therein. Use of information and data from closely related species is an appropriate and commonly used analysis technique when information for a particular species does not exist (FWS 2007).⁴⁵

As the comment correctly identifies, the Draft EA states that interactions between stocked species and lowland leopard frogs are not well understood. While this is the case, these factors did not compromise the analysis since the Draft EA also states in the same paragraph, “In cases where adequate information was not available to determine the potential biological impacts, we chose the higher effects (more conservative to the lowland leopard frog) outcome to describe the effects.” Using this analytical approach, the Draft EA accounts for the unknowns and uncertainties by using a precautionary approach in regard to the special status species. This is described in detail in the analysis methodology for amphibians in Appendix F of the Draft EA.

The potential effects to lowland leopard frogs would be offset by reducing threats to the species through illegal or inadvertent transport of potentially dangerous nonnative species and disease and by removing two stressors from each of the following watersheds: Verde River, Bill Williams, Gila River, and Salt River (see CAMP, Chapter 5, of the Final EA).

Comment 183 [559]: Lowland Leopard Frogs were known 6 and 7 miles from Arivaca lake (and may still occur in those areas or closer to the lake). They have been found in the past year 10.5 mi from the lake. This is greater than the estimated 40 miles from the lake to the nearest population.

Response: The commenter is correct. There are known locations of lowland leopard frog from about 5 miles from the stocking site. However, these known locations are to the south and outside the watershed of Arivaca Lake. The 40-mile distance cited in the Draft EA refers to the nearest records within the watershed of Arivaca Lake. These known locations cited by the commenter were considered and do not change the analysis. These known locations are greater than 1 mile overland, and the lowland leopard frog

⁴⁵ FWS. 2007. “Chiricahua Leopard Frog (*Rana chiricahuensis*) Recovery Plan.” Southwest Region FWS, Albuquerque, New Mexico.

would therefore not be anticipated to reach Arivaca Lake. Also, stocked sport fish would not be able to access these known locations, which are outside of the watershed.

Effects on Chiricahua Leopard Frogs

Comment 184 [567]: Chiricahua leopard frog, page 44 –states procedures would reduce risk of contaminating frog sites with disease, fungus, and nonnative species. I would like to have information disclosed as to what procedures would be implemented and how effective they would be to potential risk to the species

Response: Hatchery operation (fish rearing and transport) would be guided by the principles of fish hatchery management included in guidance from the AFS (2001)⁴⁶ and the FWS (FWS 1982).⁴⁷ AGFD fish health inspections follow established AFS Blue Book procedures for the detection and identification of certain finfish and shellfish pathogens (AFS 2007).⁴⁸ Samples for routine hatchery inspections are collected once per calendar year, and samples for diagnostic cases at the hatcheries are collected as needed, such as when there is unusual mortality or a suspected fish health concern.

In addition, hatchery operations are guided by the principles of HACCP planning for natural resource pathways from the FWS National Conservation Training Center (FWS 2004)⁴⁹. Three hatchery activity areas have associated HACCP procedures:

1. Products (i.e., fish or eggs) coming into a hatchery,
2. Products (i.e., fish) leaving a hatchery, and
3. Equipment being transferred between facilities.

Each hatchery has a hatchery-specific HACCP plan that can be found at <http://haccp-nrm.org/liststateplans.asp?State=AZ>.

These HACCPs cover a broad range of organisms (i.e., vertebrates, invertebrates, plants, and other organisms) rather than listing species-specific threats. The AGFD provides training to hatchery staff and field resource managers with the specific goal to maintain and implement HACCP plans and associated procedures for all essential risk-bearing hatchery activities. Detection of nontarget organisms can occur during a number of operational/procedural steps. For example, detection can occur while inspecting spring water sources, cleaning raceways, feeding and observing fish, conducting fish health assessments, monitoring water quality and quantity, removing mortalities, inventory and/or harvesting of fish, and transferring fish among rearing units. The procedures provide opportunities to detect nontarget organisms and fish disease. Should a nontarget organism or fish health issue of concern be discovered, it would be investigated to determine the source and analyze the threat to the hatchery. Thereafter, options would be

⁴⁶ AFS. 2001. *Fish Hatchery Management*, second edition, edited by Gary A. Wedemeyer. Bethesda, Maryland.

⁴⁷ FWS. 1982. *Fish Hatchery Management*. Washington, D.C.

⁴⁸ AFS. 2007. "Suggested Procedures for the Detection and Identification of Certain Finfish and Shellfish Pathogens." *Blue Book*, 2007 edition, Fish Health Section. Bethesda, Maryland.

⁴⁹ AGFD. 2004. "HACCP Planning for Natural Resource Pathways." FWS National Conservation Training Center.

reviewed to determine the best approach to address and/or remove the nontarget organism or threat.

Vendor-stocked fish are required to be certified free of bacteria, viruses, and parasites. In addition, the following mitigation measure is included in the CAMP: For warm-water sport fish stocking actions via contract vendors at sites where effects to Chiricahua leopard frogs are a concern, the “sensitive areas” HACCP plan shall be followed by AGFD personnel receiving the fish from the vendor. This “sensitive areas” plan shall involve the double-sorting and examination of all fish in the load to reduce the risk of introduction of unwanted aquatic organisms with the sport fish. Loads containing unwanted aquatic organisms shall be refused and not stocked.”

Additional measures in the CAMP to both reduce the risk of the Proposed Action and to offset effects from the Proposed Action by reducing the risk of spread of disease and nonnative species from other actions that are not part of the Proposed Action include:

- The AGFD shall conduct a statewide live bait (bait fish and tiger salamander) use assessment and risk analysis to develop recommendations to amend live bait management. The AGFD shall present these recommendations to the AGFD Commission for implementation consideration.
- The AGFD shall review and update existing outreach programs addressing use of live bait to ensure they are adequately informing the public about capture, use, and proper discard of live bait species.
- The AGFD shall review and update existing outreach programs on the risks to native aquatic species from the transport of nonnative aquatic species (sport fish, baitfish, other fish species, amphibians, invertebrates, and plants) to ensure they are adequately informing the public of the harmful nature of such actions, and means they can take to reduce or prevent inadvertent transport of such nonnative species.
- The AGFD shall review the existing angler information concerning the restrictions on transport and use of tiger salamanders at Parker Canyon Lake and modify the information as deemed appropriate to increase angler awareness that such transport and use are harmful.

Comment 185 [578]: Chiricahua leopard frog (Threatened) (Draft EA at 44-45): We disagree with the “no jeopardy” finding for this species, particularly as it relates to impacts resulting from stocking Parker Canyon Lake and Peña Blanca Lake. We strongly support the Reduced Stocking Alternative in part because it would eliminate threats to the Chiricahua leopard frog populations in these two lakes by ceasing to stock those sites with nonnative species.

We disagree with this statement: “Adverse effects to the metapopulation around Peña Blanca Lake from the stocking of rainbow trout would not be sufficient to eliminate Chiricahua leopard frog from the lake because the trout would not be present through the entire Chiricahua leopard frog breeding season and the high amount of cover in the lake that provides protection for egg masses and tadpoles.” This assertion fails to take into account the cumulative impacts resulting from this action coupled with the grave threat posed to this species by invasive bullfrogs, which

is an ongoing problem at Peña Blanca Lake. Together, these impacts may indeed be sufficient to eliminate this species from that site.

This analysis does not consider the recent proposal to designate Critical Habitat for this species. See 76 Fed. Reg. 14126 (March 15, 2011). The analysis of impacts to this species resulting from the Proposed Action must be redone in order to consider impacts to Critical Habitat, particularly considering there is significant overlap of the Proposed Action in this Draft EA and the recently proposed designation.

Response: Commented noted. Effects on Chiricahua leopard frog were analyzed in the draft BCO, which concludes that the Proposed Action, including implementation of the CAMP, would not jeopardize the continued existence of this species. This determination was made for the following reasons:

Adverse effects on natural Chiricahua leopard frog populations in the San Francisco River and tributaries near Reserve, New Mexico, would be unlikely. Information suggests that the rainbow trout populations may be self-sustaining or rely on inflow from nearer populations.

Adverse effects on Chiricahua leopard frogs in reestablishment and natural populations in the Black River, East Verde River, Tonto Creek, and Parker Canyon Lake could occur if dispersing Chiricahua leopard frogs move out of the secure habitats and into stream reaches containing stocked trout species or, in the case of Parker Canyon Lake, channel catfish and sunfish. Successful establishment of populations in secure reestablishment sites would lead to larger number of Chiricahua leopard frogs leaving the area to locate new habitats, with a concomitant increase in potentially adverse interactions with stocked fish or other dangers. However, these losses would not impinge on the success of the reintroduced population in the secure area, so these effects would not be meaningful.

Adverse effects on the metapopulation around Peña Blanca Lake from the stocking of rainbow trout would not likely be sufficient to eliminate Chiricahua leopard frogs from the lake because the trout are not present through the entire Chiricahua leopard frog breeding season, and the amount of cover in the lake provides protection for egg masses and tadpoles.

The risks of contamination of Chiricahua leopard frog sites with chytrid fungus, waterdogs, and other nonnative aquatic species, diseases, or parasites due to stocking actions and angler pursuit of stocked sport fish would exist, and procedures to reduce the risk would not entirely eliminate it. For the sites considered in this analysis, under the current environmental baseline, this risk would not be substantial, except at Peña Blanca Lake, where a metapopulation may be forming in the watershed. Additional consideration of these issues is provided in the area-wide analysis in the draft BCO.

Effects on proposed critical habitat would only be likely to occur at Peña Blanca Lake and would not be likely to substantially reduce the conservation value of that unit. The conservation value of the Peña Blanca Lake portion of that unit may have already been compromised by approval to stock warm-water sport fish at the site. Under the

conservation measures included in the 2011 BO on that stocking, the remainder of the proposed critical habitat unit would be monitored for nonnative species presence and management actions taken as needed. The stocking of rainbow trout into the lake would have no additive risk to the critical habitat found in the rest of the unit over that resulting from the previous consultation.

Comment 186 [566]: The preferred alternative anticipates stocking sport fish into Peña Blanca Lake on the Coronado National Forest, which is an area occupied by the Chiricahua leopard frog, listed as threatened under the ESA. This area is proposed critical habitat for leopard frog. In the critical habitat proposal for the leopard frog, the FWS wrote of the threat from sport fish in proposed Critical Habitat Unit 6 (Peña Blanca Lake and Spring and Associated Tanks):

- Nonnative introduced predators, particularly bullfrogs and sport fish, remain a serious threat in this region. A concerted effort was made in 2008–2010 to clear the area of bullfrogs. The effort appears to be successful, and Chiricahua leopard frogs have benefited. However, there is a continuing threat of reinvasion or introduction of bullfrogs. Sport fish at Peña Blanca Lake are an additional threat.
- This unit is a metapopulation that includes Peña Blanca Lake, Peña Blanca Spring, Summit Reservoir, Tinker Tank, Thumb Butte Tank, and Coyote Tank. These sites were all occupied in 2009. Chiricahua leopard frogs and tadpoles were found in Peña Blanca Lake in 2009 and 2010, after the lake had been drained and then refilled, which eliminated the nonnative predators. However, early in 2010, rainbow trout (*Oncorhynchus mykiss*) were restocked back into the lake, and plans are underway to reestablish a variety of warm water fishes, as well.

76 Fed. Reg. at 14126 at 14141. Pena Blanca Lake is therefore not an appropriate location to introduce sport fish. The EA in fact proposes to introduce sport fish into multiple sites with Chiricahua leopard frogs or areas to which the leopard frog could be restored: e.g., Luna Lake, Black River, Lower Verde River, Santa Cruz River, and Tonto Creek. See EA at pp. 44-45. The EA states that there would be “no jeopardy” to the Chiricahua leopard frog from such stocking, but this is a lesser standard than the forthcoming critical habitat’s standard of “the destruction or adverse modification of [critical] habitat.” 16 U.S.C. § 1536(a)(2).

FWS is required to issue a final critical habitat rule for the Chiricahua leopard frog by March 8, 2012. 76 Fed. Reg. at 14126. Final critical habitat for this species will therefore be designated just one year into the 10-year term of the Arizona Sport Fish Stocking EA. We believe that the EA should therefore be revised specifically to avoid sport fish stocking into any area that contains Chiricahua leopard frogs, is proposed critical habitat for this species, or contains the primary constituent elements for this species, as outlined in FWS’s critical habitat proposal. See 76 Fed. Reg. at 14135-36.

The Chiricahua leopard frog faces massive threats such as climate change and chytrid fungus and, therefore, it makes sense to reduce other threats to the Chiricahua leopard frog over which we have control, such as sport fish stocking. We think it is also legally required under the ESA.

Response: Comment noted. Effects on Chiricahua leopard frog, including effects on proposed critical habitat, were analyzed in the draft BCO, which concludes that the

Proposed Action, including implementation of the CAMP, would not jeopardize the continued existence of this species. See Comment 185.

Effects on Narrow-headed Garter Snake

Comment 187 [561]: Section 4.1.4 states that the Proposed Action “would not be likely to jeopardize” the narrow-headed garter snake. Every other special status species discussed in this section states “no jeopardy,” and, while we disagree with that conclusion due to the reasons mentioned above, the fact that the EA mentions the possibility for jeopardy to the narrow-headed garter snake is cause for even greater concern. As the ESA states, any actions that may result in jeopardy should not be permitted and should be eliminated from further consideration. Again, with the uncertainty and lack of knowledge of what effects may occur, the agencies need to take a conservative approach.

Response: Comment noted. The FWS uses the terms “no jeopardy” and “not likely to jeopardize” synonymously in the draft BCO, where this conclusion originated. Effects on the narrow-headed garter snake were analyzed in the draft BCO, which concludes that the Proposed Action, including implementation of the CAMP, would not jeopardize the continued existence of this species. This determination was made for the following reasons:

- The Proposed Action, through intentional killing of narrow-headed garter snakes by anglers along Oak Creek, could have continuing adverse effects on a population weakened by other causes, such as nonnative predation on narrow-headed garter snakes and an altered or diminished prey base. The population remains robust at locations away from heavy visitor use; however, long-term monitoring is needed to document changes to population viability.
- The number of rainbow trout or cutthroat trout that access narrow-headed garter snake habitats in the San Francisco River, Tularosa River, and Negrito Creek are likely to be small and persistence limited. Trout are predators on fish species that support narrow-headed garter snake populations; however, the magnitude of the contribution of trout from Luna Lake would be very limited.
- Most of the sport fish stockings proposed are rainbow trout. Though rainbow trout are predators on small fish, they constitute a smaller risk to the native prey base of the narrow-headed garter snake than the warm-water species that are extant in those areas. Juvenile trout are also likely to provide a prey base for narrow-headed garter snakes in some areas.
- The Proposed Action would not result in additional effects from stocked sport fish that are not already part of the environmental baseline. These effects would be expected to continue at their current level over the 10-year period covered by this consultation.
- The Proposed Action contains a significant conservation effort for the narrow-headed garter snake that would work to offset the effects of the action and provide additional conservation benefit.

Effects on Northern Mexican Garter Snake

Comment 188 [578]: Northern Mexican garter snake (Candidate) (Draft EA at 53): We disagree with the “no jeopardy” finding for this species in light of the fact that the Draft EA precludes Peña Blanca Lake as a site where the snakes occur and may be affected by stocking. The analysis for this species should be redone in order to consider the impacts resulting from stocking this site with nonnative species.

We disagree that “[T]he spread of diseases that can affect the Northern Mexican garter snakes native frog prey base through legal and illegal use of nonnative tiger salamanders or bait fish is not directly connected to the Proposed Action.” If such legal and illegal use can be anticipated or foreseen as a result of continuing to stock sport fish and encouraging recreational fishing in this species’ habitat, it should be analyzed as an indirect effect of the Proposed Action.

Response: The commenter’s intent in the remark about Peña Blanca Lake is unclear. Northern Mexican garter snakes are not known from the vicinity of Peña Blanca Lake. Effects on the Northern Mexican garter snake at other sites were analyzed in the draft BCO, including the potential for the spread of diseases and illegal transport.

Effects on Northern Leopard Frog

Comment 189 [561]: The EA states that the Proposed Action “could have substantial adverse effects” to Northern leopard frog populations but that the species could persist in the Mormon Lake stocking site, which was eliminated from the Proposed Action. As discussed above, providing only one site within an area does not further the recovery goals of a species and may, in fact, result in local extirpation. The EA further states that continuation of the stocking program would reduce opportunities for Northern leopard frog population maintenance and expansion and would affect distribution of the species. This is inconsistent with recovery goals and could necessitate listing it as threatened or endangered.

Response: Effects on the Northern leopard frog were analyzed in the draft BCO, which concludes that the Proposed Action, including implementation of the CAMP, would not jeopardize the continued existence of this species. This determination was made for the following reasons:

- Though proposed stocking in the Canyon Diablo and Walnut Creek complexes could have substantial adverse effects on Northern leopard frog populations extant in that area, the elimination of the Mormon Lake stocking site and stocking channel catfish in all but two sites would provide a substantial area for Northern leopard frog persistence in the drainage. Continuation of the stocking program with the warm-water species would likely reduce the opportunities for Northern leopard frog population maintenance and expansion in the action area, which would affect distribution of the species in Arizona.
- The only functioning metapopulation in Arizona at and around Stoneman Lake, south and west of the action area, would not be affected by the stocking program because that site was dropped from the Proposed Action.

- Effects on Northern leopard frogs at Lyman Lake from stocked rainbow trout would likely be limited because conditions in the lake to support stocking may not occur over the term of this consultation, and few rainbow trout may access occupied habitats.
- There would be additional effects on Northern leopard frogs due to new stocking sites or species included in the Proposed Action. These additional effects would not substantially increase the total level of effects from that carried forward by the continuing stocking actions in the Proposed Action.
- The Proposed Action contains substantial conservation measures to improve the status of the Northern leopard frog in Arizona.

Effects on Roundtail Chub

Comment 190 [561]: The EA states that the Proposed Action would result in no jeopardy for the roundtail chub, but the considerations that were factored into this determination do not support such a finding. First, information used for this determination is lacking as it relies on data collected several years ago, is qualitative and non-standardized, and is limited. The EA states that many of the populations were in small habitats that may be extirpated due to stochastic events. Without current surveys, it cannot be known if they still persist in all of these areas. Second, the Proposed Action could affect 17 of the 31 known sites, 16 of which are considered either “unstable-threatened” or “stable-threatened.” Non-native fish are already present in these sites, so stocking could further the effects and increase the likelihood that these populations will be extirpated.

Response: Effects on the roundtail chub were analyzed in the draft BCO, which concludes that the Proposed Action, including implementation of the CAMP, would not jeopardize the continued existence of this species. This determination was made for the following reasons:

- The overall status of the roundtail chub is not clearly understood. Across Arizona, 31 of 40 historically known waters in five discrete major river basins still contain roundtail chub, and one is considered stable-secure. Determination of status categories was most recently done in 2009 for the 12-month finding (FWS 2009)⁵⁰. However, the supporting data are qualitative, non-standardized, and in some cases, very limited. Though this is the best available information, and it was used consistently across the sites, considerable unknowns remain about the status of the species in these occupied waters. Roundtail chub in these waters may be persisting at varying levels in the face of ongoing physical and biological threats, but a number of them are in small habitats where stochastic events may result in extirpation. The recent genetic data indicate that though many sites are isolated, the genome in the most at-risk sites on the Verde River is part of a connected population with considerable resilience, as documented by recruitment events after spring floods. Despite these uncertainties, the overall status of the DPS does not point to extinction in the next 10 years.

⁵⁰ FWS. 2009. “Endangered and Threatened Wildlife and Plants: 12-Month Finding on a Petition to List a Distinct Population Segment of the Roundtail Chub (*Gila robusta*) in the Lower Colorado River Basin.” Proposed Rule. Federal Register Vol. 74, No. 128 (July 7, 2009):32352–32387.

- The Proposed Action could affect 17 of the 31 known waters occupied by roundtail chub, including five currently considered “stable-threatened” and 11 currently considered “unstable-threatened” in the 12-month finding. Rainbow trout are the only sport fish proposed for stocking into occupied roundtail chub habitats (six of the 17 affected waters). An evaluation of the magnitude of the effect of these proposed stockings on the roundtail chub present is complicated by the presence of wild populations of nonnative fish that are also more effective potential predators and competitors. At the other stocking sites, a mix of cold- and warm-water sport fish are proposed for stocking, and the connectivity between stocking sites and occupied habitats is possible at varying levels of likelihood, so effects would not likely occur often. The elimination of stocking channel catfish and largemouth bass at the stocking sites in the Bill Williams River drainage (except for Coors Lake, which is a closed system) would provide additional protection from these species becoming established in the system.
- The Proposed Action would not result in additional effects from stocked sport fish that are not already part of the environmental baseline in the occupied waters. These effects would be expected to continue at their current level over the 10-year period covered by this consultation, so there would be no meaningful increase in effects.
- The conservation measure to only stock triploid rainbow trout would significantly reduce the likelihood that stocked rainbow trout would contribute to self-sustaining populations of rainbow trout in roundtail chub habitats.
- The implementation of the Statewide Conservation Agreement (AGFD 2006)⁴¹ has provided conservation actions for the roundtail chub. Two new waters, Ash Creek and Roundtree Canyon, were stocked with roundtail chub under the agreement, and other actions are listed under the range-wide status of the species. Other conservation measures under the Gila River Basin Native Fishes Program have also benefited roundtail chub.
- Significant conservation measures to improve the overall status of the roundtail chub are included in the conservation plan that would be implemented as part of the Proposed Action, and these would adequately offset the adverse effects of the Proposed Action.

Effects on Little Colorado Spinedace

Comment 191 [567]: AGFD should disclose the effects of weed harvesting in Nelson Reservoir on Little Colorado spinedace. As part of the Conservation & Mitigation section of the EA, one possible conservation action for Little Colorado spinedace includes their removal from Nelson Reservoir to repatriate upstream habitat. The likelihood of the species occurring in the reservoir as well as the potential effects of weed harvesting on the species should be disclosed.

Response: The mechanical harvesting of weeds in Nelson Reservoir is not part of the action alternatives analyzed in this project. Little Colorado spinedace do not inhabit the reservoir. Spinedace have never been caught, observed, or documented in Nelson Reservoir, or in any reservoir that is connected to occupied stream habitat. The measure outlined in the CAMP (“Repatriate spinedace found in Nelson Reservoir to occupied

habitat upstream”) would apply only in the event that spinedace are discovered in Nelson Reservoir in the future.

Comment 192 [476]: Page 50, paragraph 3 (second bullet item). What is the current status of Little Colorado spinedace in the several sites mentioned here?

Response: The current status of Little Colorado spinedace at these sites is identified and addressed in the draft BCO.

Effects on Loach Minnow

Comment 193 [567]: Loach minnow, pg. 51 – states the number of stocked trout leaving the stocking reach to invade occupied loach minnow habitat would likely be low. Nonnative trout have been collected in occupied loach minnow habitat in the East Fork Black River in previous years. Distribution of stocked trout should be verified to determine if interactions could potentially occur. The EA also states stocking would be a short duration effect as trout will be stocked in pools and not riffles where competition would occur. Loach minnow do primarily inhabit riffles. Predation should be the main concern as loach minnow move across pools from riffle to riffle increasing exposure to nonnative trout.

Response: The commenter is correct. Nonnative trout have been collected in occupied loach minnow habitat in previous years. However, the vast majority of these nonnative trout collected in occupied habitat have been brown trout, which are wild throughout this system and not stocked into the Black River locations as part of the Proposed Action. Surveys conducted in 1988, 1996, 2000, 2004, 2005, 2007, 2008, and 2009 within occupied habitat found only three hatchery trout, one in 1996 and two in 2008, while 99.7 percent were wild trout. Numbers of trout collected in 2004 and 2005 were not available; however, all were wild trout. No hatchery trout were found 1988, 2000, 2004, 2005, 2007, and 2009. These data show that hatchery trout do emigrate into occupied habitat from where they were stocked, but this occurs only rarely and they do not persist. This supports the statement that the number of stocked trout leaving the stocking reach to invade occupied loach minnow habitat would be low.

Comprehensive surveys occurred throughout these drainages in 1988, 1996, 2000, and 2009. The 2009 surveys were particularly extensive, surveying the East Fork Black River from top to bottom in the spring (pre-stocking season), summer (during stocking season), and fall (post-stocking season) to determine stocked trout movement and persistence. These surveys found no stocked trout in occupied habitat in this particular year. A very low number of stocked trout were found a short distance upstream and downstream of the stocking location, but not as far upstream as occupied habitat. No stocked trout were found anywhere in the East Fork in the spring survey, showing extremely low persistence from the previous year, and no stocked trout in the fall survey, showing extremely low persistence from this stocking year. These 2009 surveys show that stocked trout do move from where they were stocked, but in very low numbers, usually low distances, and do not persist long even within the location they are stocked.

Effects on Apache Trout

Comment 194 [567]: One effect to Apache trout that should be disclosed is how continued stocking and persistence of nonnatives precludes establishment of metapopulations and gene flow between Apache trout populations and how that may affect recovery of the species.

Response: The stocking of Apache trout for recreational fishing was included as a compatible action that contributes to the conservation of the species in the 1995 downlisting rule.

Recreational fishing populations of Apache trout are, with one exception, separate from the recovery populations that are the primary conservation focus for the species. In that one instance, the effects of recreational fishing on the recovery population is not significant enough to degrade the conservation value of that population.

There is a risk of contamination by nonnative fish species of recovery populations when such species are stocked below the barriers in recovery streams. Barrier failure is well-documented and currently exists at two streams near stocking sites. Contamination by nonnative fish following barrier failure has a short-term impact on the Apache trout in those streams, but does not permanently degrade the sites or prevent recovery.

Apache trout from the recovery populations are not the source of fish for the recreational populations; thus, there is no additional pressure on recovery streams to produce fish for recreational purposes. All recreational fish are bred in hatcheries that do, on occasion, provide fish for recovery streams; however, production capacity is adequate to meet both needs.

The addition of new stocked warm-water and cold-water sport fish species to sites where Apache trout are stocked for recreational purposes does not result in additional adverse effects to the species, as these Apache trout are not expected to establish populations in the stocking sites.

Effects on Humpback Chub

Comment 195 [553]: Due to the uncertainties related to upstream stocked areas being sources for exotic fish in humpback chub habitat, it is requested that AGFD pursue additional research into identifying the source of exotic fish species found in the Little Colorado River above Chute Falls. Methods developed in cooperation with the USGS–Grand Canyon Monitoring and Research Center using fish otolith micro-chemistry could be useful in this endeavor. The research should be conducted prior to the continuation of sport fish stocking in waterways perennially or intermittently connected to the Little Colorado River.

Response: The detailed analyses contained in the BA and draft BCO identify and analyze the potential for the Proposed Action to affect humpback chub in the lower Little Colorado River and Colorado River. However, for the general purpose of humpback chub conservation, the research questions and approaches identified in this comment could be useful. Comment noted.

Effects on New Mexico Meadow Jumping Mouse

Comment 196 [567]: New Mexico Meadow Jumping Mouse, pg. 55 – states ‘*There is limited or no active management consideration given to the jumping mouse on FS lands that contain the majority of occupied habitats, and adverse effects from ongoing land management actions are continuing at most sites.*’ We have been proactive in managing riparian areas utilized by the species. Grazing decisions have removed livestock from riparian areas in all New Mexico meadow jumping mouse localities (historic and current) except for two historic, not currently occupied sites on the Springerville Ranger District. We have supported Dr. Jennifer Frey for surveys in historic localities for jumping mouse which has led to finding new populations of the species. We have partnered with Dr. Frey in her latest research effort to determine how to appropriately manage Forest Service lands to benefit New Mexico meadow jumping mouse. Additionally, we are supporting further surveys outside of Dr. Frey’s research to determine if more jumping mouse populations occur. Additionally, the Three Forks Special Closure area has been closed to all recreational activity for years to benefit multiple species including the New Mexico meadow jumping mouse.

Response: The analysis of effects to the New Mexico meadow jumping mouse was conducted by the FWS-AESO in the draft BCO for the Proposed Action and included a discussion of the status of populations, threats, and the environmental baseline in the action area. The draft BCO recognizes that the ASNF has put in place measures to manage riparian areas occupied by the jumping mouse, particularly in eliminating livestock use from all but two historical and all currently occupied habitats. Identification of management options for the jumping mouse has been discussed with Dr. Jennifer Frey, and the ASNF has supported, and continues to support, survey work. The Three Forks Special Closure Area includes the occupied habitat for the jumping mouse at this location, and no recreational activities are allowed in the closed area. This closure protects the occupied jumping mouse habitat from trampling and other effects of recreational activity. Reduction in fuel loading through the White Mountain Stewardship program and the Four Forests Restoration Initiative has reduced wildfire risks on portions of the ASNF, and these programs are continuing. The ASNF recently completed planning for a land exchange that would bring Thompson Ranch and Rancho Alegria, the latter adjacent to P-S Ranch, which is owned by the AGFD, into federal ownership. These actions may enable conservation actions to occur for jumping mice at these locations.

The draft BCO and the Draft EA have been revised to recognize ASNF’s active management (see first bullet that follows). The draft BCO, which concluded the Proposed Action was not likely to jeopardize the New Mexico meadow jumping mouse for the following reasons:

- The status of the jumping mouse across its range shows evidence of continuing declines, and recent survey data for Arizona supports data from New Mexico in this respect. The number of new populations found is fewer than the number of historical populations that may have been extirpated; however, complete surveys of all potential habitats have not been initiated, so additional populations may be present. Active interest in management of the jumping mouse on the ASNF, particularly to eliminate effects from livestock grazing, provides considerable benefit for jumping mice habitats in the excluded areas. Efforts in New Mexico to address threats and provide

conservation through the recovery plan have had limited success to date. Jumping mouse populations in Arizona were affected by the Wallow Fire, and their status is currently unknown, as is the status of their habitat after post-fire runoff events began to occur. The limited data available do not indicate that occupied habitats were entirely destroyed by the fire, and the amount of damage from runoff occurring in the next year or so while stabilizing vegetation returns to burned areas is unknown. The ASNF is, through the BAER program, working to stabilize areas of important wildlife habitat and reduce runoff damage.

- The continuation of sport fish stocking under the Proposed Action would perpetuate the habitat degradation occurring at the stocking sites at the West Fork of the Black River and along the West Fork of the Little Colorado River, and this would not support the conservation of the species. The jumping mouse population at the lower East Fork of the Little Colorado River appears to be robust; however, only one survey has ever been done there, the amount and extent of habitat is not recorded, and the amount of human use in the habitat is unknown. This area may contain the last jumping mouse population in this portion of the Little Colorado River drainage, and it was affected to some level by the Wallow Fire. The other population in the drainage, on Nutrioso Creek, is small, and the habitat extent is unrecorded. Continuing effects of human use at the East Fork of the Little Colorado River could, over the near term, reduce the quality of that habitat as continuing use along the West Fork has done to date. With the expansion of housing at Greer, additional recreational pressures on the area are likely to continue.
- Two of the three robust jumping mouse populations not affected by the Proposed Action would also not be at significant risk from recreation. However, the upper San Francisco River population is near the town of Alpine and may be affected by continued growth in that area. The Wallow Fire burned near this area, and it is unknown whether past fuel reductions in the area that kept the fire from burning Alpine also protected the jumping mouse habitat. The Campbell Blue Creek population is more remote and likely has fewer recreational pressures, but it was also affected by the Wallow Fire. The Three Forks site does not have recreational use due to the closure; however, it may have some effects from the Wallow Fire that could affect habitat and population size. The continuing degradation at occupied habitats affected by the stocking actions would reduce the total viability of the Arizona portion of the range; however, the affected populations are not supporting the species distribution in Arizona.
- Conservation measures for protection of jumping mouse habitat on AGFD-owned lands in the Black River would provide conservation benefits to the species over the long term.
- Conservation measures for protection of jumping mouse habitat on AGFD-owned lands in the Black River will provide conservation benefits to the species over the long term.

Comment 197 [567]: New Mexico Meadow Jumping Mouse, pg. 56 –The follow statement is made: ‘Furthermore, all populations are in drainages where wildfires present a risk to the larger area, and a fire could eliminate a population. The scattered nature of the populations reduces the risk that one fire could eliminate the species in Arizona.’ This statement applies to all isolated species where metapopulation dynamics and connectivity between populations no longer occurs.

In many cases, loss of one population would eliminate an entire genetic lineage from a species statewide. This does not only apply to wildfire, but any event that could potentially remove an isolated population. It should also be noted that we have gone to great lengths to reduce wildfire risk with White Mountain Stewardship and the Four Forests Restoration Initiative will expand upon those efforts.

Response: Comment noted.

Economy/Socioeconomics

Comment 198 [94]: Do not support the Reduced Stocking Alternative because it would eliminate stocking in our urban lakes and would have a devastating impact on those who cannot afford the time or cost to travel to more remote locations.

Response: Comment noted. The Draft EA acknowledges that convenient access to stocking sites may be more important to low-income anglers, who may not have the means to travel longer distances to access stocking sites.

Comment 199 [513]: Gasoline prices will prohibit people from traveling and thus reduce their opportunities for angling.

Response: Comment noted.

Comment 200 [28, 340, 457, 459]: The Proposed Action supports fishing, which is a desirable low cost activity especially important to individuals in tough economic times and is an important supplemental food source for some people.

Response: Comment noted. The Draft EA acknowledges that some anglers rely on fish harvest for food. No data are available, but low-income anglers may be more likely to rely on fishing as a part of their food supply than higher-income anglers. Convenient access to stocking sites may be more important to low-income anglers, who may not have the means to travel longer distances to access stocking sites.

Comment 201 [4, 24, 25, 49, 58, 59, 60, 98, 449, 474, 489, 505, 509, 513, 515, 520, 523, 526]: Fishing adds more than just economic benefit. It brings enjoyment to residents/visitors, provides a means to enjoy the outdoors, is a great stress reliever, and is a great activity for families.

Response: Comment noted.

Comment 202 [536]: The loss of stocking, management, and conservation of Arizona's waters with trout, and the reintroduction of its heritage Apache and Gila trout, would have an extremely negative dissatisfaction by anglers and would result in a significant reduction of license fees. The resulting loss of revenues to businesses from reduced recreational tourism would have a continuing impact throughout the state.

Response: Comment noted.

Comment 203 [505]: Hundreds of jobs depend on sport fishing.

Response: Comment noted.

Comment 204 [460]: Sport fishing has two important aspects. One is the financial benefit to the community from angler dollars spent on tackle, travel, lodging, food and fishing licenses and fees. These numbers represent some \$1.3 billion to the Arizona economy. The second, of paramount interest to the commenter, is the recreation value of fishing as it fulfills a social want and need of our members and our citizens. Fishing constitutes a basic desire of the human species as evidenced by expenditures of money and personal time. The commenter is interested in the balancing of use and preservation.

Response: Comment noted.

Comment 205 [30, 33, 54, 99, 463, 464, 467, 470, 495, 503, 504, 507, 509, 510, 523, 535, 545, 549, 551, 562, 565]: The Proposed Action supports the economy of our state. The Reduced Stocking Alternative and the No Action alternative would negatively affect the economy.

Response: Comment noted.

Comment 206 [504]: The economic impact of fishing with tourism is enormous, for the White Mountains and for Arizona as well. The permits, boat and equipment sales/rentals, camping, etc., bring our state over \$1 billion dollars-pure revenue to its coffers. With the current economy of this state, the Reduced Stocking Alternative or No Action would create hardship.

Response: Comment noted.

Comment 207 [519, 549, 562]: Not continuing the program would have significant effects on local economies, including small communities.

Response: Comment noted.

Comment 208 [495, 524]: The state's trout fisheries are highly dependent upon stocking. The loss of easily accessed put-take trout fisheries such as Big Lake, Ashurst Lake, and Oak Creek—among scores of others—would be devastating to the economies of small, rural communities in Arizona. People travelling to areas like the White Mountains and Rim country bring revenue to surrounding cities in these hard economic times.

Response: Comment noted.

Comment 209 [54]: The commenter is concerned about economic effects on Pinetop, Arizona, with selection of the Reduced Stocking Alternative or the No Action alternative.

Response: Comment noted.

Comment 210 [43, 467]: The economic impact of the Reduced Stocking Alternative would have a catastrophic impact on the economics of the cities and towns of the White Mountains. A large portion of the \$1.3 billion that benefits the state's economy annually is spent in the White Mountains and contributes to the strong local economy and the tourism industry.

Response: Comment noted.

Comment 211 [474]: The White Mountains area has been economically devastated over the last several years due to the downturn in the real estate market. The loss of fishing opportunities would cause an additional burden on the economy and possibly even reduce the population of the area.

Response: Comment noted.

Comment 212 [312, 475, 516]: All Arizona anglers provide funds to the Sport Fish Restoration Fund and deserve its benefits.

Response: Comment noted.

Comment 213 [340, 562]: If the program is not continued, the revenue that fishing licenses generate will be reduced dramatically.

Response: Comment noted.

Comment 214 [545]: The Proposed Action would strengthen state tax revenues.

Response: Comment noted.

Comment 215 [476]: Page 80, paragraph 6. The age of available survey data (2001) renders use of such information questionable, despite acknowledgement of inherent limitations.

Comment 216 [533]: The use of 2001 angler and monetary estimates is unacceptable for this level of analysis. Are the numbers used for T&E and sensitive animals and plants from 10 years ago? No, then the effects from and on the human element should not be from 10 years ago. The numbers should be updated either by projecting values to the present based on the increase in Arizona's population over the past decade or use of the 2010 US Census numbers for Arizona. Attempting to project impacts to the state's native flora and fauna and then using 10-year old data that projects or indicates the future benefits to the human environment is very misleading. I suggest updating all information the 2010 (and using valid projections for those numbers you utilize in your analysis).

Response: The 2001 data on angler use and economic benefit are the best available at this time. As stated in the Draft EA, these data are intended to provide the “relative” impacts of the alternatives for comparison purposes, rather than absolute projections of angler demand and economic benefit. Projecting these data into the future based solely on population growth would be of limited value because population is just one of the factors that can affect angler use

Angling Opportunities and Demand/Recreation

Comment 217 [29, 50, 58, 59, 60, 474, 495, 509, 515, 540, 562]: The Proposed Action is essential to the recruitment of new anglers. The Reduced Stocking Alternative would make it much harder for youth to get involved in the sport of fishing.

Response: Comment noted.

Comment 218 [519, 524]: The state's trout fisheries are highly dependent upon stocking. The loss of easily accessed put-take trout fisheries such as Big Lake, Ashurst Lake, and Oak Creek—among scores of others—would be devastating to recruitment of younger generations of anglers.

Response: Comment noted.

Comment 219 [532]: Commenter proposes that we keep the AGFD stocking program. It leads to countless hours of recreation and time with friends and family. I would propose less put and take fisheries and more sustained fish populations managed by regulations and lower limits on keepers. There is an increasing impact on the fisheries from the larger population. By keeping stocking going but also changing regulations to allow people to take less we will be able to give a larger portion of the people the experience of catching a fish.

Response: Comment noted. Modifying of fishing regulations is not part of the action.

Comment 220 [35, 55, 94, 510]: Most of our lakes and streams are dependent on artificial stocking. Fish that can reproduce are quickly overfished by anglers. Continued stocking is important to maintaining viable angling opportunities.

Response: Comment noted.

Comment 221 [465, 469, 530]: Request changes in the type and quantity of fish stocked. Prefer more stocking of catfish, bass, crappie, and bluegill.

Response: The species and locations proposed for stocking are based on a number of factors, including availability of fish to stock, water quality/temperature, demand, and effects on native aquatic and semi-aquatic species. Channel catfish, largemouth and smallmouth bass, black crappie, and bluegill sunfish would be stocked at some sites under the Proposed Action or the Reduced Stocking Alternative.

Comment 222 [546]: Why not stock walleye, pike, and northern pike instead of expensive trout since about 70 percent of the fisherman come from the Midwest and northern states, where fishing for these two species is common.

Response: Based on a statewide telephone survey of licensed anglers in 2007, trout were identified as the preferred fish type of Arizona anglers (AGFD 2007).⁵¹ Specifically, trout were preferred by 34 percent of anglers, followed by “anything that bites” (24 percent) and largemouth bass (21 percent). All other species or groups of species were under 10 percent. Walleye were preferred by 1 percent of anglers and Northern pike by less than 1 percent. In addition, the species proposed for stocking are based on a number of other factors, including availability of fish to stock, water quality/temperature, and effects on native aquatic and semi-aquatic species. Walleye would be stocked at some sites under the Proposed Action and, to a lesser extent, under the Reduced Stocking Alternative. The stocking of Northern pike, however, is not proposed under any alternative because of its

⁵¹ AGFD. 2007. “Angler Preference and Validation Survey.” AGFD, Phoenix.

highly predacious nature, which could lead to impacts to native species and other nonnative sport fish species.

Comment 223 [50, 55, 503, 545]: The Proposed Action supports the continued variety of opportunity and availability of angling experiences in Arizona.

Response: Comment noted.

Comment 224 [482, 494]: The Urban Fishing Program is an essential part of Arizona's outdoor recreation lifestyle, and it benefits an abundance of citizens and visitors to the state.

Response: Comment noted.

Comment 225 [44]: What is the AGFD proposal for Lake Havasu? Why are you not planning to stock Lake Havasu?

Comment 226 [560]: Lake Havasu is no longer a big draw for anglers because the fishing has deteriorated. Tourists are no longer coming here to fish; residents are no longer buying fishing licenses. Something needs to be done soon or Lake Havasu will no longer be known as a place to catch fish.

Response: The AGFD does not plan to stock this lake. Lake Havasu is a large open system on the Colorado River and is managed as a self-sustaining warm-water fishery. Stocking is not needed to maintain these populations of sport fish.

Lake Havasu is a large and dynamic system. While the striped bass fishery has declined somewhat in the past few years, stocking would be ineffective at changing this situation. Other highly sought-after species, specifically smallmouth bass, largemouth bass, and redear sunfish, have shown dramatic increases in quality and quantity during the same time period, based on AGFD survey data.

Comment 227 [47]: Marshall Lake should be “killed” for northern pike and returned to its previous status as an exceptional “trout only” lake.

Response: Northern pike are not known from Marshall Lake. The lake was dry in 2009, and no surveys have been conducted since then. Both action alternatives propose stocking of up to three species: rainbow trout, brook trout, and Arctic grayling.

Comment 228 [96]: Without the stocking of trout, there would be no trout fishing opportunities in this state.

Response: Trout fisheries in Arizona are generally reliant on stocking, and stocked trout comprise the majority of the angler trout catch in Arizona. In most Arizona cold-water streams, natural trout production is insufficient to meet angling needs, and trout generally do not reproduce in Arizona lakes. However, there are some wild populations of trout in Arizona streams that are not reliant on stocking.

Comment 229 [100]: Stocking is important at Ashurst Lake, Marshall Lake, and Lake Mary (upper and lower) because these are the only sites close to Flagstaff, which has a population of 65,000.

Response: Comment noted.

Comment 230 [470]: With the illegal and planned introduction of northern pike, we have seen the quality of the fishing experience continually decrease with a decreasing trout population.

Response: The stocking of Northern pike is not included in any of the alternatives because it is a highly predacious species that could impact native species and nonnative sport fisheries.

Comment 231 [496]: Supports continued stocking of Peña Blanca Lake. So much time and money have been invested cleaning the lake.

Response: Comment noted.

Environmental Education and Stewardship

Comment 232 [9, 32, 489, 509, 522]: Supports Proposed Action because it fosters environmental education and stewardship. With this benefit, residents/anglers will treat lakes and waterways as a resource worth protecting.

Response: Comment noted.

Comment 233 [576]: In my experience, fishermen have a significant conservation ethic. The general increased awareness of the need for environmental protection, which comes from an increased interest in sport fishing, is synergistic. Increased opportunities for sport fishing in Arizona should be fully funded and supported. The money generated and increased environmental awareness will also help native species recovery efforts.

Response: Comment noted.

Water Quality

Comment 234 [541]: The Draft EA for Arizona Game and Fish Departments Sports Fish Restoration program is seriously and legally deficient regarding looking at water quality issues...

There is a growing controversy over the use of Rotenone for eradicating exotic species of fish. Arizona Game and Fish proposes to continue to use Rotenone. The controversy centers on a recent National Institutes of Health report that Rotenone was linked to a 2.5 times increase of Parkinson's Disease among those applying the chemical...

None of the permitting authorities cited in the EA have considered the growing evidence linking Rotenone to Parkinson's. All previous claims of the safety of the chemical were based on short-term effects...not long term consequences. Arizona Game and Fish Department blocked a state legislative effort to conduct a legislative inquiry into the safety of the use of Rotenone. The downstream communities from where Rotenone is proposed to be applied are effectively being

told to trust the safety of their drinking water to a group of fish biologists. What is especially troubling about the entire effort is the repeated claims made by Arizona Game and Fish that if Rotenone was not allowed, then US Fish & Wildlife would not allow the state to continue its sports fishing program....the value of which is extensively documented in the draft EA. To construct a scenario in which the economic loss of sports fishing is tied to the continued use of Rotenone without a serious consideration of the risk to human health borders on criminal negligence. Since Arizona Game and Fish is permitted to speculate about the consequences to their sports fishing program if Rotenone is banned, one can also speculate as to the massive liability that will accrue to the state of Arizona and the federal government is the risk of Rotenone is not adequately considered and it is discovered through epidemiological studies that the incidence of Parkinson's Disease is in fact higher in watersheds where Rotenone was applied. One can reasonably assume that in the wake of the NIH study, efforts will be pursued to determine if there is indeed a higher incidence of Parkinson's in watersheds where Rotenone was applied. What must especially be considered that if, for whatever reason...EPA action, state court injunctive relief or state legislative action....Rotenone is banned or withdrawn...what next? Is it US Fish & Wildlife's position that Arizona risks the loss of its sports fishing program if Rotenone is no longer available for use?

I strongly encourage your agency to do one of two things: expand the EA to fully consider the risk of Rotenone; or make it absolutely clear that in the event Rotenone is no longer available for exotic fish eradication that will not in any way impact on the approval for Arizona's sports fishing program.

Comment 235 [563]: (summarized). The potential adverse effects of rotenone use for stream restoration on human health and wildlife are not adequately disclosed in the EA; its use has questionable, variable, or limited effectiveness in the control or elimination of nonnative species and would result in loss of beneficial use of water rights for livestock producers; and the Proposed Action and the reduced stocking alternative should not be allowed to progress until completion of consultation between the EPA and FWS on its effects on humans and threatened and endangered species.

Comment 236 [548]: EA fails to provide specifics for "habitat restoration." AGFD opposes the use of the available piscicide, rotenone, based on mythology, as opposed to science. No other alternative is available. How will AGFD provide for habitat restoration without use of piscicides?

Response: There are a variety of tools available for use in habitat restoration, including piscicides, and all available options will be considered. The Proposed Action does not seek approval for the use of rotenone. Some of the measures identified in the CAMP, and some of the site-specific strategies developed for their implementation (including the possible use of piscicides, including rotenone⁵²), would be subject to future review under NEPA, the ESA, and other applicable laws and regulations, and would include public input. Consistent with current CEQ guidance (Federal Register 2011),² if any of the CAMP measures cannot be implemented due to circumstances beyond FWS and AGFD

⁵² The use of rotenone is regulated by the Environmental Protection Agency and is an accepted fish management practice for the removal of undesirable fish.

control, a commensurate level of alternative measures would be developed to offset the effects of the Proposed Action.

The FWS and the AGFD do not oppose the use of the piscicide rotenone, and have supported its continued use.

Cumulative Effects

Comment 237 [561]: NEPA mandates that FWS, as the lead agency for this project, must consider cumulative impacts as well as direct and indirect impacts of the proposed project (40 CFR ~ 1508.7). However, Section 6.0 of the EA does not adequately address the cumulative impacts of the Proposed Action.

First, the EA acknowledges the impacts of past actions, including fish stocking, but does not address the additive impact of the Proposed Action. The severe negative effects of past actions are described in Section 6.4.2:

“The result of past cumulative effects have led to loss of populations and general declines in the distribution and abundance of many of Arizona’s native aquatic species to the point that 19 of 27 native fish, one frog, and one salamander species are listed under the Endangered Species Act as either threatened or endangered. Two additional fish species, one frog, and one gartersnake are currently candidates for federal listing and are expected to be listed in the near future.”

This statement is then immediately followed by Section 6.5 and Table 35, which state that “the Proposed Action would result in adverse effects to aquatic and semi-aquatic consultation and other special status species from stocking of nonnative sport fish,” but that “it is expected that the contribution of the Proposed Action to cumulative effects on native aquatic and semi-aquatic consultation and other special status species would be net positive or, at a minimum, neutral.” These statements are in direct contradiction to each other, and the *cumulative* effects of this action with regards to the statement in 6.4.2 are disregarded. Based on all information provided, the cumulative effects of this project will result in continued decline of native species, including those that are already listed as threatened or endangered, those that are currently candidates, and those that have other special status designation.

Comment 238 [556]: We are concerned about the cumulative impacts of the Proposed Action, as summarized in Table 30, which include "adverse effects to 14 listed species ... , four candidate species, and two species under consideration for candidate status." We also note the large number of sites with moderate impact to six unlisted native fish species, and high or moderate impact to lowland leopard frogs.

Response: The CAMP is designed to offset impact and contribute to recovery of consultation species and conservation of other (non-consultation) special status species over 10 years. Because the Proposed Action includes implementation of conservation and mitigation measures, it is the combination of these actions that would be anticipated to result in a net positive, or at minimum neutral, outcome. The cumulative effects to federally listed species and other special status species were fully identified and analyzed in the EA. In addition, effects to consultation species were addressed with required reasonable and prudent measures, terms and conditions, and conservation measures for

those species within the BO issued by the AESO. The EA incorporates those requirements into the CAMP.

Comment 239 [476]: Page 114, Table 34. Habitat includes both abiotic and biotic components, so the “loss of aquatic habitat” row under the “fish stocking” column should contain a “check -” to reflect the adverse effect.

Response: In Table 34, the row “loss of aquatic habitat” refers more specifically to dewatering, silting, or other abiotic factors. The biotic components of aquatic habitat are addressed in other specific rows of this table. No change to the table was made.

Comment 240 [476]: Page 114, last paragraph. There are 36 fish species native to Arizona, not 27.

Response: Comment noted. This is an error; the correct number (36) is referenced earlier in the document.

Comment 241 [561]: Table 35 says that the environmental baseline may be improved for a number of species. However, cumulative effects should not just consider the environmental baseline as that relates to only the present situation. As stated above, the information provided indicates that special status species will be adversely affected by the Proposed Action and continued population declines of many of these species can be expected.

Response: Because the Proposed Action includes implementation of conservation and mitigation measures, it is the combination of these actions that would be anticipated to result in a net positive, or at minimum, neutral outcome.

Comment 242 [476]: Page 116, Table 35. The Cumulative Effects Contribution of the No Action alternative should include beneficial effects to aquatic biota that would accrue with the cessation of sport fish stocking. Downward trends of special status and other native species would not continue and may be reversed in places where non-sustaining populations of sport fish occur and sport fish stocking is discontinued.

Response: The discussion of species status trends in Table 35 of the Draft EA pertains to the status of the species as a whole (throughout its range) and not their local status at various locations where the species may be present. This is an important distinction because local trends do not necessarily control or dictate trends at the species-wide scale.

Under the No Action alternative, effects of the action (as identified in Table 5, Section 4.1.4, and including predation and competition from stocked fish and angler-related effects resulting from anglers pursuing stocked fish, etc.) would no longer be present but threats to, and population trends of, special status species at or near stocking locations would generally not be substantially different due to remaining threats or stressors, including existing populations of established nonnative species at 142 of the 166 stocking sites. Specifically, at 114 of the stocking sites, there are nonnative species already established that are as predacious or more predacious than the species being stocked at those sites. Of the remaining 53 sites, 14 are closed systems with no established special status aquatic species at the site, and another 17 have existing populations of nonnative

species that are as or more predacious than the stocked species at the nearest occupied location of special status aquatic species. These existing nonnative communities at many of these sites also include highly predacious species that would not be stocked under the Proposed Action and would continue to persist despite the elimination of stocking. The effects to special status aquatic species from stocking sport fish at the remaining 21 sites would vary.

In addition, to minimize illegal stocking, Johnson et al. (2009)³⁸ recommended satisfying angling demand responsibly through legal, scientifically based stocking and fish management programs. The No Action alternative would leave anglers less satisfied which, in turn, could lead to higher rates of illegal stocking and of species that are more predacious than those in the Proposed Action. This would result in additional negative effects to many native species above the baseline under the No Action alternative.

Under the No Action alternative, the CAMP included in the Proposed Action would not be implemented. Because the CAMP includes substantial conservation actions, such as control or elimination of existing nonnative species at various sites and reintroducing populations of some of the affected species, the No Action alternative would not include these opportunities to positively affect the environmental baseline for native species.

Comment 243 [460]: The No Action alternative would result in losses to ESA flora and fauna. For example, it would be extremely unlikely that we would see a continuation of reintroduction of native species such as Gila Trout.

Response: See response to Comment 242. The stocking of native fish for recovery purposes is separate from stocking for recreational purposes and is not covered under the EA. Under the No Action alternative, there would be no stocking of Gila trout for recreational purposes at Frye Mesa Lake. However, these stockings are not linked to the recovery of the species.

Comment 244 [561]: Our other objection with regards to the cumulative effects section is the time frame considered for reasonably foreseeable future actions in Section 6.3.2. This time frame is considered to be the duration of the proposed stocking program. However, effects from this project will extend well beyond the proposed 10-year program. As noted throughout the EA, several previously stocked fish species have established populations in various waters throughout Arizona. Many of these populations can now be considered self-sustaining. It can be expected that continued stocking will not only bolster the existing populations of nonnative fishes but could also lead to formation of additional populations in other waters and areas.

The EA states that rainbow trout are the only nonnative fish species that will be triploid (sterile). This transition will occur within three years and will only be in select waters in the state. Within those initial three years, it is possible for the trout, which will not be sterile at that time, to bolster existing populations or form new ones. More importantly, the other 17 fish species proposed for stocking would not be sterile and could very likely add to existing populations or establish new ones. Because of this, the reasonably foreseeable future extends far beyond the 10-year duration of this program.

Response: Effects from the Proposed Action and from cumulative effects could extend beyond the 10-year project period. The positive effects to special status species from implementation of the CAMP will also extend beyond the 10-year period. Though the CAMP is a 10-year program that will be operated concurrent with the 10-year stocking action, many of the benefits of the CAMP will be long-lasting and accrue well beyond the 10-year project period. CAMP measures are intended to offset and minimize impacts and contribute toward recovery of several species. Benefits to CAMP species will be realized beyond the 10-year program implementation period and will continue to offset negative effects from the Proposed Action (as described above) that may continue to occur beyond the 10-year period. Beneficial outcomes of measures such as stressor removal, watershed plan development, establishing new populations, and others will continue beyond the 10-year period (e.g., reestablished populations are expected to persist into the foreseeable future).

The future actions identified in the Cumulative Effects Analysis (Section 6.3.2) would likely continue beyond the 10-year period. The time frame was modified in the Final EA to reflect this and now reads, “For the analysis, the time frame for present and reasonably foreseeable future actions refers to the time frame within which future actions could be reasonably foreseen. Though it can often be speculative to identify specific projects out more than 10 years, it is assumed that the types of future actions identified in this cumulative analysis would extend farther into the future.”

The potential for establishment of new populations of stocked sport fish, including rainbow trout, during the 3-year conversion process, was considered in the analysis in the draft BCO for consultation species and in the EA for other non-consultation species. On average, 90 percent of fish stocked come from state hatcheries, and of those, 88 percent are rainbow trout, which will all be stocked as triploids within 3 years. Of all the sites proposed for stocking, most either already support populations of the same species or are not suitable for establishment of self-sustaining populations of stocked species. Most sites have also been stocked in the past, and none of the species proposed for stocking are new to the watershed into which they will be stocked. The potential for stocked fish to escape is considered in detail in the BA, the draft BCO, and the Draft EA. In general, the potential for stocked fish to establish new populations is limited by the physical habitat conditions that characterize receiving and intervening waters. In many (but not all) stream systems, the presence, persistence, and establishment of the warm-water species proposed for stocking has not been documented despite their repeated stocking in the lentic habitats upstream from those systems. For example, bluegill sunfish, redear sunfish, largemouth bass, and black crappie are seldom found in the collection record for many first- or second-order desert stream systems. With some exceptions, most waters proposed for stocking with rainbow trout are not suitable for the establishment of self-sustaining populations. In summary, the potential effects cited by the commenter are limited and have been considered in the analysis and addressed in the CAMP.

Comment 245 [567]: Section 6.4.1., Table 33 –The Cumulative effects analysis does not include the effects of populations of nonnative aquatic species on native aquatic species, only the stocking of nonnative species. The existence and persistence of nonnative aquatic species is part

of the environmental baseline, but will also continue to have affects to native aquatic species. As such, it should be included in the cumulative effects analysis and disclosed in the document.

Response: The effects from existing populations of nonnative aquatic species are identified in Affected Environment, Section 4.1.3. Current populations of nonnative aquatic species are a result of past stocking (legal, illegal, or incidental). These past actions and the resulting effects from established populations of nonnative aquatic species are analyzed in Cumulative Effects, Section 6.0, and presented in Table 31 of the Final EA. The footnote to this table explains that fish stocking includes both legal (private, state, tribal, local, and federal) and illegal (e.g., illegal movement, illegal bait release, illegal aquarium release) stocking. Table 32 of the Final EA identifies the contribution of the action alternatives to the cumulative effects. Section 6.4.2 describes and summarizes the analysis of the past, present, and reasonably foreseeable future actions and their cumulative effects. The continued effects of these actions are analyzed in the EA.

Comment 246 [563]: (summarized). The EA makes statements identifying livestock grazing as a stressor on native fishes/species without citations to data or research to support these statements, thereby violating the Data Quality Act.

Response: Damage from livestock grazing on aquatic habitats has been extensively studied and cited in a number of documents. A 1994 BLM report estimated that livestock had “damaged” 80 percent of the West’s riparian areas.⁵³

“Historical accounts of livestock grazing and its effects in Arizona are consistent: widespread overgrazing throughout the State in the mid- to late-1880s denuded rangelands and so altered watersheds that the landscape was changed forever. The end result was a rapid transition for many aquatic habitats from permanent, meandering streams to intermittent ‘flashy’ arroyos (intermittent streams with higher peak flows and lower base flows)” (FWS 2009).⁵⁰

Joy Belsky and others (1999)⁵⁴ reviewed more than 120 published scientific studies on the effects of grazing on riparian areas and found the following information related to fish and their habitats:

- Reduced herbaceous cover, biomass, productivity, and native species diversity (14 studies).
- Wider stream channels, less stable banks, higher peak water flows (16 studies).
- Higher water temperature and lower dissolved oxygen (five studies).
- Reduced tree and shrub cover and biomass (eight studies).
- Shift from cold-water fish and aquatic invertebrates to warm-water species (eight studies).

⁵³ BLM. 1994. “Rangeland Reform ’94. Final Environmental Impact Statement.”

⁵⁴ Belsky, J., A. Matzke, and S. Uselman. 1999. “Survey of Livestock Influences on Stream and Riparian Ecosystems in the Western United States.” *Journal of Soil and Water Conservation* 54:419–431.

- Higher water loads of sediments, nutrients, and pathogens (10 studies).
- Lower water tables (two studies).

The extensive literature search done by Belsky and others (1999) did not find a single peer-reviewed empirical report showing a positive impact of grazing on riparian areas. Similarly, Ohmart (1996)⁵⁵ concluded that “there is not a single grazing management approach that has produced consistent improvements of degraded riparian-wetland areas.”

Mitigation

Purpose

Comment 247 [20] The naming of the mitigation program as “Sport Fish Stocking Conservation and Mitigation Program” implies that its purpose is to conserve sport fish stocking while mitigating for its impact, rather than conserving native species and mitigating stocking impacts on them and is therefore unclear.

Response: The purpose of the Sport Fish Stocking CAMP is to conserve native species and mitigate impacts of sport fish stocking on them.

Schedule

Comment 248 [20]: The proposed action of the EA is sport fish stocking over a 10-year period, with the mitigation to be accomplished in a 10-year period, although it is not clear if those two periods coincide. The draft BO has a clearly stated period of 10 years, beginning April 1, 2011 and ending June 30, 2021. We presume that the EA and BO 10-year periods will be the same, but that is not clear, and a number of questions remain regarding timing (see list below).

The first step in the proposed mitigation is to develop a 10-year planning document to “*guide annual work plans for Focus species that identify resourcing as necessary to accomplish objectives*” with annual work plans tiered off of that. It is not clear how development of the 10-year plan fits into the 10-year period for the project and mitigation. The following questions need to be answered in the final EA and BO:

- Will the 10-year project period begin on April 1, 2011 as stated in the BO or will it begin on the date of the final decision?
- Will stocking begin immediately upon reaching either April 1, 2011 or the date of the final decision, regardless of the level of completion of the 10-year plan for mitigation?
- Will the 10-year plan for mitigation be developed before or during the 10-year period that starts either on April 2, 2011 or the date of the final decision?
- If the 10-year plan for mitigation is developed after the starting project date, will mitigation be started immediately or will it be delayed until the plan is completed?

⁵⁵ Ohmart, R.D. 1996. “Historical and Present Impacts of Livestock Grazing on Fish and Wildlife Resources in Western Riparian Habitats,” edited by P.R. Krausman, pp. 245–279. *Rangeland Wildlife*. Society for Range Management, Denver.

- If implementation of mitigation is delayed due to work on, or completion of, the 10-year planning document, will the period of mitigation implementation be extended beyond the end date for the stocking project to provide for a full 10 years of mitigation?
- Would deadlines, such as stocking only triploid rainbow trout after year 3, start with the project period beginning or with the completion of the 10-year planning document?

Response: The 10-year period for stocking would commence once there is a final NEPA decision and a final BO has been completed.

Stocking would begin once the final decision is made. Immediately following the final decision, an implementation plan for the remainder of the fiscal year would be developed and tiered to the 10-year CAMP described in the EA. Some of the conservation actions in the CAMP would be implemented immediately following the final decision. Other actions would be targeted for initiation in subsequent years.

The period for implementation of the CAMP will be the same as the period of compliance approval (10 years) and would begin immediately following the final decision and completion of a final BO. All mandatory activities must be completed during the 10-year CAMP period, with suitable annual progress as determined by the FWS, in order to continue to receive SFRA funds and implement the Proposed Action. Annually, the AGFD, in concert with the FWS (AESO and WSFR), will build that year's implementation plan, making adjustments as needed to assure success on the ground.

The conversion to stocking triploid trout (except in closed or urban waters) would be complete within 3 years of a final decision. Implementation of other measures would be ensured as follows:

- The CAMP has a set of nondiscretionary activities that must be accomplished. Accomplishing the tasks on this list would be a clear measure of implementing the CAMP; the CAMP also has also been improved to discuss how success would be measured; the annual planning and reporting would track the progress being made. The review and assessment procedures outlined above are consistent with the latest CEQ guidance on implementing and monitoring mitigation commitments identified in NEPA documents (Federal Register 2011).²

Overlap of Measures

Comment 249 [20]: The proposed mitigation program in the Draft EA is the same as the up-front mitigation (conservation measures) in the proposed project description of the draft BO. However, most of the mitigation actions are also incorporated as terms and conditions of the incidental take statements (ITS) of the draft BO. This is inappropriate. If the proposed action as described (including the up-front mitigation) is concluded to result in incidental take, how can implementation of those same up-front mitigation measures reduce the take that was already adjudged to occur from a project including those measures? In other words, how can the same action that causes the take also be the action that mitigates that take?

Response: The part of the action that causes the take is stocking sport fish. The conservation and mitigation measures were included in the action to offset or reduce this

impact. Even so, the AESO determined that there will be incidental take and provided for that in the draft BCO with reasonable and prudent measures and terms and conditions. The terms and conditions were incorporated into the CAMP to capture the full suite of actions to be taken over the next 10 years.

Comment 250 [20]: The vague conservation program proposed for mitigation appears to be primarily a continuation of the ongoing program of AGFD, much of which is already being conducted as mitigation for other adverse impacts from other projects, such as the U.S. Bureau of Reclamation's Central Arizona Project (CAP) and the Salt River Project's Horseshoe and Bartlett Reservoirs Habitat Conservation Plan (SRP HCP).

Comment 251 [561]: Several of the measures included in this section are projects that are already underway or are part of other programs.

Comment 252 [20]: The Sport Fish Stocking Conservation and Mitigation Program is a poorly conceived mishmash of unrelated items, many of which are parts of ongoing programs for other purposes.

Comment 253 [548]: EA fails to analyze/admit that much of the proposed "mitigation" program activities have already been accomplished by USFWS in its BOs and Recovery Plans, or by academics. Why give money to AGFD to paste and copy studies, already readily available? And why count such actions as "mitigation"?

Response: The CAMP would provide a net increase of funding toward CAMP species for implementation of conservation and mitigation above and beyond that which is currently allocated by the AGFD Nongame Program. Some of the mitigation activities may occur at the same location or in the same vicinity as other mitigation projects, or may be similar in concept to other mitigation activities currently under way, but none of the CAMP actions are those identified as mitigation for other projects.

Comment 254 [567]: The Apache trout program has been evaluating and repairing barriers for the past few years, and should continue these efforts as part of their routine program of work. Because this is an already routine activity performed annually, it should not be considered an additional mitigation to reduced stressors.

Response: The commenter is correct. The AGFD has been evaluating and repairing the barriers for several years along three streams (Mineral Creek, South Fork Little Colorado River, West Fork Little Colorado River), even though these have not been mandatory activities. This mitigation measure is now identified as a Reasonable and Prudent Measure in the draft BCO and would therefore become mandatory. However, because this is a continuation of an activity that the AGFD has done for several years, funds expended to implement this activity would not count against the CAMP funding.

Comment 255 [476]: Certain minimum requirements must be met regardless of the selected alternative and any accompanying mitigation. First, there should be no net loss of any native fish population as a result of sport fish stocking. Next, there should be conformance with all sport fish stocking restrictions and mitigation commitments provided in existing planning and other documents (for example, 1995 and 2001 incidental take statements for Little Colorado spinedace

Lepidomeda vittata). These existing actions do not constitute new mitigation and should be implemented independently and not be associated with the EA. The EA should indicate clearly which mitigation actions currently exist or are on-going, and which are new and attributable only to the sport fish stocking program.

Response: NEPA requires disclosure of effects; in this case, mitigation is intended to offset the effects of the Proposed Action. Section 7 of the ESA requires evaluation and issuance of an opinion on whether or not a federal action will result in jeopardy. The Section 7 analysis also identifies any effects to listed species and evaluates the level of take. If take is identified, the FWS issues an incidental take statement and Reasonable and Prudent Alternatives or Reasonable or Prudent Measures, if appropriate. “No net loss” of any native fish population is not a legal or policy requirement; however, the FWS and the AGFD strive to limit any potential negative effects to native fish populations caused by sport fish stocking. The Final EA analysis concludes that the conservation and mitigation program contained in the Final EA mitigates and offsets impacts to native fish populations and may even result in a contribution to recovery of native fish species. The Final EA and the accompanying draft BCO include a reconsultation of the stocking actions that resulted in the referred incidental take statements for Little Colorado spinedace.

The C.C. Craigin, Knoll, and Nelson reservoir mitigation measures are continued mitigation from previous ESA consultations with the FWS. The proposed stocking for these three reservoirs is considered a reconsultation, which supersedes the 1995 BO for stocking at these locations and carries forward the 2005 revisions to the terms and conditions as part of this consultation. The draft BCO identified that a continuation of the mitigation from the previous consultation was sufficient to serve as a Reasonable and Prudent Measure that would further reduce the take that would result from implementing the Proposed Action.

Some of the mitigation activities may occur at the same location or in the same vicinity as other mitigation projects, or may be similar in concept to other mitigation activities currently under way, but none of the CAMP actions are identified as mitigation for other projects. Tools to offset or minimize effects from implementing proposed actions are not exclusive to any one entity and, as such, may be used widely for mitigation.

Comment 256 [20]: It [the mitigation plan] does not appear to have a coherent goal. In keeping with the dual mandates of FWS and AGFD, we recommend that the goal for the proposed stocking program and its mitigation program should be to achieve a number of protected wild sites being actively managed for native species equal to the sites being stocked for nonnatives. *(Commenter proceeds to describe the desired characteristics or defining elements of a site dedicated to native species, essentially sites where native species occur or have the potential to occur and that are free from nonnatives or threat of invasion by nonnatives).*

Response: The proposed mitigation identified in the comment assumes that stocking at every proposed location would result in negative effects to native species that must be offset; the EA and the draft BCO analyses indicate this would not be the case. Working with the AESO, the WSFR and the AGFD developed mitigation and conservation actions

that would benefit those species, which would be expected to be impacted by sport fish stocking. Included in the CAMP activities are establishment or securing populations of Focal species, those species likely to be adversely affected by sport fish stocking. The goal of the CAMP is to offset or minimize the effects of the Proposed Action and provide a net benefit for recovery of these species. Identification of locations for management of native species is included in CAMP as a mitigation measure through the Watershed-based Fish Management Process. Refer to response to Comments 35–38.

Comment 257 [548]: EA fails to incorporate Recovery Plan measures as non-discretionary mitigation measures.

Response: The CAMP has been revised to explicitly show how actions are tied to recovery and conservation plans.

Approach and Specific Recommendations

Comment 258 [454]: Page 19, second bullet under 3.2.3: While we have not reviewed the BCO, we recommend that AGFD also acknowledge the role of stocking triploid rainbow trout in the Colorado River at Lee's Ferry as a means to control density of this species, which has been shown to prey on and compete with humpback chub. While we recognize such a measure is not currently part of AGFD's stocking strategy per se, we feel that use of triploid fish could become a valuable management tool for the Lee's Ferry fishery, depending on the direction in which Federal or State nonnative fish policy may eventually take. As such, we feel coverage under NEPA for use of these fish would be helpful to ensure future management flexibility.

Response: One of the mitigation commitments under the Proposed Action is that, within 3 years, the AGFD will convert to triploid rainbow trout for all AGFD hatchery stockings, with the exception of closed systems and urban lakes. However, no stocking is proposed at Lee's Ferry under the Proposed Action or the Reduced Stocking Alternative. Therefore, consideration of the use of triploid trout at that location is not included in this analysis.

Comment 259 [20]: Adverse effects are addressed through a mitigation program that depends heavily on planning, with no requirements for implementation, and on a compensatory or in-lieu approach—where a conservation program for certain native species is substituted for avoiding, minimizing or even rectifying adverse effects.

Comment 260 [548]: EA fails to present the specifics presenting the exact benefits provided by the \$500,000/year. It looks as if the money will be primarily used for more salaries. More salaries will allow more AGFD personnel to attend more meetings which is already established as AGFD's primary conservation focus.

Comment 261 [20]: *Non-mitigation* -- The mitigation program proposed in the EA and supporting documents promises to enhance AGFD with staff biologists who have no budgets to actually do anything on the ground for native fish. But, perhaps those seven AGFD staff would be fully occupied writing documents and attending meetings, because there are many items in the mitigation program that are not mitigation actions per se, but rather planning, assessing, participating, collaborating, and other bureaucratic activities that may be important in leading up

to actual actions that benefit the native fish, but do not in themselves add any benefit. These include the following actions:

- Review and update outreach on native fish risks
- Surveys of streams and fish
- Barrier site evaluations
- Identification of priority watersheds in Arizona and development of watershed based management plans
- Development and implementation of survey schedules and procedures
- Creel survey
- Tagging of stocked fish
- Food habits studies
- Signage for anglers

While these may be valuable actions, they should not be cast as mitigation or considered as ameliorating factors in the overall effects of the proposed action. They should also not be considered as legitimate uses of the \$500,000 per year on average, mitigation funding.

Response: Though part of the CAMP funding will include salary, the focus of the program is to conduct on-the-ground projects to benefit native species and contribute to recovery. Only six of the mandatory mitigation measures are planning activities. These planning or coordination activities are intended to identify positive outcomes for Program Species. These activities are included in the CAMP as the first step toward implementing on-the-ground projects. Each year, the AGFD and the FWS (AESO and WSFR) will build an implementation plan, and as opportunities present themselves on the ground, actions identified in the planning activities will be implemented. See the CAMP in the EA (now in Chapter 5), which has been modified to better explain the benefits to the CAMP species.

Comment 262 [20]: The proposed mitigation plan is inconsistent with the FWS and CEQ mitigation guidance, which defines mitigation as sequential and in order of priority: avoidance, minimization, rectification, maintenance, and compensation. The mitigation program proposed for the Arizona fish stocking is light on avoidance, minimization, and rectification, and heavy on compensation, exactly the opposite of the priority called for by the policy. The mitigation program for the proposed stocking is not in compliance with FWS policy and needs to be revised.

Response: See responses to Comments 263, 264, 269, and 285 for discussion on avoidance, minimization, rectification, and maintenance.

Comment 263 [20]: (a) *Avoidance*—No mitigation actions are included in the draft EA and BO that would fill the requirement of item (a) of the FWS mitigation policy. According to the draft BO (but not the EA) there have been earlier agreements between FWS and AGFD that would

qualify as avoidance. These are discussed on page 3 of the draft BO and include elimination of stocking at 4 sites and elimination of channel catfish stocking at 2 sites. Given that avoidance of the adverse impacts is the top priority in FWS mitigation, it seems there is inadequate attention given to it in the proposed action, Draft EA and BO.

The three additional alternatives previously recommended would be strong in avoidance. Actions such as eliminating areas from the stocking program, or setting aside certain basins for natives should be incorporated into the mitigation program.

Response: Avoidance of impacts in the Proposed Action was achieved in the following ways. Stocking under the Proposed Action will take place in a limited number of the watersheds that occur in Arizona. The subcatchments that include the stockings sites comprise approximately 23 percent of the state by area, though it is recognized that stocked fish could move beyond that area (but that movement out of subcatchments was unlikely or not likely to contribute measurably to existing nonnative fish assemblages at the downstream end of the subcatchment). One or more of 13 species were removed from 58 waters in the Proposed Action (as modified) during the informal consultation process with the AESO, due to lack of angler use, or to reduce or eliminate impacts to consultation species. This ultimately led to the development of the Proposed Action. Following review of public comments, the WSFR, the AGFD, and the AESO modified the Proposed Action: removed Fagen Tank from the sites to be stocked; removed channel catfish and largemouth bass from the Bill Williams watershed, except for Coors Lake, which is a closed system; removed channel catfish and largemouth bass from three sites in the upper Little Colorado River watershed; and removed channel catfish from Green Valley Lake. Though analysis showed that the distance and conditions of transport in the Little Colorado River prevent all or nearly all stocked fish from reaching the lower Little Colorado River and Colorado River, it is recognized that this was an important issue to many of the commenters who were concerned about humpback chub recovery. It was determined that acceptable angler opportunity could be offered at these Little Colorado River sites without stocking catfish or largemouth bass.

Identification of locations for management of native species is included in the CAMP as a mitigation measure through the Watershed-based Fish Management Process.

Comment 264 [20]: *(b) Minimization—Several actions in the proposed mitigation meet item (b) of the FWS mitigation policy. The proposal to stock only triploid rainbow trout by the fourth year of the 10-year program is the most important. It is an excellent mitigation measure, but it is unclear why it was restricted only to rainbow trout. The proposed minimization of impacts should require use of triploid fish in all nonnative species to be stocked.*

Response: Use of triploid fish for stocking is only identified for rainbow trout because this is the only species for which there is an egg product available and for which hatchery rearing protocols and equipment are available that provide consistent product. At this time, no triploid product is available through contract purchase or that may be reared through hatchery production capability for any of the other species proposed for stocking (with the exception of white amur, which must be triploid and is available via contract vendor for purchase). The AGFD cannot induce triploidy itself because it has to happen

almost immediately during the fertilization process. The AGFD receives eyed trout eggs, which are unable to be genetically modified.

With regard to warm-water species, in many instances, these are not stocked for a put-and-take fishery, but rather to augment, establish, or reestablish a self-sustaining fishery with natural reproduction and recruitment. Use of triploid warm-water fish for stocking would not achieve that management objective and would result in an increased need and cost to repeatedly stock fish (which is outside the AGFD's financial capacity) and/or resulting in a need to more rigorously restrict the harvest of warm-water species, which fails to meet the recreational expectations and demands of the angling public. The AGFD does not have the financial capability to maintain fishable populations of warm-water sport fish in many of Arizona's larger reservoir systems without natural reproduction for many of the species at many of these sites.

Comment 265 [20]: *(b) Minimization* Other minimization mitigation includes use of barrier nets for humpback and razorback sucker during stocking at lower Colorado River sites, possible use of a weir at Big and Crescent lakes, limiting stocking of CC Craigin, Knoll & Nelson reservoirs only when the water level is below the spillway and expected to remain so throughout stocking season (1995 ITS), and stocking CC Craigin, Knoll and Nelson Reservoirs only from Memorial Day to Labor Day (1995 ITS). These measures are all aimed at minimizing movement of stocked fish out of the stocked site, but all are limited to a few sites and some have a low probability of success. In addition, all but the first are measures required by earlier biological opinions and should be considered ongoing mitigation for those actions and not new or additional mitigation for this proposed action.

Response: The mentioned activities were identified as mitigation measures because they have a high probability of success and have been demonstrated to be effective in the past.

The commenter is correct that the C.C. Craigin, Knoll, and Nelson reservoir mitigation measures are continued mitigation from previous ESA consultations with the FWS. The proposed stocking for these three reservoirs is considered a reconsultation, which supersedes the 1995 BO for stocking at these locations, and carries forward the 2005 revisions to the terms and conditions as part of this consultation. The draft BCO identified that a continuation of the mitigation from the previous consultation was sufficient to serve as a Reasonable and Prudent Measure that would further reduce the take that would result from implementing the Proposed Action.

Comment 266 [20]: *(b) Minimization*—Minimization actions that should be added to the mitigation program include use of gravel/sand filters on all hatchery outlets, elimination of warm water species from the list of species to be stocked, etc.

Response: The AGFD already employs reasonable measures at each facility to minimize fish escapement. All internal tanks and external raceways are fitted with screens at the upstream and downstream ends. Live fish are removed from tailbox areas prior to cleaning and opening drains. Page Springs Hatchery, Tonto Creek Hatchery, and Canyon Creek Hatchery route raceway water to clarifiers where escaped fish could be trapped. At Canyon Creek Hatchery, there is a secondary clarifier that will accept water from the

primary clarifier. At Page Springs Hatchery and Tonto Creek Hatchery, effluent from raceways is diverted through a show pond, which has a screened outlet.

With a few exceptions, the AGFD stocks streams with fish from the adjacent hatchery, so escapement does not differ from stocking. Survey data do not indicate that any escaped fish, for example Apache trout and brook trout from the Tonto Creek Hatchery, have ever established in Tonto Creek. At the large hatcheries (Page Springs, Tonto Creek, Canyon Creek), the AGFD would have to build giant filters capable of handling millions of gallons of water per day. This would require a complete overhaul of existing pipes. There is also very little elevation difference between outflow and creek levels; therefore, the AGFD would also need to employ use of giant water pumps to circulate and discharge water from sand filters. Costs to implement this type of a system would be prohibitive for the AGFD, with no clear advantages as a result. Use of a drum filter might decrease the space needed to treat effluent, but the AGFD would still need to use pumps and increase operational costs significantly. This idea is not practical at Silver Creek Hatchery in its current configuration because fish rearing is done in the creek. Thus, there is no mechanism to employ a fish filter.

Warm-water species were removed from the Proposed Action for several locations during the informal consultation process. All remaining species and locations were retained in the Proposed Action because there were no other viable alternatives that would provide the desired level of recreational angling opportunity. See Comment 33 regarding need to stock warm-water species.

Comment 267 [20]: *(b) Minimization*—A mitigation program element that would seemingly address minimization is the requirement to “conduct a statewide live bait use assessment and risk analysis to develop recommendations to amend live bait management.” This is then to be presented to the Commission for consideration. But, this is not a mitigation action because it would result in no actual action— it is only a paper exercise resulting in a possible recommendation that may possibly benefit native fish. On the other hand, no specific outcome is required, so it may result in a recommendation to take action that would adversely affect native fish. The appropriate mitigation element that should be included in the final EA is to require that use of live bait be prohibited throughout Arizona.

Response: Changes to live bait use regulations are under the purview of the AGFD Commission. The FWS or the AGFD cannot make commitments for the AGFD Commission and can only commit to doing the analysis and providing the data-driven analysis for the AGFD Commission to make a decision.

Comment 268 [548]: EA fails to analyze AGFD’s failure to ban live bait use in Arizona. Again this speaks volumes about AGFD’s motivation/strategies to protect/recover native fish and herps.

Response: The SFRA explicitly prohibits the use of SFRA funds to establish, change, or enforce laws. Analysis of state laws and regulations is outside the scope of NEPA.

Comment 269 [20]: *(c) Rectification*—Rectifying actions in the proposed mitigation include mechanical removal of rainbow trout found in Spring Creek (for Gila chub), mechanical removal

of nonnative fish encountered during monitoring on the Verde River (for spokedace), and mechanical removal of rainbow trout from below Big or Crescent lakes (for loach minnow). While all good actions, they are all localized and of limited effectiveness. Additional rectification actions need to be built into the mitigation program.

An important category of rectification actions would be construction of barriers to upstream fish movement. The number, location, and a rough schedule for completion of the minimum set of barriers to be constructed as mitigation should be specifically set out in the mitigation program. We have been told that the proposed mitigation element to “secure existing or establish new” populations of the three focus species fish, would likely include barriers. Because that is not specified, only insiders are aware that this was the intent and as written it is unenforceable—there are no actual specifications of what is expected. The mitigation should include, at a minimum, construction of 6-8 barriers to exclude stocked fish (rectification) and other nonnative fish (compensation) from accessing important native fish waters. We recommend inclusion of the following, although there may be several other sites that would be appropriate for inclusion:

- Upper Verde River near Sycamore Canyon
- Chevelon Creek upstream of Clear Creek Reservoir
- Black River downstream of the confluence of the East and West Forks
- Tonto Creek downstream of the mouth of Spring Creek
- Sonoita Creek, upstream of Patagonia Lake
- Oak Creek near the mouth
- West Clear Creek near the mouth
- Wet Beaver Creek near the mouth.

Response: Comment noted. Use of barriers as a possible tool for securing/establishing new populations or in stressor removal is identified in the CAMP. The CAMP states that “reintroductions are often coupled with construction of exclusion barriers and removal or suppression of nonnative species.” The commenter’s recommended locations for barriers would be taken into consideration during development of the 10-year CAMP plan and the annual implementation plans.

Comment 270 [20]: *(d) Maintenance*—This mitigation item is primarily applicable to actions like dams, mines, etc., and is only peripherally relevant to the proposed stocking, per se. It is applicable to hatchery operations, and substantial best management practices and other similar programs have been described as part of the proposed action that would fulfill this item. The requirement for barrier repair for Apache trout also fits into this category.

Response: Comment noted.

Comment 271 [567]: Chiricahua leopard frog—while examining for tadpole cover is important, it is more important to follow and monitor the species. AN action should be involved with this to improve cover to reduce trout predation to mitigate potential effects.

Comment 272 [559]: Regarding Peña Blanca Lake, introduction of trout would be a moot point, assuming, as seems clear in the appendices, that warm water fishes including largemouth bass will be present. The problem with the proposed mitigation (allowing vegetation to grow to protect leopard frogs in the lake) is that it likely won't work but will create potentially severe problems in exotic species management. Until bullfrogs are confirmed extirpated from the region, including potential sources of immigration from the Santa Cruz Valley, the lake should be kept clear of emergent vegetation to allow monitoring for and removal of bullfrogs. Further, with bass in the lake and limited structure in which bullfrogs can hide from bass predation, and suitable monitoring, a bullfrog colonization could probably be undone. This is the way to make isolated sport-fishing lakes compatible with conservation of native aquatic species. The two priorities could in this way be harmonized with only limited risk to the natives.

Response: This comment addresses a draft BCO Reasonable and Prudent Measure that was identified as a mitigation measure in the Draft EA (Appendix P) pertaining specifically to Peña Blanca Lake. This mitigation measure is required under a separate consultation and therefore was removed from the Final EA CAMP.

Comment 273 [567]: Headwater chub—differentiation between roundtail chub (sport fish) and headwater chub (not a sport fish) is likely difficult for the general public. Signing where headwater chub occurs may be an effective tool to aid in identification.

Response: This activity is included as a mitigation measure at stocking sites where headwater chub occur.

Comment 274 [567]: Moving toward use of triploid rainbow trout will address augmentation of wild populations. It does not address the continued existence of these populations and the effects they have on native aquatic species. As such, removal of wild nonnative populations should be included in the mitigation.

Response: This approach/tool is incorporated in the CAMP, which says, “The AGFD shall address two stressors impacting these species (other special status aquatic and semi-aquatic species) and associated aquatic communities within each of the following sub-watersheds/catchments: Verde River, Salt River, Middle Gila, Little Colorado River, and Bill Williams sub basins.”

Comment 275 [567]: For garter snakes, quickly restocking renovated streams could prove difficult given more than one treatment is generally needed. Utilizing dead fish to provide prey should be considered as an option.

Response: Comment noted. Potential environmental/ecological effects of this or other approaches would be considered prior to use.

Comment 276 [567]: New populations of listed species will affect management activities for land management agencies. Close coordination between AGFD and land management agencies is crucial during both planning and implementation of these actions.

Response: Comment noted.

Comment 277 [567]: Baitfish regulations should be posted at all recreational angling waters in these counties as part of the mitigation measure. Baitfish are not allowed at any site in Apache, Cochise, Coconino, Navajo, or Pima counties. However, baitfish do occur as wild, reproductive populations in many recreational waters (e.g. Luna, Nelson), therefore, they are utilized regardless of regulations.

Response: The statewide live bait use assessment and risk analysis in the CAMP would identify recommendations for live bait management, and this process would likely consider signage where appropriate. The FWS and the AGFD would work with the land manager to obtain approval for installation of the signs.

Comment 278 [559]: Arivaca Lake is not considered closely in the mitigation. The same concept as at Pena Blanca applies to Arivaca Lake. The greatest, most straightforward contribution AGFD could make to Chiricahua Leopard Frog recovery in southern Arizona (the region with which I am most thoroughly knowledgeable) would involve decisive planned steps to eliminate bullfrogs (and if possible crayfish) from that site, in tandem with coordinated work to completely eradicating those species at sites from which they would possibly recolonize the lake. Bullfrog control at the lake could be affected – even without necessarily completing eradication bullfrogs from all surrounding sites – by lowering and fluctuating the water level to get rid of cattail stands and other cover for bullfrogs. In this way, bullfrogs could be hunted to near- or temporary extinction in the lake, and kept there while other sites were worked. Details and coordination would be more complicated than this, but I see no obstacle that should create the resistance the Department appears to have regarding “renovating” this lake.

Response: The AGFD has no ability to manage the water levels at Arivaca Lake. The AGFD can drop the lake level but cannot raise it to flood new growth, and that is what would be needed to control cattails in this manner.

Comment 279 [559]: Crayfish eradication would, certainly, be much more difficult [than bullfrog eradication]. Since Arivaca Lake may be contaminated with mercury, as was Pena Blanca, more drastic management should be considered. I would guess it has, but the reasons for foregoing this have not been made clear, to me at least. In fact, the outreach by the AGFD to conservation researchers and professionals such as me has not been what I would like to see.

Response: Eradication or control of crayfish would be considered under the CAMP. The feasibility of success of particular crayfish control projects would be evaluated in the planning process. However, to date there is no known effective method for controlling crayfish at such a large site as Arivaca Lake.

Comment 280 [559]: Some of the urban lakes in Tucson support crayfish. Eliminating crayfish there may significantly reduce the further spread of crayfish to natural waters in the region.

Response: Crayfish are uncommon in the Tucson Urban Fishing Program lakes (personal communication, E. Swanson, AGFD, June 14, 2011). There have been incidental reports of an occasional crayfish found in Kennedy and Silverbell lakes over the years. Lakeside Lake has harbored a small population in recent years. There is no indication of any public effort to trap or to use crayfish at the Tucson lakes. Nor is there any evidence of any

transport of crayfish from these waters. Elimination of crayfish from Tucson urban lakes may be considered under the CAMP based on feasibility and conservation value. Crayfish control or eradication projects would likely be prioritized for nonurban waters where removal of this stressor would yield more benefits (see also response to Comment 269).

Comment 281 [559]: Brown trout appear to be one of the most impacting species on small fish populations, and thus on the Narrow-headed Gartersnake. They may also have impacts on larger fish species, including suckers, and they might be impacting chubs significantly. Reducing the stocking of this species, and increasing fishing or other impacts on it, should be evaluated as a means of increasing the success of conservation efforts for several native aquatic species.

Response: In development of the Proposed Action, potential impacts from stocked brown trout were carefully considered, and they are only proposed for stocking in locations where there would be no anticipated effects or the likelihood of effects would be very low. Brown trout are proposed for stocking at 20 locations: Cataract Lake, City Reservoir, Dogtown Reservoir, Sante Fe Tank, Kaibab Lake, Kinnikinick Lake, Coconino Lake, Ashurst Lake, Upper Lake Mary, Riggs Flat Lake, Frye Mesa Lake, Fain Lake, Lynx Lake, Canyon Creek, Rose Canyon Lake, Elk Tank, JD Dam, White Horse Lake, Middle Tank, and Perkins Tank. Effects of stocking on listed species are evaluated in the draft BCO, and effects to other sensitive species are evaluated in the Draft EA. Of these 20 locations, all but three had no effects to special status fish species from stocking brown trout. Fain Lake, Lynx Lake, and Canyon Creek had a low magnitude of potential effects from stocking brown trout.

Comment 282 [559]: Our observations point toward massive effects of Smallmouth Bass on fish abundance in at least some localities. This species may also markedly restrict crayfish abundance, at least in places where it is not heavily fished (based on anecdotal evidence from Middle Fork Gila River). Understanding the effects of Smallmouth Bass and exploring their value for or against native species recovery, might also be a valid form of mitigation.

Response: Comment noted.

Comment 283 [559]: If trout reproduction really cannot come close to sustaining populations sufficient for angling, this suggests that a management approach involving targeted reduction or suspension of stocking could allow fishermen to severely deplete unwanted populations. There is surely a density dependence to the population impact of fishermen, but by stocking other fishable species, such as Roundtail Chub, fishing pressure could be maintained. At low densities of exotic trout, flooding a system with native trout might then genetically and ecologically swamp Rainbow Trout populations.

Response: Comment noted.

Comment 284 [559]: Reid Park in Tucson is shown to receive numerous warm water and coldwater fishes. The park could, alternatively, be a suitable place to showcase native fish, amphibians, and reptile conservation.

Response: Comment noted. Reid Park is a heavily used public park. Though Reid Park was not included in past creel surveys, the AGFD estimates annual use of this lake to be on the order of 2,500 AUDs. This level of human activity and associated impacts make Reid Park incompatible as a sanctuary or conservation area for native aquatic species.

Funding Source and Adequacy

Comment 285 [20]: (e) *Compensation*—The bulk of the mitigation for the proposed stocking is compensating actions, also known as actions in-lieu of threat removal.

The provision for FWS and/or AGFD to expend \$500,000 per year on average, for a total of \$5 million over 10 years, is the largest of these. The actual source of the funding is unspecified. This is a relatively paltry amount considering the geographic area involved and the number of species for which compensatory actions must be taken. Unfortunately it is unclear to which species this funding is to be applied. The “Program Species” include the three fish (and five non-fish species) that are “focal species” and the seven fish (and nine non-fish) species included in the “Additional Conservation Species.” These are apparently the primary targets for compensatory actions using the \$500,000 per year on average. There are however an additional group of “Sensitive Aquatic Species most closely associated with stocking,” including nine fish, for which compensatory mitigation may be paid for out of the \$500,000 average per year. For the purposes of this discussion we will assume a minimum of 10 fish and 14 non-fish species for which the \$500,000 per year on average would fund compensatory mitigation.

Under that assumption the fund would provide \$20,833 per year per species, on average. However, we have been informed by FWS that the intent is to use the \$500,000 per year to fund seven staff positions at AGFD. Five of those positions are for specialists in native fish and already exist; however, they are not a priority for AGFD funding and so are currently vacant. The other two positions would be new - an overall program coordinator and a native herpetologist. Given overhead and benefits, funding of those seven positions would use about 67 percent (\$330,000) of the \$500,000 per year. This would leave a little less than \$7,000/year per species on average to pay for compensatory mitigation actions. For the 10 native fish combined, the approximately \$75,000 per year on average would be far too little to fund the statewide barriers, renovations, mechanical removals, “addressings” of “stressors”, new population establishments, surveys, monitoring, and other actions required or contemplated by the mitigation program.

Compared with similar mitigation programs this proposed program is woefully underfunded. A superficial comparison with the \$550,000 per year under the CAP Gila River Basin Native Fishes Conservation Program would seem favorable. However, that funding is in addition to other Reclamation funding committed for barriers, monitoring, information and education, Reclamation staffing, and FWS overhead, which together are far larger than \$550,000. In addition, the CAP \$550,000 covers a smaller geographic area and only six species. On a pure per-species basis, and disregarding the fact that the AGFD mitigation program fund would have to pay for barriers, monitoring, information and education, and staffing that the CAP program doesn’t, and disregarding the larger geographic area in the AGFD stocking mitigation program -- then for funding of the AGFD stocking mitigation program to be commensurate with the CAP program it would need to be about \$2.5 million per year on average – five times what is proposed in the draft EA.

We recommend that the draft stocking mitigation program be revised to provide \$2.5 million annually, in addition to funding to construct the 6-8 barriers discussed above. These would be paid for as a separate mitigation item.

Comment 286 [548]: If the yearly total from WSFRP is \$8 million/year, then \$500,000/year is a paltry sum mitigating the effects of a program that has, and will continue, devastating our native fish population.

Response: To implement the CAMP, the AGFD will commit an average of \$500,000 per year for the 10-year CAMP period. There will be multiple funding sources for implementation of this program. Funding sources that may be used to support the CAMP include, but are not limited to, any combination of the following: Sport Fish Restoration Act funds, Arizona Heritage Fund, Game and Fish fund, Wildlife Conservation Fund, and other eligible funds. Funding sources that are received by the AGFD and committed to other required mitigation projects, such as the CAP, or funds specifically dedicated, such as the National Fish and Wildlife Foundation for Apache trout, will not count toward this CAMP funding.

The mitigation is intended to offset and minimize the effects of the Proposed Action and does not need to be commensurate with the economic gains from implementing the Proposed Action or the geographic extent over which the Proposed Action occurs. The finding of effects in the draft BCO and Draft EA to consultation and other special status species provided the basis for development of the CAMP. The AGFD and the FWS concluded that the CAMP funding obligation of \$5 million over 10 years is sufficient to complete the activities identified in the CAMP.

The monetary commitment in the CAMP would be a net increase (beyond existing commitments toward AGFD conservation actions for CAMP species) that is intended to benefit Program Species. Additional AGFD resources may be drawn upon to support activities in the CAMP (similar to the CAP mitigation approach identified in the comment). The CAMP must be completed in the 10-year time frame. The \$500,000 per year allocated to mitigation may be used to support positions that would be dedicated to implementing the identified mitigation actions. Though part of the CAMP funding will include salary, the focus of the program is to conduct on-the-ground projects to benefit native species and potentially contribute to recovery.

The AGFD would pursue additional opportunities for funding through grants and collaboration. However, any funding obtained through these mechanisms would be in addition to the \$5 million. This additional funding would not be necessary to successfully complete mandatory CAMP measures but could be used to enhance these measures or implement non-mandatory measures identified in the CAMP plan.

Comment 287 [578]: Under the Proposed Action, the agency proposes to commit an average program budget of \$500,000 per year, or \$5 million over 10 years, to implement mitigation measures. These measures are referenced in the Draft EA as justification for finding that the Proposed Action “is not likely to jeopardize the continued existence of any consultation species or result in destruction or adverse modification of designated or proposed critical habitat.” Draft

EA at 41-42. Indeed, these mitigation measures are used throughout the Draft EA as justification for the general finding that the Proposed Action will not have a significant impact on the environment, thus allowing the agency to avoid preparation of an EIS. If the agency does in fact plan to use mitigation commitments in the Draft EA to lower the level of potential impacts arising from their Proposed Action so that they are not considered significant, the agency must, among other things, identify sufficient funding for such measures. See Final Guidance for Federal Departments and Agencies on the Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact, 76 Fed. Reg. 3843 (Jan. 14, 2011).

We can find no evidence in the Draft EA that supports the assertion that \$500,000 per year is sufficient to implement all of the committed mitigation and conservation measures considered mandatory under the Proposed Action. In fact, the agency provides virtually no information whatsoever regarding estimated costs to ensure implementation of these measures, and lists only brief, vague descriptions of the mitigation measures themselves. Should this Draft EA result in a Finding of No Significant Impact (FONSI), it is incumbent upon the agency to provide the public more detailed information not only about the specific, mandatory mitigation measures that will be implemented under the Proposed Action, but also information regarding the estimated costs of those measures.

Without information regarding estimated costs for implementation of the mandatory NEPA mitigation measures, the public can only guess at what an appropriate amount of funds would be to ensure implementation of these measures. Considering that \$500,000 represents only three percent of the \$16,750,140 in appropriations received by AGFD in FY 2011 from the SFRA and the Wildlife Restoration Act, and less than five percent of the \$10.8 million received by the agency from the sale of fishing licenses and all stamps, the amount committed by the agency seems grossly inadequate. We strongly encourage the agency to develop a realistic estimate of costs required to implement these measures, and ultimately commit substantially more funding to ensure that the mandatory NEPA mitigation measures are in fact implemented over the life of the proposed action.

Comment 288 [548]: EA fails to disclose how much money AGFD gets from Wildlife and Sport Fish Restoration Program (WSFRP)/year.

Response: See also response to Comment 285. In July 2011, the AGFD received approximately \$7.9 million in SFRA funding. Though it varies from year to year, approximately \$2.5 million was allocated to sport fish stocking and hatchery operations. AGFD fishing license and stamp revenues are used to provide the 25 percent match for the federal grant such that the total funding allocated to the Statewide Sport Fish Stocking Program in July 2011 was \$3.3 million.

Remaining funds are allocated to other eligible programs. Future allocation of the SFRA portion toward funding the Statewide Sport Fish Stocking Program is expected to remain consistent with the July 2011 allocation.

Comment 289 [454]: Appendix P: While the mitigation program seems to hold much promise for the interest of native fish conservation, has its funding source been identified? If so, please

specify. Also, page 11, last line of table 4: Relegating such a proactive conservation action to the last page of a document over 300 pages long seems to understate its importance. We recommend documents cited herein receive a more prominent position in the body of the EA to document the full risk potential of non-native fish proliferation due to AGFD's stocking activities and disclose that risk to the public.

Response: To implement the CAMP, the AGFD will commit an average of \$500,000 per year for the 10-year CAMP period. There will be multiple funding sources for implementation of this program. Funding sources that may be used to support the CAMP include, but are not limited to, any combination of the following: Sport Fish Restoration Act funds, Arizona Heritage Fund, Game and Fish fund, Wildlife Conservation Fund, and other eligible funds. Funding sources that are received by the AGFD and committed to other required mitigation projects, such as the Central Arizona Project, or funds specifically dedicated such as the National Fish and Wildlife Foundation for Apache trout will not count toward this CAMP funding. In the Final EA, the CAMP has been moved from Appendix P to the main document as Chapter 5.

Comment 290 [553]: Sport Fish Stocking Conservation and Mitigation Program Comments (Appendix P), Page 19, Section 3.2.3. Due to the documented potential for impacts from sport fish on native fish species, the inclusion of a mitigation and conservation program to offset impacts is commended. However, the means in which this program will be implemented, including the expenditure of \$5 million over 10 years is unclear. In addition, it appears that most of these expenditures would be focused on planning documents, rather than "on-the-ground" actions to conserve native species populations.

Response: See responses to Comments 259–261, 285, 287, and 288.

Comment 291 [553]: Table 3 identifies "Mandatory NEPA Mitigation Actions" to offset impacts to special status aquatic species, including through the removal of "two stressors" in each of several sub-basins proposed for sport fish stocking. The extent to which the "removal of stressors" will offset impacts from the stocking of sport fish in the Little Colorado River sub-basin cannot be evaluated because insufficient detail is disclosed in the document. A description of these projects is needed, including what activities will be undertaken, where they are located, the timeline for implementation. The effects analysis of those projects on the environment should also be disclosed.

Comment 292 [561]: The detail provided in the Conservation and Mitigation Program is insufficient and merely provides an outline to a plan rather than a true program. The goals of the program are unclear, especially in light of the effects of the Proposed Action. What little information is given does not provide adequate mitigation measures to combat the effects of either action alternative, especially considering cumulative effects.

Response: Stressor removal projects in the Little Colorado River will be targeted at providing benefits to special status species but may also provide additional benefits to consultation species. Specific areas where stressors will be removed will be identified during implementation planning and involve coordination with the WSFR and the AESO

to ensure benefit consistent with recent CEQ guidance on mitigation (Federal Register 2011).²

Additional definition and clarification of the CAMP has been included in the Final EA and will provide for the comprehensive approach to mitigation planning, implementation, monitoring, and reporting required.

The CAMP now incorporates measureable performance standards and adequate mechanisms for implementation, monitoring, and reporting. Performance standards are built into the CAMP that incorporate adaptive management through use of a suite of management and research tools to obtain desired environmental outcomes (e.g., new or secured populations of Program Species that provide conservation or recovery value to those species). CEQ guidance also indicates that the NEPA analysis must consider when and how the mitigation commitments will be implemented. Individual mitigation actions have been identified to benefit individual species and or in specified locations (typically at the watershed scale). The non-discretionary mitigation actions are identified to be completed within the 10-year time frame of the action. The adaptive management approach will allow for evaluation of effectiveness of the implemented projects in achieving the desired environmental outcomes, for employing the most effective tools in achieving those outcomes at the appropriate times and locations within the 10-year implementation time frame, and for increasing agency flexibility in responding to changing or unforeseen circumstances.

CEQ guidance indicates that plans should be developed and implemented in the case of a mitigated EA. The CAMP includes development of an overall 10-year planning framework as well as annual implementation planning and reporting. The 10-year framework would include a general timeline for implementing actions since several would span multiple years. At the end of years 3 and 6 and in the 10th year, the FWS will evaluate the effectiveness of actions and identify alternative approaches, if needed, to meet desired mitigation outcomes. Annual implementation plans would identify specific tasks to be completed yearly, as well as resources and funding needs. Annual reporting would include identifying activities completed and the progress toward meeting targeted mitigation actions.

Comment 293 [553]: Table 3, a reference is made to the AGFD's Watershed-based Fish Management Process to develop aquatic species management plans for all priority watersheds in the state. This section of the table mentions that "*restoration needs can be prioritized into multiple land management programs...*" As a land and resource management agency within several sub-basins of Arizona, the NPS would need to be notified in these planning efforts. It is unclear if those plans involve Grand Canyon National Park or other units of the NPS within Arizona.

Response: Any action that would impact Grand Canyon National Park or other units of the National Park Service (NPS) within Arizona will be coordinated with the NPS.

Comment 294 [476]: The proposed amount of mitigation funding (\$500,000 for 24 nominal Program Species) is inadequate to ensure direct benefit to native fishes, and represents a paltry

0.038 percent of the estimated annual economic impact of recreational fishing in Arizona. Certainly Arizona's unique native fishes deserve better than that. Much or perhaps all, of the proposed \$500,000 could easily be consumed by paying salaries, benefits and associated overhead for a relative small number of Arizona Game and Fish Department employees, leaving virtually nothing for the fish. Meaningful mitigation is costly, as demonstrated by the implementation of conservation measures in behalf of the Central Arizona Project. Annual funding of that program (\$550,000 for six species) does not include the additional millions of dollars spent on design and construction of barriers to protect native fishes from nonnatives, plus other measures such as monitoring and outreach. Considering that impacts to native fishes of continued sport fish stocking in Arizona inarguably are at least as significant and potentially longer lasting than those of the Central Arizona Project, funds for mitigation of sport fish stocking should be commensurately greater; likely \$1.5 to \$3 million per year. Finally, the specific source(s) and availability of dollars to fund the proposed sport fish stocking mitigation are not identified, the allocation of dollars to each year of the 10-year period is not provided, and the allocation of dollars among the program-related species is not given. All of this information must be included to quantitatively, critically, and effectively evaluate the EA.

Response: The mitigation is intended to offset and minimize the effects of the Proposed Action, and does not need to be commensurate with the economic gains from implementing the Proposed Action or the geographic extent over which the Proposed Action occurs. Funding allocated to individual species is less important than ensuring that impacts to each species are offset. The FWS has determined that the CAMP adequately offsets impacts of the Proposed Action, contributes toward recovery and conservation of CAMP species and, in many cases, provides for a net benefit to consultation and other special status species. The CAMP (Chapter 5 of the Final EA) must be completed in the 10-year time frame.

To implement the CAMP, the AGFD will commit an average of \$500,000 per year for the 10-year CAMP period. There will be multiple funding sources for implementation of this program. Funding sources that may be used to support the CAMP include, but are not limited to, any combination of the following: Sport Fish Restoration Act funds, Arizona Heritage Fund, Game and Fish fund, Wildlife Conservation Fund, and other eligible funds. The AGFD's budget process is administered by the AGFD Commission. Funding sources that are received by the AGFD and committed to other required mitigation projects, such as the CAP, or funds specifically dedicated such as the National Fish and Wildlife Foundation for Apache trout, will not count toward this CAMP funding.

The \$500,000 per year allocated to mitigation may be used to support positions that would be dedicated to implementing the identified mitigation actions. While part of the CAMP funding will include salary, the focus of the Program is to conduct on the ground projects to benefit native species and potentially improve the baseline.

Above and beyond the commitment of \$5 million over 10 years, additional AGFD resources may also be drawn upon to support activities in the CAMP. This additional funding will not be necessary to successfully complete mandatory CAMP measures, but may be used to enhance these measures or implement identified non-mandatory measures identified in the CAMP plan (now in Chapter 5 of the EA).

Specific activities and allocation of funding to undertake activities (primarily refers to the new populations and stressor removals because most of the other actions are fairly specific) will be identified during the annual planning process. Opportunities to implement large scale on the ground projects will be considered during this process (e.g., barriers, stream renovations).

Funding allocated to individual species is less important than ensuring that impacts to each species are offset. The FWS has determined that the CAMP adequately offsets impacts of the Proposed Action and, in many cases, provides for a net benefit to consultation and other special status species.

Comment 295 [574]: Evaluation of the Proposed Action comes down to a cost-benefit analysis of whether the proposed mitigation program offsets or outweighs the admitted adverse effects to native species from stocking of nonnative sport fish. We believe the proposed mitigation package does not adequately compensate for impacts of sport fish stockings on native fishes; therefore, we recommend either the Proposed Action or the mitigation program be substantially modified.

Comment 296 [574]: Impacts of trout stockings to other native fishes in other watersheds of the State are mostly accommodated in the RSA by elimination of problematic streams that are listed in the Proposed Action. Again, we do not believe the proposed mitigation program goes far enough to offset stocking impacts of the Proposed Action.

Response: See the CAMP in the Final EA (Chapter 5), which has been modified to better explain the benefits to the CAMP species. Information on how CAMP will affect native species and how actions implemented by CAMP relate to the Recovery Plans have been included in the CAMP chapter. It provides information on how mitigation measures in the CAMP either offset or minimize effects of the Proposed Action on Program Species and identifies which mitigation actions tie to recovery or conservation plans. See also response to Comments 285, 287, and 288.

Comment 297 [476]: Page 116, Table 35. It is arguable that it is true that “These effects [of the proposed action] would be offset by the Sport Fish Stocking Conservation and Mitigation Program ...” (brackets mine). Mitigation as proposed provides few direct benefits to the target species and there is no assurance such mitigation will ever occur because there is no commitment to ensure its implementation. On the other hand, it is a certainty that the proposed action to stock sport fish will be implemented and that adverse direct and indirect impacts will occur, whether or not there is mitigation.

Response: See the CAMP in the Final EA (Chapter 5), which has been modified to better explain the benefits to the CAMP species. Information on how CAMP will affect native species and how actions implemented by CAMP relate to the Recovery Plans have been included in the CAMP chapter. It provides information on how mitigation measures in the CAMP either offset or minimize effects of the Proposed Action on Program Species and identifies which mitigation actions tie to recovery or conservation plans.”

The AGFD has a long history of implementing conservation actions, and the SFRA grant fund is one of the most stable funding sources for the AGFD. The foundation of the entire

stocking program is based on SFRA funding. Without this funding, the Proposed Action could not take place, and implementation of mitigation measures would not be possible.

The AGFD receives the SFRA funds annually, contingent on the development of job statements (plans identifying expected activities for the upcoming fiscal year) and annual reporting. If suitable progress were not made as determined by the WSFR and the AESO, grant funds would not be deemed eligible for use in implementing the Statewide Sport Fish Stocking Program, and stocking of streams and lakes would cease.

Comment 298 [561]: Table 34 shows the cumulative effects on special status species. Of the 11 actions and conditions shown, only one – Restoration and Conservation – has a beneficial effect. The remaining 10 – including fish stocking – have adverse effects. Do the benefits of restoration and conservation really outweigh the adverse effects of the other 10 actions and conditions? The information provided for mitigation options, which are the only restoration and conservation measures discussed in the EA, do not indicate that this is possible. The small scale of restoration activities and resources cannot possibly reverse the large scale effects of the stocking program, especially in light of the other actions and conditions that also result in adverse effects.

Response: The cumulative effects analysis in the Draft EA discloses to decision-makers and the public past, ongoing, and foreseeable future actions that affect the environmental baseline. This analysis is intended to determine whether the incremental effect of the Proposed Action, in light of these other actions, would have a significant effect on the environmental baseline. The CAMP, developed jointly by the WSFR, the AGFD, and the AESO, would offset or reduce effects identified during the NEPA and the ESA process to listed, candidate, and special status species due to the Proposed Action. It is not intended to mitigate for effects from all other actions (past, ongoing, future) to the environmental baseline.

Comment 299 [574]: The rest of the mitigation program for multiple species includes "use assessment and risk analysis," "review and update of existing outreach programs," and "evaluate barrier conditions," all of which fail to improve "on-the-ground" status of native fishes. For specific native fishes, the mitigation package is restricted to surveys, increasing angler awareness, assessments, monitoring, localized use of native Apache trout stockings and spillway screens, evaluations, and opportunistic mechanical removal of rainbow trout and other stocked species. Together these actions do not reach a level of compensation that would justify implementation of the Proposed Action, given the known threats that nonnative fish stockings exert on native species.

Response: Mitigation is intended to offset effects from the Proposed Action; mitigation does not address other threats on the landscape that are not attributable to the Proposed Action. However, the CAMP has been designed to contribute to recovery of some species. See the CAMP in the Final EA (Chapter 5), which has been modified to better explain the benefits to the CAMP species. Information on how CAMP will affect native species and how actions implemented by CAMP relate to the Recovery Plans have been included in the CAMP chapter. It provides information on how mitigation measures in the CAMP offset or minimize effects of the Proposed Action on Program Species and identifies which mitigation actions tie to recovery or conservation plans

The commenter references “Evaluate barrier conditions” as a mitigation measure with no on-the-ground results. The remainder of the measure, which was not included in the comment, states “and repair barriers as part of the Proposed Action.” If evaluations determine barrier repair is needed, then repair would be conducted, thereby improving the “on-the-ground” conditions for Apache trout.

Comment 300 [567]: While education and outreach is an important tool, it is unclear how this will mitigate any of the key stressors affecting listed species. The EA should disclose the effectiveness of existing education and outreach efforts to support that this mitigation will in fact reduce effects to species.

Response: Some of the effects result from intentional or unintentional human actions (e.g., movement of non-target organisms in angling equipment or boats). Outside of development of enforceable rules and laws, the best tool available to managers is to provide information and education to the public. The outcome of the action is intended to be a positive change in human behavior through education.

Comment 301 [561]: The purpose of the Conservation and Mitigation Program in light of the Proposed Action is not clear. Table 35 and Appendix P state that the program includes measures to improve the environmental baseline by removing stressors, including nonnative species. However, both action alternatives propose to *increase* the number of stressors by stocking large numbers of various species of nonnative fishes. The Proposed Action would do so in *more* areas than these stressors currently occur. The EA also states that the Proposed Action could have a “net positive impact” on native species due to inclusion of the Conservation and Mitigation Program (Section 6.5). However, we do not understand how this is possible based on the information provided. This program may help native species in a few select areas, but it will not mitigate the effects of either action alternative. Both action alternatives have such a strong negative effect on native fisheries that the baseline condition will very likely get worse.

Response: The purpose of the CAMP to reduce and/or offset effects from the Proposed Action. Given the substantial amount of conservation actions included in the mitigation program, the Final EA analysis concludes that the mitigation program may also contribute toward recovery of many species (i.e., a net benefit to those species). See the CAMP in the EA (Chapter 5), which has been modified to better explain the benefits to the CAMP species. Information on how CAMP will affect native species and how actions implemented by CAMP relate to the Recovery Plans have been included in the CAMP chapter. It provides information on how mitigation measures in the CAMP either offset or minimize effects of the Proposed Action on Program Species and identifies which mitigation actions tie to recovery or conservation plans.

Comment 302 [574]: The Draft EA mitigation program includes a provision to “secure” several native fish populations, without providing any further explanation. The only proven technique to secure a native fish population is to segregate it from nonnative fishes. Such isolation management typically consists of preventing nonnative fish access to a native fish stream by constructing a physical barrier that is then followed by removal of existing nonnatives above the barrier. These actions have been successfully practiced for decades with native trouts and more recently with warm water native species and now form the primary basis of most native fish

recovery programs. If this is what the word "secure" in the mitigation program implies, in our extensive experience the amount of funding for the entire mitigation package (\$5 million over 10 years) would be sufficient to secure at most only a couple of streams. We cannot envision what alternative actions would "secure" new or existing populations of these species. Without additional specifics as to what this mitigation element will actually do, we are compelled to conclude it will not offset the major known detrimental effects of nonnatives to native fishes.

Response: To secure a population means to remove or reduce existing stressors (threats) to a level that would allow for the population to persist into the foreseeable future and contribute to recovery or conservation of the species. The specific factors involved in securing a population would be analyzed by the FWS and the AGFD to evaluate the results of the actions taken. The CAMP in the Final EA (Chapter 5) has been modified to better define the measure of securing a population and includes a description of factors that will be evaluated to determine the effectiveness of the actions taken.

Stressors are identified in existing recovery plans or conservation agreements and are usually termed "threats" in those documents. Particular stressors that will be the focus of this CAMP included nonnative predatory and competitive species, degraded habitat, and dewatered habitat or habitat with reduced flows. Addressing these may include eradicating, removing, or otherwise controlling nonnative predatory and competitive species, restoring habitat, purchasing land, purchasing land with accompanying water rights, providing for in-stream flow protection, and other actions under the statutory authority of the AGFD. There are multiple stressors to native fish and amphibian populations; presence of nonnative fish is not the only stressor. Specific projects designed to address stressors would be identified on a case-by-case basis and selected based on feasibility of implementation and availability of resources. Selected projects would be those providing the most benefit to multiple species.

There are various approaches to reducing or eliminating stressors, and the proposed adaptive management approach would allow for identification and implementation of the most effective tools for stressor removal. This may or may not include barrier construction. The \$5 million over 10 years is the minimum amount of funding that would be dedicated to implementing the CAMP. Additional AGFD resources may be used to support implementation of mitigation actions. The AGFD intends to seek additional resources and opportunities for implementing large-scale projects. This additional funding will not be necessary to successfully complete mandatory CAMP measures but may be used to enhance these measures or implement identified non-mandatory measures identified in the CAMP plan (Final EA, Chapter 5).

Comment 303 [20]: The second largest compensatory mitigation item proposed is the requirement to "address" two "stressors" in each of four sub-basins (Little Colorado, Salt, Verde, middle Gila Rivers). This requirement is extremely vague and probably unenforceable. While not defined in the EA, "addressing stressors" is defined in the draft BO as follows; *"Implementation of actions on the landscape may result in stressors that affect species or their habitats. Such actions can include livestock grazing, road construction, or introduction of new species. Examples of stressors are habitat loss or degradation, predation, competition, or direct disturbance of individuals of a species."* As this definition clarifies, a "stressor" is not an

element or effect of the proposed stocking program (which does not propose to introduce any new species).

The mitigation program calls for FWS and AGFD to identify and assess current and future key stressors. It fails to recognize the extensive efforts that have been conducted over the past several decades by a multitude of parties that have already done exactly that. This type of identification and assessment have been called for and conducted through listings, recovery planning, land management planning, and a wide variety of other venues. Reinventing the wheel is not effective mitigation – it is not even mitigation, it is just time-wasting delay. Beyond the planning, the requirement of this mitigation is for FWS and AGFD to “collaborate with stakeholders to address, remove, or mitigate these key stressors.” Again, this sounds uncannily like the entirety of the listing, recovery, and conservation programs already in place at FWS, AGFD, and other agencies. Granted, attempts to achieve these ends have not met with overwhelming success, but the lack of authority and the political and other opposition that have stymied past efforts are not likely to go away in the next 10 years. This is business-as-usual recast as “mitigation.”

Response: The mitigation action that commits to address stressors is intended to reduce or offset impacts from the Proposed Action for other (non-consultation) special status aquatic and semi-aquatic species. This particular mitigation commitment is to remove two stressors from each of the four watersheds identified by the commenter and the Bill Williams watershed. The identification and assessment activities associated with these measures would be to determine the most effective actions to take. Past and ongoing planning and stressor identification would be used during this process to most effectively use resources as to not “reinvent the wheel” in cases where this applies. Actions identified in this mitigation program are in addition to ongoing and past conservation actions. CAMP planning and on-the-ground projects would build upon current knowledge to maximize results.

Comment 304 [20]: For the three fish and five non-fish “Focal species” there is also a compensatory mitigation proposal to “secure existing or establish new conservation populations.” This is interesting wording – apparently recognizing as appropriate the establishment of new “conservation” populations as an alternative to protecting existing populations. The use of the word “conservation” to modify “population” needs to be explained. What populations are considered to be “conservation” versus ones which are considered to be something else? What do those differences mean for protection and recovery?

Priority should always be given to protecting existing populations. Establishment of new populations is only a secondary priority and should never be used in place of protecting an existing population. Stocking nonnative sport species where they adversely impact a native fish should not be mitigated for by establishing a new population of the native somewhere else. Inherent values of an established population in natural habitat cannot be replaced by establishing a new population elsewhere, particularly given that long-term success in establishing new populations is very poor. This mitigation element must be rewritten to emphasize the priority for protecting existing populations.

Response: The mitigation commitment is to establish new populations of focal species or to secure existing but threatened populations of focal species. The approach taken will be

determined through the mitigation planning process and will depend on the specific factors for each species, such as current occupied locations and threats and available reestablishment locations.

Comment 305 [574]: The commenter believes that the AGFD sport fish stocking program as presented in the Proposed Action will directly and negatively influence the implementation of the GRBNFCP (Gila River Basin Native Fishes Conservation Program). It seems inconsistent that the Service developed and participates in the GRBNFCP while at the same time proposes a sport fish program that will reduce the effectiveness of the GRBNFCP. We believe the proposed mitigation program for the Proposed Action needs additional and specific measures to further reduce its impacts to native fishes.

We wish to point out the inconsistencies of the approach to the nonnative fish problem taken in the Proposed Action and the approach formed in a similar consultation with us on impacts of introductions and spread of nonnative fishes by the CAP. Our project addressed unintentional, potential introductions of novel species to Gila River basin waters via the interbasin CAP water transfer. The Proposed Action, however, consists of intentional stockings of species known to detrimentally impact natives, and in many cases those species are being stocked within or very near habitats occupied by natives. The Service concluded that the CAP nonnative issue would jeopardize the continued existence of several native fishes, and resulted in the issuance of numerous, very specific, and very expensive reasonable and prudent alternatives that were mandatory to prevent jeopardy. Those alternatives directed actions that specifically eliminated stressors to native fishes (primarily removal of nonnatives). We believe the AGFD sport fish stocking program causes significantly greater impacts to native fishes than does the CAP. Why does the Proposed Action not specifically identify a similar type and level of required elements to mitigate for impacts of the proposed stockings?

Response: The comment does not identify specifics on what information from previous biological opinions and assessments may be inconsistent with the background and conclusions of the BA and the Draft EA, or how the Proposed Action will directly and negatively influence the implementation of the Gila River Basin Native Fishes Conservation Program. See response to Comments 136 and 137 for a summary of the effort undertaken and the sources used to inform the analysis of biological resources in the BA and Draft EA.

Also see the CAMP in the Final EA (Chapter 5), which has been modified to better explain the benefits to the CAMP species.

In regard to stocking species that are known to detrimentally impact native species, the EA acknowledges and analyzed the effects that stocked nonnative fish can have on special status species. In no cases would any of the alternatives result in stocking the same problem nonnative species into native aquatic species habitat that the AGFD or another management authority is attempting to eradicate. In some cases, the Proposed Action would result in stocking less predacious nonnative sport fish species into locations that have native species, and these situations were analyzed in the Draft EA. This does not preclude the possibility of future actions to protect and conserve such populations of native species, including control or eradication of some of the most problematic

nonnative species such as green sunfish. See Comment 155 for further discussion on this topic.

Comment 306 [542]: The agencies should also include mitigation measures for the alternatives not already included in the proposed action. (Federal Register 2011) Instead, the Draft EA states that if the Reduced Action Alternative is chosen, the agencies will reinitiate consultation. On page 22 of the Draft EA: “If the Reduced Stocking Alternative is selected, reinitiation of Section 7 consultation would be necessary to determine required mitigation measures, based on the reduced impacts. It is likely that the funding available and the resultant mitigation and conservation measures would be reduced from what is identified in the Sport Fish Stocking Conservation and Mitigation Program associated with the Proposed Action.”

Response: Should the Reduced Stocking Alternative be chosen, a BCO would have to be developed at that time to assess the impacts of this alternative. A mitigation plan cannot be developed until the impacts are known.

Assurance of Implementation

Comment 307 [20]: Wording problems aside, this compensatory mitigation element still remains too vague to be enforced. No timeframes, numbers of populations, or other parameters are given, so there is nothing anyone can be held to at the end of 10 years. Given that AGFD (the entity committed by this element) has little authority outside of wildlife management, we recommend that the compensatory mitigation be revised to say: The AGFD shall successfully complete at least one protective action for each of two populations of each of the three native fish in the Focal Species (6 total actions). These actions shall include, but not be limited to, land or easement acquisition, binding conservation agreements with private parties for management, successful removal of nonnative species, and construction of barriers to exclude nonnative species. In addition, but not in replacement of, those protective actions, AGFD shall successfully establish in the wild, within historical range, at least one new protected population of each of the three native fish in the Focal Species. These actions to protect existing and establish new populations shall be in addition to actions being taken under other mitigation programs, such as CAP Gila River Basin Native Fishes Conservation Program, SRP HCP, etc., but shall be taken in coordination with the actions under those programs, and with the approval of FWS and appropriate recovery teams.

Response: The CAMP now incorporates measureable performance standards and adequate mechanisms for implementation, monitoring, and reporting. Performance standards are built into the CAMP that incorporate adaptive management through the use of a suite of management and research tools to obtain desired environmental outcomes (e.g., new or secured populations of Program Species that provide conservation or recovery value to those species). CEQ guidance also indicates that the NEPA analysis must consider when and how the mitigation commitments will be implemented. Individual mitigation actions have been identified to benefit individual species and/or in specified locations (typically at the watershed scale). The non-discretionary mitigation actions are identified to be completed within the 10-year time frame of the action. The adaptive management approach will allow for evaluation of effectiveness of the implemented projects in achieving the desired environmental outcomes, and for employing the most effective tools in achieving those outcomes at the appropriate times

and locations within the 10-year implementation time frame, and for increasing agency flexibility in responding to changing or unforeseen circumstances.

CEQ guidance indicates that plans should be developed and implemented in the case of a mitigated EA. The CAMP includes development of an overall 10-year planning framework as well as annual implementation planning and reporting. The 10-year framework would include a general timeline for implementing actions since several would span multiple years. At the end of years 3 and 6 and in the 10th year, the FWS will evaluate the effectiveness of actions and identify alternative approaches, if needed, to meet desired mitigation outcomes. Annual implementation plans would identify specific tasks to be completed yearly, as well as resources and funding needs. Annual reporting would include identifying activities completed and the progress toward meeting targeted mitigation actions.

The AGFD receives the SFRA funds annually, contingent on the development of job statements (plans identifying expected activities for the upcoming fiscal year) and annual reporting. If suitable progress were not made as determined by the WSFR and the AESO, grant funds would not be deemed eligible for use in implementing the Statewide Sport Fish Stocking Program, and stocking of streams and lakes would cease.

Comment 308 [548]: In addition, the draft Biological Opinion (Biological and Conference Opinion for 10-Year Sport fish Restoration Grant to Arizona Game and Fish Department, BCO 22410-2008-F-0486: Final Draft March 2011) that attempts to offer cover for the proposed action fails the legally mandated requirement to provide for specific or enforceable mitigation measures. *Ctr. for Biological Diversity v. Rumsfeld*, 198 F. Supp. 2d 1139, 1143 (D. Ariz. 2002).

Mitigation measures supporting a Biological Opinion's conclusion must be "reasonably specific, certain to occur, and capable of implementation; they must be subject to deadlines or otherwise-enforceable obligations; and most important, they must address the threats to the species in a way that satisfies the jeopardy and adverse modification standards." 198 F. Supp. 2d at 1152 (citing *Sierra Club v. Marsh*, 816 F.2d 1376 (9th Cir. 1987)); see also *NRDC*, 506 F. Supp. 2d at 350 (same).

The Ninth Circuit Court of Appeals has held that mitigation measures may be included as part of the proposed action and relied upon only where they involve "specific and binding plans" and a "clear, definite commitment of resources for future improvements" to implement those measures [*Nat'l Wildlife Fed'n*, 524 F.3d at 935-36 (finding agency's "sincere general commitment" insufficient to support no-jeopardy conclusion)].

Statements such as "AGFD commits to provide for three populations of Chiricahua leopard frog either through securing existing but threatened populations or establishment of new conservation populations" are not specific and are not certain to occur. Questions remain as to AGFD's capability for implementation. The exact same statement is made for headwater chub, northern Mexican gartersnake, roundtail chub, narrow-headed gartersnake, and northern leopard frog, though AGFD commits to provide for only two populations of narrow-headed gartersnake, and northern leopard frog.

Response: The purpose of the CAMP is to reduce and/or offset effects from the Proposed Action. Given the substantial amount of conservation actions included in the mitigation program, the Final EA analysis concludes that the mitigation program may also contribute toward recovery of many species (i.e., a net benefit to those species). See the CAMP in the Final EA (Chapter 5), which has been modified to better explain the benefits to the CAMP species. Information on how the CAMP will affect native species and how actions implemented by CAMP relate to the Recovery Plans have been included in the CAMP chapter. It provides information on how mitigation measures in the CAMP either offset or minimize effects of the Proposed Action on Program Species and identifies which mitigation actions tier to recovery or conservation plans. Also please see response to Comment 307.

Comment 309 [476]: As mentioned in the Draft EA and firmly established by decades of scientific inquiry and case study, nonnative fishes are the most significant factor responsible for the loss, decline, and imperiled status of native fishes of Arizona, and in fact are the most significant deterrent to conservation and recovery of those fishes. Many of these nonnative fishes are present only because of intentional stocking associated with establishment or perpetuation of sport fish populations, and others were accidental but nonetheless a direct result of stocking. Given this direct and unequivocal relationship between sport fish stocking and the plight of nonnative fishes it is more than reasonable that any continuation of sport fish stocking have a significant component of meaningful mitigation. Meaningful mitigation means only those actions that provide direct, measurable benefits to native fishes. Examples of meaningful mitigation include but are not limited to protection of existing native fish populations by isolation from nonnative fishes, establishment of new populations of native fishes in protected (as above) places where nonnatives are absent, and elimination of nonnative fishes to benefit native fishes where practicable and desirable. Planning, monitoring, and other ancillary activities do not provide such benefits and are not considered meaningful mitigation in this context.

Response: Nonnative fishes are an important cause of decline of native fish in Arizona. However, there is a great deal of variability in effects from the various nonnative species present in Arizona. Some species have caused large declines in native fishes, though other nonnative species have had limited effects. See response to Comments 19–22 for a full description of the variability of effects from nonnative fishes and how this was analyzed for the Draft EA.

The CAMP takes into account the threat of nonnative species identified in this comment. In particular:

- Removal or elimination of nonnative species that are impacting native species is included in the specific measure to address stressors in five watersheds.
- Several other measures are designed to reduce the threat of transport of unwanted organisms.
- Measures to establish or secure populations of focal species would be completed in full consideration of threats from nonnative species (e.g., establishments would occur in areas free of problem nonnative species or existing problem nonnative species would be removed).

See the CAMP in the Final EA (Chapter 5), which has been modified to better explain the benefits to the CAMP species. Based on the analysis conducted for each stocking site, the mitigation plan sufficiently addresses the impacts caused by the Stocking Program. Though part of the CAMP funding will include salary, the focus of the program is to conduct on-the-ground projects to benefit native species and potentially improve the baseline.

Comment 310 [548]: EA fails to provide for concrete mitigation measures beyond monitoring (i.e., mechanical removal, or stream restoration) in the event of finding stocked exotics within occupied critical habitat.

Response: See response to Comments 259–261. See also the CAMP in the Final EA (Chapter 5), which has been modified to better explain how the specific measures will benefit the CAMP species. As noted in the CAMP (Table 4), if stocked fish are found in certain waters occupied by listed, candidate, or proposed species, these individuals will be removed. Mechanical removal and stream restoration in critical habitat are possible actions during the 10-year period and will be assessed in the annual planning process.

Comment 311 [559]: Generally, the kind of mitigation I would like to see for sport fishing impacts revolve principally around setting up mechanisms to allow maximal control of inadvertently hosted exotics. Concrete planning to achieve this at individual sites, with all their unique and sometimes complex and difficult problems, would be more productive than general statements of intent to control exotics, etc. This approach could also be applied to Parker Canyon Lake, and virtually any other relative isolated lake.

Response: See responses to Comments 287, 288, and 303. The CAMP incorporates a watershed planning and adaptive management approach to identify priority actions that would yield the most benefit, based on specific-site conditions, rather than identifying specific management prescriptions for all potentially affected sites. The comment is noted and will be discussed in the annual planning process.

Comment 312 [20]: *Contingent Actions* – In addition to the required mitigation actions committed to by FWS and AGFD, there are a number of actions that may or may not be undertaken, dependent on funding or other factors. These items have been, but should not be, included as mitigation that ameliorates the adverse impacts of the proposed action, because there is no way to judge the likelihood that they would ever occur in the foreseeable future. While it may be nice to have them in the draft EA and BO, they mostly are there to make everyone feel good. Few contingent or voluntary measures are ever carried out because funding and other resources are almost always too limited.

It is unfortunate to see that implementation of recovery plans and strategies in the proposed mitigation program falls into the contingent and voluntary category. If the two primary agencies charged with conservation of native species do not value recovery implementation sufficiently to agree to it as required mitigation, then there is little hope that recovery will ever occur.

Response: The non-mandatory actions included in the CAMP are not intended to serve as mitigation for the Proposed Action. They were included in the CAMP as desired activities to complete if sufficient funding is available.

Additional Mitigation Recommendations

Comment 313 [574]: The negative effects of rainbow trout to Little Colorado spinedace in particular are well documented, but the Proposed Action mostly dismisses those known impacts. For the Little Colorado River subcatchments, the removal of many stocking sites as presented in the RSA seems highly preferable to the Proposed Action. But even the RSA should consider further mitigation to reduce impacts to spinedace. The Spinedace Recovery Team for many years has considered upper Chevelon Canyon (between Chevelon Canyon Lake and Woods Canyon Lake) the most attractive site to replicate what appears to be the doomed (from loss of habitat due to regional groundwater pumping) lower Chevelon Canyon spinedace population. The Team has advocated emplacement of a fish barrier on Chevelon Canyon just upstream from Chevelon Canyon Lake, renovation of Woods Canyon and Willow Springs lakes to remove unwanted warm water species, and renovation followed by repatriation of spinedace to the stream. Although a replication of the lower Chevelon population of spinedace was made to West Chevelon Canyon, perennial habitat in that stream is limited and therefore population persistence there is tenuous. Establishment of an upper Chevelon Canyon population would secure the invaluable lower Chevelon population, and seems a feasible and appropriate mitigation element that the sport fish program should consider.

Response: Comment noted.

Comment 314 [559]: The most severe impacts of large sport fishing lakes comes from cases like Patagonia Lake, which sits in the mainstem of Sonoita Creek. In this situation, exotics such as bass, sunfish, bullheads, mosquitofish, crayfish, and bullfrogs can find refuge to re-infest the stream itself despite all efforts to control them. I would think this lake is a crown jewel for sport fishing in southern Arizona. If so, the impacts of the lake on southern Arizona's second largest stream should be admitted and mitigated in other ways, or specific programs to minimize impacts could be proposed (however, I don't see what, within practical bounds, those might be).

Sonoita Creek was original the core of one of the most robust populations of the Lowland Leopard Frog, which may be completely extirpated in the basin, in southern Arizona, where it is seriously threatened. The only clearly viable populations of that species in southern Arizona are in the lower San Pedro and Aravaipa Canyon, while other remaining populations are isolated, small, and probably threatened with extinction. Sonoita Creek might be made much more suitable for some native fishes but, to my knowledge, no comprehensive attempt to plan for renovation and frog and fish recovery there has been undertaken. A collaborative process to initiate such planning might be a suitable form of mitigation.

Response: The Proposed Action includes stocking only rainbow trout into Patagonia Lake and, based on surveys, rainbow trout rarely leave the lake (only one trout was found in a stream above the lake despite numerous surveys upstream and downstream of the lake). In addition, the habitat in the streams downstream and upstream is not suitable for trout during the warmer months. Based on this survey information and thermal barriers, the proposed stocking action at Patagonia Lake was determined to have

a low effect on speckled dace, longfin dace, desert suckers, Sonora suckers, and lowland leopard frogs.

EA Text/Language

Comment 315 [454]: Appendix A. Table D, page A7, first two lines: Translocation of humpback chub to above Chute Falls in the LCR and to Shinumo Creek and other Grand Canyon tributaries are not conservation actions originating with AGFD as the table heading suggests. Although AGFD plays a supporting role in these activities, translocations are actually conservation measures identified in both the 2002 and 2008 Biological Opinions on operation of Glen Canyon Dam, funded by the Bureau of Reclamation (Reclamation) through the Glen Canyon Dam Adaptive Management Program (GCDAMP), and implemented by the National Park Service (NPS) and the U.S Fish and Wildlife Service (FWS).

Response: Appendix A, Table D, does not intend to give primary credit to the AGFD for all the conservation actions listed. For any given project, the AGFD may lead, co-lead, or contribute to these actions. Other project leaders and significant contributors include the FWS, the NPS, Reclamation, the U.S. Department of Agriculture Forest Service, the BLM, the University of Arizona, The Nature Conservancy, and other agencies, universities, non-governmental organizations (NGOs), private organizations, and private individuals. This has been clarified in the Final EA (Appendix A, Table D). Additional conservation actions that did not involve or only peripherally involved the AGFD and may have benefited special status species are not included in Appendix A, Table E.

Comment 316 [553]: Table 2. "Mandatory ESA Conservation Actions" includes a statewide live bait use assessment and risk analysis to be conducted by the AGFD. It should be noted in the document that the use of bait in National Park Service-managed lands is restricted under 36 CFR § 2.3.

Response: Comment noted.

Comment 317 [559]: The title of the document is misleading. The EA applies almost exclusively to coldwater fish (trout) stocking, whereas warm water fishes (stocking and maintenance of existing managed populations) are of equal or greater importance from the standpoint of impacts on many threatened, endangered, and declining native aquatic species. The document should be re-labeled. The effects of warm water fishes should be addressed simultaneously, as the two are so intimately interrelated. Trout are not even mentioned until page 6 of the document, whereas the focus of the document should be made crystal clear up around sentence 1!

Response: Comment noted. Effects of both cold and warm-water stockings are analyzed in the Draft EA.

Comment 318 [567]: Throughout the EA the terms 'not likely to jeopardize' are used to describe effects to species. AGFD made determinations of *Likely or Not Likely to Adversely Effect* species in a Biological Assessment; the U.S. Fish and Wildlife Service concurs with those determinations. Jeopardy terminology is generally utilized by the U.S. Fish and Wildlife Service

unless making a determination on a proposed species or critical habitat. The EA should incorporate the proper terminology when describing affects to species. For example:

- a. Section 4.1, p. 27 First paragraph, the effects to listed species should be summarized from the Biological Assessment, not the draft BCO.
- b. Section 4.1.2, pg. 29 – *‘The analysis of effects of the Proposed Action on consultation species is based on determinations of jeopardy and adverse modification of critical habitat made in the draft BCO.’*
- c. Section 4.1.4, pg. 40, Table 4 – The title states ‘Consultation species for which the draft BCO made a finding of ‘Not Likely to Adversely Affect.’
- d. Section 4.1.4, pg. 41 –States this section summarized the area-wide analysis for consultation species completed in the draft BCO.

Response: Comment noted. The WSFR is the lead federal agency responsible for NEPA and ESA compliance for this action, and the AGFD has been granted Cooperating Agency status. The BA discussed possible impacts to each of the consultation species but stopped short of making effects determinations and was developed to provide information to the AESO in the development of a draft BCO. Consequently, the Draft EA relied on the draft BCO for a summary of effects.

Comment 319 [567]: Throughout the EA, the term ‘consultation species’ is utilized instead of federally listed, threatened or endangered, etc. This becomes confusing after awhile and somewhat lessens the impact.

Response: The term “consultation species” is used to describe those species listed as threatened and endangered, proposed, and candidate, as well as potential candidates for listing. To use the term “listed species” would be inaccurate, so the term consultation species was used. These are the species for which Section 7 consultation/conference was completed with the AESO.

Comment 320 [553]: Table D, within Appendix A lists *"Humpback Chub Translocation from Lower Little Colorado River to Shinumo Creek"* as all *"AGFD conservation action"* that was implemented to conserve species of conservation interest within the State of Arizona. Grand Canyon National Park appreciates the involvement and assistance of the AGFD in the implementation of this NPS project; however, the contribution of Grand Canyon National Park and their partners should be mentioned, including the U.S. Bureau of Reclamation, FWS, Grand Canyon Wildlands Council, and the Museum of Northern Arizona. It is also important that the document note that the NPS project is being led by NPS fisheries staff at Grand Canyon National Park.

Response: Comment noted. Appendix A, Table D, does not intend to give primary credit to the AGFD for all the conservation actions listed. For any given project, the AGFD may lead, co-lead, or contribute to these actions. Other project leaders and significant contributors include the FWS, the NPS, Reclamation, the Forest Service, the Bureau of Land Management, the University of Arizona, The Nature Conservancy, and other agencies, universities, NGOs, private organizations, and private individuals. Additional conservation actions that did not involve, or only peripherally involved, the AGFD may

have benefited special status species. These additional measures are not included in Appendix A, Table D. This has been clarified in the Final EA, Appendix A, Table D.

Comment 321 [476]: Page 2, paragraph 4. It would be helpful to the reader if the “Sport Fish Stocking Conservation and Mitigation Program” mentioned here and elsewhere throughout the document was cross-referenced to Appendix P, which is not usefully done until page 103.

Response: Comment noted. In the Final EA, the CAMP information has been consolidated (Chapter 5).

Comment 322 [476]: Page 8, paragraph 2. What is the current “satisfaction rating?”

Response: The Arizona angler satisfaction rating was 85 percent satisfied to completely satisfied, with the overall fishing experience based on a statewide telephone survey of licensed anglers conducted in 2007. In the period between statewide surveys, the AGFD Fisheries Branch periodically checks angling satisfaction levels gathered from other small-scale or site-specific investigations (creel surveys, responsive management surveys, public events, etc.) for any significant shifts in this rating.

Comment 323 [476]: Page 8, paragraph 4, bullet item 1. What defines “insufficient production” and what data are used to make this assessment?

Response: This refers to production that is insufficient to meet management objectives for the site/system, as determined by creel surveys, angler preference surveys, and fish population monitoring.

Comment 324 [476]: Page 9, paragraph 2 (first bullet item). It is unclear why stocking would ever be needed if a fishery is providing sustained yield.

Response: Based on the AGFD management approach for sustained yield fisheries, the agency is seeking approval for stockings of some sustained yield fisheries under some circumstances, such as in response to full or partial loss of a fishery due to catastrophic events or in support of special events (e.g., fishing clinics).

Comment 325 [476]: Page 9, paragraph 5. Bureau of Reclamation provides substantial funding to support native fish activities at Bubbling Ponds Hatchery.

Response: For clarification, contracts with Reclamation, and SRP as well, provide mitigation funding to support specific activities at Bubbling Ponds. These contracts represent mitigation for Reclamation and SRP actions. The base funding for Bubbling Ponds is from state dollars, not Reclamation funding.

Comment 326 [476]: Page 9, last paragraph. “some trout” and “several waters” are mentioned. How many and which ones of each referred to?

Response: The annual average number of stocked trout that were purchased from contract vendors from 2007 through 2009 was 71,609. All of these were rainbow trout and were stocked into Urban Fisheries Program waters.

The specific waters referred to as “several waters” will be dependent on available funds and future need.

Comment 327 [476]: Page 10, paragraph 3. The statement that “Arizona has limited opportunities for native sport fish angling due to the lack of suitable waters and habitat” is contradicted by the fact that streams and rivers currently occupied by nonnative species were historically occupied by native fishes. It is the presence of nonnative fishes that makes habitat unsuitable for natives, not the physical habitat itself.

Response: Comment noted. This text in the Draft EA was intended to convey two ideas: (1) there is limited natural reproduction of trout and (2) there are limited opportunities for fishing for natives. For clarification, the following statement is more accurate regarding fishing for native fish: “Arizona has limited opportunities for native sport fish angling due to the lack of suitable species with only three native sport species (Apache trout, Gila trout, roundtail chub). The demand for recreational angling cannot be met alone by these three native sport species.” The EA has been modified to be more precise.

Comment 328 [476]: Page 17, Figure 2 and Table E (Appendix A) should be numerically cross referenced so any reader can make a geographic connection between the information in the table and the location on the map.

Response: Comment noted.

Comment 329 [476]: Page 19, paragraph 4 (bullet item 1). How is “substantial” defined relative to “substantial mitigation?”

Response: In this context, “substantial” was intended to mean involving considerable effort and resources.

Comment 330 [476]: Page 19, last paragraph. “Some” should be quantified (for example, “This alternative would eliminate 66 of the stocking sites ...”).

Response: Comment noted. The paragraph referenced is intended to be an introduction to the Reduced Stocking Alternative. The following section on sport fish stocking, Section 3.3.1, describes how the Reduced Stocking Alternative was developed and states that 66 stocking sites were removed from those included in the Proposed Action.

Comment 331 [476]: Page 22, last paragraph. How many are “many comments” and “many of the responses?”

Response: A total of 140 comments were received during the early scoping process. During the comment period for the Draft EA, 577 comments were received. Of these, 376 comments specifically commented on one site (La Paz County Park and Lagoon), which is the location of a popular Take A Kid Fishing program.

Comment 332 [476]: Page 23, paragraph 2. What is the “break even” number of stocking sites? Where can the reader access the analysis that led to the conclusion that the expanded stocking alternative was not feasible?

Response: It was assumed that the expanded stocking concept would be dependent on the same available supplies of fish as the Proposed Action and the Reduced Stocking Alternative. Therefore, not all sites could be stocked on an intensive or repeating basis. Factors that affect stocking feasibility of potential sites include the following:

- Exposure/impacts to native species and critical habitat
- Lack of consistent availability and quality of water, limiting the suitability of continued stocking at some water bodies
- Angler demand for additional angling opportunities (species or locations)
- Loss of angler access
- Limited sustainability of a fishery in a given location (water quality, frequency of catastrophic events)
- Emphasis on existing native aquatic species management in the area
- Limited availability of funds to purchase fish to supplement fish provided by the hatcheries
- Tribal sovereignty of tribal waters
- Angler demand for wild fisheries sustained by natural reproduction

Comment 333 [476]: Page 25, paragraph 1 and Table 1. Is there a comprehensive list of resources to be considered that the reader can access, or a reference to such a list?

Response: Table 3 was located on page 25 in the Draft EA. The resources listed in Table 3 are those typically analyzed in a NEPA document and judged to have some potential relevance to the Proposed Action. This is not meant to be a comprehensive listing of all resources that may be analyzed in a NEPA document. For example, noise was not included since there is no potential for impacts on this resource.

Comment 334 [476]: Page 34, paragraph 1. Rio Grande sucker is not native to Arizona and the reference to Minckley & Marsh (2009) is incorrect (see pages 206-207 therein); see also Sublette, J.E., M.D. Hatch and M. Sublette. 1990. The Fishes of New Mexico. University of New Mexico Press, Albuquerque. 393 pages.

Response: The commenter is correct, and this is an erroneous statement. The Rio Grande sucker is not native to Arizona. The EA has been modified to reflect this correction.

Comment 335 [476]: Page 35, paragraph 1. From where are the definitions of direct and indirect effects taken? Direct effects of this action will occur even if they take place at later time and are spatially removed from the site of the action, especially because the fish (and thus the action itself) will persist in time and move to new spaces. For example, a stocked sport fish eating a native fish is a direct effect even if it takes place days or weeks later and far from the stocking

site. Indirect effects on the other hand are those mediated by the action through a chain of one or more intervening events. For example, if a stocked sport fish consumes a prey item that would otherwise be available to a native fish and the native fish goes un-fed; this would be an indirect effect. The distinction in the EA between direct and indirect effects seems trivial, and should be reconsidered.

Response: The Council on Environmental Quality Regulations for Implementing NEPA, Section 1508.8, defines effects as both direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. The authors' intent in the Draft EA was to follow these definitions when identifying specific effects as either direct or indirect. Though NEPA requires the consideration of direct and indirect effects, it does not require that these two categories of effects be distinguished in a NEPA document. NEPA does not give more weight to one category of effects over the other.

Comment 336 [476]: Page 40, Table 4. It would be helpful to the reader if the geographic location of each consultation species was provided (stream or river name and reach, location of other habitat).

Response: This (and other) information was not included in the EA in an attempt to keep the document concise. This information can be obtained from the AGFD HDMS program, though specific locations of listed or sensitive species may not be available to the public in order to protect those species or populations.

Comment 337 [476]: Page 43, last paragraph, and elsewhere. What native fishes are of concern at Arizona State University Research Park and Karsten Golf Course? Native fishes of any species have not been recorded from either location for nearly two decades.

Response: Bonytail chub, Colorado pikeminnow, and razorback sucker were stocked into ponds at the ASU Research Park in the late 1980s and mid-1990s, though there are no recent data that indicate these species are still present.

Comment 338 [476]: Page 51, paragraph 2. What specific documentation or other data support the statement that “The numbers of stocked trout leaving the stocking reach to invade occupied loach minnow habitat would likely be low over the period covered by this consultation?”

Response: The information used to analyze movement of stocked fish is in the BA and the draft BCO, and is summarized in the EA.

Comment 339 [476]: Page 58, paragraph 4 (bullet item 3). What is the “Gila River Basin Native Fishes Program” and where can the reader access the relevant documentation?

Response: This refers to the Gila River Basin Native Fishes Conservation Program. The Gila River Basin Native Fishes Conservation Program, formerly referred as the Central Arizona Project Fund Transfer Program, was developed to partially mitigate impacts of the Central Arizona Project on threatened and endangered native fishes of the Gila River basin. This program is funded by Reclamation and is directed by the FWS and

Reclamation, in cooperation with the Arizona and New Mexico Departments of Game and Fish. For more details see <http://www.usbr.gov/lc/phoenix/biology/azfish/fundtransfer.html>.

Comment 340 [476]: Page 59, paragraph 8. There is no spikedace population in the San Francisco River. If this refers to a group of fish stocked into that stream, there is no mention of such an event in the EA or its accompanying documents.

Response: Spikedace were stocked into the San Francisco River near the U.S. 180 bridge near Glenwood in 2008 and 2009. Additional augmentations to the population are anticipated over the next several years, but as of yet, spikedace have not established a population at this site.

Comment 341 [476]: Page 105, Table 31. What specifically does it mean to “address two stressors?”

Response: Stressors are identified in existing recovery plans or conservation agreements and are usually termed “threats” in those documents. Particular stressors that will be the focus of this CAMP included nonnative predatory and competitive species, degraded habitat, and dewatered habitat or habitat with reduced flows. Addressing these may include eradicating, removing, or otherwise controlling nonnative predatory and competitive species, restoring habitat, purchasing land, purchasing land with accompanying water rights, providing for in-stream flow protection, and other actions under the statutory authority of the AGFD. The CAMP has been modified to provide more detail regarding stressor removal measures; see Chapter 5 of the Final EA.

Comment 342 [476]: Page 106, Table 32. What specifically does it mean to “secure” a population?

Response: To secure a population means to remove or reduce existing stressors (threats) to a level that would allow for the population to persist into the foreseeable future and contribute to recovery or conservation of the species. The specific factors involved in securing a population would be analyzed by the FWS and the AGFD to evaluate the results of actions taken. The CAMP in the Final EA has been modified to better define the measure of securing a population and includes a description of factors that will be evaluated to determine effectiveness of the actions taken. See responses to Comments 302 and 303.

Comment 343 [476]: Pages 123–130 (Literature Cited). No recovery plans appear in the literature cited, which suggest such plans were not considered in preparation of the EA. This is a significant oversight, and it is recommended that species recovery plans be reviewed and relevant information and guidance be incorporated as appropriate throughout the document.

Response: Recovery plans were used in the development of the draft BCO and the CAMP. The CAMP in the Final EA (Chapter 5) has been modified to better explain the connection between the CAMP and existing recovery and conservation plans. The recovery plans used in the analyses have been added to the Literature Cited section of the CAMP and the Final EA.