United States
Department of
Agriculture

Forest
Service

Southwestern
Region

January 2014

FINAL

Biological Assessment for the Prescott National Forest Land and Resource Management Plan

Coconino and Yavapai Counties, Arizona

SINCE 1898
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NATIONAL FOREST
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List of Acronyms

ADEQ – Arizona Department of Environmental Quality
AZGFD – Arizona Game and Fish Department
BA – Biological assessment
BLM – Bureau of Land Management
BMPs – Best management practices
BO – Biological opinion
BO/CO – Biological opinion/Conference opinion
CH - Critical habitat
ESA – Endangered Species Act
LRMP – Land and resource management plan
MSO – Mexican spotted owl
MVUM – Motor vehicle use map
NF – National forest
NEPA – National Environmental Policy Act
NFMA – National Forest Management Act
NFS – National Forest System
OHV – Off-highway vehicle
PAC – Protected activity center
PCE – Primary constituent element
PNVT – Potential natural vegetation type
SWWF – Southwestern willow flycatcher
T&Cs – Terms and conditions
USFS – U.S. Forest Service
USFWS – U.S. Fish and Wildlife Service
WSR – Wild and scenic river
WUI – Wildland-urban interface
YBC – Yellow-billed cuckoo

Introduction

Background

This biological assessment (BA) has been prepared for the initiation of Endangered Species Act (ESA) § 7(a)(2) consultation on the proposed revised land and resource management plan (proposed LRMP) for the Prescott National Forest (Prescott NF or the forest) of the U.S. Department of Agriculture, Forest Service (USFS), Southwestern Region.

This BA summarizes an analysis of the potential effects to federally listed, proposed, and select candidate species and their designated or proposed critical habitats (CH) from implementing the direction described in the proposed LRMP. The Prescott NF LRMP was prepared and revised as required by the National Forest and Rangeland Renewable Resources Planning Act of 1974, and as amended by the National Forest Management Act of 1975 (NFMA). Once finalized, the revised LRMP will replace the 1987 Prescott National Forest LRMP and its amendments.

The proposed LRMP is part of the land management planning process and provides forest-level direction to meet the Forest Service's mission during management of activities on the Prescott NF. LRMPs identify general land use purposes or suitability; future conditions that are desirable; goals and objectives for resource conditions on specific lands; and standards, guidelines, or other mechanisms that establish the management framework for all activities conducted and allowed on National Forest System (NFS) lands. LRMPs are developed and amended over time and must comply with the National Environmental Policy Act (NEPA) and the ESA. Site specific management actions (e.g., projects) implement the LRMPs and are also subject to individual NEPA and ESA requirements.

Because LRMPs do not prescribe the timing or exact location of specific land management activities, there is some uncertainty about the potential environmental consequences of implementing LRMP direction. This uncertainty extends to effects on federally listed/proposed species and designated/proposed critical habitats, as well as species that are candidates for Federal listing. This BA evaluates the predicted effects of LRMP programmatic direction that may result in site specific land management activities. The determination of effects for each species results from evaluating the expected outcome of implementing LRMP direction (i.e., objectives, standard and guidelines, suitability determinations, and management area direction) and assumes that LRMP guidance will be followed when site specific land management activities are carried out in the future. Amending a LRMP (e.g., deleting/adding/changing standards and guidelines and other plan components) either for site specific projects or programmatically (i.e., a permanent change for all future projects) should and will occur on an as needed basis to adaptively keep the LRMP up to date. Such amendments would be considered outside of the scope of this consultation and would require their own site specific ESA § 7(a)(2) consultation to address the effects of the proposed actions.

Please note, wildland fire suppression activities are covered under ESA § 7(a)(2) emergency procedures; therefore, they are not included in the proposed action for this consultation.

A tiered approach to ESA § 7(a)(2) consultation is warranted. This approach includes consultation at the LRMP programmatic level that will result in a biological opinion (BO) with an incidental take statement and reasonable and prudent measures with implementing terms and conditions (T&Cs), as applicable. Additionally, each site specific project/activity implemented

under the revised LRMP that may affect a listed species or critical habitat will undergo a separate ESA § 7(a)(2) consultation, which will be tiered to the programmatic level LRMP BO.

Biological Assessment Objectives

The objectives of this BA are to:

- **Comply** with requirements of § 7(a)(2) of the Endangered Species Act, as amended, for the Prescott NF proposed LRMP;
- **Review** the land management programs (Watershed and Soils, Wildlife, Fish and Rare Plants, Wildland Fire and Fuels Management, Recreation Management, Roads and Engineering, Wilderness and Special Areas, Lands and Special Uses, Minerals Management, Rangeland Management, and Forestry and Forest Health) to identify ongoing activities that may affect federally listed, proposed, and select candidate species and designated, proposed, and potential critical habitats;
- **Identify** plan components and other program guidance in the proposed LRMP that may affect federally listed, proposed, and select candidate species and designated, proposed, and potential critical habitats;
- **Determine** the potential direct, indirect, cumulative, and interrelated/interdependent effects of the programmatic direction and activities described in the proposed LRMP on all federally listed, proposed, and select candidate species and designated, proposed, and potential critical habitats within the action area.

Consultation History

Communications in the form of emails, phone calls, and face-to-face meetings have been a part of the collaboration and consultation process associated with the development of a proposed LRMP. The following are relevant to the development of this BA:

- **March 2013:** An initial list of species for consultation/conference consideration was sent to the USFWS Arizona Ecological Services Office (AESO).
- **March/April 2013:** Emails and conference calls occurred between members of the Prescott NF and USFS Southwestern Regional Office (RO) to provide advice on the development of an interagency Consultation Agreement (CA).
- **March/April 2013:** Emails and phone calls exchanged between Prescott NF and AESO regarding the content of a proposed CA. Agreed to meet in person to informally discuss the consultation process.
- **May 15, 2013:** Albert Sillas and Noel Fletcher (Prescott NF biologists) and Mary Rasmussen (Prescott NF planner), met with Brenda Smith, Brian Wooldridge, and Shaula Hedwall (AESO biologists) to discuss the consultation process, review the potential species list, review initial species effects determinations, and to identify the type of information needed to describe the proposed action. Several people from the USFS Regional Office participated by video conference including: Ron Maes and Steve Plunkett (RO Wildlife TE&S Team Leaders) along with Matt Turner and Michelle Aldridge (RO Planners).

- **May 16, 2013:** The proposed species list was updated to reflect information received during discussions on May 15.
- **May 23, 2013:** A signed copy of the CA was sent to all involved parties.
- **June-December 2013:** Prescott NF biologists compiled species information and developed effects determinations for several draft versions of the BA.
- **August and October 2013:** RO Wildlife TE&S Team Leaders conducted technical reviews of the draft BA.
- **October 30, 2013:** Albert Sillas and Noel Fletcher (Prescott NF biologists) and Mary Rasmussen (Prescott NF planner), met with Brenda Smith, Brian Wooldridge, and Shaula Hedwall (AESO biologists) to discuss changes in species listing status, effects determinations based on proposed actions, and consultation timelines.
- **January 8, 2014:** Copies of the draft BA and proposed LRMP were sent to USFWS AESO for a 30-day review.
- **January 24, 2014:** Request for formal consultation with transmittal of the final BA to USFWS AESO.

Species Addressed

Consultation on the Prescott NF proposed LRMP addresses the federally listed and proposed species, their designated or proposed critical habitats, and selected candidate species affected by the proposed action.

An effect determination of "May Affect, Not Likely to Adversely Affect" or "May Affect, Likely to Adversely Affect" will be made for all federally listed, proposed, and candidate species or habitats.

The experimental non-essential (10 (j)) populations addressed in this BA are treated as if they are proposed for listing; therefore, a Jeopardy or No Jeopardy effect determination will be made for the non-essential experimental populations of Colorado pikeminnow.

Table 1 identifies the 14 species (6 endangered, 2 threatened, 3 proposed [*threatened*], 2 candidate, and 1 experimental non-essential population), and the 6 designated, 2 proposed, and 1 potential critical habitats that are addressed in this BA.

Species with "No Effect" Determinations

During the effects analysis for this BA, it was determined that the implementation of the Prescott NF proposed LRMP would have "No Effect" to the following species:

- California condor
- Mexican gray wolf

These two species are not included or discussed further in this BA. USFWS concurrence is not being requested for "No Effect" determinations.

Table 1. Federally listed, proposed, and candidate species and designated, proposed, or potential critical habitats (CH) addressed in this BA

Common Name	Scientific Name	Federal Status	Critical Habitat	Effects Determinations
Fish				
Gila chub	*Gila intermedia*	Endangered	Yes - Designated	Species: May Affect, Likely to Adversely Affect CH: May Affect, Likely to Adversely Affect
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	Endangered	No	Species: May Affect, Likely to Adversely Affect
Gila trout	*Oncorhynchus gilae*	Threatened	No	Species: May Affect, Likely to Adversely Affect
Spikedace	*Meda fulgida*	Endangered	Yes - Designated	Species: May Affect, Likely to Adversely Affect CH: May Affect, Likely to Adversely Affect
Loach minnow	*Tiaroga cobitis*	Endangered	Yes - Designated	Species: May Affect, Likely to Adversely Affect CH: May Affect, Likely to Adversely Affect
Razorback sucker	*Xyrauchen texanus*	Endangered	Yes - Designated	Species: May Affect, Likely to Adversely Affect CH: May Affect, Likely to Adversely Affect
Colorado pikeminnow	*Ptychocheilus lucius*	Experimental non-essential	Yes – Designated for listed entity. No CH designated in Arizona.	Species: Not Likely to Jeopardize
Roundtail chub	*Gila robusta*	Candidate	*NA	Species: May Affect, Likely to Adversely Affect

Table 1. Federally listed, proposed, and candidate species and designated, proposed, or potential critical habitats (CH) addressed in this BA

Common Name	Scientific Name	Federal Status	Critical Habitat	Effects Determinations
Amphibians/Reptiles				
Northern Mexican gartersnake	*Thamnophis eques megalops*	Proposed Threatened	Proposed	Species: May Affect, Likely to Adversely Affect CH: May Affect, Likely to Adversely Affect
Narrow-headed gartersnake	*Thamnophis rufipunctatus*	Proposed Threatened	Proposed	Species: May Affect, Likely to Adversely Affect CH: May Affect, Likely to Adversely Affect
Sonoran desert tortoise	*Gopherus morafkai*	*Candidate*	*NA	Species: May Affect, Likely to Adversely Affect
Birds				
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	Yes - Designated	Species: May Affect, Likely to Adversely Affect CH: May Affect, Likely to Adversely Affect
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Yes - Designated	Species: May Affect, Likely to Adversely Affect CH: May Affect, Likely to Adversely Affect
Yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Proposed Threatened	Potential	Species: May Affect, Likely to Adversely Affect CH: May Affect, Likely to Adversely Affect

*NA = not applicable

Description of the Action Area

The action area addressed in this BA includes all lands under the jurisdiction of the Prescott NF and all adjacent lands that could be directly or indirectly affected by decisions or actions implemented under the direction of the proposed LRMP.

The Prescott NF occupies 1.25 million-acres of west-central Arizona within Yavapai and Coconino Counties (Figure 1), with nearly 97 percent occurring within Yavapai County. Adjacent lands include: the Coconino, Kaibab, and Tonto National Forests; the Agua Fria National Monument managed by the Bureau of Land Management; Arizona State Trust lands; and several communities including Prescott, Camp Verde, and Cottonwood. The Prescott NF is divided into three ranger districts: Bradshaw, Chino Valley, and Verde.

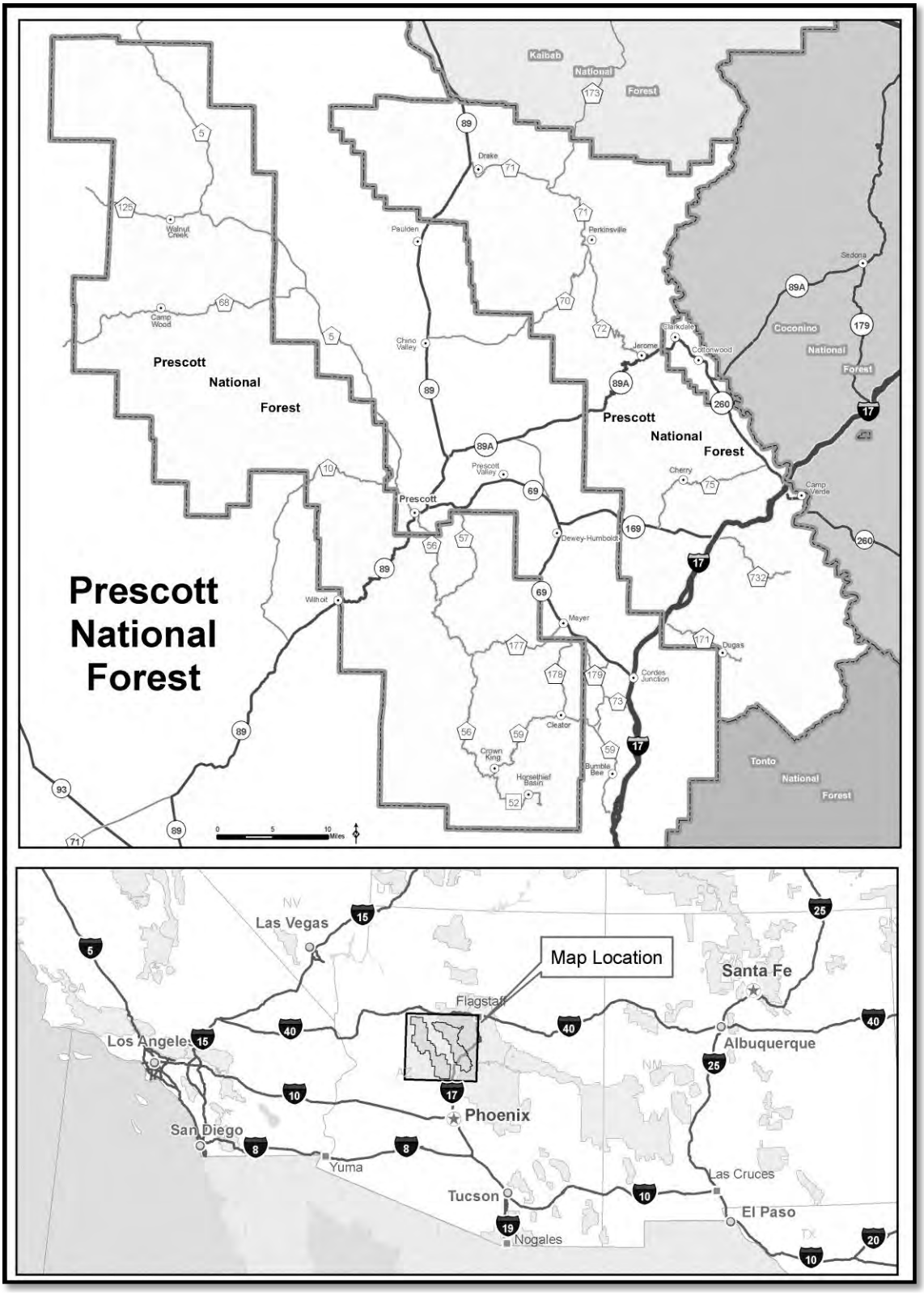

Figure 1. Vicinity map of the Prescott NF

Major Watersheds, Aquatic and Riparian Habitats

The Prescott NF land base falls within portions of eight subbasins; each subbasin is comprised of a number of watersheds, and watersheds are further divided into subwatersheds. The Prescott NF overlaps with portions of 22 watersheds and 127 subwatersheds. The hierarchical relationship of these hydrologic units is displayed below in Table 2. A map of the 5th level hydrologic units (watersheds) on the Prescott NF is displayed on the following page in Figure 2.

Table 2. Hierarchy of hydrologic units intersecting with the Prescott NF

River Basin 3rd level	Subbasin 4th level	Watersheds 5th level	Subwatersheds 6th level
Bill Williams River	Big Sandy	1	3
	Burro Creek	2	3
	Santa Maria	2	16
Verde River	Big Chino Wash	4	25
	Upper Verde	5	34
	Lower Verde	1	7
Lower Gila / Agua Fria Rivers	Agua Fria	5	30
	Hassayampa	2	9
	Totals	**22**	**127**

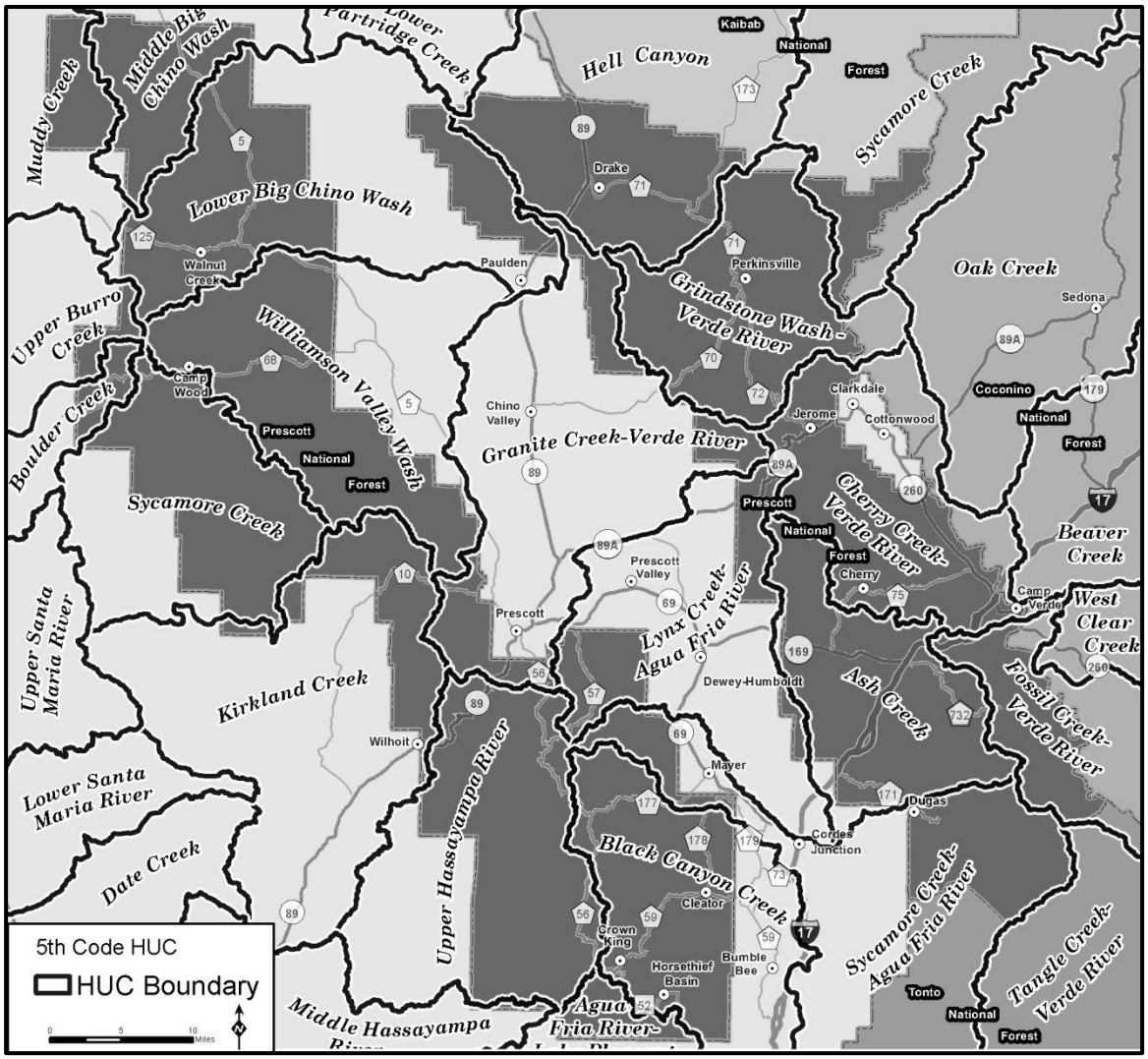

Figure 2. 5th level hydrologic units (watersheds) on the Prescott NF

Watershed Condition Classification (WCC)

A nationally consistent, science-based approach to classify the condition of all National Forest System (NFS) watersheds was developed by the Forest Service to identify outcome-based performance measures for watershed restoration. The result was the six-step Watershed Condition Framework. The Watershed Condition Classification (WCC) system (Forest Service, 2011b) is the first step in this process.

The WCC system uses 12 watershed condition indicators to assess and classify the overall state of a given subwatershed. These indicators and their attributes represent the underlying factors that affect soil and hydrologic function. Most of the indicators can be affected through management actions to maintain or improve watershed condition. This structure provides for a direct linkage

between the classification system and management or improvement activities that the Forest Service conducts on the ground.

Ninety-seven of the 127 subwatersheds were analyzed, and of these, 5 are made up entirely of NFS lands, and another 32 are at least 90 percent administered by the Forest Service. They vary from about 7,000 to over 48,000 acres in size, although in many cases, only a portion covers the Prescott NF.

Each of the 12 watershed condition indicators were assessed individually and then all were combined to produce an overall score which falls into one of three classes:

- **Class 1** - Functioning watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition and are functioning properly.
- **Class 2** - At risk watersheds exhibit moderate geomorphic, hydrologic, and biotic integrity relative to their natural potential condition and are functioning at risk of impairment.
- **Class 3** - Impaired watersheds exhibit low geomorphic, hydrologic, and biotic integrity relative to their natural potential condition and are functioning in an Impaired condition.

Table 3. Overall watershed condition class ratings on the Prescott NF

Condition Class	Number of Watersheds	Number of Sub-watersheds	USFS Acres	Non-USFS Acres	Total Acres
1 - Functioning	1	12	147,564	171,151	318,715
2 - At Risk	21	83	1,076,526	618,247	1,694,773
3 - Impaired	0	2	32,407	18,405	50,812

Source: Forest Service, 2011a and Forest Service, 2011c

As shown above (Table 3), 86 percent of the 97 subwatersheds are rated overall as being in an at risk condition. The Cherry Creek and Hayfield Draw subwatersheds were rated as Impaired. The twelve subwatersheds that make up the Lower Big Chino watershed were rated as functioning.

In 4 of the 21 at risk watersheds, there has been a decline in the number of aquatic species that were historically present (Table 4). Native fish populations within the Lower Colorado River subregion have experienced declines in their distribution because of loss or modification of habitat, and from competition and predation by introduced nonnative species. Only 9 of the 15 native fish species known to occur in the subregion currently occur within the Prescott NF.

Table 4. Aquatic species no longer present

Sub-basin	Watershed	Historically Occurring Species No Longer Present
Agua Fria	Ash Creek/Sycamore Creek	Gila topminnow Northern Mexican gartersnake
Upper Verde River	Cherry Creek	Colorado pikeminnow Loach minnow Razorback sucker Spikedace
	Grindstone Wash	Colorado pikeminnow Razorback sucker
Lower Verde River	Fossil Creek	Gila trout

Source: Forest Service, 2009

Aquatic Habitats

Big Sandy River, Burro Creek, and Santa Maria River subbasins all flow to the Bill Williams River basin, which empties into the mainstem of the Colorado River near Parker, Arizona. The Big Chino Wash, Upper Verde, and Lower Verde subbasins form the Verde River basin, which joins the Salt River, a tributary to the Gila River, near Phoenix, Arizona. The Agua Fria and Hassayampa subbasins drain into the Middle Gila River basin, downstream from its confluence with the Salt River.

There are 79.4 miles of perennial stream on the Prescott NF, the main one being the Verde River, which extends about 52 miles across the forest. There are approximately 38 miles of river within the Granite Creek and Grindstone Wash 5th level watersheds that form the upper Verde River. This section of river is potentially eligible for inclusion in the National Wild and Scenic Rivers System. The upper Verde River also has a proposal to build a fish barrier for the management of listed fish species under the biological opinion for the Central Arizona Project (Fish and Wildlife Service, 2008). The next 40 miles of the Verde River flows through the Verde Valley within the Cherry Creek and Fossil Creek 5th level watersheds. This reach of the river is mainly in private ownership and is highly altered from water diversions and development. There are only about 5 miles of Prescott NF lands in this section that provide public access to this part of the Verde River. The next 15.5 miles of the river on the Forest are part of the Verde Wild and Scenic River (41 mile designated reach) that falls within the Fossil Creek 5th level watershed. The other 27 miles of streams within the Prescott NF are perennial intermittent or intermittent. These streams are mainly in the Ash Creek-Sycamore Creek and Upper Hassayampa River 5th level watersheds.

Riparian Habitats

The Riparian Gallery Forest vegetation type on the Prescott NF occurs along perennial or intermittent streams and around springs and seeps. It covers approximately 12,400 acres, represents less than 1 percent of the total forest acreage, and ranges in elevation from 2,000 to 8,000 feet (Forest Service, 2009). It contains approximately 7,496 acres of understory habitat and 4,247 acres of overstory habitat. The two major vegetation communities within it are cottonwood-

willow and mixed broadleaf deciduous forests. The dominant woody vegetation varies according to elevation, substrate, stream gradient, and depth to groundwater. This contributes to the mix of vegetative structures within the type, including riparian forests, woodlands, and shrublands. Common species include Fremont cottonwood, narrowleaf, Gooding, and Bebb willow, Arizona sycamore, velvet and green ash, Arizona alder, Arizona walnut, and box elder. Herbaceous plants include several forbs, sedges, rushes, and grasses. Current vegetation shows a high similarity to desired conditions; the difference between existing and desired conditions is mainly due to the presence of tamarisk and other nonnative plants.

Major Vegetation Community Types

The Prescott NF uses potential natural vegetation types (PNVTs or vegetation types) to describe and map units of similar vegetation, soil, climate, and ecosystem disturbance across the landscape.

Table 5 summarizes the current conditions for the 10 PNVTs that occur on the Prescott NF. The information is based on mid-scale vegetation assessments compiled in 2010. For most of the PNVTs, the vegetation and fire characteristics currently exhibit a low or moderate similarity to the desired conditions. These PNVTs are the focus for restoration treatments identified in the proposed LRMP. Current conditions and ecosystem concerns summarized here are described in greater detail for each PNVT in the proposed LRMP.

Table 5. Current conditions of PNVTs found on the Prescott NF

PNVT Name	Acres	Percent of PNF Area	Similarity to Desired Conditions		Management Concerns
			Vegetation Structure	Fire Regime	
Semi-Desert Grassland	125,712	10	Low	Low	Lack of desired fire disturbance; tree and shrub encroachment; increases in exposed soil surface and spread of nonnative plants.
Great Basin Grassland	38,389	3	High	Moderate	
Juniper Grassland	137,274	11	Moderate	Moderate	Lack of desired fire disturbance; increased tree and shrub density and canopy cover; lack of perennial grasses and forbs.
Piñon-Juniper Evergreen Shrub	463,296	37	Low	Moderate	
Piñon-Juniper Woodland	36,263	3	High	High	
Interior Chaparral	315,445	25	High	High	Wildfire threat to human life and property.
Ponderosa Pine-Evergreen Oak	63,539	5	Low	Low	Increased tree and shrub density; increased fuel load, increased risk of uncharacteristic high intensity fire, proximity to human life and property.
Ponderosa Pine-Gambel Oak	49,052	4	Low	Low	
Desert Communities	5,919	<1	High	High	Threat of human-caused fire.
Riparian Gallery Forest	12,439	1	High	High	Dewatering; trampling of vegetation.
Grand Total:	1,247,328	100			

Proposed Action

Background

The proposed action analyzed in this BA is the implementation of the management direction provided in a revised LRMP for the Prescott NF. The proposed LRMP provides forest-level direction to meet the Forest Service's mission during management of activities on the Prescott NF. The proposed LRMP does not specifically authorize individual projects or activities. Site specific actions will be subject to future and separate ESA § 7(a)(2) consultations, as required, but the programmatic approach to project guidance nested within should expedite consultations that are within the LRMP sideboards.

The planning period for the proposed LRMP is the 15 years immediately following LRMP approval[1] or until the LRMP is revised, which ever applies. For this consultation, the effects of plan implementation (achieving or progressing towards desired conditions through application of standards and guidelines and treatment rates [objectives] over 10 years) will be measured against current (baseline) conditions. The intent is to accomplish all of the objectives within 10 years of plan approval, but operationally, it may take up to 15 years to achieve some objectives if there are unexpected environmental events or changes in staffing or budget levels.

The proposed LRMP includes the following types of direction (i.e., plan components):

- **Desired conditions** are goals that express an aspiration, often to achieve long-term ecosystem restoration and resiliency. They form the basis for projects, activities, and uses that will occur under the LRMP. Site specific projects will be designed to maintain or move towards desired conditions over the long term. Desired conditions provided in the proposed LRMP include important ecosystem elements like resilience to climate change, airsheds, watersheds, vegetation, aquatic and terrestrial wildlife; as well as social and cultural resources including recreation, wilderness, scenic beauty, open space, transportation system, and public access and use opportunities for the Prescott NF.
- **Objectives** are the short-term mechanisms to reach desired conditions over the long-term. Objectives are generally the actions proposed to reach certain short-term goals over the planning period. Objectives have two parts: a quantifiable outcome and a time in which to achieve the outcome. There is intent to meet the outcome of objectives during the planning period. Although they are considered realistic short-term goals, there may be unforeseen operational, logistical, environmental, political, or financial considerations that may influence the outcome. To accommodate potential uncertainty, there is a stated or implied range of values for the outcome (e.g., acres treated during the proposed action period).
- **Standards and guidelines** set sideboards on the achievement of desired conditions and objectives by setting requirements to limit or guide forest uses or activities that are expected to occur under the LRMP. Standards are activity or project design constraints that must be followed; guidelines allow for some variance from the exact wording, as long as the intent of the guideline is met. Thus, standards and guidelines are often mitigative measures placed on objectives. The plan components being consulted on are most often objectives with effects tempered by their mitigative standards and guidelines.

[1] Section 219.10(g) – 1982 planning rule

- **Suitability determinations** identify areas of land as suitable or unsuitable for the specific uses of timber, livestock grazing, and recreation activities.
- **Management area and special designations**, or recommendations for special designations, identify areas with differing desired conditions, uses, standards, and/or guidelines than the forestwide plan direction. Examples include wilderness, botanical areas, and wild and scenic rivers. Consultation applies to the management direction identified for these areas and designations in addition to those that apply forestwide.
- **Monitoring and evaluation** requirements for LRMP implementation are used to: (1) determine the degree to which on-the-ground management is maintaining or making progress towards desired conditions, (2) evaluate plan implementation effectiveness, and (3) inform adaptive management. Required monitoring and evaluation are part of the proposed actions being consulted on.

The proposed LRMP that accompanies this BA organizes the types of plan components described above into a chapter-by-chapter format. For example, chapter 2 of the LRMP contains all of the forestwide desired conditions. Chapter 3 contains the list of objectives. Chapter 4 contains all of the forestwide standards and guidelines, etc. Additionally, individual plan component elements each have a unique identifying label consisting of three parts: (1) type of plan component (e.g., a desired condition, objective, or guideline); (2) resource area (e.g., vegetation, recreation, or heritage); and (3) number. Abbreviations are used to shorten these labels. The following examples illustrate this scheme: "DC-Veg-1" relates to the first listed desired condition for vegetation; "Obj-7" relates to the seventh objective listed[2]; and "Guide-AF MA-1" relates to the first listed guideline for the Agua Fria Management Area. See Figure 3 below for a more graphic example.

DC- Resource Area-1	Specific desired conditions described here…

Figure 3. Visual example of plan component

The proposed LRMP document is a source for more information and the exact language contained within individual elements of the various types of plan components referenced throughout this BA.

The emphasis on plan components should not imply that the Prescott NF is only consulting on those specific parts of the LRMP. All stated and implied actions of the various program areas (e.g., range management, recreation, wilderness, etc.) are also management actions being consulted on.

Description of the Proposed Action by Program Area

The proposed LRMP directs how current and future activities will be implemented for the land and resource programs managed by the Prescott NF. The program areas described in this BA are: Watersheds and Soils; Wildlife, Fish and Rare Plants; Wildland Fire and Fuels Management;

[2] The numbering scheme for objectives does not include abbreviations for individual resource areas.

Recreation; Transportation; Wilderness and Special Areas; Lands and Special Uses; Minerals Management; Rangeland Management; and Forestry and Forest Health.

The sections that follow provide a summary of the ongoing and future activities for each program for the 15 years following approval of the proposed LRMP.

Watershed and Soils

The Watershed and Soils program is responsible for maintaining or improving the condition of watersheds managed by the Prescott NF. Methods used to meet the overall objectives of the program include assessing watershed condition; prioritizing watersheds for protection or improvement; coordinating with other Federal, State, and tribal agencies; securing water rights under State or Federal law to meet NFS management; improving and maintaining water quality through the use of best management practices (BMPs); improving and protecting riparian areas and other groundwater dependent ecosystems; protecting floodplains; and planning and implementing burned area emergency response (BAER) activities. Future projects would be designed to protect and improve watershed condition and would employ best management practices, standards and guidelines, and mitigation measures to protect soils and watershed resources.

Desired conditions for watersheds and soils include:

- The quantity and timing of waterflows in streams, seeps, springs, and wetlands is sustained at a level that retains or enhances essential ecological functions.
- Water quality is sustained at a level that retains the biological, physical, and chemical integrity of the aquatic systems and benefits survival, growth, reproduction, and migration of native and desired nonnative aquatic species (e.g., sportfish). Characteristics include:
    - Water quality meets Arizona water quality standards and supports designated beneficial uses and native and desired nonnative aquatic species.
    - Short-term exceedance of water quality standards (i.e., temporary period of declining water quality) due to management activity occurs only in the anticipation of long term improvement of watershed condition and water quality.
- Soil and vegetation functions in upland and riparian settings are retained or enhanced to facilitate precipitation infiltration and groundwater recharge.
- Watersheds support sustainable levels of forage for browsing and grazing animals, timber production, and recreation opportunities with no long term decline in watershed conditions.
- Riparian corridors are intact and are trending toward properly functioning condition across the landscape.
- Stream channels and associated flood plains occur within their natural flow regimes.
- In the flood plains and channels of deciduous forest dominated riparian corridors, coarse woody debris is found in sufficient quantities to provide instream transitory pool-like

habitat; shading from intense solar radiation; and organic particles for use as food by fish and aquatic invertebrates.

- Access to food, water, cover, nesting areas, and protected pathways for aquatic and upland species is maintained between aquatic and upland components (e.g., logs, ground vegetation).
- Soil productivity, function, and inherent physical, chemical, and biological processes remain intact or are enhanced.
- Elements necessary to sustain soil productivity and function include:
    - Logs and other woody material are distributed across the soil surface to maintain soil function within the limitations of individual PNVTs.
    - Soil loss does not inhibit soil function. Limited soil compaction does not affect ecological and hydrological functions.
    - Vegetative ground cover, including biological soil crusts (i.e., soil consisting of cyanbacteria, lichens, mosses, and algae organisms), provides stability and fertility for soil function.
    - Vegetative ground cover is distributed across the soil surface in sufficient proportions to meet or trend toward "natural" conditions listed for each map unit in the terrestrial ecosystem survey.
- Soils with a condition rating below satisfactory (i.e., impaired or unsatisfactory) do not further decline in function and trend toward a satisfactory rating where environmental factors allow.
- The municipal supply watersheds contributing to the upper Verde River contain vegetation and soil conditions that support desired water quality and quantity for the communities in the Verde Valley and the municipality of Phoenix.
- The municipal watershed surrounding Goldwater Lakes provides a supply of clean water for the city of Prescott (from Granite Creek and Groom Creek).
- Wetlands, seeps, springs, wet meadows, and associated wetlands or riparian systems develop and support stable herbaceous and woody vegetative communities with root masses that stabilize streambanks, flood plains, shoreline, and soil surfaces.
- The natural hydrologic and geomorphic processes inherent to these groundwater dependent ecosystems function at a level that allows retention of their unique physical and biological properties.

The proposed LRMP has four objectives that direct watershed and soils program activities:

- **Obj-18** includes direction to implement 5 to 50 essential projects within high-priority watersheds that improve or maintain watershed conditions during the 10 years following plan approval. Activities could include, but would not be limited to, range improvements to distribute grazing, treatments to increase vegetative ground cover, stream stabilization, and mining restoration.
- **Obj-19** includes direction to implement projects to counter 1 to 3 critical threats to riparian system functionality during the 10 years following plan approval. Activities

could include, but are not limited to, vegetation reestablishment, nonnative invasive plant treatments, erosion control, instream habitat improvement, adjusting the timing and season of grazing, or fencing.

- **Obj-23** includes direction to maintain or enhance 25 to 55 discrete sites that are water dependent ecosystems containing seeps and springs during the 10 years following plan approval.
- **Obj-31** includes direction to apply for at least 8 instream flow water rights to enable the Prescott NF to provide for channel and floodplain maintenance and recharge of riparian aquifers during the 10 years following plan approval. National forests may apply to the State (Arizona Department of Water Resources) to obtain water rights on instream flows within rivers that flow through a national forest. Usually this is based on the need for water to support wildlife and/or recreation.

Standards and guidelines for watershed and soils include:

- Construction or maintenance equipment service areas shall be located at least 100 feet from the edges of all riparian corridors, seeps, and springs to prevent gas, oil, or other contaminates from washing or leaching into aquatic and riparian habitats.
- Equipment working on open water and wetlands shall be cleaned prior to entry into such areas to remove gas, oil, and other contaminants.
- Containment measures shall be employed within 100 feet from the edge of all riparian corridors, seeps, and springs for storage of fuels and other toxicants to prevent degradation of water quality and aquatic habitat.
- Ground-disturbing projects should not alter the long term hydrologic regime within 6th level hydrologic units (subwatersheds). The long term hydrologic effects analysis should evaluate:
    - Level of disturbance
    - Type of activity
    - Soil, geologic, and streamflow characteristics and expected recovery periods
- Watershed projects that provide surface water for municipal use should be given high priority.
- Riparian-dependent resources should be managed to maintain and improve productivity and diversity of riparian-dependent species. Riparian communities should provide for the sustainability of aquatic and riparian species.
- Adverse impacts to stream channel features (e.g., streambanks, obligate riparian vegetation) should be minimized by modifying management actions. Examples of modification could include, but are not limited to, adjusting timing and season of grazing, limiting use and location of heavy machinery, or avoiding placing trails or other recreation structures where recreation use could negatively affect stream channel features.
- Ground cover sufficient to filter runoff and prevent erosion should be retained in riparian corridors, seeps, and springs.
- New infrastructure or facilities (e.g., roads, trails, parking lots, trailheads, and energy transmission lines) should be located outside of riparian corridors. If crossing such areas

with transmission lines is unavoidable, design features should be used to maintain hydrologic function and minimize impacts on riparian habitats.

- Infrastructure or facilities locations that lead to erosion or negative impacts to riparian systems should be mitigated/corrected. If no permanent correction is possible, they should be relocated outside of riparian corridors as opportunities arise.
- Operation of heavy equipment, such as dozers, backhoes, or vehicles, in stream channels, seeps, and springs should be avoided. If use of equipment in such areas is required, site specific design features should be implemented to minimize disturbance to soil and vegetation. Restoration or stabilization should occur immediately following disturbance.
- Along perennial streams, perennial intermittent streams, and spring ponds, mitigations such as offsite water for livestock should be provided to reduce impacts on riparian communities and groundwater dependent sites.
- Measures that restrict use should be considered as a way to mitigate recurring negative impacts to aquatic species and riparian plants. These could include, but are not limited to, installation of barriers, road closures, area closures, or seasonal restrictions.
- Watershed projects that increase herbaceous ground cover within piñon-juniper PNVTs should be given high priority.
- Projects should be designed to limit activities that would cause long term impacts to soils such as loss of ground cover, severely burned soils, detrimental soil displacement, erosion, puddling, or compaction. Where disturbance cannot be avoided, project-specific soil and water conservation practices should be developed.
- Down logs and coarse woody debris should be retained at the appropriate tonnage per PNVT as outlined in the "Vegetation" desired condition sections to retain soil productivity.
- Operation of heavy equipment, such as dozers, backhoes, or vehicles, on slopes with a grade of 40 percent or greater should be avoided. If use of equipment in such areas is required, site specific design features should be implemented to minimize disturbance to soil and vegetation.
- Project-specific design features to avoid soil impacts should be used when projects occur on slopes with a grade of 40 percent or greater or on soils that are sensitive to degradation when disturbed.
- Ground disturbing activity should be avoided when the soil moisture level is such that activity would cause damage to the soil character or function.

Wildlife/Fish/Rare Plants

The Wildlife/Fish/Rare Plants program involves a variety of activities conducted by the USFS and its partners, including inventory and monitoring, habitat assessments, habitat improvements through land treatments and structures, species reintroductions, development of conservation strategies, administrative studies, collaboration with research, and information and education.

The Wildlife/Fish/Rare Plants program is tasked to manage habitats for all existing native and desired nonnative wildlife, fish, and plant species in order to maintain viable populations (FSM 2620.1). Habitat planning and evaluation are integral to meeting the goals for ensuring the continued existence of wildlife, fish, and plants generally throughout their geographic range, and much of this habitat enhancement is accomplished by the involvement of fisheries biologists, wildlife biologists, and botanists in project planning and implementation.

Desired conditions for Wildlife/Fish/Rare Plants include:

- Habitats that support populations of Southwestern Region sensitive species are enhanced to provide ecological conditions that facilitate the life history, distribution, and natural population fluctuations of the species within the capability of the ecosystem.
- Fire plays a role in maintaining wildlife habitat for species associated with fire-adapted systems.
- Wildlife in habitats associated with animal movement corridors are free from human harassment.
- Avian and mammal fatality and habitat alteration associated with existing and proposed power lines, corridors, energy development (i.e., wind and solar), and cell towers is minimized through implementation of design features and guidelines.
- Terrestrial habitats are free of negative impacts from nonnative or feral species.
- Vegetation conditions for federally listed species are consistent with existing recovery plans.
- Ecological conditions provide habitat for associated federally listed species. Habitat conditions generally contribute to survival and recovery, and contribute to the delisting of species under the ESA.
- Improved habitats for candidate and proposed species help preclude species listings as threatened or endangered under the ESA.
- Streams, springs, and wetlands with the potential to support native fish and/or other aquatic species provide habitats that are resilient or adaptive to natural disturbances and projected warmer and drier climatic conditions.
- Quantity and timing of waterflows are maintained in streams, seeps, springs, and wetlands to retain or enhance aquatic habitat and ecological functions.
- Water quality is sustained at a level that retains the biological, physical, and chemical integrity of the aquatic systems and benefits survival, growth, reproduction, and migration of native aquatic species.
- Riparian vegetative communities within these aquatic habitats are intact and trending toward properly functioning condition.
- Aquatic habitats are free of negative impacts from nonnative plant and animal species.
- Desired nonnative fish species are present only where recreational fishing opportunities are emphasized.

- Aquatic and riparian conditions for federally listed species are consistent with existing recovery plans.
- Ecological conditions provide habitat for associated federally listed species. Habitat conditions generally contribute to survival and recovery, and contribute to the delisting of species under the ESA.
- Improved aquatic and riparian habitats for candidate and proposed species help preclude species listings as threatened or endangered under the ESA.
- Ecological conditions provide suitable habitat for plants identified as Southwestern Region sensitive species.
- Locally endemic plant communities are intact and functioning.
- Unique plant community habitats (e.g., limestone cliffs, margins of seeps and springs, Verde Valley Formation, basalt-lava flows/cinders, calcareous soil/alkaline clay, canyons/cliffs and ledges, granitic soils/igneous rocks, sandstone rocks/soils and riparian forest) are present to maintain well distributed populations of associated native plant species.
- Native plants provide nectar, floral diversity, and pollen throughout the seasons that pollinator species are active. Desired habitat conditions promote pollinator success and survival.
- Species identified as culturally important are valued and, therefore, enhanced and protected.

The proposed LRMP has five **objectives** that direct Wildlife/Fish/Rare Plants program activities:

- **Obj-24** includes direction to restore native fish species to 2 to 3 stream reaches during the 10 years following plan approval. Possible locations for restoration of native species include reaches along the upper Verde River as well as portions of Sycamore Creek, downstream from Pine Mountain Wilderness.
- **Obj-25** includes direction to modify or remove at least 3 to 5 miles of fence to facilitate pronghorn antelope movement during the 10 years following plan approval.
- **Obj-26** includes direction to treat 15,000 to 90,000 acres to increase pronghorn antelope habitat quantity and quality during the 10 years following plan approval. Prescribed burning, mechanical tree removal, or other treatments included as part of objectives 1, 2, and 3 may help to fulfill the intent of this objective.
- **Obj-27** includes direction to treat 2 to 3 areas to facilitate pronghorn migration during the 10 years following plan approval. Doing this habitat improvement activity focuses on providing open habitat that allows pronghorn to avoid predators and move across the landscape.
- **Obj-28** includes direction to improve up to 25 existing and 5 new water developments for wildlife during the 10 years following plan approval.

Standards and guidelines for Wildlife/Fish/Rare Plants include:

Terrestrial Wildlife Species

- Habitat management objectives and terrestrial species protection measures from approved recovery plans should be applied to activities occurring within federally listed species habitat.
- Design features and mitigation measures should be incorporated in all Forest Service projects as needed to ensure that Southwestern Region sensitive species do not trend toward listing as threatened or endangered species.
- Design features and mitigation measures should be incorporated in all Forest Service projects as needed to ensure compliance with other Federal laws governing wildlife such as, but not limited to, Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act.
- For pronghorn antelope, the following should occur:
    - When scheduling activities in pronghorn fawning areas, provide adequate cover and time activities to minimize disturbance.
    - Evaluate opportunities to enhance pronghorn migration routes when identifying priorities for vegetation treatments within grassland PNVTs.
    - Use fencing that allows pronghorn passage when replacing fences or building new fences. Specifications should be based on most recent AZGFD fencing guidelines related to wire heights, distance between posts, and distances between strands of fence wire.
    - As pronghorn habitat improvements to maintain pronghorn travelways are proposed, work done by AZGFD and other partners should be considered.
    - Within identified pronghorn habitat, juniper trees that have been cut down should be treated so that pieces lie no higher than 18 inches above the ground.
- For cavity nesting birds, snags should be retained at levels indicated in PNVT desired condition statements, if available, and replaced at natural recruitment rates.
- For raptors as each nest site (e.g., stick nest, cliff, ledge, cavity) is identified:
    - Size and structure of raptor species' nest stands should be maintained.
    - Disturbance at nest sites during the breeding season should be minimized.
- For bats, the following should occur:
    - Where known bat use and concentrations of bats occur (e.g., maternity colonies, hibernacula, or seasonal roosts), measures to maintain habitat and reduce disturbance by human activities through use of seasonal or permanent access restrictions should be used. These habitats generally include abandoned mines, caves, bridges, rock crevasses, old buildings, or tree snags.
    - Bat occupancy should be assessed when considering closing abandoned mines (and caves).
    - When closing mines or caves occupied by bats, use appropriate closure protocols, and consider the installation of bat-friendly closure devices.

- Containment and decontamination procedures should be used to avoid spread of white-nose syndrome (*Geomyces destructans* fungus). Forest Service guidance dated July 21, 2010, or most recent decontamination procedures should be used.
- Where goshawks exist:
    - A minimum of six nest areas (known and replacement) should be located per territory. Goshawk nest and replacement nest areas should generally be located in drainages, at the base of slopes, and on northerly (northwest to northeast) aspects. Nest areas should generally be 25 to 30 acres in size.
    - Goshawk post-fledgling family areas (PFAs) of approximately 420 acres in size should be designated surrounding the nest sites.
    - Human presence should be minimized in occupied goshawk nest areas during nesting season of March 1 through September 30.
    - Management activities and human uses for which the Forest Service issues permits (excluding livestock permits) should be restricted within active nest stands during the active nesting period unless disturbance is not likely to result in nest abandonment.
- Projects should be designed to minimize the long term impacts to wildlife from human activities in or adjacent to animal movement corridors.
- Water developments or open impoundments, such as those for wildlife, livestock, or mining operations, should incorporate design features to prevent animal entrapments or assist in escape.
- All open top vertical pipes with an inside diameter greater than one inch should incorporate design features to prevent animal entrapments. Examples could include pipe for used for fences, survey markers, building plumbing vents, or sign posts.

Aquatic and Riparian Wildlife Species

- Habitat management objectives and aquatic/riparian species protection measures from approved recovery plans should be applied to activities and special uses occurring within federally listed species habitat.
- Design features, mitigation, and project timing considerations should be incorporated into ground-disturbing projects that may affect Southwestern Region sensitive species' occupied habitat near streams, seeps, and springs. Examples include, but are not limited to: undisturbed areas, timing restrictions, adjusted intensity of use, and avoiding use of large equipment.
- Water developments (such as a diversion or well) should be avoided near streams or seeps and springs where there is high risk of dewatering aquatic habitats.
- To prevent the spread of invasive species and fungal disease within aquatic habitats, the following should be cleaned of plant, animal, and mud material before coming into the Prescott NF:
    - Mechanized equipment and tools used for projects
    - Equipment (including suction dredges and hoses)
    - Watercraft, boating equipment, and personal gear (e.g., personal flotation devices, waders, wading boots/shoes) used for projects or surveys

  - Gear used for permitted activities
  - Items should again be cleaned at takeout and suction devices should be drained and cleaned prior to leaving the project site.

Native, Rare, or Endemic Plant Species

- Collection of Southwestern Region sensitive plants shall occur for research or scientific purposes only.
- When treating nonnative and invasive plant species to protect endangered, threatened, proposed, and candidate wildlife and plant species and their habitats, design features in appendix B of the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds (Forest Service, 2005a) or the most current direction must be followed.
- Design features and/or mitigation measures should be incorporated in all Forest Service projects, as needed, to insure that Southwestern Region sensitive plant species do not trend toward listing as threatened or endangered species.
- Applicable design features in appendix B—Design Features, Best Management Practices, Required Protection Measures and Mitigation Measures—from the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds (Forest Service, 2005a) or more current direction—should be followed in treating nonnative invasive plant species and for managing site disturbing projects and maintenance.
- Efforts to improve severely disturbed sites, especially those within the vicinity of occupied Southwestern Region sensitive plant species habitat, should be undertaken to reduce nonnative invasive plant species colonization, protect soils, and improve watershed condition.
- In choosing materials for revegetation, the following should be used:
  - Plant or seed materials that are appropriate to the site, capable of becoming established, and are not listed as a State noxious weed species.
  - Certified weed-free seed and weed-free erosion control materials.
- In cases where plant collection permits are issued, collecting seeds or cuttings should be encouraged; while digging or physically removing whole plants should be discouraged.
- Within the Verde Formation:
  - New developments for mineral materials and motorized trails should be located outside of areas identified as medium or high potential rare plant habitat.
  - Plant surveys for Southwestern Region sensitive species should be carried out before using any heavy equipment for the implementation of projects.

Wildland Fire and Fuels Management

The Fire Management program combines elements of wildland fire prevention, response and management; post-fire area stabilization and rehabilitation; and hazardous fuels planning, implementation, and monitoring.

Wildland fire is defined as any nonstructural fire that occurs in vegetation or natural fuels, and it is further categorized as either wildfire or prescribed fire. Wildfires are fires with unplanned ignitions including lightning or unauthorized and accidental human-caused actions. Prescribed fires are intentionally ignited by the Forest Service under an approved plan to meet specific objectives.

Management actions taken in response to wildfires are not planned, so they are covered under ESA § 7(a)(2) emergency procedures. Therefore, they are not included as part of the proposed action for this consultation. However, the Forest Service expects to work closely with the USFWS on management responses and emergency consultation procedures as wildfires occur during the life of the LRMP.

Prescribed fire and mechanical treatments are actions that are part of the hazardous fuels program designed to protect communities, watersheds, and species at risk; and to restore and maintain resilient ecosystems. Fuel reduction activities focus on treating landscapes in fire regimes I, II and III, adjacent to the wildland-urban interface (WUI) areas; that are in condition class 2 or 3.

Desired conditions related to Wildland Fire and Fuels Management include a focus on establishing ecosystem resilience as listed below along with the PNVT-specific desired conditions listed in the proposed LRMP (i.e., DC-Veg-1 and DC-Veg-6 through DC-Veg-23):

- Ecosystems retain all of their essential components, processes, and functions under changing and uncertain future environmental conditions. These resilient ecosystems provide a wide range of ecosystem services for local and regional needs.
- Prescott NF landscapes retain capacity to survive natural disturbances and threats to sustainability such as those driven by climate change and an increasing human population.
- Ecosystem functions (e.g., nutrient cycling, water infiltration, and carbon sequestration) are sustained as forests, woodlands, grasslands, and desert communities adapt to changing conditions.
- Ecosystems are resilient or adaptive to changing natural disturbance regimes (e.g., drought, wind, fire, insects, and pathogens), allowing for shifting of plant communities, structure, and ages across the landscape.
- Ecological conditions for habitat quality, distribution, and abundance contribute to self-sustaining populations of terrestrial and aquatic plants and animals. Conditions provide for the life history, distribution, and natural population fluctuations of the species within the capability of the ecosystem.
- Contiguous blocks of habitat are interconnected, support a wide array of native species, and allow for genetic and behavioral interactions.
- Habitat quality distribution and abundance exist to support recovery and/or stabilization of federally listed and other species.

The proposed LRMP has five objectives that direct Wildland Fire and Fuels Management activities:

- **Obj-1** includes direction for 25,000 to 65,000 acres of wildland fire within the Semi-Desert Grassland PNVT during the 10 years following plan approval.
- **Obj-2** includes direction for 1,000 to 5,000 acres of wildland fire within the Great Basin Grasslands PNVT during the 10 years following plan approval.
- **Obj-3** includes direction for 20,000 to 90,000 acres of wildland fire or mechanical treatments within the Juniper Grasslands, Piñon-Juniper Evergreen Shrub, and Piñon-Juniper Woodlands PNVTs during the 10 years following plan approval.
- **Obj-4** includes direction for 40,000 to 100,000 acres of wildland fire or mechanical treatments within the Interior Chaparral PNVT during the 10 years following plan approval.
- **Obj-5** includes direction for 25,000 to 50,000 acres of wildland fire within the Ponderosa Pine-Evergreen Oak and Ponderosa Pine-Gambel Oak PNVTs during the 10 years following plan approval.

As explained in the objectives section of the proposed LRMP (chapter 3), wildland fire includes two management approaches or tools: prescribed fire and wildfire managed to meet resource objectives. Programmatically, both tools will be used to maintain or trend toward desired conditions. The opportunity to manage wildfires to meet resource objectives is difficult to quantify; however, when conditions allow, such wildfires would be used in conjunction with prescribed fires to meet the desired outcomes (acreage targets) identified in a given objective.

To estimate the effects of mechanical treatments and prescribed fire actions that are proposed as part of the wildland fire program, the following parameters were used:

- Management activities including tree thinning, shrub removal and prescribed fire were modeled for each PNVT (Vegetation Dynamics Development Tool [VDDT], Version 6.0.25) to estimate movement toward or away from desired conditions over time. The modeling results included estimates of the proportions for each vegetation state within a PNVT. Table 6 displays the proposed treatments acres by vegetation type that were modeled and the expected progress towards desired conditions.
- For the proposed LRMP, the projected amount of acres treated with prescribed fire is 253,000 acres after 10 years. This is equal to an annual treatment rate of about 25,000 acres across all vegetation types. The projected amount of acres treated by mechanical means to remove wildland fuels is 35,000 acres after 10 years. This is equal to an annual treatment rate of about 3,500 acres focused on the Interior Chaparral vegetation type. Mechanical treatments are also proposed for the ponderosa pine and piñon-juniper PNVTs. However, these treatment acres are discussed under the Forestry and Forest Health program description (Table 7) and are not shown here in Table 6.

Table 6. Projected acres treated after 10 years and expected outcomes by PNVT

PNVT Name	PNF Acres	Proposed Treatments (Acres)		Similarity to Desired Conditions After 10 Years
		Prescribed Fire	Mechanized Fuel Removal	
Semi-Desert Grassland	125,712	65,000	0	Improves from low to moderate similarity
Great Basin Grassland	38,389	5,000	0	Retains high similarity
Juniper Grassland	137,274	8,000	*	Remains at moderate similarity
Piñon-Juniper Evergreen Shrub	463,296	60,000	*	Improves from low to moderate similarity
Piñon-Juniper Woodland	36,263	0	0	Improves from low to moderate similarity
Interior Chaparral	315,445	65,000	35,000	Retains high similarity
Ponderosa Pine-Evergreen Oak	63,539	40,000	*	Improves from low to moderate similarity
Ponderosa Pine-Gambel Oak	49,052	10,000	*	Remains at low similarity

Source: Forest Service 2012 (Prescott NF LRMP DEIS, Appendix B Table 15)

*See Forestry and Forest Health Section (Table 7) for treatment acres.

Standards and guidelines for Wildland Fire and Fuels Management include:

- During response to wildland fire, risks to firefighters and the public shall be mitigated. Protection of human life overrides all other priorities.
- Within the PNVT called Desert Communities, fire shall not be used as a tool for management and all fires will be suppressed.
- Slash piles shall not be located in places or burned at times that will impact identified cultural or heritage sites.
- Determinations of responses to wildfire should be based on risk assessments that include preseason analysis and review as well as on-scene and immediate risk assessments by those initially responding to the wildfire incident. Such assessments should be on an appropriate scale and timeline relative to the time of the assessment and the time available during the incident. Such risk assessments should include, but are not limited to, the following:

  - Evaluation of the threats to firefighter and public safety
  - Evaluation of the threats to both natural and human-made resource values
  - Evaluation of seasonal and/or climatic conditions
  - Evaluations of cost-effective strategies that contribute to the success of the appropriate wildfire objective(s)
- Strategies to manage wildland fire (wildfire and prescribed fire) that restore and maintain the natural fire regime of affected PNVTs, should be encouraged.
- Within the shaded areas of map 6 (proposed LRMP), a management objective of protection should be used to manage wildfires that occur to minimize the risk of loss or damage to human life and property.
- Mechanical or manual treatment of hazardous fuels should be considered where the use of wildland fire (wildfire and prescribed fire) may cause unacceptable damage to other resources or pose an unacceptable risk to life and private property.
- For fires managed for resource benefits and prescribed fires, amount of scorch and char should be minimized on trees in areas with a high scenic integrity objective that are visible from concern level 1 and 2 roads, unless risk to firefighters and public make this impractical.
- Project-specific design features to avoid undesired impacts should be used when fire operations occur within or near riparian corridors or seeps and springs. For example, provide screens on water hoses when drafting water to prevent the entrapment of fish.
- Give wildland-urban interface areas high priority for fuel reduction treatments.
- Project-specific design features to avoid undesired impacts should be used when fire operations occur within a quarter of a mile of a developed campground. Example could include a no fire treatment buffer around campsites, using existing fire barriers when possible and retaining vegetation between campsites for screening purposes.

Management of wildland fire would be coordinated across jurisdictional boundaries whenever there is potential for managing a wildfire or a prescribed fire on more than one jurisdiction.

Recreation

The Recreation program provides a wide range of recreation settings, opportunities, and services. Program components include administration and management of resources and visitors at developed recreation sites, dispersed recreation settings, partnerships and tourism, interpretive services, recreation special use permits, congressionally designated areas, visual quality management, trail management, and scenic byways.

A variety of year-round recreation opportunities exist on the Prescott NF. Visitors and local citizens alike enjoy having such opportunities nearby, and during the summer, recreate in the Prescott NF where temperatures are moderate. In the winter, people visit the Verde Valley and other snow-free areas to recreate where temperatures are mild. Increases in population have led to increased demand for trails and other recreation opportunities. If climate changes include continuing increases in temperatures, it is likely that there will also be increases in recreation visitors from hotter areas such as Phoenix.

In addition to a host of trails and campgrounds, the Prescott NF has several unique recreation opportunities, including: a hang-glider site atop Mingus Mountain; Alto Pit and Hayfield Draw Off-highway Vehicle (OHV) recreation sites; Granite Mountain National Recreation Trail; General Crook National Historic Study Trail, a portion of the Great Western Trail, which traverses the western U.S. from Mexico to Canada; gold panning on Lynx Creek; and three historic Forest Service buildings which are a part of the "Rooms with a View" cabin rental program.

The recreation program has administered an average of 15 recreation event permits per year for the last 10 years and currently has 17 active outfitter/guide permits. The recreation event permits are short term, generally spanning a period of 3 to 5 days to cover setup, takedown, and the event itself. Categories of events include noncommercial events such as club gatherings or weddings and commercial ventures like festivals and races.

Desired conditions for a sustainable recreation include the following (see chapter 5 of the proposed LRMP for additional area-specific direction for recreation resources):

- Recreation on the Prescott NF provides opportunities for current and future demographics, as well as those of all abilities, to discover and enjoy the landscape.
- The number, location, and types of recreation facilities respond to changes in demand. They concentrate use at key locations so that visitors enjoy the cultural and biophysical resources while protecting those resources. Forest users learn from their experience on the Prescott NF and have a better understanding of the ecology of the area.
- Conflicts between different recreation uses are infrequent.
- Visitors experience friendly and positive interactions with Forest Service employees and volunteers.
- Developed recreation sites are safe, clean, and sanitary.
- Recreation facilities and constructed features (e.g., trails, trailheads) minimize resource impacts, especially those related to watershed integrity.
- Trails, facilities, or areas eligible for State or National special designation retain their qualifying characteristics.
- Vegetation within developed recreation areas is diverse, healthy, and free from hazards to public safety. Vegetation contributes to scenic, healthy, natural, and sustainable recreation areas and enriches the visitors' experience.
- Designated dispersed recreation occurs in areas that can accommodate concentrations of use, thereby lessening impacts to natural and cultural resources of other areas.
- Signage is accurate, effective, and in appropriate numbers for the recreation setting. Information provided matches that found in brochures and other printed material.
- Visitors are aware of, and comply with, forest regulations.
- Permitted recreation uses (e.g., recreation special events or guided activities) are consistent with recreation settings, protection of natural and cultural resources, and community goals.

- Trail opportunities are available in a variety of settings that provide differing levels of challenge and seclusion.
- Trail routes include both point-to-point trails that connect communities and interconnected loops of varying lengths.
- On designated maintenance level 2 NFS roads, motorized vehicles and their operators comply with State motor vehicle regulations.
- Trails and trailheads meet the needs of the intended recreation use. For example, trailheads to be used by horseback riders provide adequate parking and turning space for vehicles with trailers.
- Trail systems meet the diverse needs of a growing population.
- Conflicts between various types of trail activities are addressed and resolved.
- Resource impacts due to trail location and use are identified and mitigated.
- Alternate access is available where changes in land ownership or increased development have eliminated historic access to the national forest.
- Use of trails and trailheads are consistent with the desired recreation opportunities identified for the trail or area.

The proposed LRMP has 10 **objectives** that direct Recreation program activities:

- **Obj-8** includes direction to create up to 4 designated dispersed camping areas during the 10 years following plan approval.
- **Obj-9** includes direction to implement sufficient maintenance projects at developed recreation areas to ensure that the backlog (i.e., deferred maintenance) does not increase over baseline levels by more than 20 percent during the 10 years following plan approval.
- **Obj-10** includes direction to develop and implement at least 3 additional strategies to raise awareness of responsible target shooting practices within the Prescott NF to promote visitor safety during the 10 years following plan approval.
- **Obj-11** includes direction to construct or improve the facilities at 5 to 20 trailheads during the 10 years following plan approval.
- **Obj-12** includes direction to maintain 10 to 20 percent of signage annually.
- **Obj-13** includes direction to work with partners to maintain and enhance recreational fishing opportunities in 2 lake/pond sites during the 10 years following plan approval.
- **Obj-14** includes direction to develop 2 to 5 additional methods for providing visitor information and education during the 10 years following plan approval.
- **Obj-15** includes direction to mark boundaries of portions of 2 to 5 designated wilderness areas where risk of motorized or mechanized access is high during the 10 years following plan approval.
- **Obj-16** includes direction to protect, relocate, or rehabilitate 2 to 5 recreation areas or locations (including trails) that show evidence of resource damage during the 10 years following plan approval.

- **Obj-17** includes direction to implement 5 to 10 management actions on trails to meet desired conditions during the 10 years following plan approval.

Standards and guidelines for recreation include:

- When projects are carried out, they should meet the minimum characteristics for recreation opportunities and settings as classified in the Recreation Opportunity Spectrum (ROS) inventory and map.
- Areas that are identified as roaded modified and located one-half mile on each side of existing power or gas lines should be managed as semiprimitive motorized.
- Motorized use within areas identified as providing a nonmotorized recreation setting may take place on a case-by-case basis as documented in site specific permits. Examples of such permits include, but are not limited to, grazing permits, recreation event permits, or communication site permits.
- Customer services should meet evolving customer needs by being available in a variety of formats, locations, and timeframes.
- Native plant species, when suitable and available, should be used during the design of new or improved recreation sites. Invasive weeds should be removed or treated on existing sites before they become widespread within recreation sites.
- Unauthorized travel routes should be returned to natural conditions to discourage continued use.
- Management tools (e.g., education, engineering, and enforcement) should be used to prevent resource damage due to recreation activities. Examples of such tools include, but are not limited to: traffic control devices, designation of campsites, time limits, site rotation, group size limitation, registration, public contact, written information, permits, seasonal closures, fencing, enforcement activity, and current information posted on the Internet.
- Redesign, restoration, or rehabilitation of recreation sites should be carried out where recreation activities have caused unacceptable natural and social resource impacts.
- New developed campgrounds and designated dispersed campsites should be located away from riparian areas, flood plains, and other environmentally sensitive areas.
- To guide appropriate motorized use, accurate and understandable signs should be placed in effective locations to discourage encroachment of motorized vehicles into nonmotorized areas.
- Engineering tools should be used to minimize recreation and livestock grazing conflicts. Tools could include, but are not limited to: trail design that avoids stock tanks, incorporation of self-closing gates, use of ATV cattle guards, or gates around cattle guards for horseback riders.
- Within developed campgrounds, vegetation removal should promote visitor safety, scenic values, and vegetation health.

- In areas outside of the Prescott Basin Management Area, camping by each individual or group should not exceed a period of 14 days in a 30 consecutive day period within the Prescott NF, unless specifically designated otherwise.

Transportation

The transportation system on the Prescott NF consists of roads and trails that provide access to areas on the forest including private land, structures and improvements under special use permit, recreational opportunities, and facilities that support land and resource management activities. The Prescott NF provides management of the transportation system including conducting inventories, surveys, and analyses; formulating plans; and executing reconstruction, maintenance, and obliteration operations.

The motorized transportation system for the Prescott NF is composed of 29.5 miles of roads managed and maintained for passenger cars and about 1,300 miles of roads managed and maintained for high-clearance vehicles, 28 miles of roads closed to all motorized vehicles, and 408 miles of trails open to motorized vehicles less than 50 inches wide. The miles of road open to motorized use include roads where access may be restricted on a seasonal basis. Any road, regardless of maintenance level, may be closed during extreme weather conditions for public safety or to minimize resource damage. Cross-country motorized travel is restricted to two designated areas on the Prescott NF, Alto Pit (41 acres) and Hayfield Draw (80 acres), and for motorized big game retrieval. Motor vehicle use off of the designated system of roads, trails and areas is prohibited except as identified on the motor vehicle use map (MVUM) and as authorized by law, permits, and orders in connection with resource management and public safety.

Desired conditions for transportation and forest access include a safe, sustainable, and economical transportation system (roads and trails) that matches the intended uses and needs; balances desire for public access with potential for ecological impacts**,** and has well maintained and marked roads and trails that provide diverse opportunities to safely explore the forest and does not impede wildlife and fish movement.

The proposed LRMP has three **objectives** that direct Transportation program activities:

- **Obj-20** includes direction to repair or relocate 20 to 100 miles of NFS roads or trails that impact watershed integrity during the 10 years following plan approval. Projects could include, but are not limited to, the following activities related to roads and trails: relocation, decommissioning, recontouring, revegetating, improving to standard, or maintaining features for resource protection.
- **Obj-21** includes direction to obliterate, recontour, or revegetate a minimum of 10 miles of unauthorized routes that are impacting watershed integrity during the 10 years following plan approval. An unauthorized route is a former road or trail that is not designated for motorized use, or a user-created route that was never designated for motorized use.
- **Obj-22** includes direction to improve 15 to 25 stream or drainage crossings associated with roads or trails to facilitate flow and sediment transport during the 10 years following plan approval. Examples of activities that could be done to fulfill this objective include ensuring that culvert sizes match what is needed to handle flood flows and avoid washouts that deposit road material into a stream, adjusting culvert height to ensure

aquatic species are not prevented from moving along the stream, or installing drainage structures across roads where needed.

Standards and guidelines for transportation include:

- Where the creation of alternate routes does not lead to excessive damage to other resources, opportunities to relocate and restore motorized roads or trails in riparian areas, and in proximity to other watercourses, should have priority.
- Roads and trails removed from the transportation network should be rehabilitated as soon as possible. Treatments may include reshaping travelways, removal of stream crossing structures, restoring and armoring natural drainages, stabilizing ground surface, revegetation, and maintenance or restoration of fish passage.
- Roads and trails should be designed to not impede terrestrial and aquatic wildlife species movement and habitat connectivity.
- Seasonal road and trail closures or other management methods should be used to manage and protect resources and infrastructure.
- To avoid unintended entrapment, wildlife friendly design for cattle guards should be incorporated for new and replacement installations.
- When system roads are constructed or reconstructed, efforts should be focused on reducing cumulative watershed effects. This could include, but is not limited to, using design features that minimize sedimentation, reduce the number or length of system roads, or rehabilitate unneeded system roads and user-created routes.
- Only designated roads, motorized trails, and motorized use areas as depicted and described on the motor vehicle use map (MVUM) are open to public motorized vehicle use.
- Only designated roads, motorized trails, and motorized use areas depicted and described on the MVUM are open for motorized big game retrieval. Motorized big game retrieval is precluded in areas where motorized travel is prohibited, such as wilderness.
- For the purpose of motorized big game retrieval:
    - Use of motor vehicles should be limited to within 1 mile of designated roads and motorized trails to retrieve a legally hunted and tagged elk during elk hunting seasons as designated by the Arizona Game and Fish Department, and for 24 hours following the end of each season.
    - Only one vehicle (i.e., one trip in and one trip out) per harvested animal should be operated off of designated roads and motorized trails.
    - Hunters should use the most direct and least ground-disturbing route to accomplish the retrieval.
    - Motorized big game retrieval should not occur when conditions are such that travel would cause damage to natural and/or cultural resources.
    - Motor vehicles should not cross riparian corridors, streams, and rivers except at hardened crossings or crossings with existing culverts.

Wilderness and Special Areas

The Prescott NF contains 8 designated wilderness areas, totaling over 100,000 acres. The largest wilderness area is Sycamore Canyon Wilderness, which encompasses parts of three national forests: Prescott, Coconino, and Kaibab. Management of the area is shared among the three units. Pine Mountain Wilderness is also managed cooperatively, as it sits atop the boundary between the Prescott NF and the Tonto NF. Of the remaining six wilderness areas managed by the Prescott NF (Apache Creek, Castle Creek, Cedar Bench, Granite Mountain, Juniper Mesa, and Woodchute), Granite Mountain Wilderness receives the highest level of visitation due to its proximity to the Prescott Basin. Adjacent to these wilderness areas, extensions totaling 23,000 acres are recommended for future wilderness designation as part of the proposed LRMP.

The Verde River below Camp Verde is designated as a wild and scenic river (WSR), and a 37-mile segment of the upper Verde River (extending from the Prescott NF boundary downstream to Clarkdale) is identified as eligible for WSR designation.

The Prescott NF also contains 11 inventoried roadless areas (IRAs) identified in the 2001 Roadless Area Conservation Rule (RACR). The RACR prohibited road construction and reconstruction in most inventoried roadless areas and outlined procedures to evaluate the quality and importance of roadless characteristics. IRAs are characterized as having an undeveloped character and are valued for many resource benefits including wildlife habitat, biological diversity, and dispersed recreation opportunities.

Special areas, such as research natural areas, botanical areas, and geological areas, are designated to ensure protection of specific biological and geological communities. By definition, they must have unique or special characteristics for which specific management is required. Grapevine Botanical Area (800 acres), a special area located in the Bradshaw Mountains south of Prescott, was designated to protect the 12 perennial springs and associated Arizona alder-Arizona walnut vegetation community found in the area.

Desired conditions for wilderness include providing outstanding opportunity for exploration, solitude, risk, and challenge where natural processes influence ecosystems with little or no human intervention; and protecting the wilderness character of recommended wilderness areas.

Desired conditions for designated or eligible wild and scenic river segments include retaining their free-flowing character and outstandingly remarkable values and classifications.

Desired conditions for special areas include recognition of the unique ecological features for which they were designated; and that their inherent physical and biological processes flourish, with little evidence of human intervention or disturbance. Their unique characteristics are protected and maintained, with visitor access and use limited to environmentally sustainable levels that do not compromise the values of the area.

Standards and guidelines for wilderness and special areas include:

- Wilderness characteristics and values shall take precedence over recreation uses where conflicts occur.

- Natural ecological processes shall be allowed to occur freely in wilderness to the extent that they retain the wilderness character, except where public and firefighter safety and private property is put at risk. Activities allowed in wilderness shall be managed to preserve the wilderness character and value.
- All fire management actions within wilderness shall be conducted in a manner compatible with overall wilderness desired conditions including the character and values associated with each individual wilderness area.
- Where agency or applicant objectives can be met outside of designated wilderness, special use permits should not be issued in wilderness.
- Wilderness maximum group size should be limited to 15 people except for occasional Forest Service maintenance crews, organized rescue parties, or firefighting forces performing official duties.
- Unless otherwise approved under permit, the maximum size of a party traveling or camping at one location with riding or pack animals should be limited to 10 animals.
- Wilderness boundary posting should be maintained in areas where nonconforming use is likely to occur.
- Where active intervention is warranted to preserve the wilderness character, corrective activities should be initiated for areas that become degraded as a result of human activities.
- Facilities at wilderness trailheads should be consistent with the level of use and Recreation Opportunity Spectrum (ROS) setting.
- Minimum Impact Suppression Tactics (MIST) should be used when managing both wildfire and prescribed fire within wilderness.
- Helispots, spike camps, and water source locations outside of wilderness should be considered over locations within designated wilderness.
- Decisions for the appropriate suppression tool or tactic in the wilderness should receive the same considerations for firefighter and public safety and the protection of values at risk as they would outside of wilderness. If such considerations are not urgent, the use of retardant in wilderness should be avoided if possible.
- Management actions should maintain the wilderness characteristics of a recommended wilderness area until further action is initiated by the Forest Service to forward it to Congress for designation.
- Within Granite Mountain Wilderness:
    - New fixed anchor climbing routes shall not be created; however, existing fixed anchors may be maintained for rock climbing.
    - Power drills and other electro-mechanical or pneumatic devices shall not be used for maintaining fixed anchors.
- Within Granite Mountain Wilderness:
    - All dogs should be on a leash.
    - Camping should not take place within 200 feet of either side of Trail 261.

  - Campfires should not be used.
- Management standards found in chapter 3 of the Verde Wild and Scenic River Comprehensive River Management Plan for Coconino, Prescott and Tonto National Forests (Forest Service, 2004) shall be incorporated into management activities.
- Within river segments that are eligible for wild/scenic river designation, identified outstandingly remarkable values shall be afforded adequate protection, subject to valid existing rights, until the eligibility determination is superseded (i.e., the segment is determined not suitable for designation or Congress makes a decision regarding designation). Authorized uses shall not be allowed to adversely affect either eligibility or the tentative classification, (i.e., actions that would change a classification from wild to scenic).
- Within the Grapevine Botanical Area:
  - No livestock grazing, trailing, or driving shall take place within the botanical area except that livestock may trail through the Bootlegger-Grapevine Unit on established roads to Forest Road 87A and then Trail 304. This movement shall be controlled and not be accomplished by drifting.
  - Motorized or mountain bike use shall not take place on Trails 4, 304, and 9432 below the rim of Big Bug Mesa.
  - Recreation use shall be limited to day use.

Lands and Special Uses

The Prescott NF lands program is responsible for identification and maintenance of land line locations between Forest Service lands and lands of other ownership and land adjustments. Land ownership adjustments include: purchases, withdrawals, land exchanges, and the issuance of non-recreation special use authorizations. The Prescott NF has issued over 400 active special use authorizations including recreation residences, organizational camps, research studies, rights-of-way, communications towers, power lines, and wildlife water catchments.

The effects of future development projects such as for utilities and transportation systems would be addressed on a site specific basis and mitigated individually following the Forest Service policy regarding special uses. Mitigations are typically accomplished by consolidation of new developments along existing routes and corridors or by construction techniques that disturb less land and improve reclamation success.

Desired conditions developed to address management of lands, open space, and scenery include:

- Rights-of-way are in place for legal access needs for private land, public access, administrative access needs, or to resolve legal status deficiencies at a level that is commensurate with need. Roads that provide access to multiple properties are well maintained.
- Electronic sites help fulfill public and government need for adequate communication. Sites are co-located where possible to minimize visual, wildlife, recreation and other natural resource impacts.

- Towers are nonreflective, self-supporting, and less than 199 feet in height to reduce visual impacts. They do not interfere with fire detection or cause radio frequency interference with senior uses, and they are not a source of unacceptable human exposure to radio frequency radiation.
- Power lines and pipelines are located and co-located within existing energy corridors when compatible. Distribution lines (less than 69 kV) are generally underground and rights-of-way for aboveground lines retain existing low growing plant communities that do not interfere with overhead lines growing within the corridors.
- Existing recreation residences are stable in number and blend into a natural forest setting.
- Open space values including those related to naturally appearing landscapes, wildlife habitat, recreation opportunity, riparian/wetland character, and community needs are retained.
- The natural appearing visual character, free-flowing water, and habitat for federally listed and sensitive species along and within the Verde River are retained or enhanced.
- The landscape generally appears natural within the context of native vegetation and landforms.
- Landscapes on a majority of the Prescott NF appear intact and unaltered by human activity.

The proposed LRMP has two **objectives** that direct lands and open space management activities:

- **Obj-29** includes direction to act on up to 10 opportunities to acquire lands within and around the Prescott NF to retain open space values during the 10 years following plan approval.
- **Obj-30** includes direction to identify and act on up to 10 opportunities to secure legal access to areas where historic access to the national forest has been lost. The management tools available for acquiring access across private property would depend on the specific circumstances but could include: obtaining or purchasing easements or rights-of-way through direct negotiations with land owners; filing for legal access based on "prescriptive rights" determinations with the help of the Office of General Council; or designing and constructing reroutes where feasible and affordable.

Standards and guidelines for lands and special uses include:

- New recreational residences shall not be established.
- Recreational residences shall be occupied no less than 15 days per year and shall not be used as full-time residences.
- Recreation residences should be managed according to the guidelines below:
    - Recreation residences, decks, outbuildings, and other structures should be colored and designed to blend in with the natural landscape. All improvements should be preapproved by the Forest Service representative.
    - Recreation residences should be maintained in good condition to prevent vandalism and wildlife access.

  - Native plants should be used for landscaping. Type of species and placement should be consistent with maintaining a low fire risk. Nonnative invasive species should not be introduced; infestations should be removed where they exist.

- Right-of-way authorizations should help provide adequate access to the Prescott NF. When responding to requests for new access authorizations, reciprocity should be sought to ensure administrative and public access to forest land.
- When responding to land exchange proposals as presented, consideration should be given to the effects they have on visual characteristics; cultural resources; recreation opportunities; threatened, endangered or sensitive species impacts; and community vision statements. In coordination with general factors to consider in 36 CFR 254.3(1), proposals for acquisition should meet one or more of the following criteria:
  - Lands within designated wilderness.
  - Lands that contain important wildlife habitat, including that needed for species viability, such as habitat needed to maintain migration patterns or important habitat linkages.
  - Wetlands, riparian areas, and other water oriented lands.
  - Lands that contain unique, natural, or cultural values.
  - Lands that provide needed access, protect public lands from fire or trespass, or prevent damage to resources.
- Lands offered by the United States in land exchange should generally meet one or more of the following criteria:
  - Lands needed to meet the needs of communities and the public, such as land for a water treatment plant.
  - Lands where public land management would be improved by transferring them to others.
  - Lands that have lost their wildland character.
- The following guidelines apply to communication sites:
  - Height of towers, including appurtenances (attachments), should be less than 200 feet above natural ground level. Exceptions to the height limitation may be granted by the forest supervisor, if allowing an increase in height would result in placement of fewer towers, or if a greater height is necessary for emergency services or homeland security. The applicant must prove that the requested height is the minimum necessary to provide communication services.
  - They should help fulfill the public and government need for adequate communication sites and should strive to find a balance between the availability of low power versus high power sites.
  - Communication site management plans, including site boundaries, should be implemented at each communication site.
  - The use of existing facilities (i.e., colocation) should be maximized prior to authorizing new facilities.
  - Access to electronic sites should be maintained at a level sufficient to provide day-to-day commercial frequency management.
  - New authorizations for facility managers should include the requirement that the facility manager provide shared resources such as backup generators and grounding

systems, fuel containers, solar generating systems, access ways, and parking areas as needed for all tenants upon request.
    - Lot plans as previously established should be eliminated. Sites should be allocated only the actual ground space (footprint) they occupy.
    - Vegetation clearing should be limited to defensible space within: (a) the communication sites, (b) fuel breaks around the perimeter of the sites, and (c) areas that pose a hazard to facilities and operational efficiency.
    - All uses should be designed, operated, and maintained to not physically or electronically interfere with the senior uses. Senior uses generally take precedence over new uses. High power uses should be physically separated from low power uses by one mile or more. The responsibility for correcting interference problems lies with the holder of the communications site authorization for the facility, the user causing the interference, and the affected parties.
    - New and replacement towers should be self-supporting and should incorporate design features to minimize bat and bird impacts.
    - All new and replacement microwave radome covers should be dark grey, or as specified by the forest representative.
    - Visual resource objectives should be maintained by using design standards that make towers unobtrusive and by using nonreflective surface materials and colors which blend in with the surroundings.
    - New towers and tower additions should not be authorized if they adversely affect the fire tower lookouts' lines-of-sight or present radio frequency radiation hazards to Forest Service employees or the general public.

- Energy sources should be managed according to the guidelines below:
    - New energy proposals should be located within existing corridors including the Westwide Energy Corridor unless valid concerns about the reliability and integrity of the state's electrical grid indicate otherwise.
    - Towers for 69 kV lines and above, should be self-weathering with nonreflective lines, and where geomorphology allows, located in areas that blend in with the terrain or background.
    - Low growing plant communities that do not interfere with overhead lines, should be maintained within power line corridors.
    - Less than 69kV power lines should be placed underground where physically and economically feasible.
    - Overhead utilities should have approved corridor management plans or operating plans in place prior to all vegetation treatments
    - Solar and wind power facilities should be co-located within compatible corridors or located in areas with the least visual impacts to maintain natural appearing vistas.
    - When locating new power line corridors, areas in proximity to existing power line corridors or substations should be considered first.
    - Utility companies and wind power facilities should incorporate design features to minimize bat and avian collisions.
    - Current USFWS and AZGFD guidelines for wind and solar energy development should be considered for avoiding or minimizing impacts to wildlife.
    - Wildlife movement corridors should be considered when energy sources and transmission lines are located.

Minerals Management

Minerals of economic interest are classified as leasable, salable, or locatable. Locatable minerals are subject to the General Mining Law of May 10, 1872, as amended, and for the most part are outside the scope of the LRMP.

Locatable minerals include gold, cooper, silver, and zinc, as well as uncommon variety minerals such as perlite, high-grade limestone and others. Approved mining includes any anticipated surface disturbance associated with underground mining operations and all surface mining activity. These activities can involve exploration drill holes, small scale prospecting, active mining from surface quarries and pits, and mill sites. For locatable minerals, new plans of operations (and acres of new disturbance) have been fairly consistent with not much variation from year to year on the number of active mine sites or acres open at any one time. The Southwestern Region does not currently have detailed acreage estimates for all the locatable mineral surface disturbances, but generally, as new operations are approved, reclamation is done on other pre-existing sites as their plans expire, so the overall net change in acreage is minor.

The Prescott NF has abundant minerals deposits and mining is common both on and off the forest. Existing mining activities on the Prescott NF includes five mineral material contracts for removal of flagstone, one contract for schist removal, one contract for removal of decomposed granite, one limestone operation with an approved commercial plan of operations, and numerous recreational gold placer mining operations.

Gold mining is limited to small-scale placer and/or lode mining. Placer operations involve methods such as excavation, dredging, and panning from alluvial deposits and are most common on the forest in the Bradshaw Mountains. Most placer mining is recreational use or small commercial operators; the Gold Basin Project is the only commercial mine with an approved plan of operations. Lode operations, also known as hard rock mining, consist of mining a vein bearing gold or a rock in-place valuable mineral deposit. There are 1,800 active placer claims and 1,484 active lode claims with 10 tunnel site claims. Claims can be up to 20 acres per placer claim with a maximum of 160 contiguous acres with 8 or more people (an association). Lode claims are limited to a maximum size of 1,500 feet in length along the vein or lode and width of 600 feet. Mining claims are not filed on the forest, but rather with the Bureau of Land Management. It should be noted that the vast majority of mining claims do not have any on-the-ground operations associated with them; many of them are for speculative purposes.

Copper is the most abundant metallic mineral on the Prescott NF, and there is an active plan of operation for exploratory drilling of copper on the Verde Ranger District. High demand growth is expected for copper in the United States, and this is likely to increase the interest of mining on the Prescott NF. It is anticipated that most major mineral exploration and development will occur in the Bradshaw Mountains (Bureau of Mines, 1995).

Geologic surveys and studies suggest that the highest concentrations of metallic minerals exist in the western parts of the forest. Areas with exploration potential for large tonnage deposits of copper and gold are near Copper Basin, Groom Creek, Big Bug Creek, Crooks Canyon, Crown King, and Goodwin.

The Prescott NF does not produce any energy or fuel minerals such as uranium, oil, natural gas, or coal. There is no method for predicting future demand, but current conditions and trends

indicate that development interests should remain low due to the unlikelihood of suitable deposits on the forest.

There is substantial production of construction related materials (e.g., cinders, crushed stone, dimension stone, landscape rock) on the forest. Demand tends to be highly influenced by local conditions and has varied considerably in recent years, so mining activity for these minerals has been sporadic.

Desired conditions for minerals management are to meet legal mandates in a manner that minimizes the impacts of mineral exploration and development on natural and cultural resources; sufficiently reclaim past and present mine facilities to provide for public safety and minimizes impacts to cultural and natural resources; and provide that developed recreation areas, such as Lynx Lake Recreation Area, and administrative sites are free from commercial mining activity.

Standards and guidelines for minerals management include:

- Surface disturbance shall be limited to the minimum necessary for the extraction of minerals; however, land management decisions must not preclude the ability of private mineral owners to make reasonable use of the surface, as defined by deed and public law.
- Heritage sites, administrative sites, and recreation sites that have an investment in facilities shall be requested for withdrawal from mineral entry and location.
- Closed roads or routes not on the motor vehicle use map shall not be used for mining activity without written authorization.
- Approval of mining activities shall include the use of reclamation bonds to protect and restore surface resources.
- Provisions should be provided for recreational gold panning and dry mining activities that are allowed on the Prescott NF. These could include but would not be limited to:
    - Only operating one area at a time and refilling holes and restoring areas of operation as nearly as possible to their premining appearance.
    - Minimizing disturbance to riparian vegetation.
    - Avoiding disturbance to upland vegetation.
    - Guidance found in 36 CFR Part 228.
- Given that the Forest Service function is the management and protection of surface resources in a manner compatible with reasonable and logical mining operations, the following should be included in plans of operations for locatable minerals:
    - Structures and support facilities for mining activity should be located outside riparian areas. Where no alternative to locating facilities in riparian areas exists, site specific design features should be developed to minimize impacts.
    - Mine waste that has the potential to generate hazardous material should be located outside of riparian areas. If there is no reasonable alternative, design features should be applied to minimize impacts.
    - Mitigation measures should be used for Southwestern Region sensitive species to minimize impacts to populations due to mineral exploration or extraction activity.
    - Watershed protection and mitigations should be incorporated to avoid degradation of aquatic systems, including water quality, during mineral extraction.

    - Closing and reclaiming abandoned mine lands should be given high priority.
- Restoration plans shall be prepared before development and use of new mineral material sources. Existing pits that have not been utilized as a source for mineral materials for 2 years shall require a reclamation plan and bonding before approval is granted to new applicants.
- Mineral activity shall not be permitted in designated wilderness and other withdrawn areas.
- Adverse effects to aquatic and other riparian dependent resources from mineral material operations should be avoided.
- Visual impact assessments should accompany new mineral material pit proposals. Pit proposals should meet scenic integrity objectives for the area of activity.
- Mineral material sites open for public use versus those only available for Forest Service use should be determined and the information shared with the public.
- Mineral material activities should not be permitted in designated or recommended special areas (e.g., wilderness, wild/scenic rivers).
- Occupied Southwestern Region sensitive species habitat should be avoided during development of new mineral material extraction sites. Heavy equipment use and material removal should not take place in occupied Southwestern Region sensitive species habitat within current or new permitted sandstone or dolomitic limestone quarries.

Rangeland Management

The Prescott NF authorizes livestock grazing on as many as 68 allotments covering 920,779 suitable acres (73 percent of the forest). Of the 62 active grazing allotments, 19 are used seasonally (31 percent) and 43 are used yearlong (69 percent). Allotments are managed using an adaptive management strategy whereby results from long and short term monitoring are used to guide managers concerning yearly stocking rates, pasture rotations, and whether other adjustments are needed in order to meet management objectives and desired conditions for rangelands.

Areas where grazing is excluded include: Prescott Municipal watershed (Goldwater Lake), Lane Mountain watershed, Lynx Lake and Granite Basin Recreation Areas, Grapevine Botanical Area, and the designated wild and scenic segments of the Verde River. Periodic review of allotment management plans also results in decisions to exclude livestock grazing on individual allotments in response to drought, wildfire, and other factors that influence range conditions.

Desired conditions for rangelands include providing sustainable amounts of forage (grass and forbs) for authorized livestock and wildlife species; managing herbivory to sustain or improve native vegetation cover and composition; and managing grazing permits in a way that contributes to the social, economic, and cultural structure and stability of rural communities.

Standards and guidelines for livestock grazing include:

- Year-long livestock grazing in riparian areas (streams, springs, and seeps) shall be avoided to prevent adverse impacts to water quality and riparian habitat in those areas.

- Water troughs shall incorporate escape devices to prevent animal entrapments.
- The placement of salt, minerals, and/or other supplements for the purposes of livestock management should be located further than one-quarter mile from riparian areas or seasonally present water.
- For structural improvements:
    - Implement design features that incorporate wildlife needs and reduce barriers to movement and entrapment hazards.
    - Consider wildlife needs in fence placement and design to reduce barriers and hazards to movement and minimize chances of entrapment.
    - Remove fencing when it is no longer needed.
- After occurrence of wildland fire or mechanical activity that removes most vegetation, a time period for recovery, establishment, and regrowth of vegetation should be determined and applied to meet site specific objectives.
- Livestock salting should be located away from known locations of Southwestern Region sensitive plant species so that plants are not adversely affected by associated trampling.
- Livestock use of woody riparian species (e.g., cottonwood, willow, ash, and alder) should provide for maintenance of those species and allow regeneration of new individuals leading to diverse age classes of woody riparian species where potential for native woody vegetation exists.
- Grazing intensity, frequency, occurrence, and period should provide for growth and reproduction of desired plant species while maintaining or enhancing habitat for wildlife.

Grazing capacity and management success of grazing operations is monitored and evaluated in numerous ways including assessment of rangeland features and conditions, annual range allotment inspections (forage utilization and stocking levels), and periodic revision of allotment management plans. These assessments serve as inputs for decision making within an adaptive management framework.

Forestry and Forest Health

Forest products sold on the Prescott NF include both sawtimber and firewood. The harvest of sawtimber on the Prescott NF is solely a byproduct of thinning forested areas where the primary purpose is to improve forest health and wildlife habitat or to reduce hazardous fuels in the wildland-urban interface, rather than an outcome of regulated forest production. The demand for wood products other than sawtimber has been driven by local and regional needs for firewood.

Desired Conditions for forest health include offering a sustainable mix of forest products for sale in response to local and regional needs; these products contribute to the social, economic, and cultural structure and stability of rural communities. On lands deemed suitable for timber production, harvest activities provide for the diversity of plant and animal communities and other resources to meet overall multiple-use objectives. Forest products are removed from unsuitable lands solely to benefit forest health, mitigate insect and disease damage, reduce hazardous fuels, improve wildlife habitat, create recreation opportunities, or to perform research or administrative studies.

Additional desired conditions for all vegetation include:

- Diverse vegetation structure, species composition, and densities, provide quality habitat for native and desirable nonnative plant and animal species throughout their life cycle and at multiple spatial scales. Landscapes provide for the full range of ecosystem diversity at multiple scales, including habitats for those species associated with old growth conditions.
- Native plant communities dominate the landscape, while nonnative invasive species are nonexistent or in exist in low quantities. Establishment of invasive plant species new to the Prescott NF is prevented. Existing invasive plant species are prioritized for eradication, containment, or control.

The proposed LRMP has three **objectives** that direct forest health management activities:

- **Obj-3** identifies using mechanical treatments to improve watershed and rangeland conditions, vegetation structure, and wildlife habitat within the Piñon-Juniper PNVTs.
- **Obj-5** includes direction to thin or harvest 2,500 to 8,000 acres in Ponderosa Pine-Evergreen Oak and Ponderosa Pine-Gambel Oak PNVTs during the 10 years following plan approval.
- **Obj-6** includes direction to treat at least 50 percent of nonnative invasive plants species populations within 1 to 2 years of detection during the 10 years following plan approval.

Management activities including tree thinning for firewood and sawtimber harvest were modeled for the piñon-juniper and ponderosa pine PNVTs (Vegetation Dynamics Development Tool [VDDT], Version 6.0.25) to estimate the resulting movement toward or away from desired conditions, including estimates of each vegetation state. Table 7 displays the proposed treatment acres by vegetation type that were modeled.

Under the proposed LRMP, the projected harvest volume would be approximately 40,447 ccf (hundred cubic feet) of sawtimber and 152,215 ccf of firewood per decade on 8,000 acres of ponderosa pine PNVTs and 22,000 acres of piñon-juniper PNVTs, respectively.

Table 7. Projected 10-year harvest volume by product type, vegetation type, and area

Product	Volume	Vegetation Type	Acres
Sawtimber	40,447 ccf	Ponderosa Pine PNVTs	8,000
Firewood	152,215 ccf	Piñon-Juniper PNVTs	22,000
Totals	**192,662 ccf**	**PNVT**	**30,000**

Standards and guidelines for forestry and forest health include:

- Regulated timber harvest activities shall occur only on those lands classified as suitable for timber production.
    - Lands deemed suitable for timber production shall be on a regulated timber harvest schedule.

  - Intermediate treatments, such as precommercial thinning between harvest intervals, shall be used to maintain tree vigor, provide growing space for regeneration, and reduce hazardous fuels.

- If individual harvest openings created by even-aged silvicultural practices are proposed that would exceed 40 acres, then NFMA requirements regarding public notification and approval shall be followed. These requirements do not apply to the size of areas harvested because of catastrophes such as, but not limited to, fire, insect and disease attacks, or windstorms.
- Regulated timber harvest activities shall only be used when there is reasonable assurance of restocking within 5 years after final regeneration harvest.
- Restocking level is prescribed in a site specific silviculture prescription for a project treatment unit and is determined to be adequate depending on the objectives and desired conditions for the plan area. In some instances, such as when lands are harvested to create openings for fuel breaks and vistas or to prevent encroaching trees, it is adequate not to restock.
- Even-aged stands shall generally have reached or surpassed culmination of mean annual increment (95 percent of CMAI as measured by cubic volume) prior to regeneration harvest, unless the following conditions have been identified during project development:
  - When such harvesting would assist in reducing fire risk within the wildland-urban interface (WUI).
  - When harvesting of stands will trend landscapes toward vegetation desired conditions.
- Harvesting systems should be selected based on their ability to meet desired conditions and not on their ability to provide the greatest dollar return.
- Ponderosa pine site treatment timing and residual green slash accumulations should be managed to reduce opportunities for Ips beetle populations to increase.

For project prescriptions within WUI, post-treatment vegetation conditions may need to be on the more open end of the desired range to accommodate growth between treatments and to influence wildfire behavior and to reduce hazards to life and property.

Restoration work in ponderosa pine and piñon-juniper PNVTs would be implemented using two primary types of prescriptions: free thinning all sizes to a target basal area and group selection cuts with matrix thinning to a target basal area.

Other Management Direction

The proposed LRMP provides management direction for resources that are not included in the program areas described above, including: ecosystem resilience, air quality, and heritage resources.

The proposed LRMP also includes a plan monitoring strategy that identifies monitoring questions organized according to six themes: (1) legally required monitoring (1982 planning rule provisions); (2) conserving biological diversity, (3) retaining ecosystem resilience; (4)

maintaining watershed, soil, and air quality; (5) sustaining recreational and social benefits; and (6) maintaining infrastructure capacity. See the proposed LRMP for more information about the monitoring strategy.

Environmental Baseline

The environmental baseline for this consultation is the existing condition of the ecosystems in the action area of the Prescott NF that has resulted from the combined effects of past and ongoing human and natural factors. The USFS species ESA § 7(a)(1) conservation actions described in the effects analysis sections also help shape the environmental baseline for each species. The impacts of State and private actions that are contemporaneous with this consultation also contribute to the environmental baseline (see Cumulative Effects section). Additionally, climate change may be responsible for ongoing or future changes in the environmental baseline (see Climate Change section below).

Climate Change

The following information is taken primarily from USFS Southwestern Region May 2010 document entitled: Southwestern Region Climate Change Trends and Forest Planning – A Guide for Addressing Climate Change in Forest Plan Revisions for Southwestern National Forests and National Grasslands (Forest Service, 2010).

Background on Climate Change

Climate scientists agree that the earth is undergoing a warming trend, and that human-caused elevations in atmospheric concentrations of carbon dioxide (CO_2) and other greenhouse gases are among the causes of global temperature increases. The observed concentrations of these greenhouse gases are projected to increase. Climate change may intensify the risk of ecosystem change for terrestrial and aquatic systems, affecting ecosystem structure, function, and productivity.

Currently there appears to be broad agreement among climate modelers that the Southwestern U.S. is experiencing a drying trend that will continue well into the later part of the 21st century. Based on current projections for the 21st century, the primary regional-level effects of climate change most likely to occur in the Southwest include: (1) temperatures will increase; (2) an increase in the number of extremely hot days, with summer heat waves lasting two weeks or longer; (3) warmer winters and reduced snowpack and a later monsoonal season; (4) Arizona and New Mexico will become drier; and (5) an increase in extreme flood events following an overall increase in tropical storms (Forest Service, 2010).

Ecological Impacts of Climate Change in the Southwest

Climate may influence the distribution and abundance of plant and animal species through changes in resource availability, fecundity, and survivorship. The potential ecological implications of climate change trends in the Southwest indicate:

- More extreme disturbance events, including wildfires and intense rain and flashfloods and wind events (Swetnam et al., 1999);
- Greater vulnerability to invasive species, including insects, plants, fungi, and vertebrates (Joyce et al., 2007);
- Long-term shifts in vegetation patterns (Westerling et al., 2006; Millar et al., 2007);
- Cold-tolerant vegetation moving upslope, or disappearing in some areas. Migration of some tree species to the more northern portions of their existing range (Clark 1998);
- Potential decreases in overall forest productivity due to reduced precipitation (Forest Service, 2005b);
- Shifts in the timing of snowmelt (already observed) in the American West, which, along with increases in summer temperatures, may have serious implications for the survival of fish species, and may challenge efforts to reintroduce species into their historic range (Joyce et al., 2007, Millar et al., 2007);
- Effects on biodiversity, pressure on wildlife populations, distribution, viability, and migration patterns, because of increasing temperatures, water shortages, and changing ecological conditions.

The USFS Southwestern Region includes a high degree of biodiversity and an unusually large number of plant and animal species that are endemic. It is expected that large changes in the structure and species composition of plant communities due to the warming air temperatures and altered hydrological cycles will occur. Many of the region's plant, animal, and insect species depend on precise phonological events based on climatic conditions for migration, flowering, and timing for foraging and reproductive activities. Climate thus influences their distribution and abundance through changes in resource availability, fecundity, and survivorship. It is currently unknown how many species will successfully adapt to changing conditions. The ability of plant and animal species to migrate under climate change will be strongly influenced by their dispersal abilities and by disturbances to the landscape.

Current knowledge of possible climate change impacts on specific vegetation types remains limited. However, projected and observed climate change effects are being studied at the broad-scale habitat level throughout the Southwest. The mild nature of climate gradients among lower life zones of the Southwest, and protracted ecotonal bands, make woodland plant communities particularly vulnerable. Many of the Southwestern Region's plant and animal species are associated with these key habitats, and therefore, are important when considering the potential impacts of climate change on ecosystems managed by the national forests in the Southwest.

Climate change effects to riparian habitats are very important for wildlife in the national forests in the Southwestern Region, as approximately 69 percent of terrestrial vertebrates inhabit riparian areas at some time during the year. Research predicts that as climate changes, water inputs are expected to decline due to reduced precipitation, consequently reducing water in riparian zones (Forest Service, 2010). Furthermore, observed shifts in the timing of snowmelt along with increases in summer air temperatures have serious implications for the survival of aquatic species. For cool and cold-water species a nearly 50 percent reduction in thermal habitat is projected with scenarios of increased water temperature. Predicted impacts to aquatic ecosystems include altered

seasonal discharge events, increases in drought severity during summer flows, and increasing temperatures in small streams and tributaries that further limit habitat.

Potential Climate Change Strategies for Southwestern Region National Forests

In developing strategies for managing future changes, the range of possible approaches could be quite broad, but the strategies which follow are focused on recommendations from recent research studies, including the U.S. Climate Change Science Program, which are appropriate for the Southwestern Region national forests and balance effectiveness, feasibility, and available resources. Although some strategies contain new ideas, most of these management strategies include practices that are already in effect, can serve multiple needs, and may just need to be adjusted or expanded to respond to climate changes during the next 15 years. Using an adaptive management approach will allow forest managers to adopt and adjust strategies as new information is available, conditions change, and staff and resources are available.

Key climate change factors can be addressed through five management strategies:

- Enhance adaptation by anticipating and planning for disturbances from intense storms,
- Reduce vulnerability by maintaining and restoring resilient native ecosystems,
- Increase water conservation and plan for reductions in upland water supplies,
- Anticipate increase in forest recreation use, utilize markets and demand for small-diameter wood and biomass for restoration, renewable energy, and carbon sequestration,
- Monitor climate change influences.

These management strategies have been incorporated into the various plan components of the Prescott NF LRMP. It is important to remember, however, climate change science is evolving which in turn can result in changes in recommended management approaches to climate change in the future. Managing ecosystems under uncertainty necessitates flexible and adaptive approaches that are reversible, implemented in incremental steps, and which allow for new information and learning, and can be modified with changing circumstances.

Cumulative Effects

As defined in ESA (50 CFR §402.02), cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area of the Federal action subject to consultation. For this consultation, the Action Area has been defined as the Prescott NF plus adjacent lands within Yavapai County that the proposed action may directly or indirectly affect. Due to the programmatic nature of this consultation, it is difficult to determine and analyze accurately future State or private actions that are reasonably certain to occur within the Action Area. Therefore, the following discussion of cumulative effects is general in nature.

As displayed in Table 8, Arizona and Yavapai County have experienced rapid population growth during the past two decades; the population of Yavapai County has almost doubled since 1990

and both the County and State grew 25 to 26 percent between 2000 and 2010. The national growth rate during the same period was more moderate, at almost 10 percent.

Table 8. Population trends for Yavapai County compared to Arizona and the U.S.

	1990	2000	Percent Growth 1990-2000	2010	Percent Growth 2000-2010	Density (People/ Square Mile)
Yavapai County	107,714	167,517	55.5	211,033	26	26.0
Arizona	3,665,228	5,130,632	27	6,482,505	24.6	56.3
U.S.	—	281,421,906	—	308,745,538	9.7	87.4

Source: U.S. Census Bureau, 1990, 2000, and 2010

Based on this population projection information, it is logical to expect that development activities will also occur at a higher than average rate in Arizona, as compared to the remainder of the U.S. Development activities that are likely to occur include home and business construction and infra-structure developments which support an increase in population (e.g., highway developments/improvements). Increased urbanization results in loss of habitat or habitat suitability for federally listed species, as well as putting increased pressure on already limited water resources. Additionally, recreational activities are expected to increase within the Action Area over the next 10 to 15 years, particularly on public lands that are within a short driving distance from the Phoenix metropolitan area.

On the more positive side, the Arizona Game and Fish Department and the U.S. Fish and Wildlife Service are active in species conservation and recovery. Some of the federally listed, proposed, and candidate aquatic and terrestrial species addressed in this BA have benefitted from a number of recovery and conservation actions coordinated by these agencies in partnership with the Forest Service.

Analysis Process

This BA analyzes the potential effects to 14 federally listed, proposed, candidate, and non-essential experimental populations, and their designated, proposed, or potential critical habitats from the programmatic direction described in the proposed LRMP. The analysis area for this BA includes all National Forest System (NFS) lands of the Prescott NF plus adjacent lands that could be directly or indirectly affected by actions that the LRMP directs. This analysis followed an orderly approach. The sections below describe how data were gathered, interpreted, and the likely effects to species determined.

Types of Data and Data Sources

Biologists used the information and analysis found in both the U.S. Forest Service 2011 LRMP BA (Forest Service, 2011d) and the U.S. Fish and Wildlife Service 2012 BO/CO (Fish and Wildlife Service, 2012) as a starting point for the development of this BA and incorporated that information by reference if no significant changes were identified.

Biologists updated information on life history, distribution, abundance, and threats (including climate change) for each species. Various literature sources were used to update the information found in the 2011 LRMP BA and 2012 LRMP BO/CO. These sources included peer reviewed literature, U.S. Fish and Wildlife Service (USFWS) 5-year reviews, Federal Register publications, recovery plans, Natural Heritage Program reports, various internet Web sites, agency reports, maps, and other miscellaneous information. Personal communications were often made with USFWS and other species experts who have the most up-to-date information about species, critical habitats, and management activities in their area of responsibility. Personal communications may have been telephone calls, email messages, or letters. These sources are cited throughout the BA and appear in the Literature Cited section, organized by species.

Aquatic Species

The analysis area for most fish and aquatic species is at the 5th level HUC (hydrologic unit code) watershed based on their range of occurrence and habitat distribution. A few species have analysis areas at the 6th level HUC subwatershed based on their smaller range of occurrence on the forest. The analysis for some species also includes the occurrence of designated or proposed critical habitat within the species analysis area. For those species with designated or proposed critical habitat, the effects analysis approach identified how the primary constituent elements (PCEs) or biological features essential to the conservation of the species were likely to be affected.

Terrestrial Species

The analysis areas for bird and reptile species include potential natural vegetation types (PNVTs) and specific habitat features within their range of occurrence. The analysis for some species also includes the occurrence of designated, proposed, or potential critical habitat within the species analysis area. For those species with designated, proposed, or potential critical habitat, the effects analysis approach identified how the primary constituent elements (PCEs) or biological features essential to the conservation of the species were likely to be affected.

Review of Plan Components

All of the proposed LRMP objectives, standards and guidelines, land suitability determinations, and management area direction were reviewed to determine potential effects to species and their proposed or designated critical habitats. Additionally, the management implications of recommending an additional 23,000 acres for future wilderness designation were considered.

The proposed LRMP includes components that provide protection and conservation for all listed species over the life of the LRMP and help provide the ESA § 7(a)(1) conservation actions for these species. Most desired conditions (DCs) would provide for ESA § 7(a)(1) conservation actions. Table 9 identifies how the proposed LRMP desired conditions address species risks and/or meet recovery. In addition to the proposed LRMP components, the Forest Service will continue to implement the ESA § 7(a)(1) actions described in the status of the species in the action area.

Table 9. Summary of LRMP desired conditions that support species recovery

Desired Conditions that Support Recovery Objectives or Address Species Threats	Plan Component Summary
DC-Ecosystem Resilience-1	Desired outcome is to build adaptive capacity for plant and animal communities to withstand changes of expected future climate trends. Under projected warmer and drier climate conditions, the species and their habitat would be susceptible to increased water temperatures, altered seasonal discharge events, and increase in drought severity. This DC supports recovery actions to protect populations and habitat by adjusting management activities to compensate for changing conditions such as drought, flooding, and wildfires.
DC-Watershed 1 to 3, 6	Desired outcome is for restoration and maintenance of watershed integrity to increase the resilience and adaptive capacity of watershed and riparian corridors to climate change. Projected warmer and drier climate conditions and increasing recreational use on the forest are expected to increase impacts to watershed and riparian conditions. The DCs support recovery actions to protect populations and habitat by improving water quality, securing instream flow rights, and maintaining or improving aquatic and riparian habitats.
DC-Vegetation-1, 6, 7, 9, 11, 13, 14, 21, 23	Desired outcome is for maintaining or restoring vegetation and fire characteristics of PNVTs to natural conditions. The DCs support recovery actions to protect populations and habitat by reducing threats of wildfire and the spread of noxious weeds.
DC-Aquatic-1	Desired outcome is for aquatic habitat and watershed characteristics that would support native fish species. The DC supports recovery actions to protect current populations and habitat from Prescott NF management actions and to establish additional populations of listed species.

Desired Conditions that Support Recovery Objectives or Address Species Threats	Plan Component Summary
DC-Wildlife-1	Desired outcome is for terrestrial habitats and landscape features that would support native wildlife species. The DC supports recovery actions to protect current populations and habitat from Prescott NF management actions and to establish additional populations of listed species.
DC-Open Space-1	Desired outcome is for open space values some of which include naturally appearing landscapes, wildlife habitat, and riparian/wetland character. The DC supports recovery actions to protect populations and habitat by acquiring lands that would protect or expand existing populations.

Analysis Assumptions

In order to make determinations of effect for the species and critical habitats in this BA, it was necessary to make assumptions, including two central assumptions about implementation of the Prescott NF LRMP. The LRMP describes land management goals and desired future conditions for various resources. The first assumption is that the Prescott NF will implement site specific management actions to move toward these goals and desired future conditions. It is understood that funding and constraints other than LRMP direction will control the actual extent and intensity of these site specific management actions, but this cannot be predicted in a program-level analysis.

The second assumption is that the standards and guidelines in the LRMP will be followed when selecting, planning, and executing site specific management actions. If a site specific action does not follow the standards and guidelines, the action must either be modified or the LRMP must be amended (either project specific or full LRMP amendment) before the action can be allowed. In the situation where a site specific action requires LRMP amendment, the action would be considered outside of the scope of this consultation and would require its own separate site specific ESA § 7(a)(2) consultation to address the effects of that particular proposed action.

Other assumptions used during the analyses include:

- The land management plan provides a programmatic framework for future site specific actions, but does not authorize or mandate any site specific projects or activities (including ground-disturbing actions).
- Land management plans may have implications, or environmental consequences, of managing the forests under a programmatic framework.
- Law, policy, regulations and applicable best management practices (BMPs) will be followed when planning or implementing site specific projects and activities.
- The plan components (i.e., desired conditions, objectives, standards, guidelines, special areas, suitability determinations, monitoring) will be followed when planning or implementing site specific projects and activities.

- Monitoring will occur and the land management plan will be amended, as described in the proposed LRMP.
- Management activities that help ecosystems accommodate changes adaptively will improve ecosystem resiliency in the long term.

Species/Critical Habitat Information

This section provides updated information regarding the natural history, distribution, threats (including climate change), and the rangewide status of the species.

Fish

Gila Chub (*Gila intermedia*) Including Designated Critical Habitat

Endangered Species Act Status:	Endangered, 2005
Recovery Plan:	None, In Progress
Designated Critical Habitat:	Designated, 2005
Determination of Effects (Species):	May Affect, Likely to Adversely Affect
Determination of Effects (Critical Habitat):	May Affect, Likely to Adversely Affect

Natural History and Distribution

The natural history and distribution of Gila chub is described in the final rule listing Gila chub as endangered with critical habitat (Fish and Wildlife Service, 2005). That information is incorporated by reference into this BA.

Status of the Species and Critical Habitat Rangewide

The Gila chub was listed as endangered with critical habitat in 2005 (Fish and Wildlife Service, 2005). A detailed status of the species rangewide is found in the final rule listing and is incorporated by reference into this BA. Of 47 known populations, only 29 are considered occupied and all are considered small, isolated, and subject to some form of threat. Of the 29 currently occupied populations, it is estimated that 10 can be considered stable-threatened and 19 are considered unstable-threatened; none are considered stable-secured. Approximately 85 to 90 percent of Gila chub historic habitat has been degraded or destroyed. The BLM and the USFS manage approximately 59 percent of the lands supporting the extant populations.

In Mexico, Gila chub historically occupied significant portions of the Santa Cruz and San Pedro river basins; however, no Gila chub remain in the Mexican portion of the Santa Cruz River basin. The current known distribution of Gila chub in Mexico is limited to two small spring areas, Cienega los Fresnos and Cienega la Cienegita, adjacent to the Arroyo los Fresnos (tributary of the San Pedro River).

Critical Habitat

Critical habitat consists of 160.3 miles in 24 rivers and creeks within the Gila River Basin. The seven areas designated as critical habitat are: (1) Upper Gila River Area, (2) Middle Gila River Area, (3) Babocomari River Area, (4) Lower San Pedro River Area, (5) Lower Santa Cruz River Area, (6) Upper Verde River Area, and (7) Aqua Fria River Area. All of these segments were occupied by Gila chub at the time of designation (Fish and Wildlife Service, 2005). The primary constituent elements of critical habitat for Gila chub are listed in Table 10.

Table 10. Gila chub critical habitat – primary constituent elements

PCE #	Primary Constituent Elements
PCE-1	Perennial pools, areas of higher velocity between pool areas, and areas of shallow water among plants or eddies all found in headwaters, springs, and cienegas generally of smaller tributaries.
PCE-2	Water temperatures for spawning ranging from 17 to 24 degrees Celsius (62.6 to 75.2 degrees Fahrenheit), and seasonally appropriate temperatures for all life stages (varying from approximately 10 to 30 degrees Celsius).
PCE-3	Water quality with reduced levels of contaminants, including excessive levels of sediments adverse to Gila chub health, and adequate levels of pH (e.g., ranging from 6.5 to 9.5), dissolved oxygen (e.g., ranging from 3.0 to 10.0) and conductivity (e.g., 100 to 1000 mmhos).
PCE-4	Food base consisting of invertebrates (e.g., aquatic and terrestrial insects) and aquatic plants (e.g., diatoms and filamentous green algae).
PCE-5	Sufficient cover consisting of downed logs in the water channel, submerged aquatic vegetation, submerged large tree root wads, undercut banks with sufficient overhanging vegetation, large rocks and boulders with overhangs, a high degree of streambank stability, and a healthy, intact riparian vegetation community.
PCE-6	Habitat devoid of nonnative aquatic species detrimental to Gila chub or habitat in which detrimental nonnative are kept at a level that allows Gila chub to continue to survive and reproduce; and
PCE-7	Streams that maintain a natural flow pattern including periodic flooding.

Threats

The major threats to Gila chub are detailed in the final rule listing (Fish and Wildlife Service, 2005) and are incorporated by reference into this BA. Major threats include predation by and competition with nonnative aquatic species and habitat alteration, destruction, and fragmentation. Because the species exists in small, isolated populations, they are highly susceptible to threats such as drought, flood events, and wildfire.

Climate Change

For a discussion on climate change refer to the Climate Change section in this BA. Temperature is a key factor defining the gradients of performance and the absolute bounds of life for most aquatic organisms. It also affects rates of growth and timing of key life history events or transitions (Rieman and Isaak, 2010). Increased temperature may also lead to an increase in water temperature, which would allow other warmwater fishes (native and nonnative) to expand their range into the limited habitat occupied by Gila chub. However, within the temporal bounds of this action there are no expectations of measurable change for Gila chub.

Status of the Species and Critical Habitat within the Action Area

Historical and current distribution and status of Gila chub on the Prescott NF is shown in Table 11. Gila chub also occurs downstream of the Prescott NF in Indian Creek and Williamson Valley

Wash. The species is known to occur in Sycamore, Little Sycamore, and Indian creeks in the Agua Fria River drainage (Bettaso et al., 1995; Weedman et al., 1996; Sillas, 2003, 2005, 2006). All three streams have perennial-interrupted flow and thus provide less occupied habitat than available on the forest. There is limited direct impact to occupied habitat of Gila chub from management activities because of exclosures around occupied sites or rough terrain that restricts access to the stream. The species distribution and abundance in each stream are negatively impacted due to the presence of nonnative aquatic species which are predatory and/or competitive with the chub and because of impacts associated with the 2005 Cave Creek Complex wildfire that reduced habitat quantity and quality from excess sedimentation filling in pool habitats.

Table 11. Gila chub distribution and status on the Prescott National Forest

6th Level HUC Name	Existing Pop. Name/Stream	Stream Miles On Forest	Miles of Occupied Habitat	Status Classification from the USFWS 2005 Final Rule
Sycamore Creek	Sycamore Creek	7	3	unstable-threatened
Little Sycamore Creek	Little Sycamore Creek	0.5	0.25	stable-threatened
Indian Creek	Indian Creek	0.5	0.5	unstable-threatened
Williamson Valley Wash	Williamson Valley Wash	0	0.5	unstable-threatened

Critical Habitat

On the Prescott NF, three stream reaches that are designated critical habitat occur within the Agua Fria River Area. One known population and designated critical habitat is located on private lands downstream of the eastern boundary of the forest (west half) in Williamson Valley Wash.

- **Little Sycamore Creek -** 2.9 miles of creek extending from its confluence with Sycamore Creek upstream. Land ownership includes private lands and Prescott NF.
- **Sycamore Creek -** 11.4 miles of creek extending from its confluence with Little Sycamore Creek upstream to Nelson Place Spring. Land ownership includes private lands and Prescott NF.
- **Indian Creek -** 5.2 miles of creek extending from Upper Water Springs downstream into BLM lands. Land ownership includes private lands, BLM, and Prescott NF.
- **Williamson Valley Wash -** 4.4 miles of creek extending from the gauging station upstream to the crossing of the Williamson Valley Road. This critical habitat occurs entirely on private lands.

Factors Affecting the Species and Critical Habitat in the Action Area

The analysis area for Gila chub includes the subwatersheds with occupied and designated critical habitat (Table 12). Land ownership is primarily Prescott NF lands and other state or federal lands

but there are private land inclusions along many of the streams. The main land use activities in the area include livestock grazing and dispersed recreation activities such as OHV and hunting.

Table 12. Subwatershed ownerships in Gila chub analysis area

6th Level HUC Name	Total Acres	PNF Acres	Non-PNF Acres State/Federal	Private Acres	% PNF Acres
Sycamore Creek	31,594	24,907	4,835	1,852	79
Little Sycamore Creek	10,422	9,935	4	483	95
Indian Creek	17,715	9,582	7,932	201	54
Williamson Valley Wash (5th level HUC)	205,367	107,928	19,702	77,737	53

The Watershed Condition Classification (WCC) for the Prescott NF is referenced to display the existing condition of the subwatersheds in the analysis area for Gila chub and their designated critical habitat (Forest Service, 2011). The individual watershed condition indicators that best reflect the consequences of management activities and recreation use are given in Table 13. The main PNVTs within these watersheds are the piñon juniper PNVTs and grassland PNVTs (proposed LRMP appendix A, map 1). These PNVTs have a relatively low percentage of satisfactory soil conditions (DEIS page 94).

Watershed conditions are At-Risk or Impaired for several key watershed condition indicators. These departures collectively are contributing to an altered hydrologic condition that is affecting aquatic habitat quality in Gila chub streams.

Table 13. Subwatershed conditions by selected WCC indicators in Gila chub analysis area

6th Level HUC Name	WCC Indicator								
	Water Quality	Water Quantity	Nonnative Species	Riparian Vegetation	Roads and Trails	Soils	Fire Regime	Forest Cover	Rangeland Vegetation
Sycamore Creek	1*	1	2	1	3	2	2	1	2
Little Sycamore Creek	1	1	2	2	3	2	2	1	2
Indian Creek	1	2	1	1	3	2	2	1	2
Upper Williamson Valley Wash (5th level HUC)	1	2	2	2	3	3	2	N/A	3

*Indicator Rating Classes: 1=Functioning; 2=At-Risk; 3=Impaired. Ratings are for the entire subwatershed. Ratings for 5th level HUCs are consolidated scores from 6th level HUC subwatersheds.

There are some threats to water quantity for Gila chub from water withdrawals in several streams. Water withdrawals in Indian Creek occur on private lands downstream of the Prescott NF and do not affect the sites on the forest. Williamson Valley Wash has experienced a number of recent housing developments, and more are proposed. Although data are lacking, the effects of water withdrawal in this area combined with recent drought appear to have eliminated most of Gila chub habitat in this system (Fish and Wildlife Service, 2005).

Nonnative fishes which are predatory and/or competitive with the native species occur in portions of Sycamore, Little Sycamore, Indian Creeks, and Williamson Valley Wash. Rainbow trout occur with Gila chub in Sycamore Creek and are having an unknown impact on the species. Portions of all streams have presence of nonnative fish that have reduced or eliminated Gila chub distribution and abundance.

The presence of aquatic and riparian habitat in all streams attracts recreational use. There are no developed recreational sites on any of the streams. Salt Flat campground is a dispersed camping site and trailhead to Pine Mountain Wilderness that has picnic tables and fire rings. There are localized impacts in this area that cause soil compaction and increased runoff with some minor impacts to water quality.

The primary threat to the subwatersheds and to aquatic/riparian ecosystems in the subwatersheds is due to roads and trails. Roads—and to a lesser extent, trails—are the most significant source of increased sediments into stream channels on the Prescott NF. Many roads and trails on the Prescott NF are located in proximity to surface water and concentrate runoff into these drainages, increasing sediment transport and reducing infiltration rates. There are several stream crossings that occur in all three streams on both forest and private lands. These are all low water stream crossings and do not pose a barrier to aquatic passage. All the subwatersheds were rated as Impaired for this indicator, meaning there is a higher probability that the hydrologic conditions have been substantially altered by the roads and trails.

Livestock grazing occurs throughout suitable rangelands in all subwatersheds within the Gila chub analysis area. These watersheds have a high percentage of acres rated as Impaired for rangeland vegetation though much of this is related to high amounts of piñon-juniper PNVTs that are departed from reference conditions. Authorized livestock grazing on Prescott NF allotments follow grazing rotations, riparian utilization levels, and other LRMP standards and guidelines to minimize impacts to riparian and aquatic resources. Areas of suitable habitat for Gila chub within Sycamore Creek are accessible to livestock grazing that could affect the aquatic/riparian zone from livestock use and movement along habitat and waste deposits into or near habitat that can impair water quality.

Juniper treatments followed by slash pile burning have been ongoing for pronghorn habitat improvement within the Indian Creek 6th Level HUC. This project with the implementation of resource protection measures has improved vegetation and soil conditions in the area.

ESA § 7(a)(1) Conservation Actions on the Prescott NF

In 2003, riparian exclosures were constructed around occupied sites in Indian Creek. Annual monitoring and maintenance of the exclosures are completed to exclude livestock grazing.

During 2005 and 2008, population and habitat monitoring was completed in all occupied habitat for the Sycamore Creek, Little Sycamore Creek, and Indian Creek populations on the forest. Salvage and repatriation of Gila chub was accomplished on the forest following the Cave Creek Complex Fire in 2005.

Design measures to protect Gila chub were incorporated in the Proposed Action for the Sycamore Livestock Grazing Project Environmental Assessment (Forest Service, 2010b) and the Agua Fria Juniper Removal Project (Forest Service, 2010a). Annual habitat and population monitoring is conducted for Gila chub in Sycamore Creek in support of the Biological Opinion for the Sycamore Allotment.

During 2012, forest personnel assisted Arizona Game and Fish Department (AZGFD) in population monitoring for the Sycamore Creek, Little Sycamore Creek, and Indian Creek populations on the forest.

Effects Analysis for the Species

All plan components are detailed in the Description of the Proposed Action by Program section of this BA. All of the proposed LRMP desired conditions, objectives, standards and guidelines, management area direction, and monitoring were reviewed to determine potential affects to Gila chub and their designated critical habitat. The following analysis is grouped by program area and includes the ongoing and future activities for the 10 to 15 years after plan approval.

Watershed and Soils

The proposed LRMP has four objectives (Obj-18, Obj-19, Obj-23, and Obj-31) that direct Watershed and Soils program activities. These objectives are expected to occur throughout the

subwatersheds identified for the species analysis area based on the need to improve several of the WCC indicators.

Obj-18 includes direction to implement 5 to 50 essential projects within high priority watersheds that would improve or maintain watershed condition during the 10 years following plan approval. Activities could include, but would not be limited to, range improvements to distribute grazing, treatments to increase vegetative ground cover, and gully stabilization. In most cases, projects would be limited in extent and amount of ground disturbance. Range improvements could include pasture division fences and water developments. Placement of these structures would generally occur outside of occupied species habitat or apply protection measures to mitigate effects (also see Guide-Fish/Aquatics-1, 3). Vegetation treatments could include wildland fire (prescribed), mechanical treatments, and hand thinning to reduce tree and shrub density and canopy cover in various PNVTs. Gully stabilization could include use of mechanical equipment, placement of structures, and application of soil protective cover to treat gully systems. Projects in the uplands would have short term effects of soil disturbance, vegetation reduction, and/or increases of ash and nutrients in the project area. The extent of erosion and surface runoff resulting in sedimentation and ash/nutrient input to species habitat due to project activities would be mitigated by implementation of the standards and guidelines listed below and also by best management practices (e.g., stream management zones). Projects in the uplands would improve soil and vegetation conditions and are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality and promote healthy macroinvertebrate populations in the streams.

Obj-19 includes direction to implement projects to counter 1 to 3 critical threats to riparian functionality during the 10 years following plan approval. Activities could include, but are not limited to, vegetation reestablishment, nonnative invasive plant treatments, erosion control, instream habitat improvement, adjusting the timing and season of grazing, or fencing. In most cases, projects would be limited in extent and amount of ground disturbance. Projects in the riparian and stream zone would have localized, short term effects of streambank disturbance, vegetation reduction, sedimentation into the stream, and species disturbance. All activities would implement standards and guidelines listed below and best management practices (also see Guide-Fish/Aquatics-1, Guide-Fish/Aquatics-4, and Std-Plants-2). Projects would have short term adverse effects to the species and habitat but would have long term beneficial effects. Projects in the riparian areas would improve aquatic and riparian conditions and are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality and healthy macroinvertebrate populations; it would also promote native riparian vegetation which would maintain suitable water temperature in the streams.

Obj-23 includes direction to maintain or enhance 25 to 55 discrete sites that are groundwater dependent during the 10 years following plan approval. Activities could include road or trail relocation or closure, obliteration of unauthorized routes, livestock grazing management, and fencing. In most cases, projects would be limited in extent and amount of ground disturbance. Projects would have short term effects of soil disturbance and/or vegetation reduction in the project area. Potential erosion and sedimentation due to project activities would be mitigated by implementation of standards and guidelines listed below and best management practices. Projects for springs and seeps would improve soil and vegetation conditions and promote watershed integrity.

Obj-31 includes direction to apply for at least eight instream flow water rights during the 10 years following plan approval. Sycamore Creek already has secured instream flow rights. Stream flows in occupied Gila chub habitat in Indian Creek do not have any threats from private land interests. Little Sycamore Creek has several private land parcels interspersed along the creek and could benefit from acquisition of instream flow water rights. Acquisition of instream flow water rights would have beneficial effects to Gila chub by maintaining suitable baseflows throughout the year.

Standards and guidelines applicable to mitigate effects to the species:

- Std-WS-1: Construction or maintenance equipment service areas shall be located at least 100 feet from the edges of all riparian corridors, seeps, and springs to prevent gas, oil, or other contaminates from washing or leaching into aquatic and riparian habitats.
- Std-WS-2: Equipment working on open water and wetlands shall be cleaned prior to entry into such areas to remove gas, oil, and other contaminants.
- Std-WS-3: Containment measures shall be employed within 100 feet from the edge of all riparian corridors, seeps, and springs for storage of fuels and other toxicants to prevent degradation of water quality and aquatic habitat.
- Guide-WS-1: Ground-disturbing projects should not alter the long-term hydrologic regime within 6th level hydrologic units (subwatersheds).
- Guide-WS-3: Riparian dependent resources should be managed to maintain and improve productivity and diversity of riparian dependent species. Riparian communities should provide for the sustainability of aquatic and riparian species.
- Guide-WS-4: Adverse impacts to stream channel features (e.g., streambanks, obligate riparian vegetation) should be minimized by modifying management actions.
- Guide-WS-5: Ground cover sufficient to filter runoff and prevent erosion should be retained in riparian corridors, seeps, and springs.
- Guide-WS-6: New infrastructure or facilities (e.g., roads, trails, parking lots, trailheads, and energy transmission lines) should be located outside of riparian corridors.
- Guide-WS-7: Infrastructure or facilities locations that lead to erosion or negative impacts to riparian systems should be mitigated/corrected. If no permanent correction is possible, they should be located outside of riparian corridors as opportunities arise.
- Guide-WS-8: Operation of heavy equipment, such as dozers, backhoes, or vehicles, in stream channels, seeps, and springs should be avoided. If use of equipment in such areas is required, site specific design features should be implemented to minimize disturbance to soil and vegetation. Restoration or stabilization should occur immediately following disturbance.
- Guide-WS-9: Along perennial streams, perennial intermittent streams, and spring ponds, mitigations such as offsite water for livestock should be provided to reduce impacts on riparian communities and groundwater dependent sites.
- Guide-WS-10: Measures that restrict use should be considered as a way to mitigate recurring negative impacts to aquatic species and riparian plants. These could include, but

are not limited to, installation of barriers, road closures, area closures, or seasonal restrictions.

- Guide-Soils-1: Projects should be designed to limit activities that would cause long-term impacts to soils such as loss of ground cover, severely burned soils, detrimental soil displacement, erosion, puddling, or compaction. Where disturbance cannot be avoided, project-specific soil and water conservation practices should be developed.
- Guide-Soils-2: Down logs and coarse woody debris should be maintained at the appropriate tonnage per PNVT as outlined in the "Vegetation" desired condition sections to retain soil productivity.

The extent and rate of watershed and soil treatments within Gila chub analysis area are expected to be at low levels for the planning period. Projects in the uplands would have short term effects in the project area but effects would be insignificant and discountable to Gila chub. Instream improvement projects would have localized, short term adverse effects to Gila chub and their habitat but would have long term benefits to the species. Standards and guidelines for watershed and soils are positive to maintaining long term watershed conditions and with implementation are expected to mitigate the effects of projects from all forest program areas. Best management practices would also be implemented on a project-by project basis to prevent impacts to soils and the watershed. Overall, the Watershed and Soils program plan components are positive for Gila chub and would maintain or improve watershed condition indicators related to water quality, water quantity, soils, riparian vegetation, and rangeland vegetation.

Wildlife/Fish/Rare Plants

The proposed LRMP has five objectives (Obj-24 through Obj-28) that direct Wildlife/Fish/Rare Plants program activities. These objectives are expected to occur throughout the subwatersheds identified for the species analysis area.

Obj-24 to restore native fish species to 2 to 3 stream reaches during the 10 years following plan approval. Projects on the Prescott NF are expected to include Gila chub. USFS management actions needed to support native fish restoration could include construction and maintenance of fish barriers and other projects to improve aquatic habitat for the species. These projects would have localized, short term adverse effects to the species and their habitat from implementation and maintenance of structures such as streamflow and streambank alteration, sedimentation, and disturbance to the species. Project activities would be mitigated by implementation of guidelines listed below, Watershed and Soil standards and guidelines, and best management practices. The projects would have long term benefits by improving the quality of occupied and suitable habitat of Gila chub on the forest.

Obj-25 to modify or remove fence to improve pronghorn movement would have no effect to Gila chub as it would not occur in their habitat.

Obj-26 includes direction to treat 15,000 to 90,000 acres to increase pronghorn antelope habitat quantity and quality during the 10 years following plan approval. Treatments are expected to occur in the Sycamore, Little Sycamore, and Indian Creek subwatersheds occupied by Gila chub. Actions include prescribed fire and mechanical treatment that are also tied to Obj-1 through Obj-3 for grassland and piñon-juniper PNVTs. Mechanical or hand thinning treatment projects would

have short term effects of vegetation reduction and also soil disturbance with use of heavy equipment (e.g., agra-ax) in the project area. Prescribed fire projects would have short term effects of vegetation reduction and increases in ash and nutrients. The extent of erosion and surface runoff resulting in sedimentation and ash/nutrient input to species habitat due to project activities would be mitigated by implementation of the guidelines listed below, Watershed and Soil standards and guidelines, and best management practices. Projects would improve soil and vegetation conditions in the uplands and are expected to reduce sedimentation to aquatic habitats which would maintain water quality and healthy macroinvertebrate populations. Projects would also improve the PNVTs similarity to desired conditions and reduce the potential for uncharacteristic wildfire.

Obj-27 includes direction to treat two to three areas to facilitate pronghorn migration during the 10 years following plan approval. Treatments are expected to occur in the Sycamore, Little Sycamore, and Indian Creek subwatersheds occupied by Gila chub. Projects could include hand thinning and mechanical treatment of trees and prescribed fire (both broadcast and pile burning). Effects would be similar to those described for Obj-26.

Obj-28 includes direction to improve up to 25 existing and 5 new water developments for wildlife during the 10 years following plan approval. Water development projects would avoid occupied species habitat or apply protection measures to mitigate effects.

Standards and guidelines applicable to mitigate effects to the species:

- Guide-Fish/Aquatics-1: Habitat management objectives and aquatic/riparian species protection measures from approved recovery plans should be applied to activities occurring within federally listed species habitat[3].
- Guide-Fish/Aquatic-3: Water developments (such as a diversion or well) should be avoided near streams or seeps and springs where there is high risk of dewatering aquatic habitats.
- Guide-Fish/ Aquatics-4: To prevent the spread of invasive species and fungal disease within aquatic habitats, the following should be cleaned of plant, animal, and mud material before coming into the Prescott NF: Mechanized equipment and tools used for projects; Equipment (including suction dredges and hoses); Watercraft, boating equipment, and personal gear (e.g., personal flotation devices, waders, wading boots/shoes) used for projects or surveys; Gear used for permitted activities. Items should again be cleaned at takeout and suction devices should be drained and cleaned prior to leaving the project site.

Standards and guidelines for aquatic and terrestrial wildlife would apply to all program areas on the forest. Implementation of the standards and guidelines, especially those for Aquatic Wildlife, is positive for the conservation and recovery of Gila chub and is expected to mitigate the effects of projects within and adjacent to aquatic/riparian areas.

[3] Recovery plans can be found on the following Web site: http://www.fws.gov/endangered/

The extent and rate of aquatic and terrestrial wildlife treatments (Table 6) within Gila chub analysis area are expected to be at low levels for the planning period. Projects in the uplands would have short term effects in the project area but effects would be insignificant and discountable to Gila chub. Native fish stream improvement projects would have localized, short term adverse effects to Gila chub and their habitat but would have long term benefits by improving the quality of occupied and suitable habitat of Gila chub on the forest. Overall, the Wildlife/Fish/Rare Plants program plan components are positive for Gila chub and would maintain or improve watershed condition indicators related to water quality, nonnative species, soils, riparian vegetation, and rangeland vegetation.

Wildland Fire and Fuels Management

The proposed LRMP has five objectives (Obj-1 through Obj-5) that direct Wildland Fire and Fuels Management activities. There would be an average of 11,350 acres per year (1 percent) of treatments across all PNVTs on the forest. Planned wildland fire and mechanical treatments could occur across the landscape of the PNVTs in the subwatersheds. Semi-Desert Grassland and the piñon-juniper PNVTs in these subwatersheds would be targeted for treatment due to their moderate to high departure from reference conditions. There would be no planned fire within riparian areas.

Obj-1 includes direction for 25,000 to 65,000 acres of wildland fire within the Semi-Desert Grassland PNVT during the 10 years following plan approval. Projects would have short-term effects of vegetation reduction and increases of ash and nutrients in the project area. The extent of erosion and surface runoff resulting in sedimentation and ash/nutrient input to species habitat due to project activities would be mitigated by implementation of the guidelines listed below, Watershed and Soil standards and guidelines, and best management practices.

Obj-2 includes direction for 1,000 to 5,000 acres of wildland fire within the Great Basin Grasslands PNVT during the 10 years following plan approval. Projects effects and mitigation are the same as Obj-1.

Obj-3 includes direction for 20,000 to 90,000 acres of wildland fire or mechanical treatments within the Juniper Grasslands, Piñon-Juniper Evergreen Shrub, and Piñon-Juniper Woodlands PNVTs during the 10 years following plan approval. Projects effects from prescribed fire would be the same as Obj-1. Mechanical treatment projects would have short term effects of vegetation reduction and also soil disturbance with use of heavy equipment (e.g., agra-ax) in the project area. The extent of erosion and surface runoff resulting in sedimentation and ash/nutrient input to species habitat due to project activities would be mitigated by implementation of the guidelines listed below, Watershed and Soil standards and guidelines, and best management practices.

Obj-4 includes direction for 40,000 to 100,000 acres of wildland fire or mechanical treatments within the Interior Chaparral PNVT during the 10 years following plan approval. Priority areas for treatments would take place near wildland-urban interface areas such as in the vicinity of Cherry, Crown King, or within the Hassayampa River watershed. Projects effects and mitigation are the same as Obj-1 and Obj-3.

Obj-5 includes direction for 25,000 to 50,000 acres of wildland fire within the Ponderosa Pine-Evergreen Oak and Ponderosa Pine-Gambel Oak PNVTs during the 10 years following plan

approval. Priority areas for treatments would take place near wildland-urban interface near Prescott and on Mingus Mountain. Projects effects and mitigation are the same as Obj-1.

Guidelines applicable to mitigate effects to species:

- Guide-Wildland Fire-5: Mechanical or manual treatment of hazardous fuels should be considered where the use of wildland fire (wildfire and prescribed fire) may cause unacceptable damage to other resources or pose an unacceptable risk to life and private property.
- Guide-Wildland Fire-7: Slash piles should not be placed in sensitive areas[4] and should be located in places and burned at times that will minimize scorching of adjacent trees.
- Guide-Wildland Fire-8: Project-specific design features to avoid undesired impacts should be used when fire operations occur within or near riparian corridors or seeps and springs.

The extent and rate of wildland fire and fuels treatments (Table 6) within Gila chub analysis area are expected to be at low to moderate levels for the planning period. Implementation of the standards and guidelines is positive for Gila chub and is expected to mitigate the effects of projects to aquatic and riparian areas. Projects would improve soil and vegetation conditions in the uplands and are expected to reduce sedimentation to aquatic habitats which would maintain water quality and healthy macroinvertebrate populations. Projects would also improve the PNVTs similarity to desired conditions and reduce the potential for uncharacteristic wildfire. Overall, the Wildland Fire program plan components would have insignificant and discountable effects to Gila chub and would maintain or improve watershed condition indicators related to water quality, soils, fire regime, and rangeland vegetation.

Recreation

The proposed LRMP has 10 objectives (Obj-8 through Obj-17) that direct Recreation program activities. All objectives, except Obj-13 to increase recreational fishing opportunity, are expected to have planned activities within subwatersheds and streams with Gila chub.

The majority of the objectives include direction to minimize the impacts of recreational activities and facilities to natural resources. Actions such as designated dispersed camping areas, maintenance of facilities, relocation and rehabilitation of recreation facilities impacting natural resources, and signing would improve upland and aquatic/riparian conditions and are expected to reduce sedimentation to aquatic habitats which would maintain water quality and healthy macroinvertebrate populations.

Obj-8 includes direction to create up to 4 designated dispersed camping areas during the 10 years following plan approval. Projects would reduce recreation impact to sensitive areas along aquatic habitats such as soil compaction, vegetation reduction, and contaminants. Projects would be mitigated by standards and guidelines listed below and best management practices.

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[4] Examples of sensitive areas are important wildlife habitat, waterways, visually unique areas, heritage sites, occupied Southwestern Region sensitive species habitat, and recreation areas.

Obj-9 includes direction to implement sufficient maintenance projects at developed recreation areas to ensure that the backlog (i.e., deferred maintenance) does not increase over baseline levels by more than 20 percent during the 10 years following plan approval. Maintenance near species habitat would be mitigated by standards and guidelines listed below, Watershed and Soil standards and guidelines, and best management practices.

Obj-10 includes direction to develop and implement at least 3 additional strategies to raise awareness of responsible target shooting practices within the Prescott NF to promote visitor safety during the 10 years following plan approval. There would be no effects to the species from this action.

Obj-11 includes direction to construct or improve the facilities at 5 to 20 trailheads during the 10 years following plan approval. Projects would be mitigated by standards and guidelines listed below, Watershed and Soil standards and guidelines, and best management practices.

Obj-12 includes direction to maintain 10 to 20 percent of signage annually. There would be no effects to the species from this action.

Obj-13 includes direction to work with partners to maintain and enhance recreational fishing opportunities in 2 lake/pond sites during the 10 years following plan approval. Projects would not occur in species habitat.

Obj-14 includes direction to develop 2 to 5 additional methods for providing visitor information and education during the 10 years following plan approval. There would be no effects to the species from this action.

Obj-15 includes direction to mark boundaries of portions of 2 to 5 designated wilderness areas where risk of motorized or mechanized access is high during the 10 years following plan approval. There would be no effects to the species from this action.

Obj-16 includes direction to protect, relocate, or rehabilitate 2 to 5 recreation areas or locations (including trails) that show evidence of resource damage during the 10 years following plan approval. Projects would be mitigated by standards and guidelines listed below, Watershed and Soil standards and guidelines, and best management practices.

Obj-17 includes direction to implement 5 to 10 management actions on trails to meet desired conditions during the 10 years following plan approval. Projects would be mitigated by standards and guidelines listed below, Watershed and Soil standards and guidelines, and best management practices.

Standards and guidelines applicable to mitigate effects to the species:

- Std-Rec-1: Only designated roads, motorized trails, and motorized use areas as depicted and described on the motor vehicle use map are open to public motorized vehicle use.
- Std-Rec-2: Only designated roads, motorized trails, and motorized use areas depicted and described on the MVUM are open for motorized big game retrieval. Motorized big game retrieval is precluded in areas where motorized travel is prohibited, such as wilderness.
- Guide-Rec-4: Native plant species, when suitable and available, should be used during the design of new or improved recreation sites. Invasive weeds should be removed or treated on existing sites before they become widespread within recreation sites.

- Guide-Rec-5: Unauthorized travel routes should be returned to natural conditions to discourage continued use.
- Guide-Rec-6: Management tools (e.g., education, engineering, and enforcement) should be used to prevent resource damage due to recreation activities.
- Guide-Rec-7: Redesign, restoration, or rehabilitation of recreation sites should be carried out where recreation activities have caused unacceptable natural and social resource impacts.
- Guide-Rec-8: New developed campgrounds and designated dispersed campsites should be located away from riparian areas, flood plains, and other environmentally sensitive areas.
- Guide-Rec-9: To guide appropriate motorized use, accurate and understandable signs should be placed in effective locations to discourage encroachment of motorized vehicles into nonmotorized areas.

Implementation of standards and guidelines for recreation would mitigate the effects of ongoing recreational activities and future projects to aquatic and riparian resources. Overall, the Recreation program plan components would have insignificant and discountable effects to Gila chub and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Transportation

The proposed LRMP has three objectives (Obj-20, Obj-22, and Obj-23) that direct Transportation program activities. All objectives are expected to have planned activities within subwatersheds with Gila chub.

Obj-20: Maintain, repair, or relocate 20 to 100 miles of National Forest System roads or trails that impact watershed integrity during the 10 years following plan approval. Projects would have short-term effects of soil disturbance and/or vegetation reduction in the project area. Potential erosion and sedimentation due to project activities would be mitigated by implementation of standards and guidelines listed below, Watershed and Soil standards and guidelines, and best management practices.

Obj-21: Obliterate, recontour, or revegetate a minimum of 10 miles of unauthorized routes that are impacting watershed integrity during the 10 years following plan approval. Projects would have short-term effects of ground disturbance. Potential erosion and sedimentation due to project activities would be mitigated by implementation of standards and guidelines listed below, Watershed and Soil standards and guidelines, and best management practices.

Obj-22: Improve 15 to 25 stream or drainage crossings associated with roads or trails to facilitate flow and sediment transport during the 10 years following plan approval. Projects in the stream zone would have short-term effects of streambank disturbance, sedimentation into the stream, and species disturbance. Potential effects due to project activities would be mitigated by implementation of standards and guidelines listed below, Guide-Fish/Aquatic-1, Watershed and Soil standards and guidelines, and best management practices. There would continue to be impacts from low water road crossings on Little Sycamore and Sycamore Creeks.

Standards and guideline applicable to mitigate effects to the species:

- Guide-Trans-1: Where the creation of alternate routes does not lead to excessive damage to other resources, opportunities to relocate and restore motorized roads or trails in riparian areas, and in proximity to other watercourses, should have priority.Guide-Trans-2: Roads and trails removed from the transportation network should be rehabilitated as soon as possible. Treatments may include reshaping travelways, removal of stream crossing structures, restoring and armoring natural drainages, stabilizing ground surface, revegetation, and maintenance or restoration of fish passage.
- Guide-Trans-3: Roads and trails should be designed to not impede terrestrial and aquatic wildlife species movement and habitat connectivity.
- Guide-Trans-4: Seasonal road and trail closures or other management methods should be used to manage and protect resources and infrastructure.
- Guide-Trans-6: When system roads are constructed or reconstructed, efforts should be focused on reducing cumulative watershed effects. This could include, but is not limited to, using design features that minimize sedimentation, reduce the number or length of system roads, or rehabilitate unneeded system roads and user-created routes.

Projects would improve soil and vegetation condition in the uplands and would improve or minimize impacts to aquatic and riparian conditions along streams. Implementation of the standards and guidelines is expected to mitigate the effects of the projects in the uplands and aquatic/riparian areas. Overall, the Transportation program plan components could have localized, short term adverse effects to Gila chub and their habitat from actions taken near or instream but would maintain or improve watershed condition indicators related to water quality, soils, riparian vegetation, roads and trails, and rangeland vegetation.

Wilderness and Special Areas

The proposed LRMP does not have any objectives that direct Wilderness Management activities. Ongoing management within Gila chub analysis area includes the Pine Mountain Wilderness within the Sycamore Creek subwatershed. Wildland fire in wilderness would have short term effects of vegetation reduction and increases in ash and nutrients in the project area. Standards and guidelines for wilderness provide direction to protect values from recreation and fire activities. Out of the eight recommended wilderness areas, none fall within any subwatersheds with Gila chub. Overall, the Wilderness and Special Areas program plan components would have insignificant and discountable effects to the species and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Standards and guidelines applicable to mitigate effects to the species:

- Std-Wild-1: Wilderness characteristics and values shall take precedence over recreation uses where conflicts occur.

- Std-Wild-3: All fire management actions within wilderness shall be conducted in a manner compatible with overall wilderness desired conditions including the character and values associated with each individual wilderness area.
- Guide-Wild-5: Where active intervention is warranted to preserve the wilderness character, corrective activities should be initiated for areas that become degraded as a result of human activities.
- Guide-Wild-7: Minimum Impact Suppression Tactics (MIST) should be used when managing both wildfire and prescribed fire within wilderness.
- Guide-Wild-9: Decisions for the appropriate suppression tool or tactic in the wilderness should receive the same considerations for firefighter and public safety and the protection of values at risk as they would outside of wilderness. If such considerations are not urgent, the use of retardant in wilderness should be avoided if possible.

Lands and Special Uses

The proposed LRMP has two objectives (Obj-29 and Obj-30) that direct Lands and Open Space management activities. Both objectives have the potential to have actions taken within Gila chub analysis area because of the interspersion of private lands along Little Sycamore, Sycamore, and Indian Creeks. Obj-29 includes direction to acquire lands which could include areas with Gila chub or their habitat. This action would have beneficial effects to protecting or expanding Gila chub populations, especially those lands acquired with water rights. Obj-30 to secure right of ways would have minimal effects to Gila chub. Standards and guidelines for lands have minimal relevance to the species. Overall, the Lands and Special Uses program plan components would have beneficial effects to Gila chub.

Guidelines applicable to mitigate effects to the species:

- Guide-Lands-2: When responding to land exchange proposals as presented, consideration should be given to the effects they have on visual characteristics; cultural resources; recreation opportunities; threatened, endangered or sensitive species impacts; and community vision statements.

Minerals Management

The proposed LRMP does not have any objectives that direct Minerals Management activities. There are limited mining activities within the subwatersheds and/or streams with Gila chub. Mineral standards and guidelines restrict mineral activities in wilderness and other special areas which have beneficial effects to Gila chub for populations below Pine Mountain Wilderness and provide guidance to mitigate mining impacts to upland, riparian, and aquatic resources. Overall, the Minerals program plan components would have insignificant and discountable effects to the species and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Standards and guidelines applicable to mitigate effects to the species:

- Std-All Minerals-1: Surface disturbance shall be limited to the minimum necessary for the extraction of minerals.

- Std-Locatable Minerals-3: Approval of mining activities shall include the use of reclamation bonds to protect and restore surface resources.
- Guide-Locatable Minerals-2: Structures and support facilities for mining activity should be located outside riparian areas; Watershed protection and mitigations should be incorporated to avoid degradation of aquatic systems, including water quality, during mineral extraction.
- Std-Minerals Materials-1: Restoration plans shall be prepared before development and use of new mineral material sources.
- Std-Minerals Materials-2: Mineral activity shall not be permitted in designated wilderness and other withdrawn areas.
- Guide-Minerals Materials-1: Adverse effects to aquatic and other riparian dependent resources from mineral material operations should be avoided.

Rangeland Management

The proposed LRMP does not have any objectives that direct Rangeland Management activities. Livestock grazing would continue throughout suitable rangelands on forestlands within Gila chub analysis area. Segments of Gila chub habitat are protected from livestock grazing by exclosure fences in all streams or have limited accessibility due to rough terrain. Accessible areas of Sycamore Creek would have short term adverse effects of livestock grazing to streambanks, riparian vegetation and water quality from waste deposits into or near habitat. Impacts to aquatic and riparian areas would be mitigated by standards and guidelines listed below, Fish/Aquatic guidelines, Watershed and Soil standards and guidelines, and best management practices. Overall, the Rangeland program plan components would have short term adverse effects to Gila chub from livestock grazing in their habitat but would maintain watershed condition indicators related to water quality, soils, riparian vegetation, and rangeland vegetation.

Standards and guidelines applicable to mitigate effects to the species:

- Std-Range-2: Year-long livestock grazing in riparian areas (streams, springs, and seeps) shall be avoided to prevent adverse impacts to water quality and riparian habitat in those areas.
- Guide-Range-1: The placement of salt, minerals, and/or other supplements for the purposes of livestock management should be located further than one-quarter mile from riparian areas or seasonally present water.
- Guide-Range-3: After occurrence of wildland fire or mechanical activity that removes most vegetation, a time period for recovery, establishment, and regrowth of vegetation should be determined and applied to meet site specific objectives.
- Guide-Range-5: Livestock use of woody riparian species (e.g., cottonwood, willow, ash, and alder) should provide for maintenance of those species and allow regeneration of new individuals leading to diverse age classes of woody riparian species where potential for native woody vegetation exists.

- Guide-Range-6: Grazing intensity, frequency, occurrence, and period should provide for growth and reproduction of desired plant species while maintaining or enhancing habitat for wildlife.

Forestry and Forest Health

The proposed LRMP has three objectives (Obj-3, Obj-5, and Obj-6) that direct the Forest Health program activities.

Obj-3 identifies using mechanical treatments on 22,000 acres to improve watershed and rangeland conditions, vegetation structure, and wildlife habitat within the piñon-juniper PNVTs. Projects would have short-term effects of soil disturbance and/or vegetation reduction in the project area. Potential erosion and sedimentation due to project activities would be mitigated by implementation of standards and guidelines listed below, Watershed and Soil standards and guidelines, and best management practices.

Obj-5 includes direction to thin or harvest 2,500 to 8,000 acres in Ponderosa Pine-Evergreen Oak and Ponderosa Pine-Gambel Oak PNVTs during the 10 years following plan approval. There are no suitable timber sites within the species analysis area.

Obj-6 includes direction to treat at least 50 percent of nonnative invasive plants species populations within 1 to 2 years of detection during the 10 years following plan approval. Projects in the riparian and stream zone would have short term effects of streambank disturbance, vegetation reduction, sedimentation into the stream, and species disturbance. Project effects would be mitigated with implementation of Std-Plants-2.

Standards and guidelines applicable to mitigate effects to the species:

- Std-FP-1: Regulated timber harvest activities shall occur only on those lands classified as suitable for timber production.
- Std-Plants-2: When treating nonnative and invasive plant species to protect endangered, threatened, proposed, and candidate wildlife and plant species and their habitats, design features in appendix B of the “Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds” or the most current direction must be followed.

The extent and rate of forestry treatments (Table 7) within Gila chub analysis area are expected to be at low to moderate levels for the planning period. Implementation of the standards and guidelines is positive for Gila chub and is expected to mitigate the effects of projects to aquatic and riparian areas. Overall, the Forestry and Forest Health program plan components would have insignificant and discountable effects to Gila chub and would maintain or improve watershed condition indicators related to water quality, riparian vegetation, soils, fire regime, and rangeland vegetation.

Effects Analysis for Critical Habitat

For those species with designated critical habitat, the effects analysis approach identified how the primary constituent elements (PCEs) or biological features essential to the conservation of the species are likely to be affected by the proposed LRMP. Refer to Table 10 in the Critical Habitat section above for the description of the PCEs.

Watershed and Soils

Projects in the uplands (Obj-18) would have short term effects of soil disturbance, vegetation reduction, and increases in ash and nutrients in the project area. The extent of erosion and surface runoff resulting in sedimentation and ash/nutrient input to critical habitat due to project activities would be mitigated by implementation of the Watershed and Soil standards and guidelines and best management practices (see Gila chub Effects Analysis for the Species section for these standards and guidelines). Projects would improve soil and vegetation conditions and are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality (PCE-3) and provide for healthy macroinvertebrate populations (PCE-4). Projects in aquatic/riparian areas (Obj-19) would improve aquatic and riparian conditions which would promote healthy, native riparian vegetation communities, stream cover, and streambank stability (PCE-5), maintain aquatic habitat components (PCE-1), and water temperatures (PCE-2) suitable for Gila chub. Projects are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality (PCE-3) and provide for healthy macroinvertebrate populations (PCE-4). They may be localized, short term effects from projects in riparian zones such as streambank disturbance, vegetation reduction, and sediment input to the streams, but these effects would be minimized by standards and guidelines and best management practices (see Gila chub Effects Analysis for the Species section for these standards and guidelines). Projects related to springs and seeps (Obj-23) within Gila chub critical habitat would have effects for PCEs similar to Obj-19. Attaining or maintaining instream flow rights (Obj-31) would have beneficial effects by providing for natural flow patterns (PCE-7) for Gila chub critical habitat.

The extent and rate of watershed and soil treatments within the subwatersheds with Gila chub critical habitat are expected to be at low levels for the planning period. In most cases, projects are expected to be limited in extent and amount of ground disturbance. Projects in the uplands would have short term effects in the project area, but effects would be insignificant and discountable to Gila chub critical habitat. Instream improvement projects would have localized, short term adverse effects to PCEs for habitat components, water quality, and prey base but would have long term benefits to maintaining or improving these PCEs.

Wildlife/Fish/Rare Plants

Obj-24 to restore native fish species to 2 to 3 stream reaches on the Prescott NF could include projects within Gila chub critical habitat. USFS management actions needed to support native fish restoration could include stream improvement projects to improve aquatic habitat such as perennial pools (PCE-1), improve streambank stability (PCE-5), and provide barriers to nonnative aquatic invasive expansion (PCE-6). Instream improvement projects would have localized, short term adverse effects to PCEs for habitat components, water quality, and prey base but would have long term benefits to maintaining or improving critical habitat.

Obj-25 to modify or remove fence to improve pronghorn movement would have no effect to Gila chub critical habitat as it would not occur in designated areas. Obj-26 and Obj-27 to improve pronghorn habitat are expected to have projects occur in the Sycamore, Little Sycamore, and Indian Creek subwatersheds with Gila chub critical habitat. Actions include prescribed fire and mechanical treatment which are also tied to Obj-1 and Obj-3 for grassland and piñon-juniper PNVTs. Mechanical treatment projects would have short term effects of vegetation reduction and also soil disturbance with use of heavy equipment in the project area. Prescribed fire projects

would have short term effects of vegetation reduction and increases in ash and nutrients in the project area.

The extent of erosion and surface runoff resulting in sedimentation and ash/nutrient input to species critical habitat due to project activities would be mitigated by implementation of the Wildlife/Fish/Rare Plants guidelines, Watershed and Soil standards and guidelines, and best management practices (see Gila chub Effects Analysis for the Species section for these standards and guidelines).

Projects would improve soil and vegetation conditions in the uplands and are expected to reduce sedimentation to aquatic habitats which would maintain water quality (PCE-3) and healthy macroinvertebrate populations (PCE-4). Projects would also improve the PNVTs similarity to desired conditions and reduce the potential for uncharacteristic wildfire.

Obj-28 to improve and develop new wildlife water would have no effect to Gila chub critical habitat since placement of water developments are typically in the uplands outside of aquatic habitat.

The extent and rate of aquatic and terrestrial wildlife treatments (Table 6) within Gila chub critical habitat analysis area are expected to be at low levels for the planning period. Projects in the uplands would have short term effects in the project area but effects would be insignificant and discountable to Gila chub critical habitat. Native fish stream improvement projects would have localized, short term adverse effects to Gila chub critical habitat, but they would have long term benefits by maintaining or improving Gila chub critical habitat conditions on the forest.

Wildland Fire and Fuels Management

Planned wildland fire and mechanical treatments (Obj-1 through Obj-5) would occur across the landscape of the PNVTs in the subwatersheds with Gila chub critical habitat. Treatments would have short term increases in runoff and sediment production in treated areas due to the decrease in vegetative ground cover. The extent of erosion and surface runoff resulting in sedimentation and ash/nutrient input to species habitat due to project activities would be mitigated by implementation of the Wildland Fire guidelines, Watershed and Soil standards and guidelines, and best management practices (see Gila chub Effects Analysis for the Species section for these standards and guidelines).

Projects would improve soil and vegetation conditions and are expected to reduce sedimentation to critical habitat which would maintain water quality (PCE-3) and healthy macroinvertebrate populations (PCE-4). The extent and rate of wildland fire and fuels treatments (Table 6) within Gila chub critical habitat analysis area are expected to be at low levels for the planning period. The Wildland Fire and Fuels program plan components are expected to have short term effects in project areas but effects would be insignificant and discountable to Gila chub critical habitat.

Recreation

The majority of the objectives include direction to minimize the impacts of recreational activities and facilities to natural resources. Actions such as designated dispersed camping areas, maintenance of facilities, relocation and rehabilitation of recreation facilities impacting natural

resources, and signing would improve upland and aquatic/riparian conditions and are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality (PCE-3) and healthy macroinvertebrate populations (PCE-4) and promote healthy riparian vegetation communities (PCE-5). Implementation of Recreation standards and guidelines would mitigate the effects of ongoing recreational activities or future projects (see Gila chub Effects Analysis for the Species section for these standards and guidelines). The Recreation Program plan components provide for the maintenance or improvement of aquatic and riparian habitats and would have insignificant and discountable effects to Gila chub critical habitat.

Transportation

All objectives are expected to have planned activities within subwatersheds with Gila chub critical habitat. Projects would improve soil and vegetation condition in the uplands and would improve or minimize impacts to aquatic and riparian conditions along streams. Implementation of standards and guidelines would mitigate the effects of ongoing roads and trail maintenance and future projects in the subwatersheds (see Gila chub Effects Analysis for the Species section for these standards and guidelines). There are ongoing, localized adverse effects to Gila chub critical habitat from roads and trails in and adjacent to critical habitat that affect water quality (PCE-3) food base (PCE-4), and riparian vegetation and streambanks (PCE-5) but retain the function of this critical habitat for the species.

Wilderness and Special Areas

The proposed LRMP does not have any objectives that direct Wilderness management activities. Ongoing management within Gila chub analysis area includes the Pine Mountain Wilderness within the Sycamore Creek subwatershed. Wildland fire in wilderness would have short term effects of vegetation reduction and increases in ash and nutrients in the project area. Standards and guidelines for wilderness provide direction to protect values from recreation and fire activities (see Gila chub Effects Analysis for the Species section for these standards and guidelines). Out of the eight recommended wilderness areas, none fall within any subwatersheds with Gila chub. Overall, the Wilderness and Special Areas program plan components would have insignificant and discountable effects to Gila chub critical habitat and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Lands and Special Uses

The proposed LRMP has two objectives (Obj-29 and Obj-30) that direct Lands and Open Space management activities. Both objectives have the potential to have actions taken within Gila chub critical habitat because of the interspersion of private lands along Little Sycamore, Sycamore, and Indian Creeks. Obj-29 includes direction to acquire lands which could include areas with Gila chub critical habitat. This would have beneficial effects to protecting Gila chub critical habitat, especially those lands acquired with water rights. Obj-30 to secure right of ways would have minimal effects to Gila chub. Standards and guidelines (see Gila chub Effects Analysis for the Species section for these standards and guidelines) for lands have minimal relevance to the species. Overall, the Lands and Special Uses program plan components would have beneficial effects to Gila chub critical habitat.

Minerals Management

There are limited mining activities within the subwatersheds and/or streams with Gila chub critical habitat. Mineral standards and guidelines (see Gila chub Effects Analysis for the Species section for these standards and guidelines) restrict mineral activities in wilderness and other special areas (Std-MM-2) which has beneficial effects to Gila chub critical habitat downstream of the Pine Mountain Wilderness. Standards and guidelines also provide guidance to mitigate mining impacts to upland, riparian, and aquatic resources which would maintain or improve water quality (PCE-3) in critical habitat. Overall, the Minerals Program plan components would have insignificant and discountable effects to Gila chub critical habitat.

Rangeland Management

The proposed LRMP does not have any objectives that direct Rangeland Management activities. Livestock grazing would continue throughout suitable rangelands on forestlands within subwatersheds with Gila chub critical habitat. Segments of Gila chub critical habitat are protected from livestock grazing by exclosure fences in all streams or have limited accessibility due to rough terrain. Accessible areas of Sycamore Creek would have short term adverse effects of livestock grazing to streambanks, riparian vegetation and water quality from waste deposits into or near habitat. Impacts to water quality would be greatest during seasonally low flow periods and in droughts. Overall, the Rangeland Program plan components would have short term adverse effects to water quality (PCE-3) of Gila chub critical habitat from livestock grazing but retain the function of the critical habitat for the species.

Forestry and Forest Health

The extent and rate of treatments (Table 7) within the subwatersheds with Gila chub critical habitat are expected to be at low to moderate levels. Planned activities within watersheds with Gila chub critical habitat using mechanical and fire treatments would have short term increases in runoff and sediment production in treated areas due to the decrease in vegetative ground cover. Implementations of standards and guidelines (see Gila chub Effects Analysis for the Species section for these standards and guidelines) would avoid or minimize effects to aquatic and riparian areas. Projects would improve soil and vegetation conditions and are expected to reduce sedimentation to critical habitat which would maintain or improve water quality (PCE-3) and healthy macroinvertebrate populations (PCE-4). The Forestry program plan components would have insignificant and discountable effects to Gila chub critical habitat.

Cumulative Effects to the Species and Critical Habitat in the Action Area

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this BA. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to ESA § 7. The cumulative effects area includes Gila chub analysis area listed in Table 12.

The majority of the Sycamore, Little Sycamore, and Indian Creek subwatersheds are in USFS and BLM ownership. Private land parcels are located along all of the creeks. Private land activities include residential homes, agriculture related to ranching and some farming, and water

withdrawals. There is one large private land parcel located near Dugas on Sycamore Creek that is zoned for residential development with the potential for 80 homes. Currently, the prospect is low but with development there would be an increase in forest recreational use that would have some impact to Gila chub and their habitat.

The majority of Williamson Valley Wash watershed is in USFS and State Trust ownership. All USFS lands occur in the western half or headwaters of the watershed. Private land activities include residential homes, agriculture, and water withdrawals. Future population growth in the area surrounding the forest is expected to have an increase in forest recreational use that would have some impact to Gila chub and their habitat.

Determination of Effects (Species)

The implementation of plan components related to the Recreation, Wildland Fire and Fuels, Wilderness, Lands, Minerals, and Forestry programs are expected to have insignificant and discountable effects to Gila chub because of the limited extent and rate of treatments and the mitigation of effects through implementation of standard and guidelines. Plan components related to the Watershed and Soils, Wildlife/Fish/Rare Plant, Transportation, and Rangeland programs may have short term adverse effects to the species but would maintain or improve the quality of occupied and suitable habitat on the forest. The proposed LRMP would result in a "May Affect, Likely to Adversely Affect" determination to Gila chub.

Determination of Effects (Critical Habitat)

The implementation of plan components related to the Recreation, Wildland Fire and Fuels, Wilderness, Lands, Minerals, and Forestry programs are expected to have insignificant and discountable effects to Gila chub critical habitat because of the limited extent and rate of treatments and the mitigation of effects through implementation of standard and guidelines. Program plan components related to the Watershed and Soils, Wildlife/Fish/Rare Plant, Transportation, and Rangeland programs may have short term adverse effects to critical habitat but would maintain or improve PCEs. The proposed LRMP would result in a "May Affect, Likely to Adversely Affect" determination to Gila chub critical habitat.

Gila Topminnow (*Poeciliopsis occidentalis occidentalis*)

Endangered Species Act Status:	Endangered, 1967
Recovery Plan:	Yes, 1984
Critical Habitat:	None Designated
Determination of Effects (Species):	May Affect, Likely to Adversely Affect

Natural History and Distribution

The natural history and distribution of the Gila topminnow is covered in detail in the 1984 Recovery Plan (Fish and Wildlife Service, 1984) and the draft revised Gila topminnow Recovery Plan (Weedman, 1999). That information is incorporated by reference into this BA.

Status of the Species Rangewide

The most recent status of the Gila topminnow is described in the 2011 Reinitiation of the LRMPs for the Eleven Forests for the Southwestern Region (Forest Service, 2011) and is incorporated by reference into this BA. Rangewide Gila topminnow has gone from being one of the most common fishes of the Gila River basin to one that exists in no more than 32 known locations: 14 natural and 18 stocked, with an additional 20 captive populations also in existence. The reasons for decline include dewatering of rivers, springs and marshlands, impoundment, channelization, diversion, regulation of flow, land management practices that promote erosion and arroyo formation, and the introduction of predacious and competing nonnative fishes. Gila topminnows are highly vulnerable to adverse effects from nonnative aquatic species, including nonnative crayfish and bullfrogs. Predation and competition from nonnative fishes has been a major factor in their decline and continues to be a major threat to the remaining populations. It has been documented that mosquito fish can eliminate a population of topminnow within a year. The spread of mosquito fish has continued virtually unchecked since their introduction to Arizona in 1926.

Threats

For a complete discussion of the threats to the Gila topminnow refer to the 2011 Reinitiation Biological Opinion (Fish and Wildlife Service, 2011).

Climate Change

For a detailed discussion on climate change refer to the Climate Change section in this BA.

Although the information on how climate change might specifically impact Arizona and New Mexico is uncertain, virtually all climate change scenarios predict a warmer climate in the American Southwest during the 21st century (IPCC 2001, 2007). Precipitation predictions show a greater range of possibilities, depending on the model and emissions scenario, but precipitation is likely to be less (Williams et al., 2010; Rieman and Isaak, 2010). Williams et al. (2010) predict that the effects of climate change could be particularly profound for aquatic ecosystems in the Rocky Mountains because those systems often lack resilience and are strongly dependent on temperature and stream flow regimes that are already experiencing change. Changes in stream environments will parallel change in the climate, with streams becoming warmer, more variable in flow timing and amount, and subject to more frequent extreme events including flooding, droughts, and wildfires. Climate change may also influence channel structure and forest and riparian communities through changes in the pattern, severity, or intensity of wildfire; inputs of sediment and large wood; and disturbances such as debris flows. However, within the temporal bounds of this action there are no expectations of measurable change for Gila topminnow.

Status of the Species within the Action Area

Historically, there were no documented occurrences of Gila topminnow within the forest (Fish and Wildlife Service, 1999). Twenty-four sites on the forest were introduced with topminnows in the early 1980s (Fish and Wildlife Service, 1985). All sites failed to maintain surviving populations (Voeltz and Bettaso, 2003). Reasons for failure included drying of sites, flooding

impacts, reduction of suitable habitat due to vegetation overgrowth, and cold temperatures. Potential habitats on the forest need to be assessed for those sites that meet habitat criteria for possible reintroduction. Possible sites include those already occupied by Gila chub in Sycamore, Little Sycamore, and Indian Creeks.

Factors Affecting the Species in the Action Area

The analysis area for the Gila topminnow includes the Sycamore, Little Sycamore, and Indian Creek subwatersheds listed in Table 10 for Gila chub. Refer to that section for a description of factors affecting the species.

Endangered Species Act § 7(a)(1) Conservation Actions on the Prescott NF

Site evaluations have been conducted with the U.S. Fish and Wildlife Service and the Arizona Game and Fish Department in Sycamore, Little Sycamore, and Indian Creeks in 2008.

Effects Analysis

All of the proposed LRMP desired conditions, objectives, standards and guidelines, management area direction, and monitoring were reviewed to determine potential affects to Gila topminnow. The following analysis is for all ongoing and future activities for the 10 to 15 years after plan approval.

Introductions of Gila topminnow by the Arizona Game and Fish Department could occur in Sycamore, Little Sycamore, and Indian Creeks within already occupied habitat for Gila chub. Effects to Gila topminnow from the proposed LRMP would be the same as for Gila chub related to these subwatersheds.

Determination of Effects (Species)

The implementation of plan components related to the Recreation, Wildland Fire and Fuels, Wilderness, Lands, Minerals, and Forestry programs are expected to have insignificant and discountable effects to Gila topminnow because of the limited extent and rate of treatments and the mitigation of effects through implementation of standard and guidelines. Plan components related to the Watershed and Soils, Wildlife/Fish/Rare Plant, Transportation, and Rangeland programs may have short term adverse effects to the species but would maintain or improve the quality of occupied or suitable habitat on the forest. The proposed LRMP would result in a "May Affect, Likely to Adversely Affect" determination to the Gila topminnow

Gila Trout (*Oncorhynchus gilae*)

Endangered Species Act Status:	Threatened, 2006
Recovery Plan:	Yes, 1979; Revisions-1984, 1993, 2003
Critical Habitat:	None Designated
Determination of Effects (Species):	May Affect, Likely to Adversely Affect

Natural History and Distribution

The natural history and distribution of the Gila trout is fully described in the Gila Trout Recovery Plan (Fish and Wildlife Service, 2003) and in the final rule reclassifying Gila trout from Endangered to Threatened (Fish and Wildlife Service, 2006). That information is incorporated by reference into this BA.

Status of the Species Rangewide

The most recent status of the Gila trout is described in the Recovery Plan and Reclassification Final Rule (Fish and Wildlife Service, 2003, 2006) and is incorporated by reference into this BA. Gila trout were originally recognized as endangered under the Federal Endangered Species Preservation Act of 1966, and subsequently, they were listed as endangered under the ESA of 1973. No critical habitat has been designated for Gila trout. The Gila trout was downlisted from endangered to threatened in 2006. With the reclassification to threatened status, a special rule under ESA § 4(d) was established, allowing the New Mexico Department of Game and Fish and the Arizona Game and Fish Department to promulgate special regulations in collaboration with the U.S. Fish and Wildlife Service allowing recreational fishing of Gila trout.

Surveys on most of the 18 existing populations indicate that the recovery efforts to remove nonnative fish and prevent their return to the renovated areas have been successful (Fish and Wildlife Service, 2003; Fish and Wildlife Service, 2011). Replicated populations in New Mexico are successfully reproducing, indicating that suitable spawning and rearing habitats are available. Replication efforts in Arizona have not been as successful. Stockings in Dude Creek and Raspberry Creek were impacted by fire. Recent stockings in Frye Creek on the Coronado NF and Grapevine Creek on the Prescott NF occurred in 2009 and are still too early to determine establishment.

Threats

For a complete description of the threats to the Gila trout refer to the Gila Trout Recovery Plan (Fish and Wildlife Service, 2003) and the proposed rule reclassifying Gila trout from endangered to threatened (Fish and Wildlife Service, 2006). Current limiting factors for Gila trout recovery include impacts of wildfire; continued impacts from predation, competition and hybridization with nonnative trout; limited range of the species; and other habitat impacts.

Climate Change

For a discussion on climate change refer to the Climate Change section in this BA. In summary, periods of drought in the Southwest are not uncommon; however, the frequency and duration of these dry periods in the future may be altered by climate change. The associated effects on regional climatic regimes are not well understood, but the predictions for the Southwest indicate less overall precipitation and longer periods of drought. Gila trout, along with their habitat, will almost certainly be affected in some manner by climate change; the magnitude and extent of the change cannot be quantified at this time, and within the temporal bounds of this action, there are no expectations of measurable change for Gila trout.

Status of the Species within the Action Area

Historical and current distribution and status of Gila trout on the Prescott NF is shown in Table 14. Historically, there were no naturally occurring Gila trout populations on the forest. Gap Creek, a tributary to the Verde River, was introduced with trout in 1974. This population persisted until 1990 but was extirpated presumably due to drought (AZGFD, 1992). It was recommended not to restock this stream because of the inconsistency of stream flows (AZGFD, 1992). Grapevine Creek was stocked with the South Diamond lineage in 2009 (AZGFD, 2009) and augmented in 2012 along with speckled dace. No reproduction has yet been documented. Sycamore Creek (Agua Fria River drainage) near Pine Mountain Wilderness is suitable habitat for Gila trout. Currently, the creek is occupied by a self-sustaining population of rainbow trout originally stocked in the 1940s (Bettaso et al., 1995).

Table 14. Gila trout distribution and status on the Prescott National Forest

6th Level HUC Name	Stream Name	Stream Miles on PNF	Miles of Occupied Habitat	Status
Big Bug Creek	Grapevine Creek	1	1	Introduced
Gap Creek	Gap Creek	1.5	0	Introduced Extirpated
Sycamore Creek	Sycamore Creek	2.	0	Potential

Factors Affecting the Species in the Action Area

The analysis area for the Gila trout is the two 6th level HUC subwatersheds with occupied or suitable habitat listed in Table 15. The majority of Big Bug Creek subwatershed is in Federal and State ownership. The Grapevine Creek drainage area with one-mile of perennial water is entirely within the Prescott NF and occurs within the Grapevine Botanical Area. The main forest activities are livestock grazing and dispersed recreational activities. The majority of the Sycamore Creek subwatershed is in Federal ownership. There is a total of about 2.5 miles of suitable habitat along Sycamore Creek which has two private land parcels, one developed and the other undeveloped with limited potential for development. The main forest activities are livestock grazing and dispersed recreational activities.

Table 15. Summary of 6th level HUC subwatersheds in the Gila trout analysis area

6th Level HUC Name	Total Acres	PNF Acres	Non PNF Acres State/ Federal	Private Acres	% PNF Acres
Big Bug Creek	38,342	15,921	12,169	10,252	42
Sycamore Creek	31,594	24,907	4,835	1,852	79

The Watershed Condition Classification (WCC) for the Prescott NF is referenced to determine the existing condition of the subwatersheds in the analysis area for Gila trout (Forest Service, 2011). The individual watershed condition indicators that best reflect the consequences of management activities and recreation use are given in Table 16.

Table 16. Subwatershed conditions by selected WCC indicators in the Gila trout analysis area

6th Level HUC Name	WCC Indicator								
	Water Quality	Water Quantity	Nonnative Species	Riparian Vegetation	Roads and Trails	Soils	Fire Regime	Forest Cover	Rangeland Vegetation
Big Bug Creek	1*	3	2	2	3	2	2	1	2
Sycamore Creek	1	1	2	1	3	2	2	1	2

*Indicator Rating Classes: 1=Functioning; 2=At-Risk; 3=Impaired. Ratings are for the entire subwatershed.

There are few threats to occupied Gila trout habitat in the Big Bug Creek subwatershed. The Grapevine Creek drainage area with one-mile of perennial water is entirely within the Prescott NF and occurs within the Grapevine Botanical Area. This area is excluded from livestock grazing (Forest Service, 1997) and has additional management direction for no motorized or mountain bike use of trails within the botanical area and recreation use is restricted to Day use only. Forest Trail #4 accesses Grapevine Botanical Area and parallels the creek for about 0.5 miles. Overall, recreation opportunities are limited and use is low. There is no potential for managed timber harvest within the Grapevine Creek drainage. Vegetation treatments using prescribed fire within the drainage has not occurred. The only real threat within the drainage is from wildfire.

There are few threats to suitable Gila trout habitat in the Sycamore Creek subwatershed. Access to upper Sycamore creek with suitable habitat is only available at two points along Forest Road 68 to the Pine Mountain Wilderness trailhead. The trailhead also served as a dispersed recreation site with picnic tables and fire rings. The upper 0.75 mile of creek is easily accessible to recreational use and livestock grazing. Forest Trail #159 parallels the creek. Livestock grazing is managed by the Sycamore Allotment and follows annual operating plans for LRMP direction to minimize impacts to the aquatic and riparian resources. There is a one-mile exclosure fence on the creek from the trailhead downstream to the Double T Ranch. The 0.25 mile of creek below the ranch has no road or trail access. There is no potential for managed timber harvest adjacent suitable habitat due to access and designated wilderness area. Vegetation treatments using prescribed fire or mechanical treatment adjacent to or above suitable habitat has not occurred in several decades. The only real threat within the drainage is from wildfire. The Cave Creek Fire Complex in 2005 burned within the lower half of the subwatershed which resulted in high sediment and ash flows to occupied habitat of Gila chub that occur in the creek.

Endangered Species Act § 7(a)(1) Conservation Actions on the Prescott NF

During 2009 and 2012, forest personnel assisted AZGFD in introduction and augmentation of Gila trout into Grapevine Creek on the forest.

Effects Analysis

All plan components are detailed in the Description of the Proposed Action by Program section of this BA. All of the proposed LRMP desired conditions, objectives, standards and guidelines, management area direction, and monitoring were reviewed to determine potential affects to the Gila trout. The following analysis is for all ongoing and future activities for the 10 to 15 years after plan approval.

Effects to the species could occur in Grapevine Creek within already occupied habitat for Gila trout and in Sycamore Creek with the introduction of the species. Effects to Gila trout from the proposed LRMP would be the same as for Gila chub related to the Sycamore Creek subwatersheds.

Watershed and Soils

The proposed LRMP has four objectives (Obj-18, Obj-19, Obj-23, and Obj-31) that direct Watershed and Soils program activities. These watershed objectives are expected to occur throughout the Sycamore and Big Bug subwatersheds based on the need to improve several of the WCC indicators.

Obj-18 includes direction to implement 5 to 50 essential projects within high priority watersheds that would improve or maintain watershed condition. Activities could include, but would not be limited to, range improvements to distribute grazing, treatments to increase vegetative ground cover, and gully stabilization. In most cases, projects would be limited in extent and amount of ground disturbance. Project effects and applicable standards and guidelines to mitigate effects would be the same as for the Gila chub. Projects in the uplands would improve soil and vegetation conditions and are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality and promote healthy macroinvertebrate populations in the streams.

Obj-19 includes direction to implement projects to counter 1 to 3 critical threats to riparian functionality. Activities could include, but are not limited to, vegetation reestablishment, nonnative invasive plant treatments, erosion control, instream habitat improvement, adjusting the timing and season of grazing, or fencing. In most cases, projects would be limited in extent and amount of ground disturbance. Instream habitat improvement projects are possible within suitable habitat in Sycamore Creek and would have localized, short term adverse effects to the species and habitat but would have long term beneficial effects. Project effects and applicable standards and guidelines to mitigate effects would be the same as for the Gila chub. Projects in the riparian areas would improve aquatic and riparian conditions and are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality and healthy macroinvertebrate populations; they would also promote native riparian vegetation which would maintain suitable water temperature in the streams.

Obj-23 includes direction to maintain or enhance 25 to 55 discrete sites that are groundwater dependent. Activities could include road or trail relocation or closure, obliteration of unauthorized routes, livestock grazing management, and fencing. In most cases, projects would be limited in extent and amount of ground disturbance. Project effects and applicable standards and guidelines

to mitigate effects would be the same as for the Gila chub. Projects for springs and seeps would improve soil and vegetation conditions and promote watershed integrity.

Obj-31 includes direction to apply for at least 8 instream flow water rights. Sycamore Creek already has secured instream flow water rights and there are no threats to instream flow in Grapevine Creek from private lands.

Standards and guidelines applicable to mitigate effects to species are the same as for Gila chub.

The extent and rate of watershed and soil treatments within the Gila trout analysis area are expected to be at low levels for the planning period. Projects in the uplands would have short term effects in the project area but effects would be insignificant and discountable to the Gila trout. Instream improvement projects would have localized, short term adverse effects to Gila trout and their habitat but would have long term benefits to the species. Standards and guidelines for watershed and soils are positive to maintaining long term watershed conditions and with implementation are expected to mitigate the effects of projects from all forest program areas. Overall, the Watershed and Soils program plan components are positive for the Gila trout and would maintain or improve watershed condition indicators related to water quality, water quantity, soils, riparian vegetation, and rangeland vegetation.

Wildlife/Fish/Rare Plants

The proposed LRMP has five objectives (Obj-24 through Obj-28) that direct Wildlife/Fish/Rare Plants program activities.

Obj-24 to restore native fish species to 2 to 3 stream reaches on the Prescott NF are expected to include the Gila trout. USFS management actions needed to support native fish restoration could include instream structures to improve aquatic habitat for the species. These projects would have localized, short term adverse effects to the species and their habitat from implementation and maintenance of structures such as streambank alteration, sedimentation, and disturbance to the species. Project effects and applicable standards and guidelines to mitigate effects would be the same as for the Gila chub. The projects would have long term benefits by improving the quality of occupied and suitable habitat of Gila trout on the forest.

Obj-25 to improve pronghorn habitat and Obj-28 for wildlife waters would have no effect to Gila trout as these projects would not occur near or affect their habitat. Obj-26 and Obj-27 to improve pronghorn habitat would have no effect to Gila trout within Grapevine Creek because no pronghorn habitat is present within the stream drainage. Obj-26 and Obj-27 to improve pronghorn habitat are expected to have projects occur in the Sycamore subwatershed. Actions include prescribed fire and mechanical treatment that are also tied to Obj-1 and Obj-3 for grassland and piñon-juniper PNVTs. Project effects and applicable standards and guidelines to mitigate effects would be the same as for the Gila chub. Projects would improve soil and vegetation conditions in the uplands and are expected to reduce sedimentation to aquatic habitats which would maintain water quality and healthy macroinvertebrate populations. Projects would also improve the PNVTs similarity to desired conditions and reduce the potential for uncharacteristic wildfire.

The extent and rate of aquatic and terrestrial wildlife treatments within the Gila trout analysis area are expected to be at low levels for the planning period. Projects in the uplands would have short

term effects in the project area but effects would be insignificant and discountable to Gila trout. Native fish stream improvement projects would have localized, short term adverse effects to Gila trout and their habitat but would have long term benefits by improving the quality of occupied and suitable habitat of Gila trout on the forest. Overall, the Wildlife/Fish/Rare Plants program plan components are positive for the Gila trout and would maintain or improve watershed condition indicators related to water quality, nonnative species, soils, riparian vegetation, and rangeland vegetation.

Wildland Fire and Fuels Management

The proposed LRMP has five objectives (Obj-1 through Obj-5) that direct Wildland Fire and Fuels Management activities.

Planned wildland fire and mechanical treatments could occur across the landscape of the PNVTs in the subwatersheds. Semi-Desert Grassland and the piñon-juniper PNVTs in these subwatersheds would be targeted for treatment due to their moderate to high departure from reference conditions. There would be no planned fire within riparian areas. Mechanical treatment projects would have short term effects of vegetation reduction and also soil disturbance with use of heavy equipment in the project area. Prescribed fire projects would have short term effects of vegetation reduction with subsequent runoff of sediment and ash to adjacent drainages after rain events. Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Projects would improve soil and vegetation conditions in the uplands and are expected to reduce sedimentation to aquatic habitats which would maintain water quality and healthy macroinvertebrate populations. Projects would also improve the PNVTs similarity to desired conditions and reduce the potential for uncharacteristic wildfire.

The extent and rate of wildland fire and fuels treatments within the Gila trout analysis area are expected to be at low to moderate levels for the planning period. Standards and guidelines for wildland fire would apply to all fire activities on the forest. Implementation of the standards and guidelines is positive for the Gila trout and is expected to mitigate the effects of projects to aquatic and riparian areas. Overall, the Wildland Fire program plan components would have insignificant and discountable effects to the Gila trout and would maintain or improve watershed condition indicators related to water quality, soils, fire regime, and rangeland vegetation.

Recreation

The proposed LRMP has 10 objectives (Obj-8 through Obj-17) that direct Recreation program activities. All objectives, except Obj-13 to increase recreational fishing opportunity, are expected to have planned activities within subwatersheds and streams with Gila trout.

The majority of the objectives include direction to minimize the impacts of recreational activities and facilities to natural resources. Project effects and applicable standards and guidelines to mitigate effects would be the same as for the Gila chub. Actions such as designated dispersed camping areas, maintenance of facilities, relocation and rehabilitation of recreation facilities impacting natural resources, and signing would improve upland and aquatic/riparian conditions and are expected to reduce sedimentation to aquatic habitats which would maintain water quality

and healthy macroinvertebrate populations. Recreation use within the Grapevine Botanical Area would have restrictions in the area that mitigate effects to the species in Grapevine Creek (Std-CK MA-1).

Std-CK MA-1: Recreation use within the Grapevine Botanical Area would have restrictions on motorized or mountain bike use on Trails 4, 304, and 9432 below Big Bug Mesa. Recreation use shall be limited to day use.

Implementation of standards and guidelines for recreation would mitigate the effects of ongoing recreational activities and future projects to aquatic and riparian resources. Overall, the Recreation program plan components would have insignificant and discountable effects to the Gila trout and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Transportation

The proposed LRMP has three objectives (Obj-20, Obj-22, and Obj-23) that direct Transportation program activities. All objectives are expected to have planned activities within subwatersheds with Gila trout.

Objectives include direction on projects to repair, relocate, or close roads and trails; close and rehabilitate unauthorized routes; or provide for proper stream drainage of roads and trails that are impacting watershed integrity. Road maintenance and proximity to stream drainages are of concern and are probably causing impacts to watershed and aquatic/riparian conditions. Project effects and applicable standards and guidelines to mitigate effects would be the same as for the Gila chub except there would be no vehicle road crossing within suitable or occupied habitat. Projects would improve soil and vegetation condition in the uplands and would improve or minimize impacts to aquatic and riparian conditions along streams. Implementation of the standards and guidelines is expected to mitigate the effects of the projects in the uplands and aquatic/riparian areas.

Overall, the Transportation program plan components would have insignificant and discountable effects to Gila trout and would maintain or improve watershed condition indicators related to water quality, soils, riparian vegetation, roads and trails, and rangeland vegetation.

Wilderness and Special Areas

The proposed LRMP does not have any objectives that direct Wilderness Management activities. Ongoing management within the Gila trout analysis area includes the Pine Mountain Wilderness within the Sycamore Creek subwatershed and the Grapevine Botanical Area in the Big Bug Creek subwatershed. Standards and guidelines for wilderness provide direction to protect values from recreation and fire activities. Project effects and standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Grapevine Botanical Area would be managed with its own desired conditions (DC-CK-MA-3) and standard (Std-CK-MA-1) listed below. This would maintain and protect the unique characteristics of this area including Grapevine Creek. Out of the eight recommended wilderness areas, none fall within any subwatersheds with Gila trout. Overall, the Wilderness and Special

Areas program plan components would have insignificant and discountable effects to the species and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

- Std-CK MA-1: Within the Grapevine Botanical Area:
    - No livestock grazing, trailing, or driving shall take place within the botanical area except that livestock may trail through the Bootlegger-Grapevine Unit on established roads to Forest Road 87A and then Trail 304. This movement shall be controlled and not be accomplished by drifting.
    - Motorized or mountain bike use shall not take place on Trails 4, 304, and 9432 below the rim of Big Bug Mesa.
    - Recreation use shall be limited to day use.

Lands and Special Uses

The proposed LRMP has two objectives (Obj-29 and Obj-30) that direct Lands and Open Space Management activities. Obj-29 includes direction to acquire lands which could include private lands along Sycamore Creek. This would have beneficial effects to protecting or expanding Gila trout populations, especially those lands acquired with water rights. The lands in and adjacent to the Grapevine Botanical Area are in forestlands. Obj-30 to secure right of ways would have no effects to Gila trout. Overall, the Lands and Special Uses program plan components would have beneficial effects to the Gila trout.

Minerals Management

The proposed LRMP does not have any objectives that direct Minerals Management activities. There are limited mining activities within the subwatersheds and/or streams with Gila trout. Mineral standards and guidelines restrict mineral activities in wilderness and other special areas (Std-Mineral Materials-2) which has beneficial effects to the Gila trout and provide guidance to mitigate mining impacts to upland, riparian, and aquatic resources. Overall, the Minerals program plan components would have insignificant and discountable effects to the species and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Rangeland Management

The proposed LRMP does not have any objectives that direct Rangeland Management activities. Livestock grazing will continue throughout suitable rangelands within the Gila trout analysis area. Standards for the Grapevine Botanical Area (Std-CK MA-1) would continue to restrict livestock grazing within the area. Segments of Gila chub habitat within Sycamore Creek are protected from livestock grazing by exclosure fences or have limited accessibility due to rough terrain. Accessible areas of Sycamore Creek would have short term adverse effects of livestock grazing to streambanks, riparian vegetation, and water quality from waste deposits into or near habitat. Implementation of Rangeland standards and guidelines would minimize effects to aquatic

and riparian areas. Overall, the Rangeland program plan components would have short term adverse effects to Gila trout from livestock grazing in their habitat but would maintain watershed condition indicators related to water quality, soils, riparian vegetation, and rangeland vegetation.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub and those listed below.

- Std-CK MA-1: Within the Grapevine Botanical Area:
    - No livestock grazing, trailing, or driving shall take place within the botanical area except that livestock may trail through the Bootlegger-Grapevine Unit on established roads to Forest Road 87A and then Trail 304. This movement shall be controlled and not be accomplished by drifting.

Forestry and Forest Health

The proposed LRMP has three objectives (Obj-3, Obj-5, and Obj-6) that direct the Forest Health program activities Obj-3 is expected to have planned activities within subwatersheds with Gila trout. Obj-5 related to timber harvest in ponderosa pine PNVTs would not occur in these watersheds since it is present only in special areas restricted to harvest. Obj-3 identifies using mechanical and fire treatments to improve watershed and rangeland conditions, vegetation structure, and wildlife habitat within the piñon-juniper PNVTs. Project effects and applicable standards and guidelines to mitigate effects would be the same as for the Gila chub.

The extent and rate of forestry treatments within the Gila trout analysis area are expected to be at low to moderate levels for the planning period. Implementation of the standards and guidelines is positive for the Gila trout and is expected to mitigate the effects of projects to aquatic and riparian areas. Overall, the Wildland Fire program plan components would have insignificant and discountable effects to the Gila trout and would maintain or improve watershed condition indicators related to water quality, soils, fire regime, and rangeland vegetation.

Cumulative Effects

The cumulative effects area includes the two 6th level HUC subwatersheds that encompass the Gila trout analysis area. The reach of Grapevine Creek occupied by Gila trout within the Big Bug Creek subwatershed, is entirely within Prescott NF ownership. There would be no non-Federal activities in the Grapevine Botanical Area. The majority of the upper Sycamore Creek subwatershed and three miles of Sycamore Creek are within Prescott NF. There are two private land parcels within this area. The uppermost parcel at Nelson Place Spring is undeveloped. The parcel at Double T Ranch is part of the Sycamore Allotment with a residential home, corrals and holding pastures, and water withdrawals from Sycamore Creek. The home and ranching operations are having some impacts to stream flows and water quality in Sycamore Creek.

Population growth in the area surrounding the forest is expected to continue. Demand for outdoor recreation is also expected to grow concurrently with increasing population with more visitor use of the forest having more impacts to natural resources.

Determination of Effect (Species)

The implementation of plan components related to the Recreation, Transportation, Wildland Fire and Fuels, Wilderness, Lands, Minerals, and Forestry programs are expected to have insignificant and discountable effects to Gila trout because of the limited extent and rate of treatments and the mitigation of effects through implementation of standard and guidelines. Plan components related to the Watershed and Soils, Wildlife/Fish/Rare Plant, and Rangeland programs may have short term adverse effects to the species but would maintain or improve quality of occupied and suitable habitat on the forest. The proposed LRMP would result in a "May Affect, Likely to Adversely Affect" determination to the Gila trout.

Spikedace (*Meda fulgida*) Including Designated Critical Habitat

Endangered Species Act Status:	Endangered, 2012
Recovery Plan:	Yes, 1991
Critical Habitat:	March, 2007; New Designation 2012
Determination of Effects (Species):	May Affect, Likely to Adversely Affect
Determination of Effects (Critical Habitat):	May Affect, Likely to Adversely Affect

Natural History and Distribution

The natural history and distribution for spikedace is fully described in the current Spikedace Recovery Plan (Fish and Wildlife Service, 1991) and Reclassification to Endangered with revised critical habitat (Fish and Wildlife Service, 2012). This information is incorporated by reference into this BA.

Status of the Species and Critical Habitat Rangewide

A detailed status of spikedace is found in the Final Rule uplisting to endangered (Fish and Wildlife Service, 2012) and is incorporated in this BA by reference. The status of spikedace is declining range wide. The species was recently uplisted to endangered (Fish and Wildlife Service, 2012).

In Arizona, the species is now common only in Aravaipa Creek. The Verde River is presumed occupied; however, the last captured fish from this river was from a 1999 survey. Spikedace from the Eagle Creek population have not been seen for over a decade, although they are still thought to exist in numbers too low for the sampling efforts to detect. Translocated populations are present in Hot Springs Canyon and Fossil and Bonita Creeks.

In New Mexico, spikedace is common only in one section of the Gila River south of Cliff. Spikedace are present, but rare, in the West and Middle Forks Gila River and have not been collected at East Fork Gila River since 2000. Spikedace were repatriated to the San Francisco River in 2008. However, the success of this effort is unknown at this time. The USFWS considers the San Francisco River currently occupied.

During the last century, both the distribution and abundance of spikedace have been greatly reduced throughout the species' range. Competition and predation by nonnative fish and habitat destruction have reduced the historic range of spikedace by about 85 percent.

Critical Habitat

Revised critical habitat for spikedace was finalized with the change in status from threatened to endangered (Fish and Wildlife Service, 2012). In total, about 630 miles are designated as critical habitat in the Gila River Basin of Arizona and New Mexico. Eight individual critical habitat units are designated and include the Verde River Subbasin, Salt River Subbasin, San Pedro Subbasin, Bonita Creek Subbasin, Eagle Creek Subbasin, San Francisco River Subbasin, Blue River Subbasin, and Gila River Subbasin. The primary constituent elements of critical habitat for spikedace are listed in Table 17. The lateral extent of critical habitat for all designations is 300 feet on either side of bankfull stage.

Table 17. Spikedace critical habitat – primary constituent elements

PCE #	Primary Constituent Elements
PCE-1	Habitat to support all egg, larval, juvenile, and adult spikedace. This habitat includes perennial flows with a stream depth generally less than 3.3 feet and with slow to swift flow velocities of between 1.9 and 31.5 inches per second. Appropriate stream microhabitat types include glides, runs, riffles, the margins of pools and eddies, and backwater components over sand, gravel, and cobble substrates with low or moderate amounts of fine sediment and substrate embeddedness. Appropriate habitat will have a low gradient of less than approximately 1.0 percent, at elevations below 6,890 feet. Water temperatures should be in the general range of 46.4 to 82.4 degrees Fahrenheit.
PCE-2	An abundant aquatic insect food base consisting of mayflies, true flies, black flies, caddisflies, stoneflies, and dragonflies
PCE-3	Streams with no or no more than low levels of pollutants
PCE-4	Perennial flows, or interrupted stream courses that are periodically dewatered but that serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted
PCE-5	No nonnative aquatic species, or levels of nonnative aquatic species that are sufficiently low as to allow persistence of spikedace
PCE-6	Streams with a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of transporting sediments

Climate Change

For a detailed discussion on climate change refer to the Climate Change section of this BA.

Climate conditions have contributed to the status of spikedace now and will likely continue into the foreseeable future (Fish and Wildlife Service, 2012). The potential effects of climate change on spikedace have been discussed in the Final Rule: Endangered Status and Designation of Critical Habitat for Spikedace and Loach Minnow (Fish and Wildlife Service, 2012). Increased temperatures in the Southwest may impact the species in several ways including increased habitat

fragmentation (from stream drying), changes in invertebrate prey base (species composition and availability), increased frequency and intensity of fire, additional invasive species, and increased susceptibility and mortality from disease. A decline in water resources with or without climate change will be a significant factor in the compromised watersheds of the desert Southwest (Fish and Wildlife Service, 2012).

Status of the Species within the Action Area

Historical and current distribution and status of spikedace on the Prescott NF is shown in Table 18. Historically, spikedace were collected in the Verde River above Camp Verde and the lower ends of Beaver Creek and West Clear Creek in 1938, and in the Verde River above Camp Verde in 1950 (Minckley, 1993). The species was first collected in the upper Verde River in the 1890 (ASU, 2002). Currently, the upper Verde River is presumed to be occupied by spikedace but they are rare based on extensive surveys (AZGFD, 2000a-b, 2001, 2005a-c; Bahm and Robinson, 2009; Robinson and Crowder, 2009; Forest Service, 2010a; Fish and Wildlife Service, 2005). The last capture of a spikedace was documented during surveys in 1999 (Brouder, 2002). Spikedace populations are extirpated from the lower Verde River in the Verde Valley (Fish and Wildlife Service, 2007).

Table 18. Spike dace distribution and status on the Prescott National Forest

5th Level HUC Name	Stream Name	Stream Miles On PNF	Miles of Occupied Habitat	Status
Granite Creek-Upper Verde River	Verde River	4	4	Rare
Grindstone Wash- Upper Verde River	Verde River	28	28	Rare
Cherry Creek-Upper Verde River	Verde River	3.4	0	Extirpated
Fossil Creek-Lower Verde River	Verde River	15.5	0	Extirpated

Critical Habitat within the Action Area

A total of about 106 miles of designated critical habitat for spikedace occurs on the Verde River from the confluence with Fossil Creek upstream to Sullivan Dam. The first 6 miles of CH from Sullivan Dam downstream to the forest boundary is on The Nature Conservancy (TNC) and State lands. The next 100 miles occurs on or is adjacent to the Prescott NF. The uppermost 37 miles of river from the forest boundary downstream to Clarkdale are primarily within USFS ownership with a few private land parcels occurring in this reach. The next 45 miles of river in the Verde Valley is primarily within private ownership. The last 15.5 miles are on the forest within the Verde Wild and Scenic River. Granite Creek critical habitat occurs off-forest but is potentially

impacted by Prescott NF management actions in the Granite Creek watershed that drains into this area.

Verde River Subbasin

- **Verde River.** Approximately 106 miles, extending from the confluence with Fossil Creek in upstream to Sullivan Dam.
- **Granite Creek.** Approximately 2.0 miles, extending from the confluence with the Verde River in T 17 N, R 2 W, northeast quarter of section 14 upstream to a spring in T17N, R2W, southwest quarter of the southwest quarter of section 13.

Factors Affecting the Species and Critical Habitat in the Action Area

The analysis area for spikedace includes the current or historical distribution of spikedace and their designated critical habitat in the Verde River that occurs within or is influenced by the eight 5th level HUC watersheds shown in Table 19. There are high amounts of private land in several watersheds which include urban development. The major communities in these watersheds include Prescott and Chino Valley in the upper Verde River Basin and Jerome, Clarkdale, Cottonwood, Cornville, and Camp Verde in the Verde Valley. Primary land uses throughout the watersheds are livestock grazing, irrigated agriculture, recreation, and some mining and silviculture.

Table 19. Watershed ownership in the spikedace analysis area

5th Level HUC Name	Total Acres	PNF Acres	Non-PNF Acres State/ Federal	Private Acres	% PNF Acres
Lower Big Chino Wash	232,673	87,234	30,532	114,907	37
Williamson Valley Wash	205,367	107,928	19,702	77,737	53
Granite Creek-Upper Verde River	229,829	45,175	57,350	126,159	20
Hell Canyon	213,434	67,611	130,692	15,131	32
Grindstone Wash-Upper Verde River	197,569	146,182	50,051	1,336	74
Sycamore Creek	305,833	22,528	263,832	19,473	7
Cherry Creek-Upper Verde River	144,783	97,938	6,444	41,842	68
Fossil Creek-Lower Verde River	191,486	44,136	140,487	6,863	23

The Watershed Condition Classification (WCC) for the Prescott NF is referenced to determine the existing condition of the watersheds in the analysis area for spikedace and their designated critical habitat (Forest Service, 2011). The individual watershed condition indicators that best reflect the

consequences of management activities and recreation use are given in Table 20. The main PNVTs within these watersheds are the grassland and piñon-juniper PNVTs (Proposed LRMP appendix A, map 1). These PNVTs have a relatively low percentage of satisfactory soil conditions (DEIS page 94).

The primary threats in the Verde River include nonnative fishes which are predatory and/or competitive with the native species and reduced habitat quantity and quality from water withdrawals in the Big Chino Aquifer and the Verde Valley. In addition, watershed conditions are At-Risk or Impaired for several key watershed condition indicators such as roads and trails, soils, vegetation, and fire regimes. These departures collectively are contributing to an altered hydrologic condition that is affecting aquatic habitat quality in the Verde River.

Table 20. Watershed conditions by selected WCC indicators in the Spikedace Analysis Area

5th Level HUC Name	WCC Indicator								
	Water Quality	Water Quantity	Nonnative Species	Riparian Vegetation	Roads and Trails	Soils	Fire Regime	Forest Cover	Rangeland Vegetation
Lower Big Chino Wash	1*	2	1	2	3	3	2	N/A	3
Williamson Valley Wash	1	2	2	2	3	3	2	N/A	3
Granite Creek- Upper Verde River	1	1	2	2	3	2	2	1	3
Hell Canyon	2	1	2	2	3	3	2	N/A	3
Grindstone Wash Upper Verde River	1	1	2	2	3	2	2	1	3
Sycamore Creek	1	1	2	2	3	3	2	N/A	3
Cherry Creek- Upper Verde River	3	3	2	2	3	2	2	1	3
Fossil Creek- Lower Verde River	2	3	2	2	2	2	2	1	3

*Indicator Rating Classes: 1=Functioning; 2=At-Risk; 3=Impaired. Ratings are for the entire watershed. Ratings for 5th level HUCs are consolidated scores from 6th level HUC subwatersheds.

Water quality (impaired for turbidity) in the Verde River is affected by various factors in both the upland and riparian areas (Bowman, 2001). The departure of the piñon-juniper and grassland PNVTs in these watersheds is a major factor in increased erosion due to the higher canopy cover and less herbaceous ground cover to hold soils and moisture in place. Roads are also a major source of increased sediments and potential pollutants into stream channels on the Prescott NF due to the poor condition from inadequate maintenance and the proximity to stream drainages. In addition, there are unquantified miles of unauthorized routes from OHV users that are also contributing increased sediments to stream drainages. Overall, road and trail access to the Verde River is limited and controlled with the majority occurring in the Verde Valley.

Water withdrawals from both surface water and groundwater are affecting streamflow in the Verde River (Blasch et al., 2006). Increasing groundwater withdrawals from the Big Chino Aquifer has the potential to decrease perennial flow in the upper Verde River which would reduce the amount of habitat for spikedace. The Big Chino Aquifer has been shown to contribute at least

80 percent to the upper Verde River baseflow (Wirt et al., 2005). More than 67 river diversions in the Verde Valley deliver surface water to agricultural fields and residential customers (Garner and Bills, 2012).

Native fish species within the Verde River have been negatively affected by the introduction and establishment of nonnative aquatic species. Nonnative fish species dominate the fish community throughout the Verde River and are a major limiting factor in native aquatic species occurrence because of predation and competition (Hendrickson, 1993; Rinne and Stefferud, 1998; Bonar et al., 2004). Based on data from1987 to2003, nonnative fish species generally comprised 70 to 80 percent of the fish community in the Verde River throughout the analysis area (Rinne, 2005).

Livestock grazing occurs throughout suitable rangelands in all watersheds within the spikedace analysis area. These watersheds have a high percentage of acres rated as Impaired for rangeland vegetation though much of this is related to high amounts of piñon-juniper PNVTs that are departed from reference conditions. Livestock grazing has not been authorized in the river corridor on the six allotments along the Verde River on the Prescott NF since 1998. The four allotments within the Verde Valley are fenced off from livestock grazing. Livestock grazing has not been authorized in the river corridor for the two allotments in the lower Verde River since 2005, but there are three watering access points to the river. Grazing rotations, riparian utilization levels, and other LRMP standards and guidelines are followed to minimize impacts to riparian and aquatic resources.

Population growth in the area surrounding the forest is expected to continue with residential home and commercial development on private lands and increase impacts to watershed integrity. Expected impacts are increases in altered hydrological conditions leading to increased runoff and erosion and increased water withdrawals. Impacts would be greatest in the Lower Big Chino, Williamson Valley Wash, Granite Creek-Upper Verde River, and Cherry Creek-Upper Verde River watersheds with higher amount of private land ownership. In addition, demand for outdoor recreation is also expected to grow concurrently with increasing population and more visitor use of the forest, especially along the Verde River which is a draw for water based recreation activities.

Endangered Species Act § 7(a)(1) Conservation Actions on the Prescott NF

The Prescott NF continues to cooperate with partners to determine the status of spikedace in the upper Verde River. The forest continued with monitoring of seven sites along the upper Verde River to document fish community structure and habitat conditions. AZGFD completed species specific surveys for portions of the upper Verde River in 2008. During 2006, 2007, and 2008 the forest and partners removed nonnative fish along three miles of the upper Verde River.

The Prescott NF, along with AZGFD and the Bureau of Reclamation, completed site feasibility visits in 2006 along the upper Verde River for potential fish barrier locations. A final appraisal report was completed in 2010 (Riley and Clarkson, 2010).

Livestock grazing allotment management on the Prescott NF has not authorized livestock grazing use along the upper Verde River within occupied and designated critical habitat since 1998. Site specific NEPA analysis would be required to authorize future grazing use.

The Prescott NF continues to have road closures in place for the upper Verde River. The forest completed about five miles of road decommissioning/closures within watersheds of the upper Verde River in 2009. Barrier and sign maintenance was completed at three river access points in 2008 to prevent illegal vehicle access to the upper Verde River.

The Prescott NF has secured instream flow water rights for the 41-mile reach of the Verde Wild and Scenic River and has application for instream flow water rights for the upper Verde River.

Livestock grazing allotment management on the Prescott NF has not authorized livestock grazing use along the lower Verde River (Verde Wild and Scenic River) within designated critical habitat since 2005. Site specific NEPA analysis would be required to authorize future grazing use.

The Prescott NF has been treating noxious and invasive plants along the Verde River to improve riparian conditions under guidance of the Integrated Treatment of Noxious or Invasive Weeds EIS (Forest Service, 2005).

Effects Analysis for the Species

All of the proposed LRMP desired conditions, objectives, standards and guidelines, management area direction, and monitoring were reviewed to determine potential affects to spikedace. The following analysis is grouped by program area and includes the ongoing and future activities for the 10 to 15 years after plan approval.

Watershed and Soils

The proposed LRMP has four objectives (Obj-18, Obj-19, Obj-23, and Obj-31) that direct Watershed and Soils program activities. These objectives are detailed in the Description of the Proposed Action by Program section of this BA. These watershed objectives are expected to occur throughout the watersheds that drain to the Verde River based on the need to improve several of the WCC indicators.

Obj-18 includes direction to implement projects to improve or maintain watershed condition within high priority watersheds. Projects are expected to occur in the uplands in all watersheds within the spikedace analysis area. Soil and vegetation treatments would have short term effects of soil disturbance and/or vegetation reduction in the project area. Overall, projects would improve soil and vegetation conditions in the watersheds and are expected to reduce sedimentation which would maintain or improve water quality and promote healthy macroinvertebrate populations in the Verde River.

Obj-19 includes direction to implement projects to improve riparian condition. Projects are expected to occur along the Verde River and its tributaries. Vegetation treatments and stream improvement projects would have localized, short term effects of soil disturbance, vegetation reduction, sedimentation in the stream zone, and species disturbance. Overall, projects would improve aquatic habitat and riparian vegetation conditions along the Verde River and its tributaries and are expected to reduce sedimentation and promote native riparian vegetation which would maintain or improve water quality and promote healthy macroinvertebrate populations.

Obj-23 includes direction to maintain or enhance groundwater dependent ecosystem sites. Projects are expected to occur in all watersheds within spikedace analysis area. Projects could include road or trail relocation or closure, obliteration of unauthorized routes, livestock grazing management, and fencing. Projects would have short term effects of soil disturbance in the project area. Overall, projects would improve soil and vegetation conditions around the sites and reduce sources of sedimentation in the watersheds which would maintain or improve water quality and promote healthy macroinvertebrate populations in the Verde River.

Obj-31 includes direction to apply for instream flow water rights. The 41-mile reach of the Verde Wild and Scenic River has secured water rights. The Prescott NF has application for instream flow water rights for the upper Verde River. Acquisition of instream flow water rights for the upper Verde River would have beneficial effects to spikedace by maintaining suitable baseflows throughout the year.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of watershed and soil treatments within the spikedace analysis area are expected to be at low levels for the planning period. Projects in the uplands would have short term effects in the project area but effects would be insignificant and discountable to spikedace. Instream improvement projects would have localized, short term adverse effects to spikedace and their habitat but would have long term benefits to the species. Standards and guidelines for watershed and soils are positive to maintaining long term watershed conditions and with implementation are expected to mitigate the effects of projects from all forest program areas. Overall, the Watershed and Soils program plan components are positive for spikedace and would maintain or improve watershed condition indicators related to water quality, water quantity, soils, riparian vegetation, and rangeland vegetation.

Wildlife/Fish/Rare Plants

The proposed LRMP has five objectives (Obj-24 through Obj-28) that direct Wildlife/Fish/Rare Plants program activities.

Obj-24 to restore native fish species to 2 to 3 stream reaches on the Prescott NF could include the Spikedace. The upper Verde River has the highest potential for native fish restoration. USFS management actions needed to support native fish restoration could include construction and maintenance of a fish barrier and other projects to improve aquatic habitat for the species. These projects would have localized, short term adverse effects to the species from implementation and maintenance of structures such as streamflow alteration, sedimentation, and disturbance to the species. Projects would implement standards and guidelines to mitigate impacts to species and the aquatic habitat. Overall, projects related to restoration of native fishes may affect the species and their habitat but would have long term benefits by improving the quality of occupied habitat of Spikedace on the forest.

Obj-25 through Obj-27 related to pronghorn habitat improvement would have no effect to spikedace in the Verde River since habitat and projects do not occur along the river.

Obj-28 related to improvement or construction of water developments would have no effect to spikedace in the Verde River since projects would not occur along the river.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Wildland Fire and Fuels Management

The proposed LRMP has five objectives (Obj-1 through Obj-5) that direct Wildland Fire and Fuels Management activities. There would be an average of 11,350 acres per year (1 percent) of treatments across all PNVTs on the forest.

Planned wildland fire and mechanical treatments could occur in the PNVTs in all watersheds within the spikedace analysis area. Semi-Desert Grassland and the piñon-juniper PNVTs in these watersheds would be targeted for treatment due to their moderate to high departure from reference conditions. There would be no planned fire within riparian areas. The effects of fire on the landscape to aquatic ecosystems depend on factors such as the extent of burned area, severity of the fire, soils/geology/topography, development of soil repellency, and post-fire storm events and climate. Projects would have short-term effects of vegetation reduction and increases of ash and nutrients in the project area. Mechanical treatment projects would have short term effects of vegetation reduction and also soil disturbance with use of heavy equipment (e.g., agra-ax) in the project area. The extent of erosion and surface runoff resulting in sedimentation and ash/nutrient input to species habitat due to project activities would be mitigated by implementation of the Wildland Fire guidelines, Watershed and Soil standards and guidelines, and best management practices. Projects would increase the amount of open states for the PNVTs, thereby reducing the risk of uncharacteristic wildfire and increase herbaceous ground cover which would provide for water infiltration and less runoff and erosion in the watersheds. Projects would improve watershed conditions and are expected to reduce sedimentation to the Verde River which would maintain or improve water quality and provide for healthy macroinvertebrate populations.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of wildland fire and fuels treatments within the spikedace analysis area are expected to be at low to moderate levels (Table 6 treatment rates) for the planning period. Implementation of the standards and guidelines is positive for the spikedace and is expected to mitigate the effects of projects to aquatic and riparian areas. Overall, the Wildland Fire program plan components would have insignificant and discountable effects to the spikedace and would maintain or improve watershed condition indicators related to water quality, soils, fire regime, and rangeland vegetation.

Recreation

The proposed LRMP has 10 objectives **(**Obj-8 through Obj-17) that direct Recreation program activities. All objectives, except Obj-13 to increase recreational fishing opportunity, are expected to have planned activities along the Verde River or within the spikedace analysis area. The majority of the objectives include direction to minimize the impacts of recreational activities and facilities to natural resources. Actions such as designated dispersed camping areas, maintenance of facilities, relocation and rehabilitation of recreation facilities impacting natural resources, and signing would improve upland and riparian conditions. Actions taken along the Verde River are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality and healthy macroinvertebrate populations.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Implementation of standards and guidelines for recreation would mitigate the effects of ongoing recreational activities and future projects to aquatic and riparian resources. Overall, the Recreation program plan components would have insignificant and discountable effects to the spikedace and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Transportation

The proposed LRMP has three objectives (Obj-20, Obj-22, and Obj-23) that direct Transportation program activities. All objectives are expected to have planned activities in all watersheds within spikedace analysis area. Objectives include direction on projects to repair, relocate, or close roads and trails; close and rehabilitate unauthorized routes; or provide for proper stream drainage of roads and trails that are impacting watershed integrity. Projects would improve soil and vegetation condition in the uplands and would improve or minimize impacts to aquatic and riparian conditions along streams. Implementation of the standards and guidelines is expected to mitigate the effects of ongoing roads and trail maintenance and future projects to uplands and aquatic/riparian areas.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Overall, the Transportation program plan components would have insignificant and discountable effects to Spikedace and would maintain or improve watershed condition indicators related to water quality, soils, riparian vegetation, roads and trails, and rangeland vegetation.

Wilderness and Special Areas

The proposed LRMP does not have any objectives that direct Wilderness Management activities. Suitable and occupied habitat for spikedace in the Verde River occurs in two management areas on the Prescott NF, Upper Verde and Verde Valley, and includes the Verde Wild and Scenic River, Sycamore Canyon Wilderness, and Cedar Bench Wilderness. The desired conditions for these management areas have a strong focus on recreational use and wildernesses experience while maintaining the outstanding remarkable values of the river in relation to designation or eligibility as wild and scenic. These management areas highlight the uniqueness and attraction of recreational activities along the Verde River. The guidelines associated with these management areas provide for the protection of the natural resources through recreation management, signing and enforcement, and land acquisition or exchange opportunities. The plan components would maintain or improve aquatic and riparian habitats along the Verde River.

The management standards in the Verde Wild and Scenic River Comprehensive River Management Plan (Forest Service, 2004) are incorporated into the proposed LRMP (Std-W&S-1). This Plan provides direction to protect the outstandingly remarkable values (ORVs) of the river which includes native fish values. The Verde Wild and Scenic River segment includes a 41-mile segment and a one-half mile corridor from Beasley Flat downstream to the confluence with Red Creek within the administrative boundaries of the Coconino, Prescott, and Tonto NFs. Implementation of the river management plan would continue to maintain or enhance aquatic habitat for the spikedace.

A 37-mile segment of the upper Verde River has been classified as eligible for wild and scenic designation (Forest Service, 2010b) and is given protection for its ORVs of the river which includes native fish values (Std-W&S-2). Implementation of this standard would maintain the native fish ORV for the upper Verde River.

Sycamore Canyon and Cedar Bench Wildernesses occur along the Verde River. Wilderness standards and guidelines would provide for maintaining the ecological processes to preserve their character and value. Recreation uses and group sizes would be restricted in most cases to reduce human impacts. Fire management activities would only occur from natural ignitions and would include using minimum impact suppression tactics. Three of the eight additional recommended wilderness areas occur within the Upper Verde and Verde Valley Management Areas: Sycamore Canyon A, Cedar Bench A, and Cedar Bench B. Management would be towards maintaining the values of these potential wilderness areas.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub and those listed below.

- Std-W&S-1: Management Standards found in chapter 3 of the "Verde Wild and Scenic River Comprehensive River Management Plan for Coconino, Prescott and Tonto National Forests" shall be incorporated into management activities.
- Std-W&S-2: Within river segments that are eligible for wild/scenic river designation, identified outstandingly remarkable values shall be afforded adequate protection, subject to valid existing rights, until the eligibility determination is superseded (i.e., the segment is determined not suitable for designation or Congress makes a decision regarding designation). Authorized uses shall not be allowed to adversely affect either eligibility or the tentative classification, (i.e., actions that would change a classification from wild to scenic).

The extent and distribution in this program area covers a 95-mile reach of the Verde River of which 55-miles are under Prescott NF administration. Implementation of the management area standards and guidelines and wilderness and special areas standards and guidelines is expected to mitigate the effects of human uses and fire within these areas. Overall, the Wilderness and Special Areas program plan components would have insignificant and discountable effects to spikedace and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Lands and Special Uses

The proposed LRMP has two objectives (Obj-29 and Obj-30) that direct Lands and Open Space Management activities. Both objectives have the potential to have actions taken within the spikedace analysis area because of the interspersion of private lands along the Verde River. Acquiring lands along the Verde River would have beneficial effects to protecting spikedace populations and their habitat especially those acquired with water rights. Obj-30 to secure right of ways are expected to have no effects to the species. Program standards and guidelines are directed at maintaining or increasing open space on the forest; managing communication site and utility corridors; energy development; and reducing impacts to upland, riparian, and aquatic resources.

Plan components would have insignificant and discountable effects to spikedace. Overall, the Lands and Special Uses program plan components would have beneficial effects to the spikedace.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Minerals Management

The proposed LRMP does not have any objectives that direct Minerals Management activities. Mines are present in all watersheds within spikedace analysis area with concentrations near the towns of Jerome and Cherry. Mineral standards and guidelines restrict mineral activities in wilderness and other special areas (Std-Minerals Materials-2) which would have beneficial effects to spikedace and provide guidance to mitigate mining impacts to upland, riparian, and aquatic resources which would reduce impacts to water quality. Overall, the Minerals program plan components would have insignificant and discountable effects to spikedace and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Rangeland Management

The proposed LRMP does not have any objectives that direct Rangeland Management activities. Livestock grazing would continue throughout suitable rangelands on forestlands in all watersheds within the spikedace analysis area. These watersheds have a high percentage of acres rated as Impaired for rangeland vegetation though much of this is related to high amounts of piñon-juniper PNVTs that are departed from reference conditions. Implementation of Guide-Range-3 and 6 provide guidance for the growth and recovery of desired plant species and would trend rangeland vegetation towards DC-Veg-1 and DC-Veg-3. Livestock grazing activities with implementation of Rangeland guidelines in upland areas of the watersheds would have insignificant and discountable effects to the species.

Livestock grazing could occur along the 37 miles of the upper Verde River from the forest boundary (east half) downstream to Clarkdale, although it is currently not authorized. Site specific NEPA analysis would be required to authorize future grazing use. Livestock grazing can affect the aquatic/riparian zone from livestock use and movement along the river trampling streambanks with sedimentation and waste deposits that can impair water quality. Impacts to water quality would be greatest during seasonally low flow periods and in droughts. Implementation of Rangeland Management standards and guidelines (Std-Range-2, Guide-Range-1 and 5) provide guidance to reduce livestock grazing impacts to riparian areas. There is no livestock grazing in the Verde Valley section of the Verde River. There are only 3.4-miles of Prescott NF lands in this reach with the majority of lands being dedicated to recreational sites. There is no livestock grazing in the Verde Wild and Scenic River as directed under Std-W&S-1.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub and those listed below.

- Std-W&S-1: Management Standards found in chapter 3 of the “Verde Wild and Scenic River Comprehensive River Management Plan for Coconino, Prescott and Tonto National Forests” shall be incorporated into management activities.

- CRMP (page 20): Livestock grazing shall be excluded from Verde River riparian habitat, unless a site specific NEPA analysis approved by the forest supervisor authorized future grazing use. The river corridor should be inspected regularly when livestock are in adjacent pastures to ensure livestock are not in riparian areas.
- CRMP (page 20): Livestock water sources shall be developed outside the VWSR corridor except at three locations on the Brown Springs Allotment. These water access points shall be located at selected sites where riparian vegetation will not be degraded and where livestock can be prevented from accessing other riparian areas.

Overall, the Rangeland program plan components would have short term adverse effects to spikedace from livestock grazing in their habitat but would maintain watershed condition indicators related to water quality, soils, riparian vegetation, and rangeland vegetation.

Forestry and Forest Health

The proposed LRMP has three objectives (Obj-3, Obj-5, and Obj-6) that direct the Forest Health program activities. Obj-3 and Obj-5 are expected to have planned activities within watersheds with spikedace. Obj-3 identifies using mechanical and fire treatments to improve watershed and rangeland conditions, vegetation structure, and wildlife habitat within the piñon-juniper PNVTs. Projects would improve soil and vegetation conditions and are expected to reduce sedimentation to aquatic habitats which would maintain water quality and healthy macroinvertebrate populations. Obj-5 related to timber harvest in ponderosa pine PNVTs makes up a small amount of acres within these watersheds and would occur further away from the river.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

site specificThe extent and rate of treatments within the spikedace analysis area are expected to be at low to moderate levels (Table 6). Implementation of the standards and guidelines is positive for the spikedace and is expected to mitigate the effects of projects to aquatic and riparian areas. Overall, the Forestry program plan components would have insignificant and discountable effects to the spikedace and would maintain or improve watershed condition indicators related to water quality, soils, fire regime, and rangeland vegetation.

Effects Analysis for Critical Habitat

For those species with designated or critical habitat, the effects analysis approach identified how the primary constituent elements (PCEs) or biological features essential to the conservation of the species are likely to be affected by the proposed LRMP. Refer to the Critical Habitat section above for the description of the PCEs.

Watershed and Soils

Projects in the uplands (Obj-18) would improve soil and vegetation conditions and are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality (PCE-1) and provide for healthy macroinvertebrate populations (PCE-2). Projects in aquatic/riparian areas (Obj-19) would improve aquatic and riparian conditions which would promote healthy, native riparian vegetation communities and streambank stability, and thus, maintain aquatic

habitat components (PCE-1) suitable for all life stages of spikedace. Projects are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality (PCE-1) and provide for healthy macroinvertebrate populations (PCE-2). There may be short term effects from projects in riparian zones such as localized sediment input to the streams, but these effects would be minimized by standards and guidelines and BMPs. Projects related to springs and seeps (Obj-23) within spikedace critical habitat would have effects for PCEs similar to Obj-19. Attaining or maintaining instream flow rights (Obj-31) would have beneficial effects by providing for perennial flows (PCE-4) and natural flow regime (PCE-6) for spikedace critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of watershed and soil treatments within the watersheds with spikedace critical habitat are expected to be at low levels for the planning period. In most cases, projects are expected to be limited in extent and amount of ground disturbance. Projects in the uplands would have short term effects in the project area but effects would be insignificant and discountable to spikedace critical habitat. Instream improvement projects would have localized, short term adverse effects to PCEs for habitat components, water quality, and prey base but would have long term benefits to improving spikedace critical habitat conditions on the forest.

Wildlife/Fish/Rare Plants

Obj-24 to restore native fish species to 2 to 3 stream reaches on the Prescott NF could include projects within spikedace critical habitat. USFS management actions needed to support native fish restoration within the Verde River could include construction and maintenance of a fish barrier and other projects to improve aquatic habitat. These projects would have localized, short term adverse effects to PCEs for critical habitat such as streamflow and streambank alteration, riparian vegetation reduction, and sedimentation but would have long term benefits by improving spikedace critical habitat. Other objectives (Obj-25 through Obj-28) would have similar effects for the Gila chub for projects in the Verde River watersheds.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of aquatic and terrestrial wildlife treatments (Table 6) within spikedace critical habitat analysis area are expected to be at low levels for the planning period. Projects in the uplands would have short term effects in the project area but effects would be insignificant and discountable to spikedace critical habitat. Native fish stream improvement projects would have localized, short term adverse effects to critical habitat, but they would have long term benefits by improving spikedace critical habitat conditions on the forest.

Wildland Fire and Fuels Management

Planned wildland fire and mechanical treatments would occur across the landscape of the PNVTs in the watersheds with or potentially affecting spikedace critical habitat. The extent and rate of wildland fire and fuels treatments (Table 6) within the watersheds are expected to be at low to moderate levels. Treatments would have short term increases in runoff and sediment production in treated areas due to the decrease in vegetative ground cover. Implementation of all appropriate forest program standards and guidelines is expected to mitigate the effects of projects in the area

to species critical habitat in the Verde River. Projects would improve soil and vegetation conditions and are expected to reduce sedimentation to the Verde River which would maintain water quality (PCE-1) and healthy macroinvertebrate populations (populations).

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Plan components are expected to have short term effects in the project area but effects would be insignificant and discountable to spikedace critical habitat.

Recreation

The majority of the objectives include direction to minimize the impacts of recreational activities and facilities to natural resources. Actions such as designated dispersed camping areas, maintenance of facilities, relocation and rehabilitation of recreation facilities impacting natural resources, and signing would improve upland and aquatic/riparian conditions and are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality (PCE-1) and healthy macroinvertebrate populations (PCE-2) in the Verde River. Implementation of standards and guidelines would mitigate the effects of ongoing recreational activities or future projects.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

These plan components provide for the maintenance or improvement of aquatic habitat of the Verde River and would have insignificant and discountable effects to spikedace critical habitat.

Transportation

All objectives are expected to have planned activities within watersheds with spikedace critical habitat. Projects would improve soil and vegetation condition in the uplands and would improve or minimize impacts to aquatic and riparian conditions along streams. Projects would improve soil and vegetation conditions and are expected to reduce sedimentation to the Verde River which would maintain water quality (PCE-1) and healthy macroinvertebrate populations (PCE-2). Implementation of standards and guidelines would mitigate the effects of ongoing roads and trail maintenance and future projects.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Overall, the Transportation program plan components would have insignificant and discountable effects to spikedace critical habitat.

Wilderness and Special Areas

The extent and distribution in this program area covers a 95-mile reach of the Verde River of which 55-miles are under Prescott NF administration. Implementation of the management area standards and guidelines and wilderness and special areas standards and guidelines is expected to mitigate the effects of human uses and fire within these areas. These plan components provide for the maintenance or improvement of aquatic habitat of the Verde River and would have insignificant and discountable effects to the spikedace critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub and for the spikedace.

Lands and Special Uses

Acquiring lands (Obj-29) along the Verde River would have beneficial effects to protecting spikedace critical habitat especially those acquired with water rights (PCE-1). Obj-30 to secure right of ways are expected to have no effects to the species. Program standards and guidelines are directed at maintaining or increasing open space on the forest; managing communication site and utility corridors; energy development; and reducing impacts to upland, riparian, and aquatic resources. Plan components would have beneficial effects to spikedace critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Minerals Management

Mines are present in all watersheds with spikedace critical habitat with concentrations near the towns of Jerome and Cherry. Mineral standards and guidelines restrict mineral activities in wilderness and other special areas (Std-Minerals Materials-2) which would have beneficial effects to spikedace critical habitat and provide guidance to mitigate mining impacts to upland, riparian, and aquatic resources which would reduce impacts to water quality (PCE-1, PCE-3) for spikedace critical habitat. Overall, the Minerals program plan components would have insignificant and discountable effects to spikedace critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Rangeland Management

Authorized livestock grazing could occur along 37 miles of the upper Verde River from the forest boundary (east half) downstream to Clarkdale. Livestock grazing can affect the aquatic/riparian zone from livestock use and movement along the river trampling streambanks with sedimentation and waste deposits that can impair water quality. Impacts to water quality would be greatest during seasonally low flow periods and in droughts. There is no livestock grazing in the Verde Valley section of the Verde River. There are only 3.4-miles of Prescott NF lands in this reach, with the majority of lands being dedicated to recreational sites. There is no livestock grazing in the Verde Wild and Scenic River as directed under Std-W&S-1.

Implementations of Rangeland Management standards and guidelines (Std-Range-2, Guide-Range-1, and Guide-Range-5) would minimize effects to aquatic and riparian areas; however, there would be expected short term adverse effects to water quality from livestock grazing activities in spikedace critical habitat but the function of the critical habitat for the species would be retained.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub for the spikedace.

Forestry and Forest Health

The extent and rate of treatments (Table 7) within the watersheds with spikedace critical habitat are expected to be at low levels for the planning period. Regulated timber harvest shall occur on lands classified as suitable for timber production (Std-FP-1). Planned activities within watersheds with spikedace critical habitat using mechanical and fire treatments would have short term increases in runoff and sediment production in treated areas due to the decrease in vegetative ground cover. Implementations of Watershed and Soils and Wildland Fire standards and guidelines would avoid or minimize effects to aquatic and riparian areas. Projects would improve soil and vegetation conditions and are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality (PCE-1) and healthy macroinvertebrate populations (PCE-2) in the Verde River. Plan components would have insignificant and discountable effects to spikedace critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Cumulative Effects to the Species and Critical Habitat

The cumulative effects area includes the 5th level HUC watersheds that encompass the spikedace analysis area.

Population growth in the area surrounding the forest is expected to continue (Table 7). Residential home and commercial development would continue on private lands and increase impacts to watershed integrity resulting in altered hydrologic regimes and increased sedimentation and pollutant to stream systems. Impacts would be greatest in the Lower Big Chino, Williamson Valley Wash, Granite Creek-Upper Verde River, and Cherry Creek-Upper Verde River watersheds with higher amount of private land ownership.

Off-forest water uses are having some effect to streamflows on the forest, especially to the Verde River, and are expected to have a greater impact with increasing population and groundwater demands in watersheds that cover the forest. Impacts would be greatest in the Lower Big Chino Wash, Williamson Valley Wash, and Cherry Creek watersheds with higher amount of private land ownership.

Demand for outdoor recreation is also expected to grow concurrently with increasing population and more visitor use of the forest. Aquatic and riparian resources are major attractants for recreational activities and would receive increasing use with resulting impacts to those resources.

Other land uses such as livestock grazing, mining, and vegetation treatments is occurring across the watersheds on State, private, and tribal lands. Management actions on State lands follow law, policy, and other management direction to minimize impacts to aquatic ecosystems. Actions on private lands are having impacts to watershed integrity and the Verde River.

Determination of Effects (Species)

The implementation of plan components related to the Wildland Fire and Fuels, Recreation, Transportation, Wilderness and Special Areas, Lands and Special Uses, Minerals, and Forestry programs are expected to have insignificant and discountable effects to spikedace because of the

limited extent of action and/or mitigation of effects through implementation of standard and guidelines. Plan components related to the Watershed and Soils and Wildlife/Fish/Rare Plants programs would have localized, short term adverse effects to aquatic habitat but would result in long term beneficial effects to maintaining or improving aquatic habitat and species populations on the forest. Plan components related to the Rangeland programs would maintain upland and riparian vegetation on the forest but would have short term adverse effects to water quality from livestock use along the upper Verde River. The proposed LRMP would result in a "May Affect, Likely to Adversely Affect" determination to spikedace.

Determination of Effects (Critical Habitat)

The implementation of plan components related to the Wildland Fire and Fuels, Recreation, Transportation, Wilderness and Special Areas, Lands and Special Uses, Minerals, and Forestry programs are expected to have insignificant and discountable effects to spikedace critical habitat because of the limited extent of action and/or mitigation of effects through implementation of standard and guidelines. Plan components related to the Watershed and Soils and Wildlife/Fish/Rare Plants programs would have localized, short term adverse effects to aquatic habitat but would result in long term beneficial effects to maintaining or improving critical habitat on the forest. Plan components related to the Rangeland programs would maintain upland and riparian vegetation on the forest but would have short term adverse effects to water quality from livestock use along the upper Verde River. Therefore, the proposed LRMP would result in a "May Affect, Likely to Adversely Affect" determination to spikedace designated critical habitat.

Loach Minnow (*Tiaroga cob*itis) Including Designated Critical Habitat

Endangered Species Act Status:	Endangered, 2012
Recovery Plan:	Yes, 1991
Critical Habitat:	Designated, 2007; New Designation, 2012
Determination of Effects (Species):	May Affect, Likely to Adversely Affect
Determination of Effects (Critical Habitat):	May Affect, Likely to Adversely Affect

Natural History and Distribution

The natural history and distribution of the loach minnow is covered in detail in the recovery plan (Fish and Wildlife Service, 1991) and reclassification to endangered with revised critical habitat (Fish and Wildlife Service, 2012). This information is incorporated by reference into this BA.

Status of the Species and Critical Habitat Rangewide

A detailed status of the loach minnow is found in the final rule uplisting to endangered (Fish and Wildlife Service, 2012) and is incorporated in this BA by reference. The status of loach minnow is declining range wide. During the last century, both the distribution and abundance of the loach minnow have been greatly reduced throughout the species' range. Competition and predation by

nonnative fish and habitat destruction have reduced the historic range of the loach minnow by about 85 percent.

Critical Habitat

Revised critical habitat for the loach minnow was finalized with the change in status from threatened to endangered (Fish and Wildlife Service, 2012). In total, about 610 miles are designated as critical habitat in the Gila River Basin of Arizona and New Mexico. Eight individual critical habitat units are designated and include the Verde River Subbasin, Salt River Subbasin, San Pedro Subbasin, Bonita Creek Subbasin, Eagle Creek Subbasin, San Francisco River Subbasin, Blue River Subbasin, and Gila River Subbasin. The primary constituent elements of critical habitat for loach minnow are listed in Table 21.

Table 21. Loach minnow critical habitat – primary constituent elements

PCE #	Primary Constituent Elements
PCE-1	Habitat to support all egg, larval, juvenile, and adult loach minnow. This habitat includes perennial flows with a stream depth of generally less than 3.3 feet, and with slow to swift flow velocities between 0 and 80 cm per second (0.0 and 31.5 inches per second). Appropriate microhabitat types include pools, runs, riffles, and rapids over sand, gravel, cobble, and rubble substrates with low or moderate amounts of fine sediment and substrate embeddedness. Appropriate habitats have a low stream gradient of less than 2.5 percent, are at elevations below 8,202 feet. Water temperatures should be in the general range of 46.4 to 77 degrees Fahrenheit
PCE-2	An abundant aquatic insect food base consisting of mayflies, true flies, black flies, caddisflies, stoneflies, and dragonflies
PCE-3	Streams with no or no more than low levels of pollutants
PCE-4	Perennial flows, or interrupted stream courses that are periodically dewatered but that serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted
PCE-5	No nonnative aquatic species, or levels of nonnative aquatic species that are sufficiently low as to allow persistence of spikedace
PCE-6	Streams with a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of transporting sediments

Climate Change

For a detailed discussion on climate change refer to the Climate Change section of this BA. Information and effects of climate change for the loach minnow are the same as for spikedace.

Status of the Species within the Action Area

Historical and current distribution and status of the loach minnow on the Prescott NF is shown in Table 22. Historically, the loach minnow was collected in the Verde River above Camp Verde and

from Beaver Creek near its confluence with the Verde River in 1938 (Minckley, 1993). The loach minnow is extirpated from the Verde River (Fish and Wildlife Service, 2000).

Table 22. Loach minnow distribution and status on the Prescott National Forest

5th Level HUC Name	Stream Name	Stream Miles On PNF	Miles of Occupied Habitat	Status
Granite Creek-Upper Verde River	Verde River	4	0	Extirpated
Grindstone Wash-Upper Verde River	Verde River	28	0	Extirpated
Cherry Creek- Upper Verde River	Verde River	3.4	0	Extirpated

Critical Habitat within the Action Area

A total of about 74 miles of designated critical habitat for loach minnow occurs on the Verde River from the confluence with Beaver Creek upstream to Sullivan Dam. The first 6 miles of critical habitat from Sullivan Dam downstream to the forest boundary is on The Nature Conservancy (TNC) and State lands. The uppermost 37 miles of river from the forest boundary downstream to Clarkdale are primarily within USFS ownership with a few private land parcels occurring in this reach. The next 31 miles of river in the Verde Valley is primarily within private ownership. Granite Creek critical habitat occurs off forest but is potentially impacted by Prescott NF management in the watersheds that drain into this area.

Verde River Subbasin

- **Verde River**. Approximately 74 miles, extending from the confluence with Beaver and Wet Beaver Creek in T14N, R5E, southeast quarter of section 30 upstream to Sullivan Dam in T17N, R2W, northwest quarter of section 15.
- **Granite Creek.** Approximately 2.0 miles, extending from the confluence with the Verde River in T17N, R2W, northeast quarter of section 14 upstream to a spring in T17N, R2W, southwest quarter of the southwest quarter of section 13.

Factors Affecting the Species and Critical Habitat in the Action Area

The loach minnow analysis area is the same as for spikedace with the exception of the Fossil Creek-Lower Verde River watershed. Information on watershed conditions, land uses, threats to the species, and conservation actions taken on the Prescott NF are the same as for spikedace.

Effects Analysis for the Species

The effects to loach minnow and to designated critical habitat would be the same as for spikedace since these species' historical, current, and possible future distribution is very similar. Please refer to the spikedace analysis for the effects of the proposed LRMP on loach minnow.

Determination of Effects (Species)

The implementation of plan components related to the Watershed and Soils, Wildland Fire and Fuels, Recreation, Transportation, Wilderness and Special Areas, Lands and Special Uses, Minerals, and Forestry programs are expected to have insignificant and discountable effects to loach minnow because of the limited extent of action and/or mitigation of effects through implementation of standard and guidelines. Plan components related to the Wildlife/Fish/Rare Plants programs would have localized, short term adverse effects to aquatic habitat but would result in long term beneficial effects to maintaining or improving aquatic habitat and species populations on the forest. Plan components related to the Rangeland programs would maintain upland and riparian vegetation on the forest but would have short term adverse effects to water quality from livestock use along the Verde River. The proposed LRMP would result in a "May Affect, Likely to Adversely Affect" determination to loach minnow.

Determination of Effects (Critical Habitat)

The implementation of plan components related to the Wildland Fire and Fuels, Recreation, Transportation, Wilderness and Special Areas, Lands and Special Uses, Minerals, and Forestry programs are expected to have insignificant and discountable effects to loach minnow critical habitat because of the limited extent of action and/or mitigation of effects through implementation of standard and guidelines. Plan components related to the Watershed and Soils and Wildlife/Fish/Rare Plants programs would have localized, short term adverse effects to aquatic habitat but would result in long term beneficial effects to maintaining or improving critical habitat and species populations on the forest. Plan components related to the Rangeland programs would maintain upland and riparian vegetation on the forest but would have short term adverse effects to water quality from livestock use along the Verde River. Therefore, the proposed LRMP would result in a "May Affect, Likely to Adversely Affect" determination to loach minnow designated critical habitat.

Razorback Sucker (*Xyrauchen texanus*) Including Designated Critical Habitat

Endangered Species Act Status:	Endangered 1991
Recovery Plan:	Yes, 1998; Amended, 2002
Critical Habitat:	Designated, 1994
Determination of Effects (Species):	May Affect, Likely to Adversely Affect
Determination of Effects (Critical Habitat):	May Affect, Likely to Adversely Affect

Natural History and Distribution

The natural history and distribution of the razorback sucker is covered in detail in the recovery plan (Fish and Wildlife Service, 1998) and the recovery goals (Fish and Wildlife Service, 2002). That information is incorporated by reference into this BA.

Status of the Species and Critical Habitat Rangewide

A detailed status of the razorback sucker is found in the recovery plan (Fish and Wildlife Service, 1998) and the recovery goals (Fish and Wildlife Service, 2002) and is incorporated in this BA by reference. The razorback sucker was once abundant in the Colorado River and its major tributaries throughout the Colorado River Basin, occupying about 3,500 miles of river in the U.S. and Mexico (Fish and Wildlife Service, 2002). The present range of the razorback sucker in the upper basin is much less than its historical distribution and is limited to 1,056 miles of stream currently occupied in small numbers (Fish and Wildlife Service, 2002). Relatively speaking, razorbacks are still widely distributed in the Green River Basin; the largest concentrations are in the upper Green River (Fish and Wildlife Service, 2002). A small reproducing population occurs in the lower Green River. In the Upper Colorado River, most documented occurrences have come from the Grand Valley area. A few suckers have been sampled in the mainstem of the Colorado River, downstream of the Green River Confluence. Individuals have been captured in the San Juan arm of Lake Powell; few specimens have been confirmed in the river portion of the San Juan (Fish and Wildlife Service, 2002).

Present distribution in the lower basin includes extant populations in Mohave and Mead Lakes and small numbers in the Grand Canyon and downriver from Davis Dam to the Mexican border. No significant recruitment to any population has been documented in recent years. Juveniles are most often collected from irrigation canals in Arizona and California (Fish and Wildlife Service, 2002).

Hatchery-raised razorback suckers were stocked into the mainstem and tributaries of the Salt, Verde, Gila, and lower Colorado Rivers in the recent past. Recaptures from these stocking efforts have been scarce to date. Monitoring is difficult, given the large reintroduction area and its geography (Fish and Wildlife Service, 2002). Indications are that populations are being established in isolated habitats and in the uppermost reservoirs of the drainage. Individuals have been captured in the Verde River and Horseshoe Reservoir and in Fossil Creek. The few remaining unaltered rivers (e.g., upper Verde and Salt Rivers and their tributaries) are vital to the continued existence of razorback suckers (Fish and Wildlife Service, 2002).

Critical Habitat

Critical habitat was designated for the razorback sucker in 1994 (Forest Service, 1994) and consists of 15 river reaches (1,724 miles) within the Colorado River Basin covering about 49 percent of the historic habitat of the razorback sucker. There is approximately 179.4 miles of designated critical habitat on USFS lands along the Colorado, Gila, Salt, and Verde Rivers in Arizona. The Coconino, Prescott, and Tonto NFs manage 113.2 miles of the Verde River that has been designated as critical habitat. In addition, the Tonto NF manages 66.2 miles of the Salt River that has been designated as critical habitat. Critical habitat is located within 7.2 miles of the Apache-Sitgreaves NFs, 10.7 miles of the Coronado NF, 28.4 miles of the Gila NF, and 62.6 miles of the Carson NF. The primary constituent elements of critical habitat for razorback sucker are listed in Table 23.

Table 23. Razorback critical habitat – primary constituent elements

PCE #	Primary Constituent Elements
PCE-1	Water: This includes a quantity of water of sufficient quality (i.e. temperature, dissolved oxygen, lack of contaminants, nutrients, turbidity, etc.) that is delivered to a specific location in accordance with a hydrologic regime that is required for the particular live stage for this species.
PCE-2	Physical Habitat: This includes areas of the Colorado River system that are inhabited or potentially habitable by fish for use in spawning, nursery, feeding, and rearing, or corridors between these areas. In addition to river channels, these areas also include bottomlands, side channels, secondary channels, oxbows, backwaters, and other areas in the 100-year floodplain, which when inundated provide spawning, nursery, feeding, and rearing habitats, or access to these habitats.
PCE-3	Biological Environment: Food supply, predation, and competition are important elements of the biological environment and are considered components of this constituent element. Food supply is a function on nutrient availability to each life stage of the species. Predation and competition, although considered normal components of this environment, are out of balance due to introduced nonnative fish species in many areas.

Threats

The near extinction of razorback sucker is due to a combination of factors, the most significant being those associated with water development projects (i.e., dams) that have altered stream morphology, flow patterns, temperatures, water chemistry, and silt loads of most major streams throughout the Colorado River Basin (Fish and Wildlife Service, 2002). Fish access to most spawning areas has been blocked by dams. Water temperature changes resulting from the construction of dams and habitat degradation may be having a significant effect; cold water released from reservoirs created by dams can inhibit embryonic development and increase early life mortality.

Interactions with nonnative fishes may be an important factor in the continued survival or success of reintroduced populations of razorback sucker. Predation by nonnative channel catfish, smallmouth bass, and flathead catfish on young sucker may limit successful reintroduction in Arizona. Another specific threat is from pesticides and pollutants (Fish and Wildlife Service, 2002).

Climate Change

For a detailed discussion on climate change refer to the Climate Change section of this BA.

Climate conditions have contributed to the status of the razorback sucker now and will likely continue into the foreseeable future. The potential effects of climate change on razorback sucker have been discussed in the recovery goals for razorback sucker (Fish and Wildlife Service, 2002). Increased temperatures in the Southwest may impact the species in several ways including increased habitat fragmentation (from stream drying), changes in invertebrate prey base (species composition and availability), increased frequency and intensity of fire, additional invasive species, and increased susceptibility and mortality from disease. A decline in water resources with

or without climate change will be a significant factor in the compromised watersheds of the desert Southwest (Fish and Wildlife Service, 2012).

Status of the Species within the Action Area

Historical and current distribution and status of razorback sucker on the Prescott NF is shown in Table 24. Introductions made into main channels habitats of the Verde River since 1981 have had low survival and recruitment has not been documented (Hendrickson, 1993; Hyatt, 2004). Since 1994, almost all reintroductions have occurred in the Verde Wild and Scenic River below Camp Verde. Between 1981 and 1990, more than 13 million hatchery-produced razorback sucker fry and fingerling-sized fish were released at 57 sites into historic habitat in Arizona, primarily in the Verde, Gila, and Salt Rivers and their tributaries, where the natural population had been extirpated (Hendrickson, 1993). Low short term survival and no long term survival were reported from these releases, primarily because of predation by nonnative fishes. Since 1994, over 17,000 razorback suckers over 12 inches in length have been stocked into the Verde River at Beasley Flat and Childs river access points (Jahrke and Clark, 1999). Numerous fish have been recaptured, and survival up to two years has been documented. In addition, ripe males have been encountered in the Verde River, but no evidence of reproduction or recruitment has been found. Adults were recently reported from Fossil Creek, a tributary to the Verde River on Coconino and Tonto NFs (Fish and Wildlife Service, 2002). The goal of the razorback sucker reintroduction program is to stock 2,000 fish annually in the Verde River (Jahrke and Clark, 1999). Introductions could also occur in the upper Verde River if deemed appropriate by the USFWS and AZGFD.

Table 24. Razorback sucker distribution and status on the Prescott National Forest

5th Level HUC Name	Stream Name	Stream Miles On PNF	Miles of Occupied Habitat	Status	Threats/ Impacts
Grindstone Wash-Upper Verde River	Verde River	28	0	Extirpated	Water withdrawals impacting flows, nonnative species
Cherry Creek-Upper Verde River	Verde River	3.4	0	Extirpated	Water withdrawals impacting flows, nonnative species
Fossil Creek-Lower Verde River	Verde River	15.5	Local near stocking sites.	Introduced	Water withdrawals impacting flows, nonnative species

Critical Habitat within the Action Area

Critical habitat is designated for about 122 miles of the Verde River and its 100-year floodplain from the USFS boundary (Prescott NF) in T.18N., R.2E., sec. 31 to Horseshoe Dam in T.7N., R.6E., sec. 2 (Gila and Salt River Meridian), including Horseshoe Lake to the full pool elevation. About 70 miles of critical habitat occur on and adjacent to the Prescott NF from Perkinsville downstream to the forest boundary below Camp Verde. The uppermost 15-miles of river are within USFS ownership. The next 40-mile reach of river in the Verde Valley is primarily within private ownership. The lowermost 15 miles are again in USFS ownership. Primary constituent elements of critical habitat includes a quantity of water of sufficient quality delivered within a natural hydrologic regime; physical habitat for use in spawning, nursery, feeding, and rearing, or corridors between these areas; adequate food supply; and areas with few introduced nonnative fish species.

Factors Affecting the Species and Critical Habitat in the Action Area

The razorback sucker analysis area is the same as for spikedace. Information on watershed conditions, land uses, threats to the species, and conservation actions taken on the Prescott NF are the same as for spikedace.

Endangered Species Act § 7(a)(1) Conservation Actions on the Prescott NF

Livestock grazing allotment management on the Prescott NF has not authorized livestock grazing use along the upper Verde River within designated critical habitat since 1998. Livestock grazing allotment management on the Prescott NF has not authorized livestock grazing use along the Verde Wild and Scenic River within occupied and designated critical habitat since 2005. Site specific NEPA analysis would be required to authorize future grazing use along these reaches of the Verde River.

The Verde Wild and Scenic River Comprehensive River Management Plan (Forest Service, 2004) provides guidance for the conservation of native fishes in the 41-mile designated reach. The Prescott NF has secured instream flow water rights for the 41-mile reach of the Verde Wild and Scenic River.

The Prescott NF, along with AZGFD and the Bureau of Reclamation, completed site feasibility visits in 2006 along the upper Verde River for potential fish barrier locations. A final appraisal report was completed in 2010 (Riley and Clarkson, 2010).

The Prescott NF continues to have road closures in place for the upper Verde River. The forest completed about five miles of road decommissioning/closures within watersheds of the upper Verde River in 2009. Barrier and sign maintenance was completed at three river access points in 2008 to prevent illegal vehicle access to the upper Verde River.

The Prescott NF has been treating noxious and invasive plants along the Verde River to improve riparian conditions under guidance of the Integrated Treatment of Noxious or Invasive Weeds EIS (Forest Service, 2005).

Effects Analysis for the Species

All of the proposed LRMP desired conditions, objectives, standards and guidelines, management area direction, and monitoring were reviewed to determine potential affects to razorback sucker. The following analysis is grouped by program area and includes the ongoing and future activities for the 10 to 15 years after plan approval.

Watershed and Soils

The proposed LRMP has four objectives (Obj-18, Obj-19, Obj-23, and Obj-31) that direct Watershed and Soils program activities. These objectives are detailed in the Description of the Proposed Action by Program section of this BA. These watershed objectives are expected to occur throughout the watersheds along the Verde River within the analysis area based on the need to improve several of the WCC indicators.

Obj-18 includes direction to implement 5 to 10 essential projects within high priority watersheds that improve or maintain watershed conditions. Projects are expected to occur in the uplands in all watersheds within the razorback sucker analysis area. Soil and vegetation treatments would have short term effects of soil disturbance and/or vegetation reduction in the project area. Overall, projects would improve soil and vegetation conditions in the watersheds and are expected to reduce sedimentation which would maintain or improve water quality and promote healthy macroinvertebrate populations in the Verde River.

Obj-19 includes direction to implement projects to improve riparian condition. Projects are expected to occur along the Verde River and its tributaries. Vegetation treatments and stream improvement projects would have short term effects of soil disturbance, vegetation reduction, sedimentation in the stream zone, and species disturbance. There are no instream habitat improvements expected for the Verde River in the Verde Valley or Verde Wild and Scenic River. Overall, projects would improve aquatic habitat and riparian vegetation conditions along the Verde River and its tributaries and are expected to reduce sedimentation and promote native riparian vegetation which would maintain or improve water quality and promote healthy macroinvertebrate populations.

Obj-23 includes direction to maintain or enhance groundwater dependent ecosystem sites. Projects are expected to occur in all watersheds within the razorback sucker analysis area. Projects could include road or trail relocation or closure, obliteration of unauthorized routes, livestock grazing management, and fencing. Projects would have short term effects of soil disturbance in the project area. Overall, projects would improve soil and vegetation conditions around the sites and reduce sources of sedimentation in the watersheds which would maintain or improve water quality and promote healthy macroinvertebrate populations in the Verde River.

Obj-31 includes direction to apply for instream flow water rights. The 41-mile reach of the Verde Wild and Scenic River already has secured water rights. The Prescott NF has application for instream flow water rights for the upper Verde River. Acquisition of instream flow water rights for the upper Verde River would have beneficial effects to the razorback sucker by maintaining suitable baseflows throughout the year.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of watershed and soil treatments within the razorback sucker analysis area are expected to be at low levels for the planning period. Projects in the uplands would have short term effects in the project area but effects would be insignificant and discountable to the razorback sucker. Instream improvement projects would have localized, short term adverse effects to razorback sucker and their habitat but would have long term benefits to the species. Standards and guidelines for watershed and soils are positive to maintaining long term watershed conditions and with implementation are expected to mitigate the effects of projects from all forest program areas. Overall, the Watershed and Soils program plan components are positive for the razorback sucker and would maintain or improve watershed condition indicators related to water quality, water quantity, soils, riparian vegetation, and rangeland vegetation

Wildlife/Fish/Rare Plants

The proposed LRMP has five objectives (Obj-24 through Obj-28) that direct Wildlife/Fish/Rare Plants program activities.

Obj-24 to restore native fish species to 2 to 3 stream reaches on the Prescott NF. The upper Verde River has the highest potential to repatriate native fish species. USFS management actions needed to repatriate the species could include construction and maintenance of a fish barrier and other projects to improve aquatic habitat for the species. These projects would have localized, short term adverse effects to the species from implementation and maintenance of structures such as streamflow alteration, sedimentation, and disturbance to the species. Projects would implement standards and guidelines to mitigate impacts to species and the aquatic habitat. Overall, projects related to restoration of native fishes may affect the species and their habitat but would have long term benefits by improving the quality of occupied and suitable habitat of razorback sucker on the forest.

Obj-25 through Obj-27 related to pronghorn habitat improvement would have no effect to razorback sucker in the Verde River since projects would not occur along the river.

Obj-28 related to improvement or construction of water developments would have no effect to razorback sucker in the Verde River since projects would not occur along the river.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Overall, the Wildlife/Fish/Rare Plants program plan components would have insignificant and discountable effects to the razorback sucker.

Wildland Fire and Fuels Management

The proposed LRMP has five objectives (Obj-1 through Obj-5) that direct Wildland Fire and Fuels Management activities. There would be an average of 11,350 acres per year (1 percent) of treatments across all PNVTs on the forest.

Planned wildland fire and mechanical treatments could occur in the PNVTs in all watersheds within the razorback sucker analysis area. Semi-Desert Grassland and the piñon-juniper PNVTs in these watersheds would be targeted for treatment due to their moderate to high departure from reference conditions. There would be no planned fire within riparian areas.

The effects of fire on the landscape to aquatic ecosystems depend on factors such as the extent of burned area, severity of the fire, soils/geology/topography, development of soil repellency, and post-fire storm events and climate. Projects would have short term effects of vegetation reduction and increases of ash and nutrients in the project area. Mechanical treatment projects would have short term effects of vegetation reduction and also soil disturbance with use of heavy equipment (e.g., agra-ax) in the project area. The extent of erosion and surface runoff resulting in sedimentation and ash/nutrient input to species habitat due to project activities would be mitigated by implementation of the Wildland Fire guidelines, Watershed and Soil standards and guidelines, and best management practices. Projects would increase the amount of open states for the PNVTs thereby reducing the risk of uncharacteristic wildfire and increasing herbaceous ground cover which would provide for water infiltration and less runoff and erosion in the watersheds. Overall, plan components would improve watershed conditions and are expected to reduce sedimentation to the Verde River which would maintain or improve water quality and provide for healthy macroinvertebrate populations.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of wildland fire and fuels treatments within the razorback sucker analysis area are expected to be at low to moderate levels (Table 6) for the planning period. Implementation of the standards and guidelines is positive for the razorback sucker and is expected to mitigate the effects of projects to aquatic and riparian areas. Overall, the Wildland Fire program plan components would have insignificant and discountable effects to razorback sucker and would maintain or improve watershed condition indicators related to water quality, soils, fire regime, and rangeland vegetation.

Recreation

The proposed LRMP has 10 objectives (Obj-8 through Obj-17) that direct Recreation program activities. All objectives, except Obj-13 to increase recreational fishing opportunity, are expected to have planned activities along the Verde River or within the razorback sucker analysis area. The majority of the objectives include direction to minimize the impacts of recreational activities and facilities to natural resources. Actions such as designated dispersed camping areas, maintenance of facilities, relocation and rehabilitation of recreation facilities impacting natural resources, and signing would improve upland and riparian conditions. There is one undeveloped recreation site at Perkinsville and six developed day use sites along the Verde River within the Verde Valley. Actions taken along the Verde River are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality and healthy macroinvertebrate populations. Implementation of standards and guidelines would mitigate the effects of ongoing recreational activities or future projects to aquatic and riparian resources.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Overall, the Recreation program plan components would have insignificant and discountable effects to razorback sucker and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Transportation

The proposed LRMP has three objectives (Obj-20, Obj-22, and Obj-23) that direct Transportation program activities. All objectives are expected to have planned activities in all watersheds within the razorback sucker analysis area. Objectives include direction on projects to repair, relocate, or close roads and trails, close and rehabilitate unauthorized routes, or provide for proper stream drainage of roads and trails that are impacting watershed integrity. Projects would improve soil and vegetation condition in the uplands and would improve or minimize impacts to aquatic and riparian conditions along streams. Implementation of Transportation standards and guidelines would mitigate the effects of ongoing roads and trail maintenance and future projects to uplands and aquatic/riparian areas.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Overall, the Transportation program plan components would have insignificant and discountable effects to razorback sucker and would maintain or improve watershed condition indicators related to water quality, soils, riparian vegetation, roads and trails, and rangeland vegetation.

Wilderness and Special Areas

The proposed LRMP does not have any objectives that direct Wilderness Management activities. Suitable and occupied habitat for razorback sucker in the Verde River occurs in two management areas on the Prescott NF, Upper Verde and Verde Valley, and includes the Verde Wild and Scenic River, Sycamore Canyon Wilderness, and Cedar Bench Wilderness. The desired conditions for these management areas have a strong focus on recreational use and wildernesses experience while maintaining the outstanding remarkable values of the river in relation to designation or eligibility as wild and scenic. These management areas highlight the uniqueness and attraction of recreational activities along the Verde River. The guidelines associated with these management areas provide for the protection of the natural resources through recreation management, signing and enforcement, and land acquisition or exchange opportunities. The plan components would maintain or improve aquatic and riparian habitats along the Verde River by

The management standards in the Verde Wild and Scenic River Comprehensive River Management Plan (Forest Service, 2004) are incorporated into the proposed LRMP (Std-W&S-1). This river management plan provides direction to protect the outstandingly remarkable values (ORVs) of the river which includes native fish values. The Verde Wild and Scenic River segment includes a 41-mile segment and one-half mile corridor from Beasley Flat downstream to the confluence with Red Creek within the administrative boundaries of the Coconino, Prescott, and Tonto NFs. Implementation of this river management plan would continue to maintain or enhance aquatic habitat for razorback sucker.

A 37-mile segment of the upper Verde River has been classified as eligible for wild and scenic designation (Forest Service, 1984) and is given protection for its ORVs of the river which includes native fish values (Std-W&S-2). Implementation of this standard would maintain the native fish ORV for the upper Verde River.

Sycamore Canyon and Cedar Bench Wildernesses occur along the Verde River. Wilderness standards and guidelines would provide for maintaining the ecological processes to preserve their

character and value. Recreation uses and group sizes would be restricted in most cases to reduce human impacts. Fire management activities would only occur from natural ignitions and would include using minimum impact suppression tactics. Three of the eight additional recommended wilderness areas occur within the Upper Verde and Verde Valley Management Areas: Sycamore Canyon A, Cedar Bench A, and Cedar Bench B. Management would be towards maintaining the values of these potential wilderness areas.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub and the spikedace.

The extent and distribution in this program area covers a 95-mile reach of the Verde River of which 55-miles are under Prescott NF administration. Implementation of the management area standards and guidelines and wilderness and special area standards and guidelines is expected to mitigate the effects of human uses and fire within these areas. Overall, the Wilderness and Special Areas program plan components would have insignificant and discountable effects to razorback sucker and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Lands and Special Uses

The proposed LRMP has two objectives (Obj-29 and Obj-30) that direct Lands and Open Space Management activities. Both objectives have the potential to have actions taken within watersheds with razorback sucker because of the interspersion of private lands along the Verde River. Acquiring lands along the Verde River would have beneficial effects to protecting razorback sucker populations especially those acquired with water rights. Obj-30 to secure right of ways are expected to have no effects to the species. Program standards and guidelines are directed at maintaining or increasing open space on the forest, managing communication site and utility corridors, energy development, reducing impacts to upland, riparian, and aquatic resources. Overall, the Lands and Special Uses program plan components would have beneficial effects to razorback sucker.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Minerals Management

The proposed LRMP does not have any objectives that direct Minerals Management activities. Mines are present in all watersheds within the razorback sucker analysis area with concentrations near the towns of Jerome and Cherry. Mineral standards and guidelines restrict mineral activities in wilderness and other special areas (Std-MM-2) which has beneficial effects to razorback sucker and provide guidance to mitigate mining impacts to upland, riparian, and aquatic resources. Overall, the Minerals program plan components would have insignificant and discountable effects to razorback sucker and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Rangeland Management

The proposed LRMP does not have any objectives that direct Rangeland Management activities. Livestock grazing would continue throughout suitable rangelands on forestlands in all watersheds within the razorback sucker analysis area. These watersheds have a high percentage of acres rated as Impaired for rangeland vegetation though much of this is related to high amounts of piñon-juniper PNVTs that are departed from reference conditions. Implementation of guidelines (Guide-Range-3 and 6) provide guidance for the growth and recovery of desired plant species and would trend rangeland vegetation towards DC-Veg-1 and DC-Veg-3. Livestock grazing activities with implementation of Rangeland Guidelines in upland areas of the watersheds would have insignificant and discountable effects to the species.

Livestock grazing could occur along the 37 miles of the upper Verde River from the forest boundary downstream to Clarkdale, although it is currently not authorized. Site specific NEPA analysis would be required to authorize future grazing use. Livestock grazing can affect the aquatic/riparian zone from livestock use and movement along the river, trampling streambanks with sedimentation and waste deposits that can impair water quality. Impacts to water quality would be greatest during seasonally low flow periods and in droughts. Implementation of Rangeland Management standards and guidelines (Std-Range-2, Guide-Range-1 and 5) provide guidance to reduce livestock grazing impacts to riparian areas. Razorback sucker currently do not occupy the upper Verde River. There is no livestock grazing in the Verde Valley section of the Verde River. There are only 3.4-miles of Prescott NF lands in this reach with the majority of lands being dedicated to recreational sites. There is no livestock grazing in the Verde Wild and Scenic River as directed under Std-W&S-1.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub and the spikedace. Overall, the Rangeland program plan components would have short term adverse effects to razorback sucker from livestock grazing in their habitat but would maintain watershed condition indicators related to water quality, soils, riparian vegetation, and rangeland vegetation.

Forestry and Forest Health

The proposed LRMP has three objectives (Obj-3, Obj-5, and Obj-6) that direct the Forest Health program activities. Obj-3 and Obj-5 are expected to have planned activities within watersheds with razorback sucker. Obj-3 identifies using mechanical and fire treatments to improve watershed and rangeland conditions, vegetation structure, and wildlife habitat within the piñon-juniper PNVTs. See the Wildland Fire section above for effects analysis from this action. Projects would improve soil and vegetation conditions and are expected to reduce sedimentation to aquatic habitats which would maintain water quality and healthy macroinvertebrate populations. Obj-5 related to timber harvest in ponderosa pine PNVTs makes up a small amount of acres within these watersheds and occurs in the upper portions of the watersheds at greater distances from the river.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of forestry treatments within razorback sucker analysis area are expected to be at low to moderate levels (Table 7) for the planning period. Implementation of the standards and guidelines is positive for razorback sucker and is expected to mitigate the effects of projects

to aquatic and riparian areas. Overall, the Forestry program plan components would have insignificant and discountable effects to razorback sucker and would maintain or improve watershed condition indicators related to water quality, soils, fire regime, and rangeland vegetation.

Effects Analysis for Critical Habitat

For those species with designated or critical habitat, the effects analysis approach identified how the primary constituent elements (PCEs) or biological features essential to the conservation of the species are likely to be affected. Refer to the Critical Habitat section above for the description of the PCEs.

Watershed and Soils

Projects in the uplands (Obj-18) would improve soil and vegetation conditions and are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality (PCE-1) and provide for healthy macroinvertebrate populations (PCE-3) in the Verde River. Projects in aquatic/riparian areas (Obj-19) would improve riparian conditions and are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality and provide for healthy macroinvertebrate populations and maintain water temperatures (PCE-1) suitable for razorback sucker in the Verde River. Projects related to springs and seeps (Obj-23) would have no effect to PCEs since would they typically occur in the uplands and have minimal extent of impact. Attaining or maintaining instream flow rights (Obj-31) would have beneficial effects by providing for perennial flows for razorback sucker critical habitat. Standards and guidelines for watershed and soils are positive to maintaining long term watershed conditions and with implementation are expected to mitigate the effects of projects from all forest program areas.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of watershed and soil treatments within the watersheds with razorback sucker critical habitat are expected to be at low levels for the planning period. In most cases, projects are expected to be limited in extent and amount of ground disturbance. Projects in the uplands and riparian would have short term effects in the project area but effects would be insignificant and discountable to razorback sucker critical habitat. Instream improvement projects would have localized, short term adverse effects to PCEs for habitat components, water quality, and prey base but would have long term benefits to improving razorback sucker critical habitat conditions on the forest.

Wildlife/Fish/Rare Plants

Obj-24 to restore native fish species to 2 to 3 stream reaches on the Prescott NF could include projects within razorback sucker critical habitat. USFS management actions needed to support native fish restoration within the upper Verde River could include construction and maintenance of a fish barrier and other projects to improve aquatic habitat. These projects would have localized, short term adverse effects to PCEs for critical habitat such as streamflow and streambank alteration, riparian vegetation reduction, and sedimentation but would have long term benefits by improving razorback sucker critical habitat. Other objectives (Obj-25 through 28)

would have no effect to razorback sucker critical habitat in the Verde River since pronghorn habitat and projects do not occur along the river.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of aquatic and terrestrial wildlife treatments (Table 6) within razorback sucker critical habitat analysis area are expected to be at low levels for the planning period. Projects in the uplands would have short term effects in the project area but effects would be insignificant and discountable to spikedace critical habitat. Native fish stream improvement projects would have localized, short term adverse effects to critical habitat, but they would have long term benefits by improving razorback sucker critical habitat conditions on the forest.

Wildland Fire and Fuels Management

Planned wildland fire and mechanical treatments would occur across the landscape within the PNVTs in the watersheds with or potentially affecting razorback sucker critical habitat. The extent and rate of wildland fire and fuels treatments within the watersheds are expected to be at low to moderate levels (Table 6) for the planning period. Treatments would have short term increases in runoff and sediment production in treated areas due to the decrease in vegetative ground cover. Implementation of all appropriate forest program standards and guidelines is expected to mitigate the effects of projects in the area to species critical habitat in the Verde River. Projects would improve soil and vegetation conditions and are expected to reduce sedimentation to the Verde River which would maintain water quality (PCE-1) and healthy macroinvertebrate populations (PCE-3). Plan components are expected to have short term effects in the project area but effects would be insignificant and discountable to razorback sucker critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Recreation

The majority of the objectives include direction to minimize the impacts of recreational activities and facilities to natural resources. Actions such as designated dispersed camping areas, maintenance of facilities, relocation and rehabilitation of recreation facilities impacting natural resources, and signing would improve upland and aquatic/riparian conditions and are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality and healthy macroinvertebrate populations in the Verde River. Implementation of standards and guidelines would mitigate the effects of ongoing recreational activities or future projects. These plan components provide for the maintenance or improvement of aquatic habitat of the Verde River and would have insignificant and discountable effects to razorback sucker critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Transportation

All objectives are expected to have planned activities within watersheds with razorback sucker critical habitat. Projects would improve soil and vegetation condition in the uplands and would

improve or minimize impacts to aquatic and riparian conditions along streams. Implementation of the standards and guidelines is expected to mitigate the effects of the projects in the uplands and aquatic/riparian areas. Implementation of standards and guidelines would mitigate the effects of ongoing roads and trail maintenance and future projects. Overall, the Transportation program plan components would have insignificant and discountable effects to razorback sucker critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Wilderness and Special Areas

The extent and distribution in this program area covers a 95-mile reach of the Verde River of which 55-miles are under Prescott NF administration. Implementation of the management area standards and guidelines and wilderness and special Area standards and guidelines is expected to mitigate the effects of human uses and fire within these areas. These plan components provide for the maintenance or improvement of aquatic habitat of the Verde River and would have insignificant and discountable effects to razorback sucker critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub and the spikedace.

Lands and Special Uses

Acquiring lands (Obj-29) along the Verde River would have beneficial effects to protecting razorback sucker critical habitat especially those acquired with water rights (PCE-1). Obj-30 to secure right of ways are expected to have no effects to the species. Plan components would have beneficial effects to razorback sucker critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Minerals Management

Mines are present in all watersheds within the razorback sucker analysis area with concentrations near the towns of Jerome and Cherry. Mineral standards and guidelines restrict mineral activities in wilderness and other special areas (Std-MM-2) which would have beneficial effects to razorback sucker critical habitat and provide guidance to mitigate mining impacts to upland, riparian, and aquatic resources which would reduce impacts to water quality (PCE-1,3). Overall, the Minerals program plan components would have insignificant and discountable effects to razorback sucker critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Rangeland Management

Authorized livestock grazing could occur along 20-miles of the upper Verde River from about Perkinsville downstream to Clarkdale within razorback sucker critical habitat. Livestock grazing can affect the aquatic/riparian zone from livestock use and movement along the river and waste deposits that can impair water quality. There is no livestock grazing in the Verde Valley section of the Verde River. There are only 3.4-miles of Prescott NF lands in this reach with the majority of

lands being dedicated to recreational sites. There is no livestock grazing in the Verde Wild and Scenic River as directed under Std-W&S-1.

Implementations of Rangeland Management standards and guidelines (Std-Range-2, Guide-Range-1, and Guide-Range-5) would minimize effects to aquatic and riparian areas; however, there would be expected short term adverse effects to water quality from livestock grazing activities in razorback sucker critical habitat but the function of the critical habitat would be retained.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub and the spikedace.

Forestry and Forest Health

The extent and rate of treatments (Table 7) within the watersheds with razorback sucker critical habitat are expected to be at low levels. Regulated timber harvest shall occur on lands classified as suitable for timber production (Std-FP-1).Planned activities within watersheds with razorback sucker critical habitat using mechanical and fire treatments would have short term increases in runoff and sediment production in treated areas due to the decrease in vegetative ground cover. Implementations of standards and guidelines would avoid or minimize effects to aquatic and riparian areas. Projects would improve soil and vegetation conditions and are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality (PCE-1) and healthy macroinvertebrate populations (PCE-3) in the Verde River. Plan components would have insignificant and discountable effects to razorback sucker critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Cumulative Effects to the Species and Critical Habitat

The cumulative effects area includes the 5th level HUC watersheds that encompass the razorback sucker analysis area.

Population growth in the area surrounding the forest is expected to continue (see Table 8). Residential home and commercial development would continue on private lands and increase impacts to watershed integrity. Impacts would be greatest in the Lower Big Chino, Williamson Valley Wash, Granite Creek-Upper Verde River, and Cherry Creek-Upper Verde River watersheds with higher amount of private land ownership.

Off-forest water uses are having some effect to streamflows on the forest, especially to the Verde River (Table 6), and are expected to have a greater impact with increasing population and groundwater demands in watersheds that cover the forest. Impacts would be greatest in the Lower Big Chino Wash, Williamson Valley Wash, and Cherry Creek watershed with higher amount of private land ownership.

Demand for outdoor recreation is also expected to grow concurrently with increasing population and more visitor use of the forest. Aquatic and riparian resources are major attractants for recreational activities and would receive increasing use with resulting impacts to those resources.

Other land uses such as livestock grazing, mining, and vegetation treatments is occurring across the watersheds on State, private, and tribal lands. Management actions on State lands follow law, policy, and other management direction to minimize impacts to aquatic ecosystems.

Determination of Effects (Species)

The implementation of plan components related to the Wildland Fire and Fuels, Recreation, Transportation, Wilderness and Special Areas, Lands and Special Uses, Minerals, and Forestry programs are expected to have insignificant and discountable effects to razorback sucker because of the limited extent of action and/or mitigation of effects through implementation of standard and guidelines. Plan components related to the Watershed and Soils and Wildlife/Fish/Rare Plants programs would have localized, short term adverse effects to aquatic habitat but would result in long term beneficial effects to maintaining or improving aquatic habitat and species populations on the forest. Plan components related to the Rangeland program would maintain or improve upland and riparian vegetation on the forest but would have short term adverse effects to water quality from livestock use along the Verde River. The proposed LRMP would result in a "May Affect, Likely to Adversely Affect" determination to razorback sucker.

Determination of Effects (Critical Habitat)

The implementation of plan components related to the Wildland Fire and Fuels, Recreation, Transportation, Wilderness and Special Areas, Lands and Special Uses, Minerals, and Forestry programs are expected to have insignificant and discountable effects to razorback sucker critical habitat because of the limited extent of action and/or mitigation of effects through implementation of standard and guidelines. Plan components related to the Watershed and Soils and Wildlife/Fish/Rare Plants programs would have localized, short term adverse effects to aquatic habitat but would result in long term beneficial effects to maintaining or improving critical habitat on the forest. Plan components related to the Rangeland program would maintain or improve upland and riparian vegetation on the forest but would have short term adverse effects to water quality from livestock use along the upper Verde River. The proposed LRMP would result in a "May Affect, Likely to Adversely Affect" determination to razorback sucker critical habitat.

Colorado Pikeminnow (*Ptychocheilus lucius*)

Endangered Species Act Status:	Experimental, Non-Essential
Recovery Plan:	Yes, 1978; Revised, 1991; Amended with Recovery Goals, 2002
Critical Habitat:	Yes, However None for §10(j) Population
Determination of Effects (Species):	Not Likely to Jeopardize

Natural History and Distribution

The natural history and distribution of the Colorado pikeminnow is covered in detail in the recovery goals plan (Fish and Wildlife Service, 2002). That information is incorporated by reference into this BA.

Status of the Species Rangewide

A detailed status of the Colorado pikeminnow is found in the recovery plan (Fish and Wildlife Service, 1991) and the recovery goals (Fish and Wildlife Service, 2002) and is incorporated in this BA by reference. Wild populations of Colorado pikeminnow are found only in the upper basin, and the species currently occupies only about 25 percent of its historic range basinwide (Fish and Wildlife Service, 2002). Currently, Colorado pikeminnow is limited mainly to three areas in the upper Colorado River Basin. In these primary areas of occurrence it is common, comparatively speaking, only in the Green-Yampa River system of northwestern Colorado and northeastern Utah. A reproducing population still occurs in the western part of Colorado in the Colorado and Gunnison Rivers. A small population of reproducing pikeminnows still occurs in the San Juan River of New Mexico. In the lower Colorado River Basin, pikeminnows have been reintroduced into the Salt and Verde systems as an experimental non-essential population (Fish and Wildlife Service, 2002).

Critical Habitat

In March 1994, the USFWS designated 1,148 miles, or 29 percent of its historical range, of the upper Colorado River Basin as critical habitat for Colorado pikeminnow (Fish and Wildlife Service, 1994). There is no critical habitat designated in Arizona.

Threats

The near extinction of Colorado pikeminnow is due to a combination of factors, the most significant being those associated with water development projects (i.e., dams) that have altered stream morphology, flow patterns, temperatures, water chemistry, and silt loads of most major streams throughout the Colorado River Basin. Fish access to most spawning areas has been blocked by dams. Water temperature changes resulting from the construction of dams and habitat degradation may be having a significant effect; cold water released from reservoirs created by dams can inhibit embryonic development and increase early life mortality.

Interactions with nonnative fishes may be an important factor in the continued survival or success of reintroduced populations of Colorado pikeminnow. While predation by nonnative channel catfish, smallmouth bass, and flathead catfish on young pikeminnow may limit successful reintroduction in Arizona, nonnative fish such as red shiner, mosquito fish, and fathead minnow as well as native desert sucker and Sonora sucker are now the primary prey base for Colorado pikeminnow. Another specific threat is from pesticides and pollutants (Fish and Wildlife Service, 2002).

Climate Change

For a detailed discussion on climate change refer to the Climate Change section of this BA. Information and effects of climate change for the pikeminnow are the same as for the razorback sucker.

Status of the Species within the Action Area

Historical and current distribution and status of the Colorado pikeminnow on the Prescott NF is the same as for the razorback sucker (Table 24). Introductions made into main channels habitats of the Verde River since 1985 have had low survival and recruitment has not been documented (Hendrickson, 1993; Hyatt, 2004). Since 1994, almost all reintroductions have occurred in the Verde Wild and Scenic River below Camp Verde. Trends in species population and habitat in the Verde River have decreased from historical levels because of the introduction and establishment of nonnative aquatic species which are predatory and/or competitive with the native species and reduced habitat quantity and quality from water diversions, nutrient enrichment from agricultural practices, excess sedimentation from land development in the watersheds, and introduction and establishment of noxious plant species. The analysis area for the Colorado pikeminnow is the same as for the razorback sucker.

Factors Affecting the Species in the Action Area

The analysis area for the Colorado pikeminnow is the three 5th level HUC watersheds with current or historical presence shown for the razorback sucker in Table 24. There are high amounts of private land in the Cherry Creek watershed. The major communities in these watersheds include Jerome, Clarkdale, Cottonwood, Cornville, and Camp Verde in the Verde Valley. Primary land uses throughout the watersheds are livestock grazing, irrigated agriculture, recreation, and some mining and silviculture.

Information on factors affecting the Colorado pikeminnow is the same as for the spikedace.

Endangered Species Act § 7(a)(1) Conservation Actions on the Prescott NF

Information on conservation actions for the Colorado pikeminnow is the same as for the spikedace.

Effects Analysis for the Species

Continued stocking of the Colorado pikeminnow is expected in the lower Verde River within the Verde Wild and Scenic River. Program plan component effects related to this reach of river on the forest are detailed in the spikedace effects analysis. There are no expected objectives related to Watershed and Soil, Wildlife/Fish/Rare Plants, and the Rangeland programs that would have short term effects to the species and their habitat.

Determination of Effects (Species)

The implementation of plan components related to the Watershed and Soils, Wildlife/Fish/Rare Plant, Wildland Fire and Fuels, Recreation, Transportation, Wilderness and Special Areas, Lands and Special Uses, Minerals, Rangeland, and Forestry programs are expected to have insignificant and discountable effects to Colorado pikeminnow because of the limited extent of action and/or mitigation of effects through implementation of standard and guidelines. The proposed LRMP would result in a “Not Likely to Jeopardize” determination to the §10(j) population of Colorado pikeminnow.

Roundtail Chub (*Gila robusta*)

Endangered Species Act Status:	Candidate, 2009
Determination of Effects (Species):	May Affect, Likely to Adversely Affect

Natural History and Distribution

The natural history and distribution of roundtail chub in covered in detail in the 12-month petition finding to list a Distinct Population Segment of roundtail chub in the Lower Colorado River Basin (Fish and Wildlife Service, 2009). Information and references are incorporated by reference into this BA.

Status of the Species Rangewide

A detailed status of roundtail chub is found in the 12-month petition finding to list a distinct population segment of roundtail chub in the lower Colorado River Basin (Fish and Wildlife Service, 2009) and is incorporated by reference into this document. The finding concluded that the petitioned listing action was warranted, but precluded by higher priority actions. The species was added to the candidate species list with the designated being for the distinct population segment in the lower Colorado River Basin of Arizona and New Mexico.

Roundtail chub is found in the upper and lower Colorado River Basins. Roundtail chub was historically considered common throughout its range in the Gila and Zuni Rivers in New Mexico; the Black, Colorado (though likely only as a transient), Little Colorado, Bill Williams, Gila, San Francisco, San Carlos, San Pedro, Salt, Verde, White, and Zuni Rivers in Arizona; and numerous tributaries within those basins. Roundtail chub has been extirpated from 672 miles (965 kilometers) of 2,197 miles (3,535 kilometers; approximately 60 percent) of its formerly occupied range. Of the populations for which status and threat information is available, all but one of the remaining natural populations is considered threatened by both the presence of nonnative species and habitat-altering land uses. Of 40 populations of roundtail chub in the lower Colorado River Basin, 1 population was classified as ‘‘stable-secure,’’ 8 populations were ‘‘stable-threatened,’’ 13 populations were ‘‘unstable-threatened,’’ 9 populations were ‘‘unknown,’’ and 10 populations were extirpated (Fish and Wildlife Service, 2009). Although roundtail chub is a legal sport fish in Arizona, available information indicates that the species is not threatened by overutilization as a game species from current levels of angling.

Conservation agreements and associated plans have been developed for roundtail chub in the lower Colorado River Basin. Populations in Arizona are managed under the 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*) (Arizona Agreement; AZGFD 2006). Some actions have been implemented as a result that benefit and help conserve roundtail chub, such as the establishment of new populations in nonnative fish-free habitats and the development of broodstock for use in establishing and augmenting populations. These plans also include numerous actions to help reduce the threats to roundtail chub.

Threats

Threats to roundtail chub are fully examined in the 12-month finding (Fish and Wildlife Service, 2009) and are incorporated by reference into this BA. Predation and competition with nonnative aquatic species, and in particular fish, are, along with dewatering of habitat, the most significant threats to roundtail chub in the lower Colorado River Basin. Nonnative aquatic species are a threat to every population of roundtail chub with the possible exception of recent transplants into streams with low levels of occurrence of nonnatives and presence of natural or manmade fish barriers. Threats to roundtail chub will likely be exacerbated by changes to climatic patterns in the southwestern U.S. due to increasing drought and reduction of surface waters if the predicted patterns are realized. Threats to roundtail chub are magnified by the fragmentation of existing populations.

Climate Change

For a detailed discussion on climate change refer to the Climate Change section of this BA.

Climate conditions have contributed to the status of roundtail chub now and will likely continue into the foreseeable future. The current and future effects of climate change on roundtail chub is discussed in the 12-month finding petition to list a distinct population segment of roundtail chub in the lower Colorado River Basin (Fish and Wildlife Service, 2009). Increased temperatures in the Southwest may impact the species in several ways including altered stream flow events, increased habitat fragmentation from stream drying, warmer water temperatures, increased frequency and intensity of fire, expansion of invasive species, and increased susceptibility and mortality from disease. A decline in water resources with or without climate change will be a significant factor to the species and their habitat.

Status of the Species within the Action Area

Historical and current distribution and status of roundtail chub on the Prescott NF is shown in Table 255. Populations are found in the Verde River mainstem throughout the forest (AZGFD, 2009; Voeltz, 2002). Roundtail chub were introduced in Gap Creek within the Cedar Bench Wilderness on the Prescott NF in 2012.

Table 25. Roundtail chub distribution and status on the Prescott National Forest

5th Level HUC Name	Stream Name	Stream Miles On PNF	Miles of Occupied Habitat	Status Classification from USFWS 2009 12-Month Finding
Granite Creek-Upper Verde River	Verde River	4	4	stable-threatened
Grindstone Wash-Upper Verde River	Verde River	28	28	stable-threatened
Cherry Creek-Upper Verde River	Verde River	3.4	3.4	stable-threatened
Fossil Creek-	Verde River	15.5	15.5	stable-threatened

5th Level HUC Name	Stream Name	Stream Miles On PNF	Miles of Occupied Habitat	Status Classification from USFWS 2009 12-Month Finding
Lower Verde River				
Fossil Creek-Lower Verde River	Gap Creek	2	2	not available
Sycamore Creek (Bill Williams River Basin)	Sycamore Creek	2	0	unstable-threatened

Factors Affecting the Species in the Action Area

The analysis area for roundtail chub is the five 5th level HUC watersheds with occupied habitat either on the forest or directly downstream (Table 26). Land ownership along the upper and lower Verde River is primarily Prescott NF lands, but there are private land inclusions. The Verde River within the Verde Valley is primarily within private lands. Major communities in the upper Verde River Basin include Prescott and Chino Valley. Major communities in the Verde Valley include Jerome, Clarkdale, Cottonwood, Cornville, and Camp Verde. The main land use activities in the area include livestock grazing and recreation activities such as OHV and hunting.

Table 26. Watershed ownership for the roundtail chub analysis area

5th Level HUC Name	Total Acres	PNF Acres	Non PNF Acres State/ Federal	Private Acres	% PNF Acres
Granite Creek-Upper Verde River	229,829	45,175	57,350	126,159	20
Grindstone Wash-Upper Verde River	197,569	146,182	50,051	1,336	74
Cherry Creek-Upper Verde River	144,783	97,938	6,444	41,842	68
Fossil Creek-Lower Verde River	191,486	44,136	140,487	6,863	23
Sycamore Creek (Bill Williams River Basin)	151,652	97,559	42,458	11,635	64

The Watershed Condition Classification (WCC) for the Prescott NF (Forest Service, 2011) is referenced to determine the existing condition of the watersheds in the analysis area for roundtail chub. The individual watershed condition indicators that best reflect the consequences of management activities and recreation use are given in Table 3. The main PNVTs within these watersheds are the piñon-juniper and grassland PNVTs. The primary threats in the Verde River include nonnative fishes, which are predatory and/or competitive with the native species, and reduced habitat quantity and quality from water withdrawals in the Big Chino Aquifer and the Verde Valley. In addition, watershed conditions are At-Risk or Impaired for several key watershed

condition indicators. These departures collectively are contributing to an altered hydrologic condition that is affecting aquatic habitat quality in the Verde River.

Table 27. Watershed conditions by selected WCC indicators in the roundtail chub analysis area

5th Level HUC Name	WCC Indicator								
	Water Quality	Water Quantity	Nonnative Species	Riparian Vegetation	Roads and Trails	Soils	Fire Regime	Forest Cover	Rangeland Vegetation
Granite Creek-Upper Verde River	1*	1	2	2	3	2	2	1	3
Grindstone Wash-Upper Verde River	1	1	2	2	3	2	2	1	3
Cherry Creek-Upper Verde River	3	3	2	2	3	2	2	1	3
Fossil Creek-Lower Verde River	2	3	2	2	2	2	2	1	3
Sycamore Creek (Bill Williams River Basin)	1	1	2	3	3	3	2	N/A	3

*Indicator Rating Classes: 1=Functioning; 2=At-Risk; 3=Impaired. Ratings are for the entire watershed.

Water quality (impaired for turbidity) in the Verde River are affected by various factors in both the upland and riparian areas (Bowman, 2001). The departure of the piñon-juniper and grassland PNVTs in these watersheds is a major factor in increased erosion due to the higher canopy cover and less herbaceous ground cover to hold soils and moisture in place. Roads are also a major source of increased sediments and potential pollutants into stream channels on the Prescott NF due to the poor condition from inadequate maintenance and the proximity to stream drainages. In addition, there are unquantified miles of unauthorized routes from OHV users that are also contributing increased sediments to stream drainages. Overall, road and trail access to the Verde River is limited and controlled with the majority occurring in the Verde Valley.

Water withdrawals from both surface water and groundwater are affecting streamflow in the Verde River (Blasch et al., 2006). Increasing groundwater withdrawals from the Big Chino Aquifer has the potential to decrease perennial flow in the upper Verde River which would reduce the amount of habitat for roundtail chub. The Big Chino Aquifer has been shown to contribute at least 80 percent to the upper Verde River baseflow (Wirt and Hjalmarson, 2000). Over 30 irrigation diversions exist in the Verde Valley that diverts an estimated 15,000 acre-feet of surface water annually (ADWR, 2000) with noticeable reduction in streamflow during the irrigation season.

Native fish species within the Verde River have been negatively affected by the introduction and establishment of nonnative aquatic species. Nonnative fish species dominate the fish community throughout the Verde River and are a major limiting factor in native aquatic species occurrence because of predation and competition (Hendrickson, 1993; Rinne and Stefferud, 1998; Bonar et al., 2004). Based on data from1987 to2003, nonnative fish species generally comprised 70 to 80 percent of the fish community in the Verde River throughout the analysis area (Rinne, 2005). Nonnative fish are present in the Sycamore Creek drainage. There are no nonnative fish within Gap Creek in the perennial stream segment with roundtail chub.

Livestock grazing occurs throughout suitable rangelands in all watersheds within the roundtail chub analysis area. These watersheds have a high percentage of acres rated as Impaired for rangeland vegetation though much of this is related to high amounts of piñon-juniper PNVTs that are departed from reference conditions. No livestock grazing is currently authorized along the Verde River on the Prescott NF. The six allotments along the upper Verde River have not grazed in the river corridor since 1998. The four allotments within the Verde Valley are fenced off from livestock grazing. The two allotments in the lower Verde River were fenced off from livestock grazing in 2005 but have three watering access points. There are five allotments within the Sycamore Creek watershed that are open to livestock grazing within roundtail chub habitat. The roundtail chub habitat in Gap Creek has limited livestock grazing due to steep and rough terrain along the stream. Grazing rotations, riparian utilization levels, and other LRMP standards and guidelines are followed to minimize impacts to riparian and aquatic resources.

Population growth in the area surrounding the forest is expected to continue with residential home and commercial development on private lands and increase impacts to watershed integrity. Expected impacts are increases in altered hydrological conditions leading to increased runoff and erosion and increased water withdrawals. Impacts would be greatest in the Lower Big Chino, Williamson Valley Wash, Granite Creek-Upper Verde River, and Cherry Creek-Upper Verde River watersheds with higher amount of private land ownership. In addition, demand for outdoor recreation is also expected to grow concurrently with increasing population and more visitor use of the forest, especially along the Verde River which is a draw for water based recreation activities.

Endangered Species Act § 7(a)(1) Conservation Actions on the Prescott NF

Prescott NF contributed towards a Status Review on roundtail chub in the Verde River Basin (Girmendonk and Young, 1997).

The Prescott NF has secured instream flow water rights for the 41-mile reach of the Verde Wild and Scenic River and has application for instream flow water rights for the upper Verde River.

Livestock grazing allotment management on the Prescott NF has not authorized livestock grazing use along the upper Verde River within occupied habitat since 1998. Site specific NEPA analysis would be required to authorize future grazing use.

The Prescott NF continues to have road closures in place for the upper Verde River. The forest completed about 5 miles of road decommissioning/closures within watersheds of the upper Verde River in 2009. Barrier and sign maintenance was completed at three river access points in 2008 to prevent illegal vehicle access to the upper Verde River.

The Verde Wild and Scenic River Comprehensive River Management Plan (Forest Service, 2004) includes guidance for the conservation of native fishes in the 41-mile designated reach. Livestock grazing allotment management on the Prescott NF has not authorized livestock grazing use along the Verde Wild and Scenic River within occupied habitat since 2005. Site specific NEPA analysis would be required to authorize future grazing use.

Tamarisk treatments have been completed along the Verde River as part of the Noxious Weed Treatment Plan (Forest Service, 2004) in recent years to improve riparian and aquatic conditions.

The Prescott NF, along with AZGFD and the BOR, completed site feasibility visits in 2006 along the upper Verde River for potential fish barrier locations.

Effects Analysis for the Species

All of the proposed LRMP desired conditions, objectives, standards and guidelines, management area direction, and monitoring were reviewed to determine potential affects to roundtail chub. The following analysis is grouped by program area and includes the ongoing and future activities for the 10 to 15 years after plan approval.

Watershed and Soils

The proposed LRMP has four objectives (Obj-18, Obj-19, Obj-23, and Obj-31) that direct Watershed and Soils program activities. These objectives are detailed in the Description of the Proposed Action by Program section of this BA. These watershed objectives are expected to occur throughout the watersheds that drain to the Verde River based on the need to improve several of the WCC indicators.

Obj-18 includes direction to implement 5 to 10 essential projects within high priority watersheds that improve or maintain watershed conditions. Projects are expected to occur in the uplands in all watersheds within roundtail chub analysis area. Soil and vegetation treatments would have short term effects of soil disturbance and/or vegetation reduction in the project area. Overall, projects would improve soil and vegetation conditions in the watersheds and are expected to reduce sedimentation which would maintain or improve water quality and promote healthy macroinvertebrate populations in the Verde River.

Obj-19 includes direction to implement projects to improve riparian condition. Projects are expected to occur along the Verde River and its tributaries. . In most cases, projects are expected to be limited in extent and amount of ground disturbance. Vegetation treatments and stream improvement projects would have localized, short term effects of soil disturbance, vegetation reduction, sedimentation in the stream zone, and species disturbance. Overall, projects would improve aquatic habitat and riparian vegetation conditions along the Verde River and its tributaries and are expected to reduce sedimentation and promote native riparian vegetation which would maintain or improve water quality and promote healthy macroinvertebrate populations.

Obj-23 includes direction to maintain or enhance groundwater dependent ecosystem sites. Projects are expected to occur in all watersheds within the roundtail chub analysis area. Projects could include road or trail relocation or closure, obliteration of unauthorized routes, livestock grazing management, and fencing. In most cases, projects are expected to be limited in extent and

amount of ground disturbance. Projects would have short term effects of soil disturbance in the project area. Overall, projects would improve soil and vegetation conditions around the sites and reduce sources of sedimentation in the watersheds which would maintain or improve water quality and promote healthy macroinvertebrate populations in the Verde River.

Obj-31 includes direction to apply for instream flow water rights. The 41-mile reach of the Verde Wild and Scenic River has secured water rights. The Prescott NF has application for instream flow water rights for the upper Verde River. Acquisition of instream flow water rights for the upper Verde River would have beneficial effects to roundtail chub by maintaining suitable baseflows throughout the year.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of watershed and soil treatments within the roundtail chub analysis area are expected to be at low levels for the planning period. Projects in the uplands would have short term effects in the project area but effects would be insignificant and discountable to roundtail chub. Instream improvement projects would have short term adverse effects to roundtail chub and their habitat but would have long term benefits to the species. Standards and guidelines for watershed and soils are positive to maintaining long term watershed conditions and, with implementation, are expected to mitigate the effects of projects from all forest program areas. Overall, the Watershed and Soils program plan components are positive for roundtail chub and would maintain or improve watershed condition indicators related to water quality, water quantity, soils, riparian vegetation, and rangeland vegetation

Wildlife/Fish/Rare Plants

The proposed LRMP has five objectives (Obj-24 through Obj-28) that direct Wildlife/Fish/Rare Plants program activities.

Obj-24 to restore native fish species to 2 to 3 stream reaches on the Prescott NF could include roundtail chub. The upper Verde River has the highest potential for native fish restoration. USFS management actions needed to support native fish restoration could include construction and maintenance of a fish barrier and other projects to improve aquatic for the species. These projects would have localized, short term adverse effects to the species from barrier construction and required maintenance such as streamflow alteration, sedimentation, and disturbance to the species. Project implementation would follow appropriate standards and guidelines to minimize impacts to species and the aquatic habitat. Overall, projects related to restoration of native fishes may affect the species and their habitat but would have long term benefits by improving the quality of occupied and suitable habitat of roundtail chub on the forest.

Obj-25 through Obj-27 related to pronghorn habitat improvement would have no effect to roundtail chub in the Verde River, Gap Creek, or Sycamore Creek since habitat and projects do not occur along these streams.

Obj-28 related to improvement or construction of water developments would have no effect to roundtail chub in the Verde River, Gap Creek, and Sycamore Creek since projects would not occur along these streams.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Wildland Fire and Fuels Management

The proposed LRMP has five objectives (Obj-1 through Obj-5) that direct Wildland Fire and Fuels management activities.

Planned wildland fire and mechanical treatments could occur in the PNVTs in all watersheds within the roundtail chub analysis area. Semi-Desert Grassland and the piñon-juniper PNVTs in these watersheds would be targeted for treatment due to their moderate to high departure from reference conditions. The effects of fire on the landscape to aquatic ecosystems depend on factors such as the extent of burned area, severity of the fire, soils/geology/topography, development of soil repellency, and post-fire storm events and climate. Projects would have short term effects of vegetation reduction and increases of ash and nutrients in the project area. Mechanical treatment projects would have short term effects of vegetation reduction and also soil disturbance with use of heavy equipment (e.g., agra-ax) in the project area. The extent of erosion and surface runoff resulting in sedimentation and ash/nutrient input to species habitat due to project activities would be mitigated by implementation of the Wildland Fire guidelines, Watershed and Soil standard and guidelines, and best management practices. Projects would increase the amount of open states for the PNVTs thereby reducing the risk of uncharacteristic wildfire and increase herbaceous ground cover which would provide for water infiltration and less runoff and erosion in the watersheds. Overall, plan components would improve watershed conditions and are expected to reduce sedimentation to the Verde River which would maintain or improve water quality and provide for healthy macroinvertebrate populations.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of wildland fire and fuels treatments within the roundtail chub analysis area are expected to be at low to moderate levels (Table 6) for the planning period. Standards and guidelines for wildland fire would apply to all fire activities on the forest. Implementation of the standards and guidelines is positive for roundtail chub and is expected to mitigate the effects of projects to aquatic and riparian areas. Overall, the Wildland Fire program plan components would have insignificant and discountable effects to roundtail chub and would maintain or improve watershed condition indicators related to water quality, soils, fire regime, and rangeland vegetation.

Recreation

The proposed LRMP has 10 objectives (Obj-8 through Obj-17) that direct Recreation program activities. All objectives, except Obj-13 to increase recreational fishing opportunity, are expected to have planned activities along the Verde River or within the roundtail chub analysis area. The majority of the objectives include direction to minimize the impacts of recreational activities and facilities to natural resources. Actions such as designated dispersed camping areas, maintenance of facilities, relocation and rehabilitation of recreation facilities impacting natural resources, and signing would improve upland and riparian conditions. Actions taken along the Verde River are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality and healthy macroinvertebrate populations.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Implementation of standards and guidelines for recreation would mitigate the effects of ongoing recreational activities and future projects to aquatic and riparian resources. Overall, the Recreation program plan components would have insignificant and discountable effects to roundtail chub and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Transportation

The proposed LRMP has three objectives (Obj-20, Obj-22, and Obj-23) that direct Transportation program activities. All objectives are expected to have planned activities in all watersheds within the roundtail chub analysis area. Objectives include direction on projects to repair, relocate, or close roads and trails; close and rehabilitate unauthorized routes; or provide for proper stream drainage of roads and trails that are impacting watershed integrity. Projects would improve soil and vegetation condition in the uplands and would improve or minimize impacts to aquatic and riparian conditions along streams. Implementation of Transportation standards and guidelines would mitigate the effects of ongoing roads and trail maintenance and future projects to uplands and aquatic/riparian areas.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Overall, the Transportation program plan components would have insignificant and discountable effects to roundtail chub and would maintain or improve watershed condition indicators related to water quality, soils, riparian vegetation, roads and trails, and rangeland vegetation.

Wilderness and Special Areas

The proposed LRMP does not have any objectives that direct Wilderness Management activities. Suitable and occupied habitat for roundtail chub in the Verde River occurs in two management areas on the Prescott NF, Upper Verde and Verde Valley, and includes the Verde Wild and Scenic River, Sycamore Canyon Wilderness, and Cedar Bench Wilderness. The desired conditions for these management areas have a strong focus on recreational use and wildernesses experience while maintaining the outstanding remarkable values (ORVs) of the river in relation to designation or eligibility as wild and scenic. These management areas highlight the uniqueness and attraction of recreational activities along the Verde River. The guidelines associated with these management areas provide for the protection of the natural resources through recreation management, signing and enforcement, and land acquisition or exchange opportunities. The plan components would maintain or improve aquatic and riparian habitats along the Verde River.

The management standards in the Verde Wild and Scenic River Comprehensive River Management Plan (Forest Service, 2004) are incorporated into the proposed LRMP (Std-W&S-1). This river management plan provides direction to protect the ORVs of the river which includes native fish values. The Verde Wild and Scenic River segment includes a 41-mile segment and one-half corridor from Beasley Flat downstream to the confluence with Red Creek within the administrative boundaries of the Coconino, Prescott, and Tonto NFs. Implementation of this river management plan would continue to maintain or enhance aquatic habitat for roundtail chub.

A 37-mile segment of the upper Verde River has been classified as eligible for wild and scenic designation (Forest Service, 1984) and is given protection for its ORVs of the river which includes native fish values (Std-W&S-2). Implementation of this standard would maintain the native fish ORV for the upper Verde River.

Sycamore Canyon and Cedar Bench Wilderness areas occur along the Verde River. Wilderness standards and guidelines would provide for maintaining the ecological processes to preserve their character and value. Recreation uses and group sizes would be restricted in most cases to reduce human impacts. Fire management activities would only occur from natural ignitions and would include using minimum impact suppression tactics. Three of the eight additional recommended wilderness areas occur within the Upper Verde and Verde Valley Management Areas: Sycamore Canyon A, Cedar Bench A, and Cedar Bench B. Management would be towards maintaining the values of these potential wilderness areas.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub and the spikedace.

The extent and distribution in this program area covers a 95-mile reach of the Verde River of which 55-miles are under Prescott NF administration. Implementation of the management area standards and guidelines and wilderness and special area standards and guidelines is expected to mitigate the effects of human uses and fire within these areas. Overall, the Wilderness and Special Areas program plan components would have insignificant and discountable effects to roundtail chub and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Lands and Special Uses

The proposed LRMP has two objectives (Obj-29 and Obj-30) that direct Lands and Open Space Management activities. Both objectives have the potential to have actions taken within the roundtail chub analysis area because of the interspersion of private lands along the Verde River. Acquiring lands along the Verde River would have beneficial effects to protecting roundtail chub populations and their habitat especially those acquired with water rights. Obj-30 to secure right of ways are expected to have no effects to the species. Program standards and guidelines are directed at maintaining or increasing open space on the forest, managing communication site and utility corridors, energy development, reducing impacts to upland, riparian, and aquatic resources. Overall, the Lands and Special Uses program plan components would have beneficial effects to roundtail chub.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Minerals Management

The proposed LRMP does not have any objectives that direct Minerals Management activities. Mines are present in all watersheds within the roundtail chub analysis area with concentrations near the towns of Jerome and Cherry. Mineral standards and guidelines restrict mineral activities in wilderness and other special areas (Std-MM-2) which would have beneficial effects to roundtail chub and provide guidance to mitigate mining impacts to upland, riparian, and aquatic

resources. Overall, the Minerals program plan components would have insignificant and discountable effects to roundtail chub and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Rangeland Management

The proposed LRMP does not have any objectives that direct Rangeland Management activities. Livestock grazing would continue throughout suitable rangelands on forest lands in all watersheds within the roundtail chub analysis area. These watersheds have a high percentage of acres rated as impaired for rangeland vegetation though much of this is related to high amounts of piñon-juniper PNVTs that are departed from reference conditions. Implementation of Guide-Range-3 and Guide-Range-6 would provide guidance for the growth and recovery of desired plant species and would trend rangeland vegetation towards DC-Veg-1 and DC-Veg-3. Livestock grazing activities with implementation of Rangeland Guidelines in upland areas of the watersheds would have insignificant and discountable effects to the species.

Livestock grazing could occur along the 37 miles of the upper Verde River from the forest boundary (east half) downstream to Clarkdale and along Sycamore Creek. Livestock grazing can affect the aquatic/riparian zone from livestock use and movement along the streams and waste deposits that can impair water quality. Implementation of Rangeland Management standards and guidelines (Std-Range-2, Guide-Range-1, and Guide-Range-5) would provide guidance to reduce livestock grazing impacts to riparian areas. There is no livestock grazing in the Verde Valley section of the Verde River. There are only 3.4-miles of Prescott NF lands in this reach with the majority of lands being dedicated to recreational sites. There is no livestock grazing in the Verde Wild and Scenic River as directed under Std-W&S-1.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub and the spikedace.

Overall, the Rangeland program plan components would have short term adverse effects to roundtail chub from livestock grazing in their habitat but would maintain watershed condition indicators related to water quality, soils, riparian vegetation, and rangeland vegetation.

Forestry and Forest Health

The proposed LRMP has three objectives (Obj-3, Obj-5, and Obj-6) that direct the Forest Health program activities. Obj-3 and Obj-5 are expected to have planned activities within watersheds with roundtail chub. Obj-3 identifies using mechanical and fire treatments to improve watershed and rangeland conditions, vegetation structure, and wildlife habitat within the piñon-juniper PNVTs. Projects would improve soil and vegetation conditions and are expected to reduce sedimentation to aquatic habitats which would maintain water quality and healthy macroinvertebrate populations. Obj-5 related to timber harvest in ponderosa pine PNVTs makes up a small amount of acres within these watersheds and occur further away from the river.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of treatments (Table 7) within the roundtail chub analysis area are expected to be at low to moderate levels. Implementation of the standards and guidelines is positive for roundtail chub and is expected to mitigate the effects of projects to aquatic and riparian areas. Overall, the Forestry program plan components would have insignificant and discountable effects to roundtail chub and would maintain or improve watershed condition indicators related to water quality, soils, fire regime, and rangeland vegetation.

Determination of Effects (Species)

The implementation of plan components related to the Wildland Fire and Fuels, Recreation, Transportation, Wilderness and Special Areas, Lands and Special Uses, Minerals, and Forestry programs are expected to have insignificant and discountable effects to roundtail chub because of the limited extent of action and/or mitigation of effects through implementation of standards and guidelines. Plan components related to the Watershed and Soils and Wildlife/Fish/Rare Plants programs would have localized, short term adverse effects to aquatic habitat but would result in long term beneficial effects to maintaining or improving aquatic habitat and species populations on the forest. Plan components related to the Rangeland programs would maintain or improve upland and riparian vegetation on the forest but would have short term adverse effects to aquatic and riparian habitat from livestock use along species habitat. The proposed LRMP would result in a "May Affect, Likely to Adversely Affect" determination to roundtail chub.

Reptiles

Northern Mexican Gartersnake (*Thamnophis eques megalops*) Including Proposed Critical Habitat

Endangered Species Act Status:	Proposed Threatened, 2013
Critical Habitat	Proposed, 2013
Determination of Effects (Species):	May Affect, Likely to Adversely Affect
Determination of Effects (Proposed Critical Habitat):	May Affect, Likely to Adversely Affect

Natural History and Distribution

The natural history and distribution of the northern Mexican gartersnake is detailed in the 12-month finding petition to list the northern Mexican gartersnake as threatened or endangered with critical habitat (Fish and Wildlife Service, 2008) and the Proposed Rule for Threatened Status and Designation of Critical Habitat (Fish and Wildlife Service, 2013a, 2013b). This information is incorporated by reference into this BA.

Status of the Species and Proposed Critical Habitat Rangewide

The northern Mexican gartersnake was designated a candidate species for listing under the Endangered Species Act in 2008 (Fish and Wildlife Service, 2008) and proposed for listing as threatened with designated critical habitat in 2013 (Fish and Wildlife Service, 2013a, 2013b). A detailed status of the species rangewide is found in these documents and is incorporated by reference into this BA.

There are 29 known localities for the northern Mexican gartersnake in the U.S. (Fish and Wildlife Service, 2013a). The current status for 24 of the 29 localities (83 percent) is considered likely not viable and may exist at low populations densities that could be threatened with extirpation or may already be extirpated. In most localities where the species may occur at low population densities, existing survey data are insufficient to prove extirpation. Only five populations of northern Mexican gartersnakes in the U.S. are considered likely viable where the species remains reliably detected. These localities include the Bill Williams River, Upper Verde River, Oak Creek (Page Springs and Bubbling Ponds State Fish Hatcheries), Tonto Creek, and the Upper Santa Cruz River/San Rafael Valley. The northern Mexican gartersnake is listed as threatened throughout its range in Mexico by the Mexican Government. Our understanding of the northern Mexican gartersnake's specific population status throughout its range in Mexico is less precise than that known for its U.S. distribution because survey efforts are less and sufficient, available records do not exist or are difficult to obtain. Harmful nonnative species are a concern in almost every northern Mexican gartersnake locality in the U.S. and the most significant reason for their decline (Fish and Wildlife Service, 2013a).

Critical Habitat

Proposed critical habitat for the northern Mexican gartersnake was published in 2013 (Fish and Wildlife Service, 2013b). In total, 421,423 acres are proposed as critical habitat in the various river basins and areas throughout New Mexico and Arizona. Fourteen individual critical habitat units are proposed and include the Upper Gila River, Mule Creek, Bill Williams River, Aqua Fria River, Upper Salt River, Tonto Creek, Verde River, Upper Santa Cruz River, Redrock Canyon, Buenos Aires National Wildlife Refuge, Cienega Creek, San Pedro River, Babocomari River, and San Bernardino National Wildlife Refuge. The lateral extent of proposed critical habitat is 600 feet on either side of bankfull stage. The primary constituent elements of proposed critical habitat for northern Mexican gartersnake are listed in Table 28.

Table 28. Northern Mexican gartersnake proposed critical habitat – primary constituent elements

PCE #	Primary Constituent Elements
PCE-1	Aquatic or riparian habitat that includes: • Perennial or spatially intermittent streams of low to moderate gradient that possess appropriate amounts of in-channel pools, off-channel pools, or backwater habitat, and that possess a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of processing sediment loads; or • Lentic wetlands such as livestock tanks, springs, and cienegas; and • Shoreline habitat with adequate organic and inorganic structural complexity to allow for thermoregulation, gestation, shelter, protection from predators, and foraging opportunities (e.g., boulders, rocks, organic debris such as downed trees or logs, debris jams, small mammal burrows, or leaf litter); and • Aquatic habitat with characteristics that support a native amphibian prey base, such as salinities less than 5 parts per thousand, pH greater than or equal to 5.6, and

PCE #	Primary Constituent Elements
	pollutants absent or minimally present at levels that do not affect survival of any age class of the northern Mexican gartersnake or the maintenance of prey populations.
PCE-2	Adequate terrestrial space (600 feet, or182.9 meters, lateral extent to either side of bankfull stage) adjacent to designated stream systems with sufficient structural characteristics to support life-history functions such as gestation, immigration, emigration, and brumation (extended inactivity).
PCE-3	A prey base consisting of viable populations of native amphibian and native fish species.
PCE-4	An absence of nonnative fish species of the families Centrarchidae and Ictaluridae, bullfrogs (*Lithobates catesbeianus*), and/or crayfish (*Orconectes virilis, Procambarus clarki,* etc.), or occurrence of these nonnative species at low enough levels such that recruitment of northern Mexican gartersnakes and maintenance of viable native fish or soft-rayed, nonnative fish populations (prey) is still occurring.

Threats

Various threats that have affected and continue to affect riparian and aquatic communities that provide habitat for the northern Mexican garter snake is detailed in the 12-month finding and proposed rule for listing as threatened with critical habitat (Fish and Wildlife Service, 2008, 2013a). Riparian and aquatic habitats that are essential for the survival of the northern Mexican gartersnake are being negatively impacted throughout the subspecies' range. Threats including water diversions, groundwater pumping, dams, channelization, and erosion related effects are occurring in both the U.S. and Mexico that affect the amount of water within occupied habitat, directly affecting its suitability for northern Mexican gartersnakes. Threats from development, roads, flood control and water diversion, improper livestock grazing, high-intensity wildfire, and undocumented immigration that alter the vegetation of occupied northern Mexican gartersnake habitat are documented throughout its range and reduce the habitat's suitability as cover for protection from predators, as a foraging area, and as an effective thermoregulatory site.

While disease is not currently considered a direct threat to northern Mexican gartersnakes, chytridiomycosis or Bd does have a widespread effect on anuran prey availability for the species. In addition, stress placed on northern Mexican gartersnakes as a result of threats related to habitat may affect the health condition of individuals within populations affected by these threats, which may increase the potential for disease within current populations in the future. Direct predation by nonnative bullfrogs, crayfish, and fishes on northern Mexican garter snakes is a significant threat rangewide, as is predation on gartersnake prey species (competition) by these same groups of nonnative taxa. Nonnative fish, crayfish, and bullfrogs have reduced native populations of prey species throughout the range.

Climate Change

For a detailed discussion on climate change refer to the Climate Change section of this BA.

The effect of climate change on northern Mexican gartersnake is discussed in the Proposed Rule to list the northern Mexican gartersnake as threatened (Fish and Wildlife Service, 2013a) and is

incorporated by reference. The ecology and natural history of the northern Mexican gartersnake is strongly linked to water. The gartersnake is a highly aquatic species and relies largely upon other aquatic species, such as ranid frogs and native and nonnative soft-rayed fish, as prey. Threats to the species related to habitat destruction or modification, disease, and/or predation will likely be exacerbated by changes to climatic patterns in the southwestern U.S. due to increasing drought and reduction of surface waters.

Status of the Species within the Action Area

Historical and current distribution and status of the northern Mexican gartersnake on the Prescott NF is shown in Table 29. Historically, this species is known from along the Verde River and Little Ash Creek on the forest (Rosen and Schwalbe, 1988). A few specimens have been collected in recent years along the Verde River on and adjacent to the Prescott NF (Holycross et al., 2006). Populations are considered to be at low densities in the Verde River. Populations in the Agua Fria River drainage which include Little Ash Creek are considered extirpated (Holycross et al., 2006).

Table 29. Northern Mexican gartersnake distribution and status on the Prescott National Forest

5th Level HUC Name	Stream Name	Stream Miles On PNF	Miles of Occupied Habitat	Status*
Granite Creek-Upper Verde River	Verde River	4	Unknown	Unknown
Grindstone Wash-Upper Verde River	Verde River	28	Unknown	Unknown
Cherry Creek-Upper Verde River	Verde River	3.4	3.4	Likely Viable
Fossil Creek-Lower Verde River	Verde River	15.5	15.5	Likely Viable
Ash Creek and Sycamore Creek	Little Ash Creek	3	0	Likely Not Viable

* From the 2013 *Federal Register* Proposed Listing

Proposed Critical Habitat within the Action Area

Proposed critical habitat within the action area includes the Verde River and Little Ash Creek (Fish and Wildlife Service, 2013b). A total of 103 miles of proposed critical habitat along the Verde River occurs on or adjacent to the Prescott NF. The first 6 miles of critical habitat from Sullivan Dam downstream to the forest boundary is on The Nature Conservancy (TNC) and State lands. The uppermost 37 miles of river from the forest boundary downstream to Clarkdale are primarily within USFS ownership with a few private land parcels occurring in this reach. The next 45 miles of river in the Verde Valley is primarily within private ownership. The last 15.5 miles are on the forest within the Verde Wild and Scenic River. For Little Ash Creek, the first 3.7 miles are on primarily on BLM lands with some State and private land ownership, and the last 3 miles are on Prescott NF lands.

Verde River Subbasin Unit

- **Upper Verde River Subunit.** A total of 20,526 acres along 140 miles, extending from the confluence with Horseshoe Reservoir upstream to the confluence with Sullivan Lake.

Agua Fria River Subbasin Unit

- **Little Ash Creek Subunit.** A total of 957 acres along 6.7 stream miles of Little Ash Creek from the confluence with Ash Creek upstream to the confluence with Yellow Jacket Creek near Dugas.

Factors Affecting the Species and Proposed Critical Habitat in the Action Area

The analysis area for the northern Mexican gartersnake is the nine 5th level HUC watersheds with current or historical presence in Table 30. There are high amounts of private land in several watersheds which include urban development. The major communities in these watersheds include Prescott and Chino Valley in the upper Verde River Basin and Jerome, Clarkdale, Cottonwood, Cornville, and Camp Verde in the Verde Valley. Primary land uses throughout the watersheds are livestock grazing, irrigated agriculture, recreation, and some mining and silviculture.

Table 30. Watershed ownership for the northern Mexican gartersnake Analysis Area

5th Level HUC Name	Total Acres	PNF Acres	Non PNF Acres State/ Federal	Private Acres	% PNF Acres
Lower Big Chino Wash	232,673	87,234	30,532	114,907	37
Williamson Valley Wash	205,367	107,928	19,702	77,737	53
Granite Creek-Upper Verde River	229,829	45,175	57,350	126,159	20
Hell Canyon	213,434	67,611	130,692	15,131	32
Grindstone Wash-Upper Verde River	197,569	146,182	50,051	1,336	74
Sycamore Creek	305,833	22,528	263,832	19,473	7
Cherry Creek-Upper Verde River	144,783	97,938	6,444	41,842	68
Fossil Creek-Lower Verde River	191,486	44,136	140,487	6,863	23
Ash Creek and Sycamore Creek	166,751	152,581	Need data	Need data	92

The Watershed Condition Classification (WCC) for the Prescott NF (Forest Service, 2011) is referenced to determine the existing condition of the watersheds in the analysis area for the gartersnake. The individual watershed condition indicators that best reflect the consequences of management activities and recreation use are given in Table 31. The main PNVTs within these watersheds are the piñon-juniper and grassland PNVTs (proposed LRMP appendix A, map 1). The primary threats to the species include nonnative aquatic species which are predatory and/or

competitive with the gartersnake and reduced habitat quantity and quality from water withdrawals in the Big Chino Aquifer and the Verde Valley. In addition, watershed conditions are At-Risk or Impaired for several key watershed condition indicators. These departures collectively are contributing to an altered hydrologic condition that is affecting aquatic habitat quality in the Verde River.

Table 31. Watershed conditions by selected WCC indicators in the northern Mexican gartersnake Analysis Area

5th Level HUC Name	WCC Indicator								
	Water Quality	Water Quantity	Nonnative Species	Riparian Vegetation	Roads and Trails	Soils	Fire Regime	Forest Cover	Rangeland Vegetation
Lower Big Chino Wash	1	2	1	2	3	3	2	N/A	3
Williamson Valley Wash	1	2	2	2	3	3	2	N/A	3
Granite Creek- Upper Verde River	1	1	2	2	3	2	2	1	3
Hell Canyon	2	1	2	2	3	3	2	N/A	3
Grindstone Wash Upper Verde River	1	1	2	2	3	2	2	1	3
Sycamore Creek	1	1	2	2	3	3	2	N/A	3
Cherry Creek- Upper Verde River	3	3	2	2	3	2	2	1	3
Fossil Creek- Lower Verde River	2	3	2	2	2	2	2	1	3
Ash Creek and Sycamore Creek	1	2	2	2	3	3	2	N/A	2

Indicator Rating Classes: 1=Functioning; 2=At-Risk; 3=Impaired. Ratings are for the entire watershed.

Water quality (impaired for turbidity) in the Verde River are affected by various factors in both the upland and riparian areas (Bowman, 2001). The departure of the piñon-juniper and grassland PNVTs in these watersheds is a major factor in increased erosion due to the higher canopy cover and less herbaceous ground cover to hold soils and moisture in place. Roads are also a major source of increased sediments and potential pollutants into stream channels on the Prescott NF due to the poor condition from inadequate maintenance and the proximity to stream drainages. In addition, there are unquantified miles of unauthorized routes from OHV users that are also contributing increased sediments to stream drainages. Overall, road and trail access to the Verde River is limited and controlled with the majority occurring in the Verde Valley. Road conditions in the Ash Creek and Sycamore Creek 5th level HUC are similar to that of the Verde River watersheds.

Water withdrawals from both surface water and groundwater are affecting streamflow in the Verde River (Blasch et al., 2006). Increasing groundwater withdrawals from the Big Chino Aquifer has the potential to decrease perennial flow in the upper Verde River which would reduce the amount of habitat for the gartersnake. The Big Chino Aquifer has been shown to contribute at least 85 percent to the upper Verde River baseflow (Wirt et al., 2005). Over 67 irrigation diversions exist in the Verde Valley that diverts surface water (Garner and Bills, 2012). The 3-

mile reach of Little Ash Creek on the Prescott NF includes the start of perennial streamflow and there are no diversions or threats to streamflow for the creek.

Gartersnakes within the Verde River and Little Ash Creek have been negatively affected by the introduction and establishment of nonnative aquatic species. Nonnative fish species dominate the fish community throughout the Verde River and are a major limiting factor in native aquatic species occurrence because of predation and competition (Hendrickson, 1993; Rinne and Stefferud, 1998; Bonar et al., 2004). Based on data from1987 to2003, nonnative fish species generally comprised 70 to 80 percent of the fish community in the Verde River throughout the analysis area (Rinne, 2005). Nonnative fish, bullfrog, and crayfish are well established in Little Ash Creek (Bettaso et al., 1995; Sillas, 2003).

Livestock grazing occurs throughout suitable rangelands in all watersheds within the gartersnake analysis area. These watersheds have a high percentage of acres rated as Impaired for rangeland vegetation though much of this is related to high amounts of piñon-juniper PNVTs that are departed from reference conditions. Livestock grazing has not been authorized on the six allotments along the upper Verde River on the Prescott NF since 1998. The four allotments within the Verde Valley are fenced off from livestock grazing. Livestock grazing has not been authorized in the Verde Wild and Scenic River since 2005 but there are three watering access points. Little Ash Creek has authorized livestock grazing on three allotments. Grazing rotations, riparian utilization levels, and other LRMP standards and guidelines are followed to minimize impacts to riparian and aquatic resources.

Population growth in the area surrounding the forest is expected to continue with residential home and commercial development on private lands and increasing impacts to watershed integrity. Expected impacts are increases in altered hydrological conditions leading to increased runoff and erosion and increased water withdrawals. Impacts would be greatest in the Lower Big Chino Wash, Williamson Valley Wash, Granite Creek-Upper Verde River, and Cherry Creek-Upper Verde River watersheds with higher amount of private land ownership. In addition, demand for outdoor recreation is also expected to grow concurrently with increasing population and more visitor use of the forest, especially along the Verde River, which is a major attractant for water based recreation activities. Little Ash Creek currently receives a high amount of recreational use as a dispersed camping area with noticeable impacts to soil and riparian conditions.

Endangered Species Act § 7(a)(1) Conservation Actions on the Prescott NF

The Prescott NF has been cooperating with Northern Arizona University on inventory and monitoring of gartersnake populations on the forest.

Livestock grazing allotment management on the Prescott NF has not authorized livestock grazing use along the upper Verde River since 1998. Livestock grazing has not been authorized along the Verde Wild and Scenic River as directed under the comprehensive river management plan (Forest Service, 2004). Site specific NEPA would be required to authorize future grazing use in these two reaches of river.

The Prescott NF continues to have road closures in place for the upper Verde River. The forest completed about 5 miles of road decommissioning/closures within watersheds of the upper Verde

River in 2009. Barrier and sign maintenance was completed at three river access points in 2008 to prevent illegal vehicle access to the upper Verde River.

The Prescott NF has secured instream flow water rights for the 41-mile reach of the Verde Wild and Scenic River and has application for instream flow water rights for the upper Verde River.

The Prescott NF has been treating noxious and invasive plants along the Verde River to improve riparian conditions under guidance of the Integrated Treatment of Noxious or Invasive Weeds EIS (Forest Service, 2005).

The Prescott NF, along with AZGFD and the Bureau of Reclamation, completed site feasibility visits in 2006 along the upper Verde River for potential fish barrier locations. A final appraisal report was completed in 2010 (Riley and Clarkson, 2010).

The Prescott NF continues to have road closures in place for the upper Verde River. The forest completed about five miles of road decommissioning/closures within watersheds of the upper Verde River in 2009. Barrier and sign maintenance was completed at three river access points in 2008 to prevent illegal vehicle access to the upper Verde River.

Effects Analysis for the Species

All plan components are detailed in the Description of the Proposed Action by Program section of this BA. All of the proposed LRMP desired conditions, objectives, standards and guidelines, management area direction, and monitoring were reviewed to determine potential affects to the gartersnake. The following analysis is grouped by program area and includes the ongoing and future activities for the 10 to 15 years after plan approval.

Watershed and Soils

The proposed LRMP has four objectives (Obj-18, Obj-19, Obj-23, and Obj-31) that direct Watershed and Soils program activities. These watershed objectives are expected to occur throughout the watersheds and occupied habitat in the species analysis area based on the need to improve several of the WCC indicators.

Obj-18 includes direction to implement 5 to 50 essential projects within high priority watersheds that improve or maintain watershed conditions. Projects are expected to occur in the uplands in all watersheds within the gartersnake analysis area. Soil and vegetation treatments would have short term effects of soil disturbance and/or vegetation reduction in the project area. Overall, projects would improve soil and vegetation conditions in the watersheds and are expected to reduce sedimentation which would maintain or improve water quality and promote healthy macroinvertebrate populations in the Verde River and Little Ash Creek.

Obj-19 includes direction to implement projects to improve riparian condition. Projects are expected to occur along the Verde River and Little Ash Creek. Vegetation treatments and stream improvement projects would have localized, short term effects of soil disturbance, vegetation reduction, sedimentation in the stream zone, and species disturbance. Overall, projects would improve aquatic habitat and riparian vegetation conditions along the Verde River and Little Ash

Creek and are expected to reduce sedimentation and promote native riparian vegetation which would maintain or improve water quality and promote healthy macroinvertebrate populations.

Obj-23 includes direction to maintain or enhance groundwater dependent ecosystem sites. Projects are expected to occur in all watersheds within the gartersnake analysis area. Projects could include road or trail relocation or closure, obliteration of unauthorized routes, livestock grazing management, and fencing. Projects would have short term effects of soil disturbance in the project area. Overall, projects would improve soil and vegetation conditions around the sites and reduce sources of sedimentation in the watersheds which would maintain or improve water quality and promote healthy macroinvertebrate populations in the Verde River and Little Ash Creek.

Obj-31 includes direction to apply for instream flow water rights. The 41-mile reach of the Verde Wild and Scenic River has secured water rights. The Prescott NF has application for instream flow water rights for the upper Verde River. Acquisition of instream flow water rights for the upper Verde River would have beneficial effects to the gartersnake by maintaining suitable baseflows throughout the year. The 3-miles of gartersnake suitable habitat in Little Ash Creek do not have any threats from private land interests.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of watershed and soil treatments within the gartersnake analysis area are expected to be at low levels for the planning period. Projects in the uplands would have short term effects in the project area but effects would be insignificant and discountable to the gartersnake. Instream improvement projects would have localized, short term adverse effects to gartersnake and their habitat but would have long term benefits to the species. Standards and guidelines for watershed and soils are positive to maintaining long term watershed conditions and with implementation are expected to mitigate the effects of projects from all forest program areas. Overall, the Watershed and Soils program plan components are positive for the gartersnake and would maintain or improve watershed condition indicators related to water quality, water quantity, soils, riparian vegetation, and rangeland vegetation

Wildlife/Fish/Rare Plants

The proposed LRMP has five objectives (Obj-24 through Obj-28) that direct Wildlife/Fish/Rare Plants program activities.

Obj-24 to restore native fish species to 2 to 3 stream reaches on the Prescott NF could benefit the gartersnake. The upper Verde River has the highest potential for native fish restoration. USFS management actions needed to support native fish restoration could include construction and maintenance of a fish barrier and other projects to improve aquatic habitat for the species. These projects would have localized, short term adverse effects to the species from barrier construction and required maintenance such as streamflow alteration, sedimentation, and disturbance to the species. Project implementation would follow appropriate standards and guidelines to minimize impacts to species and the aquatic habitat. Overall, projects related to restoration of native fishes may affect the species and their habitat but would have long term benefits by increasing the distribution and abundance of northern Mexican gartersnake on the forest.

Obj-25 though Obj-27 related to pronghorn habitat improvement would have no effect to gartersnake in the Verde River since habitat and projects do not occur along the river.

Obj-25 to modify or remove fence to improve pronghorn movement would have no effect to the gartersnake as it would not occur in their habitat. Obj-26 and Obj-27 to improve pronghorn habitat are expected to have projects occur in the Little Ash Creek subwatershed. Actions include prescribed fire and mechanical treatment that are also tied to Obj-1 and Obj-3 for grassland and piñon-juniper PNVTs. Mechanical treatment projects would have short term effects of vegetation reduction and also soil disturbance with use of heavy equipment in the project area. Prescribed fire projects would have short term effects of vegetation reduction with subsequent runoff of sediment and ash to adjacent drainages after rain events. Implementation of standards and guidelines for Wildland Fire (Guide-Wildland Fire-1 and 7), Watershed (Guide-WS-1), and Soils (Guide-Soils-1 and Guide-Soils-2) would mitigate project effects. Projects would improve soil and vegetation conditions in the uplands and are expected to reduce sedimentation to aquatic habitats which would maintain water quality and healthy macroinvertebrate populations. Projects would also improve the PNVTs similarity to desired conditions and reduce the potential for uncharacteristic wildfire.

Obj-28 to improve and develop new wildlife water would have no effect to gartersnakes. Placement of water developments are typically in the uplands outside of species habitat.

Standards and guidelines for aquatic and terrestrial wildlife would apply to all program areas on the forest. Implementation of the standards and guidelines, especially those for aquatic wildlife, is positive for the conservation and recovery of gartersnakes and is expected to mitigate the effects of projects within and adjacent to aquatic/riparian areas.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of aquatic and terrestrial wildlife treatments (Table 6) within the northern Mexican gartersnake analysis area are expected to be at low levels for the planning period. Projects in the uplands would have localized, short term effects in the project area but effects would be insignificant and discountable to the gartersnake. Native fish restoration projects would have short term adverse effects to the species and their habitat but would have long term benefits by improving the quality of occupied and suitable habitat of northern Mexican gartersnake on the forest. Overall, the Wildlife/Fish/Rare Plants program plan components are positive for the northern Mexican gartersnake and would maintain or improve watershed condition indicators related to water quality, nonnative species, soils, riparian vegetation, and rangeland vegetation.

Wildland Fire and Fuels Management

The proposed LRMP has five objectives (Obj-1 through Obj-5) that direct Wildland Fire and Fuels management activities.

Planned wildland fire and mechanical treatments could occur in the PNVTs in all watersheds within the gartersnake analysis area. Semi-Desert Grassland and the piñon-juniper PNVTs in these watersheds would be targeted for treatment due to their moderate to high departure from reference conditions. The effects of fire on the landscape to aquatic ecosystems depend on factors such as the extent of burned area, severity of the fire, soils/geology/topography, development of

soil repellency, and post-fire storm events and climate. Projects would have short term effects of vegetation reduction and increases of ash and nutrients in the project area. Mechanical treatment projects would have short term effects of vegetation reduction and also soil disturbance with use of heavy equipment (e.g., agra-ax) in the project area. The extent of erosion and surface runoff resulting in sedimentation and ash/nutrient input to species habitat due to project activities would be mitigated by implementation of the Wildland Fire guidelines, Watershed and Soil standards and guidelines, and best management practices. Projects would increase the amount of open states for the PNVTs thereby reducing the risk of uncharacteristic wildfire and increase herbaceous ground cover which would provide for water infiltration and less runoff and erosion in the watersheds. Overall, plan components would improve watershed conditions and are expected to reduce sedimentation to the Verde River and Little Ash Creek which would maintain or improve water quality and provide for healthy macroinvertebrate populations.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of wildland fire and fuels treatments within the northern Mexican gartersnake analysis area are expected to be at low to moderate levels (Table 6) for the planning period. Implementation of the standards and guidelines is positive for the northern Mexican gartersnake and is expected to mitigate the effects of projects to aquatic and riparian areas. Overall, the Wildland Fire program plan components would have insignificant and discountable effects to the northern Mexican gartersnake and would maintain or improve watershed condition indicators related to water quality, soils, fire regime, and rangeland vegetation.

Recreation

The proposed LRMP has 10 objectives (Obj-8 through Obj-17) that direct Recreation program activities. All objectives, except Obj-13 to increase recreational fishing opportunity, are expected to have planned activities along the Verde River or within the gartersnake analysis area. The majority of the objectives include direction to minimize the impacts of recreational activities and facilities to natural resources. Actions such as designated dispersed camping areas, maintenance of facilities, relocation and rehabilitation of recreation facilities impacting natural resources, and signing would improve upland and riparian conditions. Actions taken along the Verde River and Little Ash Creek are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality and healthy macroinvertebrate populations. Implementation of standards and guidelines for recreation would mitigate the effects of ongoing recreational activities and future projects to aquatic and riparian resources. Overall, the Recreation program plan components would have insignificant and discountable effects to the northern Mexican gartersnake and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Transportation

The proposed LRMP has three objectives (Obj-20, Obj-22, and Obj-23) that direct Transportation program activities. All objectives are expected to have planned activities in all watersheds within the gartersnake analysis area. Objectives include direction on projects to repair, relocate, or close

roads and trails; close and rehabilitate unauthorized routes; or provide for proper stream drainage of roads and trails that are impacting watershed integrity. Projects would improve soil and vegetation condition in the uplands and would improve or minimize impacts to aquatic and riparian conditions along streams. Implementation of the Transportation standards and guidelines is expected to mitigate the effects of the projects in the uplands and aquatic/riparian areas. Overall, the Recreation program plan components would have insignificant and discountable effects to the northern Mexican gartersnake and would maintain or improve watershed condition indicators related to water quality, soils, riparian vegetation, roads and trails, and rangeland vegetation.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Wilderness and Special Areas

The proposed LRMP does not have any objectives that direct Wilderness Management activities. Suitable and occupied habitat for the gartersnake in the Verde River occurs in three management areas (Agua Fria, Upper Verde, and Verde Valley) on the Prescott NF and includes the Verde Wild and Scenic River, Sycamore Canyon Wilderness, and Cedar Bench Wilderness. The desired conditions for these management areas have a strong focus on recreational use and wilderness areas experience while maintaining the outstanding remarkable values (ORVs) of the river in relation to designation or eligibility as wild and scenic. These management areas highlight the uniqueness and attraction of recreational activities along the Verde River and Little Ash Creek. The guidelines associated with these management areas provide for the protection of the natural resources through recreation management, signing and enforcement, and land acquisition or exchange opportunities.

The management standards in the Verde Wild and Scenic River Comprehensive River Management Plan (Forest Service, 2004) are incorporated into the proposed LRMP (Std-W&S-1). This river management plan provides direction to protect the ORVs of the river which includes native fish values. The Verde Wild and Scenic River segment includes a 41-mile segment and one-half mile corridor from Beasley Flat downstream to the confluence with Red Creek within the administrative boundaries of the Coconino, Prescott, and Tonto NFs. Implementation of this river management plan would continue to maintain or enhance aquatic habitat for the gartersnake.

A 37-mile segment of the upper Verde River has been classified as eligible for wild and scenic designation (Forest Service, 1981) and is given protection for its ORVs of the river which includes native fish values (Std-W&S-2). Implementation of this standard would maintain the native fish ORV for the upper Verde River which would also benefit the gartersnake.

Sycamore Canyon and Cedar Bench Wilderness areas occur along the Verde River. Wilderness standards and guidelines would provide for maintaining the ecological processes to preserve their character and value. Recreation uses and group sizes would be restricted in most cases to reduce human impacts. Fire management activities would only occur from natural ignitions and would include using minimum impact suppression tactics. Three of the eight additional recommended wilderness areas occur within the Upper Verde and Verde Valley Management Areas: Sycamore Canyon A, Cedar Bench A, and Cedar Bench B. Management would be towards maintaining the values of these potential wilderness areas.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub and the spikedace.

The extent and distribution in this program area covers a 95-mile reach of the Verde River of which 55-miles are under Prescott NF administration. Implementation of the management area standards and guidelines and wilderness and special area standards and guidelines is expected to mitigate the effects of human uses and fire within these areas. Overall, the Wilderness and Special Areas program plan components would have insignificant and discountable effects to the northern Mexican gartersnake and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Lands and Special Uses

The proposed LRMP has two objectives (Obj-29 and Obj-30) that direct Lands and Open Space Management activities. Both objectives have the potential to have actions taken within watersheds with gartersnake because of the interspersion of private lands along the Verde River. Acquiring lands along the Verde River would have beneficial effects to protecting gartersnake populations especially those acquired with water rights. The 3-miles of gartersnake habitat within Little Ash Creek are all within the Prescott NF. Obj-30 to secure right of ways are expected to have no effects to the species. Program standards and guidelines are directed at maintaining or increasing open space on the forest, managing communication site and utility corridors, energy development, reducing impacts to upland, riparian, and aquatic resources. Overall, the Lands and Special Uses program plan components would have beneficial effects to the northern Mexican gartersnake.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Minerals Management

The proposed LRMP does not have any objectives that direct Minerals Management activities. Mines are present in all watersheds within the gartersnake analysis area with concentrations near the towns of Jerome and Cherry. Mineral standards and guidelines restrict mineral activities in wilderness and other special areas (Std-MM-2) which has beneficial effects to the gartersnake and provide guidance to mitigate mining impacts to upland, riparian, and aquatic resources which would reduce impacts to water quality. Overall, the Minerals program plan components would have insignificant and discountable effects to the northern Mexican gartersnake and would maintain or improve watershed condition indicators related to water quality, soils, and riparian vegetation.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Rangeland Management

The proposed LRMP does not have any objectives that direct Rangeland Management activities. Livestock grazing would continue throughout suitable rangelands on forest lands in all watersheds within the gartersnake analysis area. These watersheds have a high percentage of acres rated as Impaired for rangeland vegetation though much of this is related to high amounts of

piñon-juniper PNVTs that are departed from reference conditions. Implementation of Guide-Range-3 and Guide-Range-6 provide guidance for the growth and recovery of desired plant species and would trend rangeland vegetation towards DC-Veg-1 and DC-Veg-3. Livestock grazing activities with implementation of Rangeland Guidelines in upland areas of the watersheds would have insignificant and discountable effects to the species.

Authorized livestock grazing could occur along the 37 miles of the upper Verde River from the forest boundary (east half) downstream to Clarkdale and the 3-miles of Little Ash Creek. Livestock grazing can affect the species due to disturbance and the aquatic/riparian zone from livestock use and movement along the streams temporarily reducing hiding cover, trampling streambanks, potential sedimentation, and waste deposits that can impair water quality. Impacts to water quality would be greatest during seasonally low flow periods and in droughts. Implementation of Rangeland Management standards and guidelines (Std-Range-2, Guide-Range-1, and Guide-Range-5) provide guidance to reduce livestock grazing impacts to riparian areas. There is no livestock grazing in the Verde Valley section of the Verde River. There are only 3.4-miles of Prescott NF lands in this reach with the majority of lands being dedicated to recreational sites. There is no livestock grazing in the Verde Wild and Scenic River as directed under Std-W&S-1.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub and the spikedace.

Overall, the Rangeland program plan components would have short term adverse effects to northern Mexican gartersnake from livestock grazing in their habitat but would maintain watershed condition indicators related to water quality, soils, riparian vegetation, and rangeland vegetation.

Forestry and Forest Health

The proposed LRMP has three objectives (Obj-3, Obj-5, and Obj-6) that direct the Forest Health program activities. Obj-3 and Obj-5 are expected to have planned activities within watersheds with the gartersnake. Obj-3 identifies using mechanical and fire treatments to improve watershed and rangeland conditions, vegetation structure, and wildlife habitat within the piñon-juniper PNVTs. See the Wildland Fire section above for effects analysis from this action. Obj-5 related to timber harvest in ponderosa pine PNVTs makes up a small amount of acres within these watersheds and occurs in the upper portions of the watersheds at greater distances from the river.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of forestry treatments within the northern Mexican gartersnake analysis area are expected to be at low to moderate levels (Table 7) for the planning period. Implementation of the standards and guidelines is positive for the gartersnake and is expected to mitigate the effects of projects to aquatic and riparian areas. Overall, the Forestry program plan components would have insignificant and discountable effects to the northern Mexican gartersnake and would maintain or improve watershed condition indicators related to water quality, soils, fire regime, and rangeland vegetation.

Effects Analysis for Proposed Critical Habitat

For those species with designated or proposed critical habitat, the effects analysis approach identified how the primary constituent elements (PCEs) or biological features essential to the conservation of the species are likely to be affected by the proposed LRMP. Refer to the Proposed Critical Habitat section above for the description of the PCEs.

Watershed and Soils

Projects in the uplands (Obj-18) would improve soil and vegetation conditions and are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality (PCE-1) and provide for healthy prey base populations (PCE-3). Projects in aquatic/riparian areas (Obj-19) would improve aquatic and riparian conditions which would promote healthy, native riparian vegetation communities and streambank stability which would maintain aquatic habitat components (PCE-1) suitable for all life stages of gartersnake, Projects are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality (PCE-1) and provide for healthy prey base populations (PCE-3). There may be localized, short term effects from projects in riparian zones such as localized sediment input to the streams but these effects would be minimized by standards and guidelines and best management practices (BMPs). Projects related to springs and seeps (Obj-23) within gartersnake proposed critical habitat would have effects for PCEs similar to Obj-19. Attaining or maintaining instream flow rights (Obj-31) would have beneficial effects by providing for perennial flows and natural flow regime (PCE-1) for northern Mexican gartersnake proposed critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

The extent and rate of watershed and soil treatments within the watersheds with northern Mexican gartersnake proposed critical habitat are expected to be at low levels for the planning period. In most cases, projects are expected to be limited in extent and amount of ground disturbance. Projects in the uplands would have short term effects in the project area but effects would be insignificant and discountable to proposed critical habitat. Instream improvement projects would have short term adverse effects to PCEs for habitat components, water quality, and prey base but would have long term benefits to improving these PCEs.

Wildlife/Fish/Rare Plants

Obj-24 to restore native fish species to 2 to 3 stream reaches on the Prescott NF could include projects within gartersnake proposed critical habitat. USFS management actions needed for native fish restoration within the Verde River includes construction and maintenance of a fish barrier and other projects to improve aquatic habitat. These projects would have localized, short term adverse effects to PCEs for proposed critical habitat such as streamflow and streambank alteration, riparian vegetation reduction, and sedimentation. However, the projects would have long term benefits by improving habitat quality for gartersnake proposed critical habitat. Obj-25 through Obj-28 would have no effect to gartersnake proposed critical habitat in the Verde River since pronghorn habitat and projects do not occur along the river.

Obj-26 and Obj-27 to improve pronghorn habitat are expected to have projects occur in the Little Ash Creek subwatershed. Actions include prescribed fire and mechanical treatment that are also

tied to Obj-1 and Obj-3 for grassland and piñon-juniper PNVTs. Mechanical treatment projects would have short term effects of vegetation reduction and also soil disturbance with use of heavy equipment in the project area. Prescribed fire projects would have short term effects of vegetation reduction with subsequent runoff of sediment and ash to adjacent drainages after rain events. Implementation of standards and guidelines for Wildland Fire (Guide-Wildland Fire-1 and 7), Watershed (Guide-WS-1), and Soils (Guide-Soils-1 and Guide-Soils-2) would mitigate project effects. Projects would improve soil and vegetation conditions in the uplands and are expected to reduce sedimentation to aquatic habitats which would maintain water quality (PCE-1) and healthy prey base populations (PCE-3). Projects would also improve the PNVTs similarity to desired conditions and reduce the potential for uncharacteristic wildfire.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

These program plan components are expected to have short term adverse effects to gartersnake proposed critical habitat but result in long term beneficial effects.

Wildland Fire and Fuels Management

Planned wildland fire and mechanical treatments would occur across the landscape of the PNVTs in the watersheds with gartersnake proposed critical habitat. The extent and rate of wildland fire and fuels treatments (Table 6) within the watersheds are expected to be at low to moderate levels. Treatments would have short term increases in runoff and sediment production in treated areas due to the decrease in vegetative ground cover. Implementation of all appropriate forest program standards and guidelines is expected to mitigate the effects of projects in the area to species proposed critical habitat in the Verde River and Little Ash Creek. Projects would improve soil and vegetation conditions and are expected to reduce sedimentation to the Verde River and Little Ash Creek which would maintain water quality (PCE-1) and healthy prey base populations (PCE-3). Plan components are expected to have short term effects in the project area but effects would be insignificant and discountable to northern Mexican gartersnake proposed critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Recreation

The majority of the objectives include direction to minimize the impacts of recreational activities and facilities to natural resources. Actions such as designated dispersed camping areas, maintenance of facilities, relocation and rehabilitation of recreation facilities impacting natural resources, and signing would improve upland and aquatic/riparian conditions and are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality (PCE-1) and healthy prey base populations (PCE-3) in the Verde River and Little Ash Creek. Implementation of standards and guidelines would mitigate the effects of ongoing recreational activities or future projects. These plan components provide for the maintenance or improvement of aquatic habitat of the Verde River and Little Ash Creek and would have insignificant and discountable effects to northern Mexican gartersnake proposed critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Transportation

All objectives are expected to have planned activities within watersheds with northern Mexican gartersnake proposed critical habitat. Projects would improve soil and vegetation condition in the uplands and would improve or minimize impacts to aquatic and riparian conditions along streams. Projects would improve soil and vegetation conditions and are expected to reduce sedimentation to the Verde River and Little Ash Creek which would maintain water quality (PCE-1) and healthy prey base populations (PCE-3). Implementation of standards and guidelines would mitigate the effects of ongoing roads and trail maintenance and future projects. Overall, the Transportation program plan components would have insignificant and discountable effects to northern Mexican gartersnake proposed critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Wilderness and Special Areas

The extent and distribution in this program area covers a 95-mile reach of the Verde River of which 55-miles are under Prescott NF administration. Implementation of the management area standards and guidelines and wilderness and special area standards and guidelines is expected to mitigate the effects of human uses and fire within these areas. These plan components provide for the maintenance or improvement of aquatic habitat of the Verde River and would have insignificant and discountable effects to northern Mexican gartersnake proposed critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub and the spikedace.

Lands and Special Uses

Acquiring lands (Obj-29) along the Verde River would have beneficial effects to protecting northern Mexican gartersnake proposed critical habitat especially those acquired with water rights (PCE-1). Obj-30 to secure right of ways are expected to have no effects to the species. Program standards and guidelines are directed at maintaining or increasing open space on the forest, managing communication site and utility corridors, energy development, and reducing impacts to upland, riparian, and aquatic resources. Plan components would have beneficial effects to northern Mexican gartersnake proposed critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Minerals Management

Mines are present in all watersheds with northern Mexican gartersnake proposed critical habitat with concentrations near the towns of Jerome and Cherry. Mineral standards and guidelines restrict mineral activities in wilderness and other special areas (Std-MM-2) which would have beneficial effects to proposed critical habitat and provide guidance to mitigate mining impacts to upland, riparian, and aquatic resources which would maintain water quality (PCE-1) and healthy prey base populations (PCE-3). Overall, the Minerals program plan components would have insignificant and discountable effects to northern Mexican gartersnake proposed critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Rangeland Management

Authorized livestock grazing could occur along 37 miles of the upper Verde River from the forest boundary (East half) downstream to Clarkdale and along the 3-miles of Little Ash Creek. Livestock grazing can affect the aquatic/riparian zone from livestock use and movement along the streams temporarily reducing hiding cover, trampling streambanks, potential sedimentation and waste deposits that can impair water quality. Impacts to water quality would be greatest during seasonally low flow periods and in droughts. There is no livestock grazing in the Verde Valley section of the Verde River. There are only 3.4-miles of Prescott NF lands in this reach with the majority of lands being dedicated to recreational sites. There is no livestock grazing in the Verde Wild and Scenic River as directed under Std-W&S-1.

Implementations of Rangeland Management standards and guidelines (Std-Range-2, Guide-Range-1, and Guide-Range-5) would minimize effects to aquatic and riparian areas; however, there would be expected short term adverse effects to aquatic and riparian habitat from livestock grazing activities in northern Mexican gartersnake proposed critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub and the spikedace.

Forestry and Forest Health

The extent and rate of treatments (Table 7) within the watersheds with northern Mexican proposed critical habitat are expected to be at low levels for the planning period. Regulated timber harvest shall occur on lands classified as suitable for timber production (Std-FP-1). Planned activities within watersheds with proposed critical habitat using mechanical and fire treatments would have short term increases in runoff and sediment production in treated areas due to the decrease in vegetative ground cover. Implementations of Watershed and Soils and Wildland Fire standards and guidelines would avoid or minimize effects to aquatic and riparian areas. Projects would improve soil and vegetation conditions and are expected to reduce sedimentation to aquatic habitats which would maintain or improve water quality (PCE-1) and healthy prey base populations (PCE-3) in the Verde River and Little Ash Creek. Plan components would have insignificant and discountable effects to northern Mexican gartersnake proposed critical habitat.

Standards and guidelines applicable to mitigate effects would be the same as for the Gila chub.

Cumulative Effects to the Species and Proposed Critical Habitat

The cumulative effects area includes the 5th level HUC watersheds that encompass the northern Mexican gartersnake analysis area.

Population growth in the area surrounding the forest is expected to continue (see Table 8). Residential home and commercial development would continue on private lands and increase impacts to watershed integrity resulting in altered hydrologic regimes and increased sedimentation and pollutant to stream systems. Impacts would be greatest in the Lower Big

Chino, Williamson Valley Wash, Granite Creek-Upper Verde River, and Cherry Creek-Upper Verde River watersheds with higher amount of private land ownership.

Off-forest water uses are having some effect to streamflows on the forest, especially to the Verde River, and are expected to have a greater impact with increasing population and groundwater demands in watersheds that cover the forest. Impacts would be greatest in the Lower Big Chino Wash, Williamson Valley Wash, and Cherry Creek watersheds with higher amount of private land ownership.

Demand for outdoor recreation is also expected to grow concurrently with increasing population and more visitor use of the forest. Aquatic and riparian resources are major attractants for recreational activities and would receive increasing use with resulting impacts to those resources.

Other land uses such as livestock grazing, mining, and vegetation treatments is occurring across the watersheds on State, private, and tribal lands. Management actions on State lands follow law, policy, and other management direction to minimize impacts to aquatic ecosystems. Actions on private lands are having impacts to watershed integrity along the Verde River.

Determination of Effects (Species)

The implementation of plan components related to the Wildland Fire and Fuels, Recreation, Transportation, Wilderness and Special Areas, Lands and Special Uses, Minerals, and Forestry programs are expected to have insignificant and discountable effects to northern Mexican gartersnake because of the limited extent of action and/or mitigation of effects through implementation of standard and guidelines. Plan components related to the Watershed and Soils, Wildlife/Fish/Rare Plants programs would have localized, short term adverse effects to aquatic and riparian habitat but would result in long term beneficial effects to maintaining or improving aquatic habitat and species populations on the forest. Plan components related to the Rangeland programs would maintain or improve upland and riparian vegetation on the forest but would have short term adverse effects to aquatic and riparian habitat from livestock use along the Verde River and Little Ash Creek. The proposed LRMP would result in a “May Affect, Likely to Adversely Affect” determination to the northern Mexican gartersnake.

Determination of Effects (Proposed Critical Habitat)

The implementation of plan components related to the Wildland Fire and Fuels, Recreation, Transportation, Wilderness and Special Areas, Lands and Special Uses, Minerals, and Forestry programs are expected to have insignificant and discountable effects to northern Mexican gartersnake proposed critical habitat because of the limited extent of action and/or mitigation of effects through implementation of standard and guidelines. Plan components related to the Watershed and Soils and Wildlife/Fish/Rare Plants programs would have localized, short term adverse effects to aquatic and riparian habitat but would result in long term beneficial effects to maintaining or improving aquatic habitat on the forest. Plan components related to the Rangeland programs would maintain or improve upland and riparian vegetation on the forest but would have short term adverse effects to aquatic and riparian habitat from livestock use along the Verde River and Little Ash Creek. Therefore, the proposed LRMP would result in a “May Affect, Likely to

Adversely Affect" determination to proposed critical habitat for the northern Mexican gartersnake.

Narrow-headed Gartersnake (*Thamnophis rufipunctatus*) Including Proposed Critical Habitat

Endangered Species Act Status:	Proposed Threatened, 2013
Critical Habitat	Proposed, 2013
Determination of Effects (Species):	May Affect, Likely to Adversely Affect
Determination of Effects (Proposed Critical Habitat):	May Affect, Likely to Adversely Affect

Natural History and Distribution

The natural history and distribution of narrow-headed gartersnake is detailed in Rosen and Schwalbe (1988) and Holycross et al. (2006) and references cited therein. Information in these documents is incorporated by reference in this BA.

Status of the Species and Proposed Critical Habitat Rangewide

A detailed status of the species is found in the Proposed Rule to list narrow-headed gartersnake as a threatened species (Fish and Wildlife Service, 2013a) and is incorporated by reference into this document. There are 38 known localities for the narrow-headed gartersnake in the U.S. (Fish and Wildlife Service, 2013a). The current status for 29 of the 38 localities (76 percent) is considered likely not viable and may exist at low populations densities that could be threatened with extirpation or may already be extirpated. In most localities where the species may occur at low population densities, existing survey data are insufficient to prove extirpation. Only three populations of narrow-headed gartersnakes in the U.S. are considered likely viable where the species remains reliably detected. These three localities include Diamond Creek and the Tularosa River in New Mexico and Oak Creek in Arizona. Harmful nonnative species are a concern for almost every narrow-headed gartersnake population throughout their range (Fish and Wildlife Service, 2013a).

Critical Habitat

Proposed critical habitat for narrow-headed gartersnake was published in 2013 (Fish and Wildlife Service, 2013b). In total, 210,189 acres are proposed as critical habitat in several river basins or areas throughout Arizona and New Mexico. Six individual critical habitat units are proposed and include the Upper Gila River, Middle Gila River, San Francisco River, Upper Salt River, Tonto Creek, and Verde River. The lateral extent of proposed critical habitat is 600 feet on either side of bankfull stage. The primary constituent elements of proposed critical habitat for narrow-headed gartersnake are listed in Table 32.

Table 32. Narrow-headed gartersnake proposed critical habitat – primary constituent elements

PCE #	Primary Constituent Elements

PCE #	Primary Constituent Elements
PCE-1	Stream habitat, which includes: • Perennial or spatially intermittent streams with sand, cobble, and boulder substrate and low or moderate amounts of fine sediment and substrate embeddedness, and that possess appropriate amounts of pool, riffle, and run habitat to sustain native fish populations; • A natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of processing sediment loads; • Shoreline habitat with adequate organic and inorganic structural complexity (e.g., boulders, cobble bars, vegetation, and organic debris such as downed trees or logs, debris jams), with appropriate amounts of shrub- and sapling-sized plants to allow for thermoregulation, gestation, shelter, protection from predators, and foraging opportunities; and • Aquatic habitat with no pollutants or, if pollutants are present, levels that do not affect survival of any age class of narrow-headed gartersnake or the maintenance of prey populations.
PCE-2	Adequate terrestrial space (600 feet, or 182.9 meters, lateral extent to either side of bankfull stage) adjacent to designated stream systems with sufficient structural characteristics to support life-history functions such as gestation, immigration, emigration, and brumation (extended inactivity).
PCE-3	A prey base consisting of viable populations of native fish species or soft-rayed, nonnative fish species.
PCE-4	An absence of nonnative fish species of the families Centrarchidae and Ictaluridae, bullfrogs (*Lithobates catesbeianus*), and/or crayfish (*Orconectes virilis, Procambarus clarki,* etc.), or occurrence of these nonnative species at low enough levels such that recruitment narrow-headed gartersnakes and maintenance of viable native fish or soft-rayed, nonnative fish populations (prey) is still occurring.

Threats and Climate Change

Information on threats to the species is the same as for northern Mexican gartersnake. For a detailed discussion on climate change refer to the Climate Change section of this BA. The effect of climate change on narrow-headed gartersnake is discussed in the Proposed Rule to list the narrow-headed gartersnake as threatened (Fish and Wildlife Service, 2013a) and is incorporated here by reference. Information and effects of climate change for the narrow-headed gartersnake are the same as for the northern Mexican gartersnake.

Status of the Species within the Action Area

Historical and current distribution and status of narrow-headed gartersnake on the Prescott NF is shown in Table 33. A few specimens have been collected in recent years along the Verde River on and adjacent to the Prescott NF (Holycross et al., 2006; Emmons et al., 2012).

Table 33. Narrow-headed gartersnake distribution and status on the Prescott National Forest

5th Level HUC Name	Stream Name	Stream Miles On PNF	Miles of Occupied Habitat	Historical Presence	Status*
Granite Creek-Upper Verde River	Verde River	4	0	Unknown	Likely Not Viable
Grindstone Wash-Upper Verde River	Verde River	28	28	Yes	Likely Not Viable
Cherry Creek-Upper Verde River	Verde River	3.4	3.4	Yes	Likely Not Viable
Fossil Creek-Lower Verde River	Verde River	15.5	15.5	Yes	Likely Not Viable

* From 2013 *Federal Register* Proposed Listing

Proposed Critical Habitat within the Action Area

Proposed critical habitat within the action area includes the Verde River (Fish and Wildlife Service, 2013b). A total of 103 miles of proposed critical habitat along the Verde River occurs on or adjacent to the Prescott NF. The first 6 miles of critical habitat from Sullivan Dam downstream to the forest boundary is on The Nature Conservancy (TNC) and State lands. The uppermost 37 miles of river from the forest boundary downstream to Clarkdale are primarily within USFS ownership with a few private land parcels occurring in this reach. The next 45 miles of river in the Verde Valley is primarily within private ownership. The last 15.5 miles are on the forest within the Verde Wild and Scenic River.

Verde River Subbasin Unit

- **Upper Verde River Subunit**. A total of 18,721 acres along 127.5 miles, extending from the confluence with Red Creek upstream to the confluence with Sullivan Lake.

Endangered Species Act § 7(a)(1) Conservation Actions on the Prescott NF

Conservation actions taken on the Prescott NF are the same as for the northern Mexican gartersnake.

Factors Affecting the Species in the Action Area

The narrow-headed gartersnake analysis area is the same as for northern Mexican gartersnake with the exception of the Ash Creek and Sycamore Creek watershed. Information on watershed conditions, land uses, and threats to the species on the Prescott NF are the same as for the northern Mexican gartersnake.

Effects Analysis for the Species

The effects to the narrow-headed gartersnake would be the same as for the northern Mexican gartersnake since these species historical, current, and possible future distribution are very similar. Please refer to the northern Mexican gartersnake analysis for the effects of the proposed LRMP on the narrow-headed gartersnake.

Determination of Effects (Species)

The implementation of plan components related to the Wildland Fire and Fuels, Recreation, Transportation, Wilderness and Special Areas, Lands and Special Uses, Minerals, and Forestry programs are expected to have insignificant and discountable effects to narrow-headed gartersnake because of the limited extent of action and/or mitigation of effects through implementation of standard and guidelines. Plan components related to the Watershed and Soils, Wildlife/Fish/Rare Plants programs would have localized, short term adverse effects to aquatic and riparian habitat but would result in long term beneficial effects to maintaining or improving aquatic habitat and species populations on the forest. Plan components related to the Rangeland programs would maintain or improve upland and riparian vegetation on the forest but would have short term adverse effects to aquatic and riparian habitat from livestock use along the Verde River. The proposed LRMP would result in a "May Affect, Likely to Adversely Affect" determination to the narrow-headed gartersnake.

Determination of Effects (Proposed Critical Habitat)

The implementation of plan components related to the Wildland Fire and Fuels, Recreation, Transportation, Wilderness and Special Areas, Lands and Special Uses, Minerals, and Forestry programs are expected to have insignificant and discountable effects to Narrow-headed gartersnake proposed critical habitat because of the limited extent of action and/or mitigation of effects through implementation of standard and guidelines. Plan components related to the Watershed and Soils and Wildlife/Fish/Rare Plants programs would have localized, short term adverse effects to aquatic and riparian habitat but would result in long term beneficial effects to maintaining or improving aquatic habitat on the forest. Plan components related to the Rangeland programs would maintain or improve upland and riparian vegetation on the forest but would have short term adverse effects to aquatic and riparian habitat from livestock use along the Verde River. Therefore, the proposed LRMP would result in a "May Affect, Likely to Adversely Affect" determination to proposed critical habitat for the narrow-headed gartersnake.

Sonoran Desert Tortoise (*Gopherus morafkai*)

Endangered Species Act Status:	Candidate, 2010
Recovery Plan:	No
Critical Habitat:	None Designated
Determination of Effects (Species):	May Affect, Likely to Adversely Affect

Natural History and Distribution

Adequate shelter is one of the most important habitat features for the Sonoran desert tortoise (Fish and Wildlife Service, 2013). Tortoises escape extreme temperatures in burrows, which stay cooler in the summer and warmer in winter than outside temperatures. Tortoises require loose soil to excavate (usually shallow) burrows below rocks and boulders, but they may also use rock crevices which they may or may not be able to modify. Tortoises occasionally burrow under vegetation, less often dig soil burrows on more or less open slopes, and use caliche caves in incised wash banks. They will also rest directly under live or dead vegetation without constructing a burrow.

Activity begins in the spring as temperatures warm and then decreases as the season moves into the summer drought in May and June. Much more time is spent in burrows where they conserve water and energy. The onset of the summer monsoon season signals the beginning of peak tortoise activity, dramatically rising in early August and peaking during August to September. Activity decreases sharply after mid-October, as tortoises withdraw to winter hibernation, which are similar shelters to those they use during activity seasons. Even during the winter, some individuals may bask, move, or even forage on warm winter days. Females may terminate hibernation as early as late February, while some males may remain inactive through the entire spring.

Tortoises grow relatively rapidly early in life and reach about one-half their maximum size at 5 to 10 years of age. The growth rate tapers off as individuals slowly approach their maximum size. After 10 to 20 years of age, tortoises reach sexual maturity at about 220 millimeters (8.7 inches) carapace length. Males reach larger sizes than females in some populations but not in others.

Some hatchlings emerge in late summer, but some may overwinter in the nest before emerging in the spring (Averill-Murray et al., *in press b, in* HDMS AZGFD, 2010). While little information exists on the behavior and ecology of young tortoises, this size class is thought to be the most vulnerable, experiencing the highest mortality rates (Morafka *in* Fish and Wildlife Service, 2013). The adult tortoise carapace provides protection against potential predators, contributing to their high survivorship. Mountain lions appear to be the primary natural predator on adult tortoises in the Sonoran Desert, but mountain lions usually have not contributed to elevated rates of mortality in population studies so far (AIDTT, 2000).

Mating occurs during the summer monsoon season. Females begin laying eggs, which are fertilized by sperm stored from the previous summer's mating, just before or during the onset of the summer rains in late June or early July. They lay only one clutch of about six eggs, although larger clutch sizes have been reported. The proportion of females reproducing is related to the amount of recent rainfall and vegetation available for forage. Females usually lay their eggs inside burrows with adequate soil development, and many remain at and defend their nests against predators.

Sonoran desert tortoises are primarily herbivorous and have been documented to consume 199 different species of plants including herbs, grasses, woody plants, and succulents. While a nutritional difference in the quality between native and non-native forage was not found, the influence of non-native grasses on native forbs is notable. Native forbs were found to provide considerably more nitrogen and water than non-native forbs, an important factor in maintaining a

positive water balance. Therefore, native forbs provide the best nutrition to Sonoran desert tortoises and are more importantly nutritionally than grasses and non-native forbs. The proliferation of non-native grasses leading to the exclusion of native forbs places Sonoran desert tortoises at a nutritional disadvantage (Fish and Wildlife Service, 2013). The actual diets of Sonoran desert tortoises vary among populations in response to seasonal availability of plant species and in response to precipitation amounts.

Sonoran desert tortoises are also geophagous, consuming bones, stones and soil to provide nutrient and mineral supplements as well as aid in digestion through mechanical grinding of plant matter in the stomach. Soil condition and quality are important to the Sonoran desert tortoise, not only for nutrients derived from eating the soil but also production and maintenance of vegetation that is consumed by the tortoises (Avery and Neibergs, 1997 *in* Fish and Wildlife Service, 2013).

Finally, desert tortoises have been observed consuming scat from both their own species as well as that of other herbivores such as jack rabbits, woodrats, and javelina, perhaps a strategy developed to aid in transfer of gut microflora.

Sonoran desert tortoise population occurs primarily on rocky slopes and bajadas of Mojave and Sonoran desertscrub. Vegetation important to the tortoise for sustenance is also vital for predator avoidance, thermal protection, and social behaviors. Habitat use by Sonoran desert tortoises was closely associated with steepness of slope and rock type and structure rather than with a particular vegetation type.

Total Range

The distribution of Sonoran desert tortoise lies south and east of the Colorado River and half of its range extends into northern Mexico. The Sonoran desert tortoise generally prefers rocky steep slopes and bajadas, and to a lesser extent, others may occur in flatter terrain.

Arizona Range

Sonoran desert tortoise occurs south and east of the Colorado River, from locations near Pearce Ferry in Mojave County, to the south beyond the International Boundary, and at many scattered locations in between (AIDTT, 2000). The northeastern-most tortoise records in Arizona occur along the Salt River near Roosevelt Lake in Gila County, although populations here have not been confirmed with recent observations. The middle San Pedro River drainage in Cochise County harbors the eastern-most substantial tortoise populations. Sonoran desert tortoise observations have been confirmed in extreme southeastern Cochise County, but they most likely represent released captives (i.e., pets). Tortoises have been found as far southwest as the Barry M. Goldwater Range, Yuma Proving Ground, and the Cabeza Prieta National Wildlife Refuge.

There are two known Sonoran desert tortoise locations on the southeast side of the Bradshaw Ranger District of the Prescott NF around Cleator within the desert vegetation type. There is one incidental unconfirmed report of a tortoise of unknown species on the Mayer-Goodwin Road. No formal surveys have been done to determine the full extent of the species or its habitat on the Prescott NF.

Status of the Species Rangewide and within the Action Area

Sonoran desert tortoise is a candidate species under the Endangered Species Act throughout its range and within the action area. The Sonoran desert tortoise was formerly considered a subspecies of desert tortoise until the two distinct species were identified within the U.S., the Mojave and the Sonoran desert tortoises (Murphy et al., 2011). The threatened Mojave desert tortoise occurs north and west of the Colorado River and the candidate Sonoran desert tortoise occurs south and east of the Colorado River (Murphy et al., 2011).

According to the AZGFD HDMS range map for the Sonoran desert tortoise[5], there are no known locations for the species on the Prescott NF. Suitable habitat for the species does occur on the southern portions of the forest near Cleator and is well within the range of known locations of the species near Black Canyon City. With few known locations and no populations documented within the action area, it is difficult to determine the status of the species. The potential habitat for the species is the steep rocky slopes of the desert communities PNVT, and the existing condition is considered to be a low departure from reference conditions, or, similar to historic conditions.

Effects Analysis for the Species

All of the proposed LRMP desired conditions, objectives, standards and guidelines, management area direction, and monitoring were reviewed to determine potential affects to the Sonoran desert tortoise. The following analysis is grouped by program area and includes the ongoing and future activities for the 10 to 15 years after plan approval.

Watersheds and Soils

The proposed LRMP has four objectives (Obj-18, Obj-19, Obj-23, and Obj-31) that direct Watershed and Soils program activities. These are described in detail earlier in this BA. Obj-31 is a paper process that would have only beneficial effects to the terrestrial and aquatic physical natural resources associated with riparian habitat.

None of the objectives are particularly relevant to Sonoran desert tortoise. Obj-18 is proposed for the purpose of improving watershed integrity. If a priority watershed occurred in Sonoran Desert tortoise habitat, then there could be potential impacts to individual Sonoran desert tortoises or localized portions of their habitat from projects designed to maintain or improve watershed conditions. While implementing any of these projects may have limited, short term adverse effects, including displacement of individual animals or changing of current vegetation or other physical habitat features, the site specific projects would be designed with the long term objective and intent of maintaining or improving watershed conditions and would not be expected to jeopardize the continued existence of the species. Guide-WL-2 would influence the projects to ensure the needs of Sonoran desert tortoise are considered in design and implementation; thus, ensuring Forest Service actions contribute to the continued existence of the species within the action area.

[5] AZGFD HDMS 2013, http://www.azgfd.gov/w_c/edits/images/gophmora.gif

The types of projects that are ongoing and proposed within the watershed and soils program are typically those that improve the function and physical condition of the vegetation and the soil in both upland habitat types as well as in riparian habitats. Most do not occur in the desert habitat of the Sonoran desert tortoise.

Wildlife/Fish/Rare Plants

The proposed LRMP has five objectives (Obj-24 through Obj-28) that direct Wildlife/Fish/Rare Plants program activities. None of the objectives for the Wildlife/Fish/Rare Plants program are relevant to Sonoran Desert tortoise or its habitat and would not have any impacts to the species or its habitat.

Guidelines for the Wildlife/Fish/Rare Plants program would, however, influence projects in other program areas. Guide-WL-2 is the primary guideline relevant to the Sonoran desert tortoise and its habitat. Guide-WL-8 may also be relevant. By applying Sonoran desert tortoise design features to projects occurring within these species' habitat, site specific projects in these areas should contribute to species recovery. Species-specific design features (e.g., breeding season timing restrictions, drift fences, surveys, and escape ramps) would influence the details of site specific projects so as to alleviate or minimize unwanted impacts to the species, improve habitat quality, and contribute to species recovery.

Wildland Fire and Fuels Management

The proposed LRMP has five objectives (Obj-1 through Obj-5) that direct the Wildland Fire and Fuels program activities. None of the objectives are specifically relevant to the Sonoran desert tortoise because the objectives are proposed in grassland habitat and the tortoise is more closely associated with steep rocky terrain (Fish and Wildlife Service, 2013) where fire is a rare or absent occurrence. However, implementing projects adjacent to Sonoran desert tortoise habitat could have some short term adverse impacts from smoke or vegetation removal. The long term benefit of restoring healthy vegetation and reducing the potential for large landscape scale fires would have beneficial impacts for the Sonoran desert tortoise. Three known incidental locations are in desert shrub vegetation on the southeast portion of the Bradshaw Ranger District. Std-Wildland Fire-2 would ensure that all fires within this PNVT would be suppressed, potentially preventing harmful impacts to Sonoran desert tortoises and their habitat.

Ongoing activities within the Wildland Fire and Fuels program include site specific projects with site specific NEPA analyses for hazardous fuels reduction and forest health, wildfire management, aviation operations, and fire prevention patrols. It is not likely that any of the ongoing activities occur within the Desert Communities PNVT where Sonoran desert tortoises occur on steep rocky slopes. Adjacent activities could have short term adverse impacts and long term beneficial impacts to the species and the habitat.

Recreation

The proposed LRMP has 10 objectives (Obj-8 to Obj-17) that direct the Recreation program activities. None of the objectives is specifically relevant to the Sonoran Desert tortoise or its habitat. Obj-10, Obj-11, Obj-16 and Obj-17 could have site specific projects that occur within

Sonoran Desert tortoise habitat. All of these objectives are designed to improve the physical condition of recreation features and alleviate or eliminate any negative impacts to other resources including terrestrial habitat components. Any recreation projects potentially impacting Sonoran Desert tortoise or occurring in its habitat would be developed per Guide-WL-2 to alleviate or eliminate impacts to Sonoran Desert tortoise and their habitat.

Ongoing activities within the Recreation program include developed recreation; dispersed camping; recreation special use permits for a variety of activities and outfitter/guide permits for hunters, organizational camps, and several schools; and the nonmotorized trail system on the forest. The developed recreation is contained within particular areas, none of which occur in or near Sonoran desert tortoise habitat. Dispersed camping within Sonoran desert tortoise habitat is typically associated with either hunting or placer mining activities. Hunting by outfitter guides would be governed by any special permit or guiding document for their actions. Individual hunters would be allowed to dispersed camp as allowed in the LRMP. Individuals pursuing a mineral operation would be subject to the plan of operation for their claim. This is addressed under the Mineral program. Special use permits are reviewed by resource specialists; designed to comply with law, policy, and direction; can occur forestwide; and are in compliance with LRMP standards and guidelines. Site specific review of special use permits occurring within Sonoran desert tortoise habitat would include provisions for protecting the species and its habitat per Guide-WL-2 to alleviate or eliminate impacts to Sonoran desert tortoise and their habitat. Nonmotorized trails occur forestwide, including within Sonoran desert tortoise habitat. Trail maintenance with Sonoran desert tortoise habitat would be designed per Guide-WL-2 to minimize or eliminate impacts to Sonoran desert tortoise and their habitat. Some short term adverse impacts could occur to the Sonoran desert tortoise and its habitat through vegetation manipulation or trail maintenance.

Transportation

The proposed LRMP has three objectives (Obj-20 through Obj-22) that direct the Transportation program activities. These Transportation objectives are proposed for the purpose of improving watershed integrity. While implementing any of these projects may have localized, short term adverse effects, including displacement of individual animals or changing of current upland or riparian vegetation habitat features, site specific projects would be designed with the long term objective and beneficial effect intent of improving physical characteristics as either a means or a result of improving watershed integrity. The end effect would be improved vegetative habitat quality as uplands and riparian areas are moved towards desired conditions which would provide habitat for the continued existence of the species.

None of the objectives is specifically relevant to the Sonoran Desert tortoise or its habitat. Any of the objectives could have site specific projects that occur within Sonoran Desert tortoise habitat. All of the objectives are designed to improve the physical condition of watershed integrity and alleviate or eliminate any negative impacts from transportation facilities to other resources including riparian and terrestrial habitat components. None of the Transportation guidelines is specifically relevant to the Sonoran Desert tortoise or its habitat. Any transportation project potentially impacting Sonoran Desert tortoise or occurring in its habitat would be developed per Guide-WL-2 discussed above to alleviate or eliminate impacts to Sonoran Desert tortoise or their habitat.

Ongoing activities within the Transportation program include the operation and maintenance of the transportation system on the Prescott NF which consists of roads and trails that provide access to areas on the forest including private land, structures and improvements under special use permit, recreational opportunities, and facilities that support land and resource management activities. The motorized transportation system for the Prescott NF is composed of 29.5 miles of roads managed and maintained for passenger cars and about 1,300 miles of roads managed and maintained for high-clearance vehicles, 28 miles of roads closed to all motorized vehicles, and 408 miles of trails open to motorized vehicles less than 50 inches wide. Cross-country motorized travel is restricted to two designated areas on the Prescott NF, Alto Pit (41 acres) and Hayfield Draw (80 acres), and for motorized big game retrieval. Motor vehicle use off the designated system of roads, trails, and areas is prohibited except as identified on the motor vehicle use map (MVUM) and as authorized by law, permits, and orders in connection with resource management and public safety.

Open roads and trails occur within Sonoran desert tortoise habitats. Road and trail maintenance is typically done year round. There are currently no known Sonoran desert tortoise locations or hibernation dens near any roads or trails. Any future new roads, trails, maintenance, or changes in type of use or location would be site specifically assessed for effects to Sonoran desert tortoise and their habitat through Guide-WL-2 to minimize or eliminate impacts to Sonoran desert tortoise and their habitat. Maintenance activities would be designed to avoid any adverse impacts to the species and its habitat. Some short term adverse impacts could occur to the Sonoran desert tortoise and its habitat through vegetation manipulation associated with road maintenance.

Wilderness and Special Areas

The proposed LRMP has no objectives that direct the Wilderness and Special Areas program activities. The selected alternative recommends 23,000 acres for future wilderness designation adjacent to the existing 8 wilderness areas. The ongoing program includes 8 designated wilderness areas, totaling over 100,000 acres.

None of the standards or guidelines for this program area is specifically relevant to the Sonoran Desert tortoise or its habitat. Sonoran Desert tortoise is known to occur in and near the Castle Creek Wilderness. The Castle Creek Contiguous Potential Wilderness Areas would be expected to contain Sonoran Desert tortoise and their habitat. Based on the potential wilderness evaluations, the Castle Creek Contiguous potential wilderness areas may have habitat for Sonoran Desert tortoise. Therefore, any future designation of the potential areas as wilderness may have positive impacts to Sonoran Desert tortoise and their habitat based on the anticipated changes in uses within the areas.

Lands and Special Uses

The proposed LRMP has two objectives (Obj-29 and 30) that direct the Lands and Special Uses program activities. Both of these objectives could potentially be located in Sonoran Desert tortoise habitat. Obj-29 could have beneficial effects to Sonoran Desert tortoise where lands are acquired in their habitat. Obj-30 could have mixed impacts to Sonoran Desert tortoise and its habitat as access across private parcels to National Forest System (NFS) lands is acquired. Providing additional public access to areas currently not accessed could increase disturbance to

Sonoran Desert tortoise or their habitat as well as increase the risk of fire from dispersed recreation. Meanwhile, acquiring access to these same areas would provide additional USFS presence and opportunities to actively manage the areas for the improvement or protection of the resources. Any Lands and Special Uses project occurring in or impacting Sonoran Desert tortoise or its habitat would be developed per Guide-WL-2 to minimize or eliminate impacts to Sonoran Desert tortoise and their habitat.

Program guidelines relevant to the Sonoran desert tortoise and its habitat include Guide-Lands-2 through Guide-Lands-5. These guidelines include some facet of considering the importance of wildlife habitat or some aspect of wildlife needs in the purpose or design of Lands projects. Guide-Lands-5 specifically includes by reference the current USFWS and AZGFD guidelines for energy development. These guidelines would all contribute to minimizing or eliminating undesirable impacts to any Sonoran desert tortoise or its habitat. However, short and long term adverse effects could occur to individuals and the habitat as the result of vegetation manipulation, utility or road construction, or increased use or activity authorized through a legally mandated permit, right-of-way, or easement issued in Sonoran desert tortoise habitat.

Minerals Management

The proposed LRMP has no objectives that direct the Minerals Management program activities. Ongoing activities within the program area include various types of mining activities described below.

Gold mining is limited to small-scale placer and/or lode mining. Placer operations involve methods such as excavation, dredging, and panning from alluvial deposits and are most common on the forest in the Bradshaw Mountains. Most placer mining is recreational use or small commercial operators. Placer mining does occur along Turkey Creek within Sonoran Desert tortoise habitat.

Guide-Locatable Minerals-2 and Guide-Mineral Materials-5 are specifically relevant to the Sonoran Desert tortoise and its habitat because it is a Southwestern Region sensitive species. Mitigation measures to minimize impacts to populations from mineral exploration and mineral extraction should help preclude trending towards listing for the Sonoran Desert tortoise. Any Minerals project with a potential to impact Sonoran Desert tortoise or its habitat would be developed per Guide-WL-2 including breeding season timing restrictions and other details relevant to the species and its habitat to alleviate or eliminate impacts to Sonoran Desert tortoise and its habitat. These design features would cover all aspects of a minerals plan of operation from occupancy to material storage and equipment access and use. Under the 1872 Mining Law, the Prescott NF must issue a permit authorizing a plan of operation when requested by individuals with a valid mining claim. While some adverse effects may not be avoided, plans of operation can include mitigation to minimize adverse effects and preclude jeopardizing the species. There may still be short and long term adverse effects to Sonoran desert tortoises from possible mining plans of operation issued in Sonoran desert tortoise habitat.

Rangeland Management

The proposed LRMP has no objectives that direct the Rangeland Management program activities.

There is currently ongoing livestock grazing on the Prescott NF as the forest authorizes livestock grazing on as many as 68 allotments covering 920,779 suitable acres (73 percent of the forest). Of the 62 active grazing allotments, 19 are used seasonally (31 percent) and 43 are used yearlong (69 percent). Allotments are managed using an adaptive management strategy whereby results from long and short term monitoring are used to guide managers concerning yearly stocking rates, pasture rotations, and whether other adjustments are needed in order to meet management objectives and desired conditions for rangelands. Livestock grazing does occur within Sonoran desert tortoise habitat. With less than half a dozen sightings of Sonoran desert tortoises on the Prescott NF, the extent of impacts to individuals or habitat from livestock grazing is difficult to ascertain.

Standards and guidelines for Rangeland Management Program are not specifically relevant to Sonoran Desert tortoise or its habitat. Guide-WL-2 would be used to develop livestock grazing strategies that include considerations for Sonoran desert tortoise and their habitat needs. Even with proper livestock grazing levels in Sonoran desert tortoise habitat, cattle may adversely affect Sonoran desert tortoises or their habitat by reducing or removing vegetation vital to desert tortoise survival. Because Sonoran desert tortoises prefer steeper slopes (Fish and Wildlife Service, 2013), direct interaction between livestock and tortoises is not likely.

Forestry and Forest Health

The proposed LRMP has three objectives (Obj-3, Obj-5, and Obj-6) that direct the Forest Health program activities. None is relevant to Desert Communities PNVT where the Sonoran desert tortoise is found. None of the Forest Health standards or guidelines is specifically relevant to the Sonoran desert tortoise or its habitat.

Ongoing activities within the Forest Health program include projects with site specific NEPA analyses for hazardous fuels reduction and forest health. Forest health tools include commercial timber sales, fuelwood sales, and contracts. Only vehicles travelling on the Crown King-Cleator road while associated with a forest health project in Crown King could have any impact on the Sonoran desert tortoise.

Cumulative Effects

Impacts from implementing the LRMP include primarily vegetation removal and habitat destruction through permit issuance and some disturbance and smoke inhalation.

Non-Federal actions that contribute to cumulative effects to the Sonoran desert tortoise and its habitat include: urbanization and development of habitat, mining on private property, and unauthorized activities occurring along the international border in southern Arizona resulting in habitat degradation from trash and OHV use.

Summary of Impacts to Sonoran Desert Tortoise by Program

While the overall impacts of the proposed LRMP would be beneficial effects to Sonoran desert tortoise and their habitats, there is the possibility that some short term adverse effects may occur to individuals or small areas of habitat in the process of implementing the objectives or ongoing

programs. Sonoran desert tortoise is a Federal candidate species, and the effects of the proposed action may affect but would not be expected to jeopardize the species' continued existence.

Table 34. Summary of impacts to Sonoran desert tortoise by program

Program	Summary of Impacts
Watershed and Soils	Short term negative and long term beneficial impacts
Wildlife/Fish/Rare Plants	No impacts
Wildland Fire and Fuels Management	Short term negative and long term beneficial impacts
Recreation	May have some short term adverse impacts
Transportation	
Wilderness and Special Areas	Beneficial impacts
Lands and Special Uses	May have short and long term adverse impacts
Mineral Management	
Rangeland Management	May have some short term adverse impacts
Forestry and Forest Health	No impacts

Determination of Effects (Species)

Impacts among the various programs for the LRMP may range from none in the Wildlife/Fish/Rare Plants program to adverse in the Minerals, Lands, or Forest Health programs, to beneficial in the Wilderness program. Based on overall impacts, however, the LRMP would result in a "May Affect, Likely to Adversely Affect" determination to the Sonoran desert tortoise.

Birds

Mexican Spotted Owl (*Strix occidentalis lucida*) Including Designated Critical Habitat

Endangered Species Act Status:	Threatened, 1993
Recovery Plan:	Original, 1995; Revised, 2012
Critical Habitat:	Designated, 2004
Determination of Effects (Species):	May Affect, Likely to Adversely Affect
Determination of Effects (Critical Habitat):	May Affect, Likely to Adversely Affect

Natural History and Distribution

The most current information about the natural history and distribution of the Mexican spotted owl (MSO) is covered in detail in appendix B of the Mexican Spotted Owl Recovery Plan, First Revision (Fish and Wildlife Service, 2012).

Status of the Species Rangewide

MSO was listed as a threatened species in 1993 (Fish and Wildlife Service, 1993). The primary threat to the species has transitioned from the original even-aged stand management using a shelterwood timber harvest regime to an increased risk of stand-replacing wildland fire (Fish and Wildlife Service, 2012). Other land uses including grazing, recreation, and urbanization were also mentioned as possible factors influencing MSO population. Critical habitat was designated for MSO in 2004 (Fish and Wildlife Service, 2004).

Although MSO's entire range covers a broad area of the southwestern U.S. and Mexico, MSO does not occur uniformly throughout its range. Instead, it occurs in disjunct localities that correspond to isolated forested mountain systems, canyons, and in some cases, steep, rocky canyon lands. Surveys have revealed that the species is known to inhabit a physically diverse landscape in the southwestern U.S. and Mexico.

The U.S. range of MSO has been divided into six ecological management units (EMU) and is discussed in the revised recovery plan. The primary administrator of lands supporting MSO in the U.S. is the USFS. Most owls have been found within the USFS Southwestern Region (including 11 national forests in Arizona and New Mexico). USFS Rocky Mountain Region and Intermountain Region (including two national forests in Colorado and three in Utah) support fewer owls. The Prescott NF lies within the Basin and Range–West (BRW) EMU. Currently, high-intensity, stand-replacing fires are influencing ponderosa pine and mixed conifer forest types in Arizona and New Mexico. Uncharacteristic, high-severity, stand-replacing wildland fire is probably the greatest threat to MSO. Fire severity and size have been increasing throughout the West.

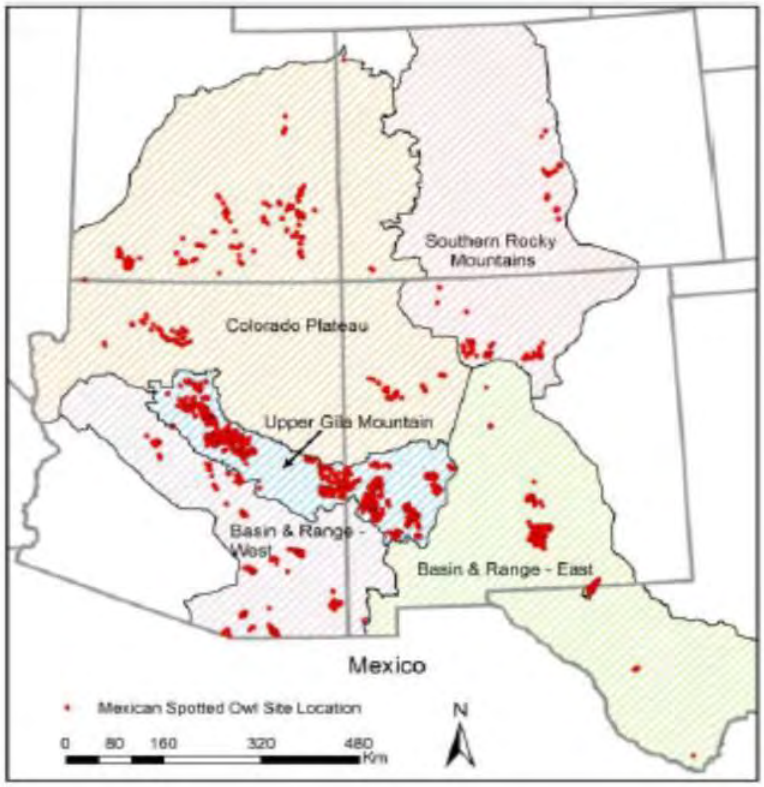

Figure 4. General areas occupied by MSO within five ecological management units within their range in the U.S.

Surveys conducted since the 1995 recovery plan continue to locate new owl sites and increase our knowledge of owl distribution, but not necessarily owl abundance. The increase in known owl sites from 758 in the early 1990s to approximately 1,300 in 2008 is probably more a product of increased survey efforts rather than an increase in actual sites. While subsequent surveys may have detected additional existing MSO sites, the current number does not reflect those sites that are no longer occupied or lost to wildfire or other factors. Thus, an increase in abundance cannot be inferred from this data.

Status of the Species within the Action Area

Mexican spotted owls are known to occur on the Bradshaw and Verde Ranger Districts of the Prescott NF. They are found in Ponderosa Pine-Gambel Oak forests with large trees, dense overstory, and woody debris including snags and downed logs. Existing habitat on the Prescott NF totals 26,448 acres. Known nesting sites on the Prescott NF include areas near Mingus Mountain, in Prescott Basin, and in Crown King for a total of 15 protected activity centers (PACs).

Figure 5. Range map of three subspecies of spotted owls

Critical Habitat

Critical habitat for MSO was designated by the USFWS on August 31, 2004 (Fish and Wildlife Service, 2004). Within the action area, the designated critical habitat is limited to areas that meet the definition of "protected" and "restricted" habitat in the original 1995 MSO recovery plan and are within the established critical habitat units (Fish and Wildlife Service, 2004). On the Prescott NF, these areas are found in the Ponderosa Pine-Gamble Oak vegetation type. Certain wildland-urban interface (WUI) project areas are excluded from designation. The effects of the proposed LRMP to critical habitat are analyzed separately. In the revised MSO recover plan, the terminology for "protected activity centers (PACs)" remained the same. However, in the revised MSO recovery plan, there is no reference to "protected" habitat outside of PACs, and the term "restricted" was exchanged for the new term "recovery." From here on, the term "recovery" will be used in reference to MSO habitat outside of PACs to be in line with the current revised MSO recovery plan.

There are three types or categories of recovery habitat: forested nest/roost, forested foraging/non-breeding, and riparian. On the Prescott NF, MSO is primarily associated with the Ponderosa Pine-Gambel Oak PNVT. Based on the desired conditions for MSO nesting and roosting habitat found

in Table C.2 in the MSO recovery plan (Fish and Wildlife Service, 2012, p. 275), recovery habitat would be considered the condition or state with medium/large trees with a closed canopy.

Threats

Threats to MSO and proposed critical habitat vary by EMU. In the two critical habitat units on the Prescott NF (located in the BRW EMU), the primary threat to MSO was, and is, the potential for uncharacteristic wildfire (Fish and Wildlife Service, 1995, 2012).

Basin and Range-West Ecological Management Unit

The Prescott NF lies completely within the Basin and Range-West Ecological Management Unit (EMU). Recreation dominates the land use within the EMU and is particularly true for those portions on the Prescott NF. Urban and rural development and mining activities also occur on the Prescott NF portions of the EMU. The Prescott NF is just one of the national forests within the EMU that has an active fuels-reduction and forest management program in place to reduce fire hazard, implement ecological restoration, and provide community protection within the WUI.

Climate Change

For a discussion on climate change refer to the Climate Change section of this BA. This discussion of climate change relevant to the MSO is taken from the Regional Biological Assessment for the Prescott National Forest LRMP (Forest Service, 2011a). Global climate change may affect MSO through long term drought and hotter than average temperatures resulting in increased effects to habitat from fire, insects, and disease. Studies have shown that since 1950, the snowmelt season in some watersheds of the western U.S. has advanced by about 10 days. Such changes in the timing and amount of snowmelt are thought to be signals of climate-related change in high elevations. The impact of climate change is the intensification of natural drought cycles and the ensuing stress placed upon high-elevation montane habitats. The increased stress put on these habitats is likely to result in long term changes to vegetation and invertebrate and vertebrate populations within coniferous forests and canyon habitats that affect ecosystem functions and processes. However, there are no expectations of measurable changes in climate within the temporal bounds of this action.

Effects Analysis for the Species

All of the proposed LRMP desired conditions, objectives, standards and guidelines, management area direction, and monitoring were reviewed to determine potential effects to MSO. The following analysis is grouped by program area and includes the ongoing and future activities for the life of the plan.

Watersheds and Soils

The proposed LRMP has four objectives (Obj-18, Obj-19, Obj-23, and Obj-31) that direct Watershed and Soils program activities. These are described in detail in the front section of this BA. The first three objectives were assessed relevant to their general effects to riparian habitat and then as they related to MSO habitat. Obj-31 is a paper process to apply for instream water

rights that does not involve any on-the-ground projects to physically manipulate the riparian habitat. Obj-31 would have only beneficial effects to the terrestrial and aquatic physical natural resources associated with riparian habitat.

Specific aspects or features of riparian habitat were not identified in the Ecological Sustainability Report (Forest Service, 2009). For this analysis, the assessment will focus on the "terrestrial" aspect of riparian habitat features or the vegetation associated with riparian habitats. The existing condition of the riparian habitat on the Prescott NF is a "low" departure from reference conditions; meaning, it closely resembles reference or historic conditions. There are no proposed objectives (e.g., treatments, management actions, projects) specifically for riparian habitats in the preferred alternative.

The proposed LRMP would improve watershed conditions and their associated riparian habitats (Forest Service, 2012). Guide-WS-3 would ensure that riparian areas are at least maintained in their existing condition if not improved by any projects that may impact these habitat features. Implementing Obj-18, Obj-19, and Obj-23 would likely improve riparian vegetation habitat features for all wildlife species. Guide-WS-4 through Guide-WS-10 would provide direction for project design to avoid or minimize impacts to riparian habitat features, and thus, associated species.

The purpose of the proposed watershed objectives is to improve watershed integrity. While implementing these projects may have localized, short term impacts (including animal displacement or changes in current riparian vegetation habitat features), site specific projects would be designed with the intent of improving the quality of riparian vegetation habitat long term, either as a means to or a result of improving watershed integrity. Some short term adverse impacts would be expected to occur in riparian habitat as projects are implemented, and the long term effects would be expected to be beneficial as the physical character of riparian habitat is improved.

The types of projects that are ongoing and proposed within the watershed conditions and soils program are typically those that improve the function and physical condition of the vegetation and the soil in both upland habitat types as well as in riparian habitats. By implementing breeding season timing restrictions and MSO recovery plan guidance, the projects would be expected to improve habitat for MSO prey species and would likely provide suitable MSO nesting and foraging habitat.

Wildlife/Fish/Rare Plants

The proposed LRMP has five objectives (Obj-24 through Obj-28) that direct Wildlife/Fish/Rare Plants program activities. None of the objectives for the Wildlife/Fish/Rare Plants program are relevant to MSO or its habitat and would not have any impacts to the species or its habitat.

Guidelines for the Wildlife/Fish/Rare Plants program, however, would influence projects in other program areas. Guide-WL-1 is the only guideline relevant to MSO and its habitat. By applying MSO recovery plan guidance to projects occurring within MSO habitat, site specific projects in these areas should contribute to the recovery of the species. Breeding season timing restrictions and other management recommendations found in appendix C of the revised MSO recovery plan would be examples of project design features that would influence the details of site specific

projects in a way to alleviate or minimize unwanted impacts to the species, improve habitat quality, and contribute to the recovery of the species. When and where possible, these management recommendations would be implemented. However, implementing these recommendations (e.g., breeding season restrictions), may not always be possible to meet the purpose and need of a project. Adverse impacts may occur short term or long term, depending on the nature and associated impacts of the project.

Wildland Fire and Fuels Management

The proposed LRMP has five objectives (Obj-1 through Obj-5) that direct the Wildland Fire and Fuels program activities. Obj-1 through Obj-4 are not relevant to MSO or its habitat as they are specific to vegetation types where MSO is not found or known to occur: grasslands, piñon-juniper, and chaparral. Obj-5 is specific to the Ponderosa Pine-Evergreen Oak and Ponderosa Pine-Gambel Oak PNVTs and includes direction for 25,000 to 50,000 acres of prescribed fire within Ponderosa Pine-Evergreen Oak and Ponderosa Pine-Gamble Oak during the 10 years following plan approval. Of the 49,052 acres of Ponderosa Pine-Gamble-Oak where MSO is found, there are about 9,000 acres of protected habitat and almost 10,000 acres of recovery habitat forestwide. In 10 years, for the entire 49,000 plus acres of Ponderosa Pine-Gamble Oak, about 10,000 acres would have experienced prescribed fire.

The preferred alternative would move Ponderosa Pine-Gamble Oak toward desired conditions. The process is slow due to the longevity of the primary species, ponderosa pine. Treatments in the proposed LRMP would put the vegetation on a trajectory that would move towards the stated desired conditions. Vegetation modeling was completed for 20 and 40 years post-plan implementation in an effort to display a meaningful change in vegetative conditions. Modeling vegetation changes within 10 to 15 years of planned treatments may not be discernible due to the slow changing nature of the long-lived ponderosa pine. Approaching 34 percent resemblance of desired conditions would include increased proportion of large over-story or old trees within the PNVT. Reducing the closed canopy states from about 90 percent of Ponderosa Pine-Gamble Oak to 77 percent of Ponderosa Pine-Gamble Oak in the first 20 years would reduce the total number of trees across the landscape and increase grasses, forbs, and shrubs in the understory. Increasing the amount and quality of prey species habitat in the understory would inherently increase the quantity and quality of foraging habitat for MSO across the landscape.

The vegetative conditions within the ponderosa pine PNVTs will shift from the existing closed canopy conditions toward desired, more open canopy conditions. The largest shift would be the increase in seedling/sapling stage. The second most considerable change in vegetative conditions would be the increase in open canopied areas with medium/large trees. The existing number of acres of medium/large trees with a closed canopy exceeds the LRMP desired amounts and would only decrease by a small proportion within 40 years of implementing the proposed LRMP due to the longevity of ponderosa pine trees and their slow response to treatments.

Nesting and roosting habitat for MSO would be considered the medium/large trees with closed canopy in the Ponderosa Pine-Gambel Oak PNVT. The existing number of acres for this vegetative condition is 26,448. The desired number of acres based on historic conditions is 7,358 acres. Therefore, MSO is currently associated with a vegetative state or condition that is extremely over-represented across the landscape relative to historic proportions. The projected

change in acres of this particular combination of habitat characteristics (i.e., medium/large trees with a closed canopy) is relatively small approximately 4,000 acres, or less than 15 percent of the existing acres, would be changed over the life of the LRMP. As landscapes are restored to historic proportions, species may begin to use underrepresented and/or unavailable habitat characteristics and conditions. Desired conditions and guidelines for snags would ensure the presence of snags across the landscape. Complying with the LRMP direction for federally listed species would ensure that the current habitat requirements for MSO are met in project design and implementation.

Moving the natural habitat for MSO toward the desired condition that more closely resembles historic conditions would be expected to improve the habitat for this species across the landscape. Increasing the abundance and distribution of large trees across the landscape would provide additional nesting habitat for MSO. Reducing canopy closure and increasing understory vegetation would improve habitat for MSO prey species across the landscape. Improving these two facets of MSO habitat would be expected to have beneficial impacts to the species on the Prescott NF. Although the relative percent of Ponderosa Pine-Gamble Oak with medium/large trees with closed canopy slightly decreases in all alternatives, the improved quality of foraging habitat in the medium/large trees with open canopy may have an overall beneficial effect to MSO. The most important benefit of the proposed treatments within Ponderosa Pine-Gamble Oak is the reduced potential for landscape-scale, stand-replacing wildfires that could eliminate MSO habitat.

During implementation of projects/objectives, some tree habitat features would be negatively impacted for a short term. However, moving towards the proposed LRMP's desired conditions for Ponderosa Pine-Gamble Oak would ultimately provide additional tree habitat features across the landscape as young and mid-size/age trees are cultivated to grow into larger and/or older trees long term, both ponderosa pine and Gambel oak trees, providing nest/roost habitat for MSO.

None of the standards or guidelines for the fire/fuel program is specifically relevant to MSO or its habitat. Guide-Wildland Fire-2 is indirectly relevant as it would contribute to restoring the natural fire regime within Ponderosa Pine-Gamble Oak and reduce the risk of landscape-scale, stand replacing wildfire to MSO and its habitat.

Ongoing activities within the Fire and Fuels program include site specific projects with site specific NEPA analyses for hazardous fuels reduction and forest health, wildfire management, aviation operations, and fire prevention patrols. NEPA projects are reviewed annually to ensure current compliance with law, policy, and direction. The effects for these projects area addressed in site specific NEPA and not in this analysis.

Fire prevention patrols consist of fire personnel patrolling open roads to look for abandoned campfires and contact forest visitors. This management action would not have any discernible impacts to MSO or their use of habitat as it occurs primarily on designated roads and in dispersed camp sites, which mostly takes place outside of MSO PAC habitat on the Prescott NF. For those areas outside of MSO PAC habitat, preventing an unattended or escaped campfire from causing negative impacts to habitat would be a beneficial impact to MSO and their habitat by reducing the potential for stand-replacing wildfire in nest/roost habitat.

The impacts from wildland fire and aviation operations would be addressed in an emergency consultation relevant to the associated suppression actions and are not included in the analysis of effects to MSO or its habitat.

Recreation

The proposed LRMP has 10 objectives (Obj-8 through Obj-17) that direct Recreation program activities. None of the objectives is specifically relevant to MSO or its habitat. Obj-16 and Obj-17 could have site specific projects that occur within MSO habitat. Both objectives are designed to improve the physical condition of recreation features and minimize or eliminate any negative impacts to other resources including terrestrial habitat components. Any recreation projects potentially impacting MSO or occurring in its habitat would be developed according to Guide-WL-1 discussed above to minimize or eliminate adverse impacts to MSO.

Ongoing activities within the recreation program include: maintenance and operation of developed recreation sites; dispersed camping; recreation special use permits for a variety of activities and outfitter/guide permits for hunters, organizational camps, and several schools; and the nonmotorized trail system on the forest. Developed recreation is contained within particular areas, none of which occur in or near MSO or its habitat. Dispersed camping is allowed forestwide with only a few exceptions. Dispersed camping is not allowed within a recreation area boundary surrounding developed recreation facilities and is confined to designated dispersed campsites within the Prescott Basin. There are some areas of the Prescott NF where dispersed camping may be occurring within an MSO PAC during the breeding season, potentially having adverse effects from disturbance to MSO. Special use permits (SUPs) are reviewed by resource specialists and designed to comply with law, policy, and direction; these can occur forestwide and are in compliance with LRMP standards and guidelines. For the most part, SUPs are designed to minimize or alleviate impacts to natural, physical, and biological resources. However, situations may arise that require the SUP to take priority over the needs of the MSO and adverse impacts could occur to individuals of the species or its habitat. Nonmotorized trails occur forestwide, including within MSO habitat. Many MSO PACs with trails located within them are found to be occupied by MSO. Routine trail maintenance would occur outside of the MSO breeding season to minimize impacts to MSO. Anything beyond routine maintenance would be addressed in site specific NEPA and analyzed accordingly.

Transportation

The proposed LRMP has three objectives (Obj-20 through Obj-22) that direct Transportation program activities. The purpose of these proposed transportation objectives are to improve watershed integrity. While implementing any of these projects may have localized, short term impacts (including animal displacement or changes in current upland or riparian vegetation habitat features), site specific projects would be designed with the intent of improving physical characteristics long term, either as a means to or a result of improving watershed integrity. As a result, vegetative habitat quality would inherently be improved as uplands and riparian areas move towards desired conditions.

Implementing Obj-20 through Obj-22 would likely improve any riparian vegetation habitat features associated with the project for all wildlife species. These objectives are relevant to MSO

and its habitat only where they might occur within MSO habitat. All of the objectives are designed to improve the physical condition of watershed integrity and alleviate or eliminate any negative impacts from transportation facilities to other resources including riparian and terrestrial habitat components. None of the transportation guidelines is specifically relevant to MSO or its habitat. Any transportation project potentially impacting MSO or occurring in its habitat would be developed per Guide-WL-1 discussed above to alleviate or eliminate impacts to MSO.

Ongoing activities within the transportation program include the operation and maintenance of the transportation system on the Prescott NF which consists of roads and trails that provide access to areas on the forest including private land, structures and improvements under special use permit, recreational opportunities, and facilities that support land and resource management activities.

Open roads and trails occur within MSO habitats and PACs. Routine road and trail maintenance in MSO PACs should be typically done outside of the breeding season. These areas continue to be occupied by MSO with the ongoing use of the roads and trails. While the MSO recovery plan recommends that no new roads or construction occur within MSO PACS, the need for any future new roads, trails, or changes in type of use or location would be assessed in an interdisciplinary assessment at the site specific level for effects to MSO and their habitat. If required by the Alaska National Interest Lands Conservation Act (ANILCA), a new road could possibly be constructed in MSO habitat that could have adverse effect to the MSO.

Wilderness and Special Areas

The proposed LRMP has no objectives that direct the Wilderness and Special Areas program activities. The proposed LRMP recommends 23,000 acres for future wilderness designation adjacent to the existing 8 wilderness areas. The ongoing wilderness program includes 8 designated wilderness areas, totaling over 100,000 acres. The largest wilderness area is Sycamore Canyon Wilderness, which encompasses parts of three national forests: Prescott, Coconino, and Kaibab. Management of the area is shared among the three units. Pine Mountain Wilderness is also managed cooperatively, as it sits atop the boundary between the Prescott NF and the Tonto NF. Of the remaining six wilderness areas managed by the Prescott NF (Apache Creek, Castle Creek, Cedar Bench, Granite Mountain, Juniper Mesa, and Woodchute), Granite Mountain Wilderness receives the highest level of visitation due to its proximity to the Prescott Basin.

None of the standards or guidelines for this program area is specifically relevant to MSO or its habitat. There are no known MSO locations within wilderness or special areas on the Prescott NF. The Lorena Gulch PAC is immediately adjacent to the Castle Creek Wilderness on the west side and does not cross the boundary as the vegetation type is not contiguous. According to the revised MSO recovery plan, wilderness is no longer automatically considered “protected” habitat for MSO.

None of the potential wilderness areas are adjacent to current MSO locations on the Prescott NF, and based on the potential wilderness evaluation (Forest Service, 2011b), none of the potential wilderness areas have any recovery habitat for MSO. Therefore, any future designation of the potential areas as wilderness would not have any impacts to MSO or their habitat.

Lands and Special Uses

The proposed LRMP has two objectives (Obj-29 and Obj-30) that direct the Lands and Special Uses program activities. Both of these objectives could potentially be located in MSO habitat. Obj-29 could have beneficial effects to MSO where lands are acquired in MSO habitat. Obj-30 could have mixed impacts to MSO and its habitat as access across private parcels to NFS lands is acquired. Providing additional public access to areas currently not accessed could increase disturbance to MSO or their habitat as well as increase the risk of fire from dispersed camping. Meanwhile, acquiring access to these same areas would provide additional USFS presence and opportunities to actively manage the areas for the improvement or protection of the resources. Any lands/special uses project occurring in or impacting MSO or its habitat would be developed per Guide-WL-1 discussed above to minimize or eliminate adverse impacts to MSO.

Program guidelines relevant to MSO and its habitat include Guide-Lands-2 through 5. These guidelines include direction to consider the importance of wildlife habitat or some aspect of wildlife needs in the purpose or design of projects. Guide-Lands-5 specifically includes by reference the current USFWS and AZGFD guidelines for energy development. These guidelines would contribute to minimizing or eliminating adverse effects to any MSO or its habitat.

While the MSO recovery plan recommends that no new roads or construction occur within MSO PACS, the need for any future new roads, trails, or changes in type of use or location would be assessed in an interdisciplinary assessment at the site specific level for effects to MSO and their habitat. If required by Alaska National Interest Lands Conservation Act (ANILCA), a new road could possibly be constructed in MSO habitat that could have adverse effects to the MSO. Also, adverse effects could occur to individuals and the habitat as the result of vegetation manipulation, utility or road construction, or increased use or activity authorized through a legally mandated permit, right-of-way, or easement issued in MSO habitat.

Minerals Management

The proposed LRMP has no objectives that direct the Minerals Management program activities. Ongoing activities within the program area include various types of mining activities described below.

Existing mining activities on the Prescott NF include five mineral material contracts for removal of flagstone, one contract for schist removal, one contract for removal of decomposed granite, one limestone operation with an approved commercial plan of operations, and numerous recreational gold placer mining operations. Approved mining includes any anticipated surface disturbance associated with underground mining operations and all surface mining activities including: exploration drill holes, small scale prospecting, active mining from surface quarries and pits, and mill sites. For locatable minerals, new plans of operations (and acres of new disturbance) have been fairly consistent with not much variation from year to year on the number of active mine sites or acres open at any one time, none of which are currently active in MSO habitat. However, if a plan of operation were submitted for a claim in MSO habitat, under the 1872 Mining Law, the Prescott NF would be required to process and grant a plan of operation to the claimant, potentially having adverse effects to MSO and their habitat.

Gold mining is limited to small-scale placer and/or lode mining. Placer operations involve methods such as excavation, dredging, and panning from alluvial deposits and are most common on the forest in the Bradshaw Mountains. Most placer mining is recreational use or small commercial operators; the Gold Basin Project is the only commercial mine with an approved plan of operations. Lode operations, also known as hard rock mining, consist of mining a vein bearing gold or a rock in-place valuable mineral deposit. There are 1,800 active placer claims and 1,484 active lode claims with 10 tunnel site claims. Claims can be up to 20 acres per placer claim with a maximum of 160 contiguous acres with 8 or more people (an association). Lode claims are limited to a maximum size of 1,500 feet in length along the vein or lode and width of 600 feet. Mining claims are not filed on the forest, but rather with the Bureau of Land Management. It should be noted that the vast majority of mining claims do not have any on-the-ground operations associated with them; many of them are for speculative purposes.

Copper is the most abundant metallic mineral on the Prescott NF, and there is an active plan of operation for exploratory drilling of copper on the Verde Ranger District. High demand growth is expected for copper in the United States, and this is likely to increase the interest of mining on the Prescott NF. It is anticipated that most major mineral exploration and development will occur in the Bradshaw Mountains (Bureau of Mines, 1995).

Geologic surveys and studies suggest that the highest concentrations of metallic minerals exist in the western parts of the forest. Areas with exploration potential for large tonnage deposits of copper and gold are near Copper Basin, Groom Creek, Big Bug Creek, Crooks Canyon, Crown King, and Goodwin.

There is substantial production of construction related materials (cinders, crushed stone, dimension stone, and landscape rock) on the forest. Demand tends to be highly influenced by local conditions and has varied considerably in recent years, so mining activity for these minerals has been sporadic.

None of the minerals standards or guidelines is specifically relevant to MSO or its habitat. Some may be indirectly relevant as they provide direction for associated habitat such as riparian (Guide-Locatable Minerals-1 and 2, Guide-Mineral Materials-1). Minimizing disturbance to riparian vegetation, avoiding disturbance to upland vegetation and avoiding adverse effects to riparian dependent resources would protect riparian habitat for MSO and its prey. Any Minerals project with a potential to impact MSO or its habitat would be developed per Guide-WL-1 discussed above, including breeding season timing restrictions and other relevant details to minimize or eliminate adverse effects to MSO and its habitat.

Rangeland Management

The proposed LRMP has no objectives that direct the Rangeland management program activities.

There is currently ongoing livestock grazing on the Prescott NF. The Prescott NF authorizes livestock grazing on as many as 68 allotments covering 920,779 suitable acres (73 percent of the forest). Of the 62 active grazing allotments, 19 are used seasonally (31 percent) and 43 are used yearlong (69 percent). Allotments are managed using an adaptive management strategy whereby results from long and short term monitoring are used to guide managers concerning yearly

stocking rates, pasture rotations, and whether other adjustments are needed in order to meet management objectives and desired conditions for rangelands.

Areas where grazing is excluded include: Prescott Municipal watershed (Goldwater Lake), Lane Mountain watershed, Lynx Lake and Granite Basin Recreation Areas, and the designated wild and scenic segments of the Verde River. Many MSO PACs on the Prescott NF fall within the Prescott Municipal watershed where no grazing is occurring.

Standards and guidelines for the rangeland management program are not specifically relevant to MSO or its habitat. However, Std-Range-2, Guide-Range-1, Guide-Range-5, and Guide-Range-6 do address protecting or providing for riparian habitat and other wildlife habitat needs which would indirectly protect or improve riparian and upland habitat for MSO and their prey species. This direction, in combination with the grazing guidelines in appendix C of the revised MSO recovery plan, would provide a framework for developing grazing strategies to provide for MSO recovery and its habitat needs.

Meanwhile, ongoing livestock grazing is not occurring in areas of unsatisfactory range condition. Any future livestock grazing in MSO habitat would be analyzed under site specific NEPA.

Forestry and Forest Health

The proposed LRMP has three objectives (Obj-3, Obj-5, and Obj-6) that direct the Forest Health program activities. Obj-3 is not relevant to MSO or its habitat; it is specific to piñon-juniper PNVT vegetation types where MSO is not found or known to occur. Obj-5 is specific to Ponderosa Pine-Evergreen Oak and Ponderosa Pine-Gambel Oak and includes direction for 2,500 to 8,000 acres of thin or harvest within these PNVTs during the 10 years following plan approval. Of the 49,052 acres of Ponderosa Pine-Gambel Oak where MSO is found, there are about 9,000 acres of protected activity centers and almost 10,000 acres of recovery habitat. In 10 years, about 8,000 acres of the entire 112,591 acres of both ponderosa pine PNVTs would have had some type of mechanical forest health treatment. The analysis does not project how many acres are Ponderosa Pine-Gamble Oak versus Ponderosa Pine-Evergreen Oak.

The proposed LRMP would move Ponderosa Pine-Gamble Oak toward desired conditions. The process is slow due to the longevity of the primary species, ponderosa pine. Treatments in the proposed LRMP would put the vegetation on a trajectory that would move towards the stated desired conditions. Vegetation modeling was completed for 20 and 40 years post-plan implementation in an effort to display a meaningful change in vegetative conditions. Modeling vegetation changes within 10 to 15 years of planned treatments may not be discernible due to the slow changing nature of the long-lived ponderosa pine. Approaching 34 percent resemblance of desired conditions would include increased proportion of large over-story or old trees within the PNVT. Reducing the closed canopy states from about 90 percent of Ponderosa Pine-Gamble Oak to 77 percent of Ponderosa Pine-Gamble Oak in the first 20 years would reduce the total number of trees across the landscape and increase grasses, forbs, and shrubs in the understory. The improved prey species habitat would inherently improve the quality of MSO foraging habitat.

Vegetative conditions within ponderosa pine PNVTs would shift from the existing closed canopy conditions toward desired more open canopy conditions. The largest shift would be the increase in seedling/sapling stage. The second most considerable change in vegetative conditions would be

the increase in open canopied areas with medium/large trees. The relative amounts of medium/large trees with a closed canopy, while considerably out of proportion to desired amounts, would only decrease by a small proportion within 40 years of implementing the LRMP due to the longevity of ponderosa pine trees and their slow response to treatments.

Nesting and roosting habitat for MSO would be considered the medium/large trees with a closed canopy in the Ponderosa Pine-Gambel Oak PNVT. The existing number of acres for this vegetative condition is 26,448. The desired number of acres based on historic conditions is 7,358 acres. MSO is currently associated with a vegetative state or condition that is extremely over-represented across the landscape relative to historic proportions. The projected change in acres of this particular combination of habitat characteristics (medium/large trees with a closed canopy) is relatively small in all alternatives. Approximately 4,000 acres, or less than 15 percent of the existing condition, would be changed over the life of the plan. As landscapes are restored to historic proportions, species may begin to use underrepresented and/or unavailable habitat characteristics and conditions. Desired conditions (DC-Veg-17) and guidelines (Guide-WL-4 and Guide-WL-6) for snags would ensure the presence of snags across the landscape. Complying with LRMP direction for federally listed species would ensure that the current habitat requirements for MSO are met in project design and implementation. Moving the natural habitat for MSO toward the desired condition that more closely resembles historic conditions would be expected to improve the habitat for this species across the landscape. Increasing the abundance and distribution of large trees across the landscape would provide additional nesting habitat for MSO. Reducing canopy closure and increasing understory vegetation would improve habitat for MSO prey species across the landscape. Improving these two facets of MSO habitat would be expected to have beneficial impacts to the species on the Prescott NF. Although the relative percent of Ponderosa Pine-Gamble Oak with medium/large trees with closed canopy slightly decreases in all alternatives, the improved quality of foraging habitat in the medium/large trees with open canopy may have an overall beneficial effect to MSO. The most important benefit to the proposed treatments within Ponderosa Pine-Gamble Oak is the reduction of potential for landscape-scale, stand-replacing wildfires that could eliminate MSO habitat.

In the process of implementing projects/objectives, some tree habitat features will be negatively affected in the short term. However, moving towards the desired conditions of the selected alternative for Ponderosa Pine-Gamble Oak will ultimately provide additional tree habitat features across the landscape as young and mid-size/age trees are cultivated to grow into larger and/or older trees long term.

Obj-6 could be relevant when nonnative plant populations are located within MSO habitats. Actions to treat the populations would be beneficial primarily as improvements to prey species habitats by improving them with native vegetation. Guide-WL-1 would be followed for all treatments including breeding season timing restrictions for MSO when applicable.

None of the Forest Products standards or guidelines is specifically relevant to MSO or its habitat, but they provide guidance for trending toward DC-Veg-2, a landscape level desired condition related to how and where treatments are completed rather than the desired results.

Ongoing activities within the forest health program include site specific projects with site specific NEPA analyses for hazardous fuels reduction and forest health. Forest health tools include commercial timber sales, fuelwood sales, and contracts. NEPA projects are reviewed annually to

ensure current compliance with law, policy, and direction. Any forest health project occurring in or impacting MSO or its habitat would be developed per Guide-WL-1 discussed above. As noted in the revised MSO recovery plan, recent forest management now emphasizes sustainable ecological function and a return toward presettlement fire regimes, both of which are more compatible with managing MSO and their habitat. Short term adverse effects that change the vegetation or habitat components from the existing condition are eventually transformed into long term beneficial effects of improved vegetation health and reduced risk of fire in the desired condition. While beneficial effects to prey species' habitat, also known as MSO foraging habitat, could be perceived as adverse effects to nest/roost habitat, moving the landscape towards more balanced historic conditions would be considered long term beneficial effects to the MSO.

Cumulative Effects

Non-federal activities that would impact MSO include loss of habitat through development of private inholdings for home sites. Disturbance impacts from developing private inholdings as home sites may have adverse effects to MSO and their habitat on adjacent National Forest System lands as well.

Summary of Impacts to MSO by Program (Species)

While most resource program areas would strive for long term beneficial effects to MSO or its habitat, some short term adverse effects may occur in the process of moving toward desired conditions. Some of the other programs may have long term adverse effects to the MSO through permit issuance required by law.

Table 35. Summary of impacts to Mexican spotted owl by program

Program	Short Term Impacts	Long Term Impacts
Watershed and Soils	Potential for some adverse impacts	Beneficial impacts
Wildlife/Fish/Rare Plants		
Wildland Fire and Fuels Management		
Recreation	Potential for some adverse impacts	
Transportation		
Wilderness and Special Areas	No impacts	
Lands and Special Uses	Potential for some adverse impacts	
Mineral Management		
Rangeland Management	May have some adverse impacts	
Forestry and Forest Health	May have some adverse impacts	Beneficial impacts

Determination of Effects (Species)

Impacts among the various programs for the LRMP may range from none in the Wilderness program to adverse in the Minerals, Lands, or Range programs. Based on overall impacts, however, the LRMP would result in a "May Affect, Likely to Adversely Affect" determination to the MSO.

Status of Critical Habitat within the Action Area

There are three Mexican spotted owl critical habitat polygons associated with the Prescott NF. A small portion of UGM-13 (Upper Gila Mountain) spans the boundary between the Prescott NF and the neighboring Kaibab NF in Sycamore Canyon Wilderness. None of the acres on the forest within that critical habitat unit are recovery or protected habitat as defined in the 2012 recovery plan. With no protected or recovery habitat within the UGM EMU on the forest, there is essentially no critical habitat on the Prescott NF within the UGM EMU. BRW-2 (Basin and Range-West) is on the Bradshaw Ranger District in the Prescott Basin. BRW-3 is on the Bradshaw Ranger District near Crown King. Per the Federal Register designating critical habitat, "WUI project areas, State and private lands are not designated as critical habitat" (Fish and Wildlife Service, 2004). For the BRW-2 unit, the Boundary WUI project area has been excluded from designation. For the BRW-3 unit, the Crown King/Ash Creek WUI project area is exempt from designation. The total area of NFS lands within critical habitat units on the forest is 44,814 acres. Within designated critical habitat on the forest, the total area of protected habitat is 4,058 acres, and the total area of forested nest/roost recovery habitat is 6,231 acres. The acres of riparian recovery habitat within the critical habitat have not been estimated at this time.

Critical Habitat

Critical habitat for MSO was designated by the USFWS on August 31, 2004 (Fish and Wildlife Service, 2004). Within the action area, designated critical habitat is limited to areas that meet the definition of protected and recovery habitat in the recovery plan and is within the established critical habitat units (Fish and Wildlife Service, 2004). On the Prescott NF, these areas are found in the Ponderosa Pine-Gamble Oak PNVT. There are no known MSO locations in canyon habitat on the Prescott NF.

Table 36. Primary constituent elements (PCE) for Mexican spotted owl critical habitat

PCE#	Primary Constituent Elements
PCEs Related to Forest Structure	
PCE-1	A range of tree species, including mixed conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30 percent to 45 percent of which are large trees with diameter-at-breast height (DBH) of 12 inches or more.
PCE-2	A shade canopy created by the tree branches covering 40 percent or more of the ground. Previous treatments were not expected to reduce the shaded canopy below 40 percent.
PCE-3	Large, dead trees (i.e., snags) with a DBH of at least 12 inches.

PCE#	Primary Constituent Elements
PCEs Related to Maintenance of Adequate Prey Species	
PCE-4	High volumes of fallen trees and other woody debris.
PCE-5	A wide range of tree and plant species, including hardwoods.
PCE-6	Adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration.
PCEs Related to Canyon Habitat	
PCE-7	Presence of water.
PCE-8	Clumps or stringers of mixed-conifer, pine-oak, pinyon-juniper, and/or riparian vegetation.
PCE-9	Canyon wall containing crevices, ledges, or caves.
PCE-10	High percent of ground litter and woody debris.

Effects Analysis for Critical Habitat

Watershed and Soils

The Proposed LRMP has four objectives (Obj-18, Obj-19, Obj-23, and Obj-31) that direct watershed and soils program activities. The first three objectives were assessed relevant to their general effects to riparian habitat and then as they related to MSO habitat. Obj-31 is a paper process that would have only beneficial effects to the terrestrial and aquatic physical natural resources associated with riparian habitat.

As the Watershed and Soils program improves riparian vegetation habitat features through Guide WS-3, it would maintain or enhance the range of trees species for MSO PCE-1, the shade canopy for MSO PCE-2, wide range of tree and plant species for prey in MSO PCE-5, and adequate levels of plant cover for MSO PCE-6. Woody debris, an important feature to watershed health and soil function, is addressed in Guide Soils-2 and would be managed for, and therefore, provide for MSO PCE-4.

All of these Watershed objectives are proposed for the purpose of improving watershed integrity. While implementing any of these projects may have localized, short term adverse effects including changing of current riparian vegetation habitat features, the site specific projects would be designed with the long term objective and intent of improving riparian vegetation habitat quality as either a means or a result of improving watershed integrity, thereby having long term beneficial effects to MSO PCE.

The types of projects that are ongoing and proposed within the Watershed and Soils program are typically those that improve the function and physical condition of the vegetation and the soil in both upland habitat types as well as in riparian habitats. By considering MSO recovery plan guidance, the project designs would be expected to maintain or enhance the quantity and quality

of PCE habitat components for MSO and its prey species. Guide Soils-2, in particular, would provide for MSO PCE-4.

Wildlife/Fish/Rare Plants

The Proposed LRMP has five objectives (Obj-24 through Obj-28) that direct Wildlife/Fish/Rare Plants program activities. None of the objectives for the Wildlife/Fish/Rare Plants program are relevant to MSO critical habitat and would not have any impacts to the critical habitat.

Guidelines for the Wildlife/Fish/Rare Plants program would, however, influence projects in other program areas. Guide-WL-1 is the only guideline relevant to MSO and its habitat. By applying MSO recover plan guidance to projects occurring within MSO habitat, site specific projects in these areas should provide for PCE in critical habitat. Breeding season timing restrictions and other management recommendations found in appendix C of the MSO recover plan are examples of project design features that would influence the details of site specific projects so as to minimize unwanted impacts to PCE and improve habitat quality.

A desired condition for terrestrial wildlife (DC-Wildlife-2) would provide for MSO PCE-1, 2, 5, and 6 by reference to the recovery plan and hence Table C.2 in the revised MSO recovery plan (USFWS 2012, p. 275). Oddly, this table does not include any desired conditions for snags or down woody material in these MSO habitats. MSO PCE-3 and PCE-4 would be provided by DC-Veg-17, Guide-WL-4 and Guide-WL-6, and Guide-Soils-2.

Wildland Fire and Fuels Management

The proposed LRMP has five objectives (Obj-1 through Obj-5) that direct the Wildland Fire and Fuels program activities. Obj-1 through Obj-4 are not relevant to MSO or its habitat as they are specific for vegetation types where MSO are not found or known to occur: grasslands, piñon juniper, and chaparral. Obj-5 is specific for the Ponderosa Pine-Evergreen Oak (PPE) and Ponderosa Pine-Gambel Oak (PPO) PNVTs and includes direction for 25,000 to 50,000 acres of prescribed fire within these PNVTs during the 10 years following plan approval. Of the 49,052 acres of PPO PNVT where MSO is found, there are about 9,000 acres of protected habitat and almost 10,000 acres of recovery habitat forestwide. In 10 years, for the entire 49,000 plus acres of PPO, about 10,000 acres would have experienced prescribed fire.

For the current plan revision, the proposed treatments or objectives would put the vegetation on a trajectory that would move towards the stated desired conditions. Approaching 34 percent resemblance of desired conditions would include increased proportion of large over-story or old trees within the PNVT, providing for MSO PCE-1. Reducing the closed canopy states from about 90 percent to 70 percent of PPO in the first 20 years would reduce the total number of trees across the landscape, possibly limiting MSO PCE-2, and it would increase grasses, forbs, and shrubs in the understory, thus providing for MSO PCE-5 and PCE-6.

Nesting and roosting habitat for MSO would be considered the medium/large trees with a closed canopy in the Ponderosa Pine-Gambel Oak PNVT. The existing number of acres for this vegetative condition is 26,448. The desired number of acres based on historic conditions is 7,358 acres. The projected change in acres of this particular combination of habitat characteristics (i.e.,

medium/large trees with a closed canopy) is relatively small. Approximately 4,000 acres, or less than 15 percent of the existing condition, would be changed over the life of the LRMP. As the character of acres change, the nature of the PCEs provided by those acres may also change. Desired conditions (DC-Veg-17) and guidelines (Guide-WL-4 and Guide-WL- 6) would ensure the presence of snags across the landscape, providing for MSO PCE-3.

Complying with the laws and following forest plan direction for federally listed species would ensure that the current habitat requirements for MSO are met in wildland fire and fuels project design and implementation. Moving MSO natural habitat toward desired condition that more closely resembles historic conditions would be expected to improve the habitat for this species across the landscape and provide key components of all PCEs. Increasing the abundance and distribution of large trees across the landscape would provide additional nesting habitat for MSO (MSO PCE-1). Reducing canopy closure and increasing understory vegetation would improve habitat for MSO prey species across the landscape, thus providing for MSO PCE-6. The most important benefit to the proposed treatments within PPO is the reduction of potential for large, landscape scale stand-replacing wildfires that could eliminate MSO critical habitat.

While implementing projects/objectives, some tree habitat features may experience some short term adverse effects. However, moving towards PPO desired conditions will ultimately provide additional tree habitat features across the landscape as young and mid-size/age trees are cultivated to grow into larger and/or older trees (MSO PCE-1) long term, thereby resulting in long term beneficial effects to MSO PCE.

None of the Wildland Fire and Fuels standards or guidelines is specifically relevant to MSO or its habitat. Guide-Wildland Fire-2 is indirectly relevant as it would contribute to restoring the natural fire regime within PPO and reducing the risk of large landscape scale fire to MSO critical habitat. Again, this would result in short term adverse effects to MSO PCE but long term beneficial effects.

Fire prevention patrols consist of people driving on open roads looking for abandoned campfires and making contact with forest visitors. These activities protect all PCEs from stand-replacing fire. The impacts from wildland fire and aviation operations would be addressed in an emergency consultation relevant to the associated suppression actions and are not included in the analysis of effects to MSO critical habitat.

Recreation

The proposed LRMP has 10 objectives (Obj-8 through Obj-17) that direct Recreation program activities. None of the objectives is specifically relevant to MSO or its habitat. Obj-16 and Obj-17 could have site specific projects that occur within MSO critical habitat. Both objectives are designed to improve the physical condition of recreation features and minimize or eliminate any negative impacts to other resources including terrestrial habitat components. Recreation projects potentially impacting MSO critical habitat would be developed per Guide-WL-1 (discussed above) to minimize or eliminate impacts to MSO critical habitat.

Ongoing activities within the Recreation program include developed recreation, dispersed camping; recreation special use permits for a variety of activities and outfitter/guide permits for hunters, organizational camps, and several schools; and the non-motorized trail system on the

forest. The developed recreation is contained within particular areas, none of which occur in or near MSO critical habitat. Therefore, managing snags within these areas for public safety should not impact the quantity or quality of MSO PCE-3 available for MSO. Dispersed camping is appropriate forestwide with a few exceptions. Dispersed camping is not allowed within a recreation area boundary surrounding developed recreation facilities and is confined to designated dispersed campsites within the Prescott Basin. Some of these dispersed sites may fall within MSO recovery habitat. Removing snags in designated dispersed camping areas for public safety would be limited in scope and scale so as to not have a discernible impact on the quantity or quality of snags (MSO PCE-3) available for MSO across the landscape. Special use permits (SUPs) are reviewed by resource specialists and designed to comply with law, policy, and direction. These can occur forestwide and are in compliance with LRMP standards and guidelines. Nonmotorized trails occur forestwide, including within MSO critical habitat. Based on a given SUP's purpose and need, short term adverse effects may occur to MSO habitat primarily by making it unavailable during the breeding season due to disturbance; typically not by altering the physical structure of the habitat. Maintenance of these trails would be completed with the appropriate site specific assessment including any relevant breeding season timing restrictions or vegetation considerations put forth in the MSO recovery plan through Guide-WL-1. While the overall intent of trail maintenance is to provide safe trails that protect natural resources, there may be instances where a PCE, such as a snag or down log, may need to be removed or eliminated to meet the purpose and need of trail design. The effect of moving or removing isolated individual PCEs would not be expected to have discernible impacts to the nature and character of PCEs in a given area. Ample snags and downed logs occur across the landscape of MSO critical habitat.

Considering the forested nature of MSO critical habitat, recreation activities typically have minimal impact to the physical features of vegetation associated with critical habitat PCEs. Impacts to the herbaceous understory associated with MSO PCE-6 would be very limited in scope to the immediate vicinity of recreation facilities or sites and not discernible at a landscape scale. Disturbance effects relate more to individual animals or in rendering the habitat unavailable rather than affecting the physical structure of the habitat across the landscape. Effects from planned recreation activities would not be expected to have long term negative impacts to MSO critical habitat PCEs. Future recreation trails and facilities would be designed in accordance with the LRMP, which may have some short term adverse effects and would be analyzed in detail under site specific NEPA. Project designs will reflect the project purpose and need as recreation uses increase and change in nature.

Transportation

The Proposed LRMP has three objectives (Obj-20 through Obj-22) that direct the Transportation program activities. All Transportation objectives are proposed for the purpose of improving watershed integrity. While implementing any of these projects may have localized, short term impacts including changing of current upland or riparian vegetation habitat features, site specific projects would be designed with the long term objective and intent of improving physical characteristics as either a means or a result of improving watershed integrity. The end effect would inherently be improved vegetative habitat quality as uplands and riparian areas are moved towards desired conditions.

Implementing Obj-20 through Obj-22 would likely improve any riparian vegetation habitat features associated with the project for all wildlife species. None of the objectives is specifically relevant to MSO critical habitat. Any of the objectives could have site specific projects that occur within MSO critical habitat. All objectives are designed to improve the physical condition of watershed integrity and alleviate or eliminate any negative impacts from transportation facilities to other resources including riparian and terrestrial habitat components. None of the Transportation guidelines are specifically relevant to MSO critical habitat. Any transportation project potentially impacting MSO critical habitat would be developed per Guide-WL-1 (discussed above) to alleviate or eliminate impacts to MSO critical habitat. Thus, all relevant PCEs of critical habitat would be considered in the project design.

Ongoing activities within the Transportation program include the operation and maintenance of the transportation system on the Prescott NF, which consists of roads and trails that provide access to areas on the forest including: private land, structures and improvements under special use permit, recreational opportunities, and facilities that support land and resource management activities.

Open roads and trails occur within MSO critical habitat. Routine road and trail maintenance in MSO critical habitat should be done outside of the breeding season. The effect of moving or removing isolated individual PCEs would not be expected to have discernible impacts to the nature and character of PCEs in a given area. Ample snags and downed logs occur across the landscape of MSO critical habitat. Any future new roads, trails, or changes in type of use or location would be site specifically assessed for effects to MSO critical habitat. While the MSO recovery plan recommends that no new roads or construction occur within MSO PACs, the need for any future new roads, trails, or changes in type of use or location would be addressed in an interdisciplinary assessment at the site specific level for effects to MSO critical habitat PCE. If required under Alaska National Interest Lands Conservation Act (ANILCA), a new road could be constructed that could have adverse effects to MSO CH PCE. Removing snags for public safety along roads or trails may minimally decrease the quantity of MSO PCE-3 available within critical habitat but would be limited scope given the narrow band of habitat involved. Additionally, habitat quality along roads or trails is typically diminished.

Wilderness and Special Areas

The proposed LRMP has no objectives that direct Wilderness and Special Areas program activities. The proposed LRMP would recommend 23,000 acres for future wilderness designation adjacent to the existing eight wilderness areas.

None of the standards or guidelines for this program area is specifically relevant to MSO critical habitat. There are no known MSO locations within wilderness or special areas on the Prescott NF. The Lorena Gulch PAC is immediately adjacent to the Castle Creek Wilderness and does not cross the boundary as the vegetation type is not contiguous. Under the revised MSO recovery plan (Fish and Wildlife Service, 2012), wilderness is no longer automatically considered “protected” habitat for MSO.

None of the recommended wilderness areas are adjacent to current MSO locations on the Prescott NF. Based on potential wilderness evaluations, none of the recommended wilderness areas have

any recovery habitat for MSO. Therefore, future designation of the recommended wilderness areas would not have any impacts to future management of MSO critical habitat.

Lands and Special Uses

The proposed LRMP has two objectives (Obj-29 and Obj-30) that direct Lands and Special Uses program activities. Both objectives could potentially be located in MSO critical habitat. Obj-29 could have beneficial effects to MSO critical habitat where lands are acquired in MSO critical habitat. Obj-30 could have mixed impacts to MSO critical habitat as access across private parcels to NFS lands is acquired. Providing additional public access to areas currently not accessed could increase impacts to MSO critical habitat as well as increase the risk of fire from dispersed camping. Meanwhile, acquiring access to these same areas would provide additional USFS presence and opportunities to actively manage the areas for the improvement or protection of the resources. Any Lands and Special Uses project occurring in MSO critical habitat would be developed per Guide-WL-1 (discussed above) to minimize or eliminate impacts to MSO and its habitat. It would be impossible to predict where future projects may occur and thus impossible to speculate on the potential for impacts to critical habitat PCEs; however, MSO recovery plan direction would be considered in designing all projects and would subsequently address any effects to PCEs of critical habitat.

Program guidelines relevant to MSO and its habitat include Guide-Lands-2 through Guide-Lands-5. These guidelines consider the importance of wildlife habitat or some aspect of wildlife needs in the purpose, need, or design of Lands projects. Guide-Lands-5 specifically includes by reference the current USFWS and AZGFD guidelines for energy development. These guidelines would contribute to minimizing or eliminating undesirable impacts to MSO critical habitat and associated PCEs. Generally, Lands and Special Uses projects might be expected to have short term negative impacts to physical features of individual PCEs, but they would not be expected to have long term negative impacts to PCE or critical habitat.

While the MSO recovery plan recommends that no new roads or construction occur within MSO PACs, the need for any future new roads for access to private property would be addressed in an interdisciplinary assessment at the site specific level for effects to MSO critical habitat PCE. If required under the Alaska National Interest Lands Conservation Act (ANILCA), a new road could be constructed that could have adverse effects to MSO CH PCE. Also, adverse effects could occur to the PCEs as the result of vegetation manipulation, utility or road construction, or increased use or activity authorized through a legally mandated permit, right-of-way or easement issued in MSO critical habitat. For example, any new utility corridors could drastically change the condition of the vegetation to one that may affect PCEs.

Minerals Management

The proposed LRMP has no objectives that direct the Minerals Management program activities.

Ongoing activities within the program area include various types of mining activities described previously.

None of the Minerals standards or guidelines is specifically relevant to MSO critical habitat. Some may be indirectly relevant as they provide direction for associated habitat such as riparian (Guide-Locatable Minerals-1, Guide-Locatable Minerals-2, and Guide-Mineral Materials-1). Minimizing disturbance to riparian vegetation, avoiding disturbance to upland vegetation, and avoiding adverse effects to riparian dependent resources would protect riparian habitat, thus providing for MSO PCE-1 and possibly PCE-5. Any Minerals project with a potential to impact MSO critical habitat would be developed per Guide-WL-1 (discussed above) including details relevant to the species' habitat to minimize or eliminate impacts to MSO critical habitat. Generally, Minerals projects would be expected to have short term adverse effects to physical features of individual PCEs within a limited area and would not be expected to have long term negative impacts to PCEs or critical habitat. However, if a request for a plan of operation were submitted for a claim in MSO critical habitat, under the 1872 Mining Law, the Prescott NF would be required to process and grant a plan of operation to the claimant, potentially having adverse effects to MSO critical habitat PCEs.

Rangeland Management

The Proposed LRMP has no objectives that direct the Rangeland Management program activities.

There is currently ongoing livestock grazing on the Prescott NF. The Prescott NF authorizes livestock grazing on as many as 68 allotments covering 920,779 suitable acres (73 percent of the forest). Of the 62 active grazing allotments, 19 are used seasonally (31 percent) and 43 are used yearlong (69 percent).

Areas where grazing is excluded include: Prescott Municipal watershed (Goldwater Lake), Lane Mountain watershed, Lynx Lake and Granite Basin Recreation Areas, and the designated wild and scenic segments of the Verde River. Many of the MSO PACs on the forest fall within the Prescott Municipal watershed where no grazing is occurring.

Based on the 2005 consultation for ongoing grazing in MSO critical habitat (Forest Service, 2005), there is the potential for livestock grazing to occur in MSO critical habitat on three allotments, which could potentially impact the respective MSO habitat in those areas. Because any livestock grazing would be subject to Guide-WL-1, considering MSO recovery plan in project design would continue to provide for the PCEs of critical habitat to meet the species' needs. MSO PCE -5 and PCE-6 could be potentially adversely affected for the short term and would not be adversely affected for the long term.

Standards and guidelines for the Rangeland Management program are not specifically relevant to MSO habitat. However, Std-Range-2, Guide-Range-1, Guide-Range-5, and Guide-Range-6 do address protecting or providing for riparian habitat and other wildlife habitat needs, which would indirectly protect or improve riparian and upland habitat for MSO prey species and provide for MSO PCE-5 and PCE-6. This direction, in combination with the Grazing guidelines in appendix C of the revised MSO recovery plan, would provide a framework for developing grazing strategies to provide for MSO critical habitat PCEs.

Meanwhile, ongoing livestock grazing is not occurring in areas of unsatisfactory range condition. Any future livestock grazing in MSO habitat would be analyzed under site specific NEPA.

Forestry and Forest Health

The Proposed LRMP has three objectives (Obj-3, Obj-5, and Obj-6) that direct the Forest Health program activities. Obj-3 is not relevant to MSO critical habitat as it is specific for piñon-juniper PNVTs where MSO is not found or known to occur. Critical habitat for MSO has not been designated in the piñon-juniper PNVT.

The Proposed LRMP would move PPO toward desired conditions. Although the process is slow due to the longevity of the primary species, ponderosa pine, the proposed treatments would put the vegetation on a trajectory that would move towards the stated desired conditions.

The vegetative conditions within the ponderosa pine PNVTs would shift from the existing closed canopy conditions toward desired more open canopy conditions. The largest shift is the increase in seedling/sapling stage. The second most considerable change in vegetative conditions is the increase in open canopied areas with medium/large trees. The relative amounts of medium/large trees with a closed canopy, while considerably out of proportion to desired amounts, would only decrease by a small proportion within 40 years of implementing the proposed LRMP due to the longevity of ponderosa pine trees and their slow response to treatments.

Nesting and roosting habitat for MSO would be considered the medium/large trees with closed canopy in the Ponderosa Pine-Gambel Oak PNVT. The existing number of acres for this vegetative condition is 26,448. The desired number of acres based on historic conditions is 7,358 acres. Therefore, MSO is currently associated with a vegetative state or condition that is extremely over-represented across the landscape relative to historic proportions. Approximately 4,000 acres, or less than 15 percent of the existing condition, would be changed over the life of the LRMP. Desired conditions (DC-Veg-17) and guidelines for snags (Guide-WL-4 and Guide-WL-6) would ensure the presence of snags across the landscape for MSO PCE-3. Increasing the abundance and distribution of large trees across the landscape would provide additional nesting habitat for MSO (MSO PCE-1). Reducing canopy closure and increasing understory vegetation would improve habitat for MSO prey species across the landscape (MSO PCE-6). As the character of acres change, the nature of the PCEs provided by those acres may also change. The most important benefit to the proposed treatments within PPO is the reduction of potential for large, landscape scale stand-replacing wildfires that could eliminate MSO habitat.

While implementing projects/objectives, some habitat features would be negatively impacted for a short term, namely MSO PCE-4 and PCE-6. However, moving towards the PPO desired conditions would ultimately provide additional tree habitat features across the landscape as young and mid-size/age trees are cultivated to grow into larger and/or older trees long term and the herbaceous vegetation recovers after treatments.

Obj-6 could be relevant when nonnative plant populations are located within MSO critical habitat. Actions to treat the populations would be beneficial primarily as improvements to prey species habitats by improving them with native vegetation and providing for MSO PCE-6. Guide-WL-1 would be followed for all treatments.

The total 10,289 acres of critical habitat on the Prescott NF includes acres of no activity centers where no forest health projects would occur. Also, many of the acres of protected habitat are on slopes too steep for commercial or mechanical treatments to occur. Many of the projected

changes to PPO would be expected to occur on areas of lower slopes outside of MSO critical habitat.

None of the Forest Products standards or guidelines is specifically relevant to MSO or its habitat, but they provide guidance for trending toward DC-Veg-2, a landscape level desired condition related to how and where treatments are completed rather than desired results.
Any Forest Health project occurring in or impacting MSO critical habitat would be developed per Guide-WL-1 (discussed above). As noted in the MSO recovery plan, recent forest management now emphasizes sustainable ecological function and a return toward pre-settlement fire regimes, which both are more compatible with management of MSO critical habitat. Short term adverse effects that change the vegetation or PCE components from the existing condition are eventually transformed into long term beneficial effects of improved quantity and quality of PCEs for MSO and their prey as well as reduced risk of fire.

Cumulative Effects:

MSO critical habitat is not designated on non-Federal lands. There, there would not be any expected cumulative effects to MSO critical habitat PCEs from non-Federal action.

Summary of Impacts to MSO by Program (Critical Habitat)

Table 37. Summary of impacts to Mexican spotted owl critical habitat by program

<table>
<tr><th>Program</th><th>PCE-1</th><th>PCE-2</th><th>PCE-3</th><th>PCE-4</th><th>PCE-5</th><th>PCE-6</th><th>PCE-7 to 10</th></tr>
<tr><td>Watershed and Soils</td><td colspan="6" rowspan="3">Short term adverse impacts
Long term beneficial impacts</td><td rowspan="11">No impacts</td></tr>
<tr><td>Wildlife/Fish/Rare Plants</td></tr>
<tr><td>Wildland Fire and Fuels Management</td></tr>
<tr><td>Recreation</td><td colspan="6" rowspan="2">Potential adverse impacts</td></tr>
<tr><td>Transportation</td></tr>
<tr><td>Wilderness and Special Areas</td><td colspan="6">No impacts</td></tr>
<tr><td>Lands and Special Uses</td><td colspan="6" rowspan="2">Adverse impacts, short and long term potentially</td></tr>
<tr><td>Mineral Management</td></tr>
<tr><td>Rangeland Management</td><td colspan="6">Some short term adverse impacts, not expected to be adverse in the long term</td></tr>
<tr><td>Forestry and Forest Health</td><td colspan="6">Short term adverse
Long term beneficial</td></tr>
</table>

Determination of Effects to Critical Habitat

Impacts among the various programs for the Prescott NF LRMP may range from none in the Wilderness program to adverse in the Minerals, Lands, or Forest Health programs. However, based on the overall impacts, the Prescott NF LRMP would result in a "May Affect, Likely to Adversely Affect" determination to MSO critical habitat PCEs.

Southwestern Willow Flycatcher (*Empidonax traillii extimus*) Including Designated Critical Habitat

Endangered Species Act Status:	Endangered, 1995
Recovery Plan:	Yes, 2002
Critical Habitat:	Designated, 2013
Determination of Effects (Species):	May Affect, Likely to Adversely Affect
Determination of Effects (Critical Habitat)	May Affect, Likely to Adversely Affect

Natural History and Distribution

A detailed description of the natural history and distribution of the southwestern willow flycatcher (SWWF) is in the 2002 Recovery Plan for SWWF (Fish and Wildlife Service, 2002). There have been no notable changes in natural history knowledge or distribution since then. Therefore, those discussions are incorporated by reference.

Status of the Species Rangewide and Regionwide

A thorough and detailed assessment of the status of the species rangewide and regionwide is presented in the 2011 LRMP BA for the Southwestern Region of the U.S. Forest Service (Forest Service, 2011) and is incorporated by reference.

Status of the Species within the Action Area

Occupied sites for SWWF in Arizona are located along permanent water courses, including the San Pedro, Salt, Gila, and Verde Rivers; Alamo Lake; and Tonto Creek. SWWF are historically and currently known to nest and migrate along the Verde River, from the upper part of the Verde Valley near Tavasci Marsh and Tuzigoot National Monument down through the Prescott and Tonto NFs along the Middle and Lower Verde River to just below Horseshoe Dam. Critical habitat is designated through non-Federal and Federal lands of the Verde Valley, including Prescott NF parcels in the Town of Camp Verde. Because of the checkerboard land ownership through the Verde Valley and the absence of thorough flycatcher surveys, it is difficult to know specifically how flycatchers may use specific properties, including National Forest System (NFS) lands. However, since flycatchers are known to nest in areas upstream and downstream of NFS lands in the Verde Valley, it is reasonable to expect in the absence of surveys that, at a minimum, migrating and dispersing flycatchers will occur on these NFS parcels.

SWWF habitat requirements include riparian vegetation with dense foliage from ground level to 13 feet in thickets of trees and shrubs interspersed with small openings. SWWF breeds in dense shrub and tree-dominated riparian habitats along streams or other wetlands. Slow-moving or still

surface water is very common, and saturated soils are present at or near breeding sites during non-drought years (Fish and Wildlife Service, 2002).

The extent of SWWF range on the Prescott NF is thought to be within the current designated critical habitat along the Verde River.

Designated Critical Habitat

On January 3, 2013 the USFWS published a Final Rule designating critical habitat (Fish and Wildlife Service, 2013) pursuant to the ESA, as amended, for SWWF 50 CFR Part 17 (Vol. 70 Federal Register Notice 201, 60886-61009). Critical habitat for the willow flycatcher is typically designated by stream reach or segments. All primary constituent elements can be found in the 100-year flood plain (includes space for individuals and population growth; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, and rearing; and habitats that are protected from disturbance). The breakdown of critical habitat on each forest is provided in Table 38. There are currently no known SWWF territories on the Prescott NF.

Table 38. Critical habitat distribution for southwestern willow flycatcher

Area	Estimated Acres	Percent of Total Acres
Rangewide	208,873	100.0
Arizona	79,856	38.0
Federal lands in AZ	24,387	11.7
Prescott NF*	556	0.3

* No known nesting SWWF

Critical habitat is designated on the national forests listed above. Designated critical habitat for SWFF occurs along 44.7 miles of the Verde River. Much of this habitat occurs on non-Forest Service land; the Prescott NF portion encompasses 556 acres along the Verde River. The effects to SWWF critical habitat are analyzed separately from the effects to the species.

Threats

A complete discussion of threats to SWWF and its habitat are included in the recovery plan (Fish and Wildlife Service, 2002) and the final critical habitat designation for the species (Fish and Wildlife Service, 2013). In summary, a number of threats have been identified as contributing to the endangered status of SWWF. These threats are often interrelated and include: (1) habitat loss and modification from numerous processes and activities, (2) changes in abundance of other species, in particular tamarisk and brown-headed cowbirds, (3) vulnerability of small populations to demographics and genetics, and (4) migration and winter range stresses associated with habitat quantity and quality especially in Central America.

The spread of the tamarisk leaf beetle, introduced as a biological-control agent to eradicate tamarisk, is now considered a threat to SWWF because, although an exotic species, tamarisk provides migration and nesting habitat for SWWF. Replacement of nonnative tamarisk

populations by the native riparian community would be very difficult to achieve in the foreseeable future. If existing riparian habitat that is currently dominated by tamarisk becomes degraded or removed by the beetle, the loss of this existing tamarisk habitat could lead to a significant loss of SWWF habitat within a relatively short period of time (unpublished data provided by Greg Beatty, Fish and Wildlife Service, 2010).

Climate Change

For a discussion on climate change refer to the Climate Change section of this BA. The potential effects of climate change could include loss of riparian habitats that SWWF depends on. The potential effects of climate change could include long term drought and hotter average temperatures, which could also result in a higher risk of stand-replacing fires near and within riparian habitats. However, there are no expectations of measurable changes within the temporal bounds of this action.

Effects Analysis for the Species

All of the proposed LRMP desired conditions, objectives, standards and guidelines, management area direction, and monitoring were reviewed to determine potential affects to SWWF. The following analysis is grouped by program area and includes the ongoing and future activities for the life of the plan.

Watersheds and Soils

The proposed LRMP has four objectives (Obj-18, Obj-19, Obj-23, and Obj-31) that direct Watershed and Soils program activities. These are described in detail in the front section of this document. The first three objectives were assessed relevant to their general effects to riparian habitat and then as they related to SWWF habitat. Obj-31 is a paper process to apply for instream flow water rights that does not involve any on-the-ground projects to physically manipulate the riparian habitat. Obj-31 would have only beneficial effects to the terrestrial and aquatic physical natural resources associated with riparian habitat.

Specific aspects or features of riparian habitat were not identified in the Ecological Sustainability Report (ESR). For this analysis, the assessment focuses on the “terrestrial” aspect of riparian habitat features or the vegetation associated with riparian habitats. The existing condition of the riparian habitat on the Prescott NF is a “low” departure from reference conditions; it closely resembles reference or historic conditions. There are no proposed objectives (e.g., treatments, management actions, projects) specifically for riparian habitats in the proposed LRMP.

The proposed LRMP would improve watershed resources and the associated riparian habitat (Forest Service, 2012). Guide-WS-3 would ensure that riparian areas are at least maintained in their existing condition if not improved by any projects that may impact these habitat features. Implementing Obj-18, Obj-19, and Obj-23 would likely improve riparian vegetation habitat features for all wildlife species. Obj-19 in particular could likely have the most potential to impact and improve the quality of SWWF habitat in riparian areas. Guide-WS-4 through Guide-WS-10 would provide direction for project design to avoid or minimize impacts to riparian habitat features, and thus, associated species.

The purpose of these proposed watershed objectives is to improve watershed integrity. While implementing these projects may potentially have localized, short term adverse effects (including animal displacement or changes in current riparian vegetation habitat features), site specific projects would be designed with the intent of improving the quality of riparian vegetation habitat for long term beneficial effects, either as a means to or a result of improving watershed integrity.

The types of projects that are ongoing and proposed within the watershed and soils program are typically those that improve the function and physical condition of the vegetation and the soil in both upland habitat types as well as in riparian habitats. By implementing breeding season timing restrictions and SWWF recovery plan guidance through Guide-WL-1, projects in this program area would be expected to minimize or alleviate adverse impacts to the species and the habitat for both SWWF and its prey species.

Wildlife/Fish/Rare Plants

The proposed LRMP has five objectives (Obj-24 through Obj-28) that direct Wildlife/Fish/Rare Plants program activities. None of the objectives for the Wildlife/Fish/Rare Plants program are relevant to SWWF or its habitat and would not have any impacts to the species or its habitat.

Guidelines for the Wildlife/Fish/Rare Plants program would, however, influence projects in other program areas. Guide-WL-1 is the only guideline relevant to SWWF and its habitat. By applying SWWF recovery plan guidance to projects occurring within SWWF habitat, site specific projects in these areas should contribute to the recovery of the species. Breeding season timing restrictions and other recovery actions found in the SWWF recovery plan are examples of project design features that would influence the details of site specific projects so as to alleviate or minimize unwanted impacts to the species, improve habitat quality, and contribute to the recovery of the species.

Wildland Fire and Fuels Management

The proposed LRMP has five objectives (Obj-1 through Obj-5) that direct the Wildland Fire and Fuels program activities. None of the objectives are relevant to SWWF or its habitat as they are specific for vegetation types where SWWF is not found or known to occur.

None of the Wildland Fire and Fuels standards or guidelines is specifically relevant to SWWF or its habitat. Guide-Wildland Fire-8 is indirectly relevant in as much as it would contribute to protecting riparian resources where prescribed fires may occur near riparian habitats.

The impacts from wildland fire and aviation operations would be addressed in an emergency consultation relevant to the associated suppression actions and are not included in the analysis of effects to SWFF or its habitat. Ongoing activities within the Wildland Fire and Fuels program include projects with site specific NEPA analyses for hazardous fuels reduction and forest health, wildfire management, aviation operations, and fire prevention patrols. The NEPA projects are reviewed annually to ensure current compliance with law, policy and direction. Fire prevention patrols consist of fire personnel patrolling open roads to look for abandoned campfires and contact forest visitors.

Recreation

The proposed LRMP has 10 objectives (Obj-8 through Obj-17) that direct the Recreation program activities. None of the objectives is specifically relevant to SWWF or its habitat. Any recreation projects potentially impacting SWWF or occurring in its habitat would be developed per Guide-WL-1 discussed above to alleviate or eliminate impacts to SWWF and its habitat.

Ongoing activities within the Recreation program include: developed recreation; dispersed camping; recreation special use permits for a variety of activities and outfitter/guide permits for hunters, organizational camps, and several schools; and the nonmotorized trail system on the forest. The developed recreation is contained within particular areas, none of which occur in or near SWWF or its habitat. Dispersed camping occurs forestwide with only a few exceptions. Dispersed camping is not allowed within a recreation area boundary surrounding developed recreation facilities and is confined to designated dispersed campsites within the Prescott Basin. Special use permits are reviewed by resource specialists and designed to comply with law, policy, and direction. These can occur forestwide and are in compliance with LRMP standards and guidelines. Nonmotorized trails occur forestwide, including within SWWF habitat. At this time, there are no occupied territories for SWWF on NFS lands on the Prescott NF.

Transportation

The proposed LRMP has three objectives (Obj-20 through Obj-22) that direct the Transportation program activities. The purpose of these proposed transportation objectives are to improve watershed integrity. While implementing any of these projects may have localized, short term effects, site specific projects would be designed with the intent of improving physical characteristics long term, either as a means to or a result of improving watershed integrity. As a result, vegetative habitat quality would inherently be improved as uplands and riparian areas move towards desired conditions.

Implementing Obj-20 through Obj-22 would likely improve any riparian vegetation habitat features associated with the project for all wildlife species. None of the objectives is specifically relevant to SWWF or its habitat. Any of the objectives could have site specific projects that occur within SWWF habitat. All of the objectives are designed to improve the physical condition of watershed integrity and alleviate or eliminate any negative impacts from transportation facilities, such as roads or trails, to other resources including riparian and terrestrial habitat components. None of the transportation guidelines is specifically relevant to SWWF or its habitat. Any transportation project potentially impacting SWWF or occurring in its habitat would be developed per Guide-WL-1 discussed above to alleviate or eliminate impacts to SWWF and its habitat.

Ongoing activities within the transportation program include the operation and maintenance of the transportation system on the Prescott NF which consists of roads and trails that provide access to areas on the forest including private land, structures, and improvements under special use permit, recreational opportunities, and facilities that support land and resource management activities. The motorized transportation system for the Prescott NF is composed of 29.5 miles of roads managed and maintained for passenger cars and about 1,300 miles of roads managed and maintained for high-clearance vehicles, 28 miles of roads closed to all motorized vehicles, and 408 miles of trails open to motorized vehicles less than 50 inches wide. Cross-country motorized travel is restricted to two designated areas on the Prescott NF, Alto Pit (41 acres) and Hayfield

Draw (80 acres), and for motorized big game retrieval. Motor vehicle use off of the designated system of roads, trails and areas is prohibited except as identified on the motor vehicle use map (MVUM) and as authorized by law, permits, and orders in connection with resource management and public safety. There are 2.2 miles of roads and 0.7 miles of nonmotorized trails within SWWF habitat.

Road and trail maintenance in SWWF habitat is typically done year round due to the lack of presence of SWWF. If one of these areas is occupied by SWWF, a breeding season timing restriction would be implemented according to the recovery plan guidance through Guide WL-1. Any future new roads, trails, or changes in type of use or location would be site specifically assessed for effects to SWWF and its habitat. The need for any future new roads, trails, or changes in type of use or location would be assessed in an interdisciplinary assessment at the site specific level for effects to SWWF and its habitat. If required by the Alaska National Interest Lands Conservation Act (ANILCA), a new road could possibly be constructed in SWWF habitat that could have adverse effects to the SWWF.

Wilderness and Special Areas

The proposed LRMP has no objectives that direct the Wilderness and Special Area program activities. The selected alternative recommends 23,000 acres for future wilderness designation adjacent to the existing 8 wilderness areas. The ongoing program includes 8 designated wilderness areas, totaling over 100,000 acres. The largest wilderness area is Sycamore Canyon Wilderness, which encompasses parts of three national forests: the Prescott NF, Coconino NF, and Kaibab NF. Management of the area is shared among the three units. Pine Mountain Wilderness is also managed cooperatively, as it sits atop the boundary between the Prescott NF and the Tonto NF. Of the remaining six wilderness areas managed by the Prescott NF (Apache Creek, Castle Creek, Cedar Bench, Granite Mountain, Juniper Mesa, and Woodchute), Granite Mountain Wilderness receives the highest level of visitation due to its proximity to the Prescott Basin.

None of the standards or guidelines for this program area is specifically relevant to SWWF or its habitat. There are no known SWWF locations within wilderness or special areas on the Prescott NF.

None of the potential wilderness areas are adjacent to current or potential SWWF habitat locations on the Prescott NF. Based on the potential wilderness evaluations, none of the potential wilderness areas have any habitat for SWWF. Therefore, any future designation of the potential areas as wilderness would not have any impacts to SWWF or their habitat.

Lands and Special Uses

The proposed LRMP has two objectives (Obj-29 and Obj-30) that direct the Lands and Special Uses program activities. Both of these objectives could potentially be located in SWWF habitat. Obj-29 is particularly relevant in the Verde Valley and could have beneficial effects to SWWF where lands are acquired in SWWF critical habitat. Obj-30 could have mixed impacts to SWWF and its habitat as access across private parcels to NFS lands is acquired. Providing additional public access to areas currently not accessed could increase disturbance to SWWF or their habitat from dispersed camping. Meanwhile, acquiring access to these same areas would provide

additional USFS presence and opportunities to actively manage the areas for the improvement or protection of the resources. Any lands/special uses project occurring in or impacting SWWF or its habitat would be developed per Guide-WL-1 discussed above to alleviate or eliminate impacts to SWWF.

Program guidelines relevant to SWWF and its habitat include Guide-Lands-2 through Guide-Lands-5. These all include some facet of considering the importance of wildlife habitat or some aspect of wildlife needs in the purpose, need or design of lands projects. These guidelines would all contribute to alleviating or eliminating undesirable impacts to any SWWF or its habitat. However, some adverse effects could occur to individuals and the habitat as the result of vegetation manipulation, utility or road construction, or increased use or activity authorized through a legally mandated permit, right-of-way, or easement issued in SWWF habitat.

Minerals Management

The proposed LRMP has no objectives that direct the Minerals Management program activities. Ongoing activities within the program area include various types of mining activities described below.

Existing mining activities on the Prescott NF includes five mineral material contracts for removal of flagstone, one contract for schist removal, one contract for removal of decomposed granite, one limestone operation with an approved commercial plan of operations, and numerous recreational gold placer mining operations. Approved mining includes any anticipated surface disturbance associated with underground mining operations and all surface mining activities including exploration drill holes, small scale prospecting, active mining from surface quarries and pits, and mill sites. For locatable minerals, new plans of operations (and acres of new disturbance) have been fairly consistent with not much variation from year to year on the number of active mine sites or acres open at any one time.

Gold mining is limited to small-scale placer and/or lode mining and does not occur within SWWF habitat along the Verde River.

Copper is the most abundant metallic mineral on the Prescott NF, and there is an active plan of operation for exploratory drilling of copper on the Verde Ranger District. High demand growth is expected for copper in the United States, and this is likely to increase the interest of mining on the Prescott NF. It is anticipated that most major mineral exploration and development will occur in the Bradshaw Mountains (Bureau of Mines, 1995), which is not SWWF habitat.

Geologic surveys and studies suggest that the highest concentrations of metallic minerals exist in the western parts of the forest. Areas with exploration potential for large tonnage deposits of copper and gold are near Copper Basin, Groom Creek, Big Bug Creek, Crooks Canyon, Crown King, and Goodwin, none of which are areas of SWWF habitat.

There is substantial production of construction related materials (e.g., cinders, crushed stone, dimension stone, and landscape rock) on the forest. Demand tends to be highly influenced by local conditions and has varied considerably in recent years, so mining activity for these minerals has been sporadic.

None of the minerals standards or guidelines is specifically relevant to SWWF or its habitat. Some may be indirectly relevant in as much as they provide direction for associated habitat such as riparian (Guide-Locatable Minerals-1, Guide-Locatable Minerals-2, and Guide-Mineral Materials-1). Minimizing disturbance to riparian vegetation, avoiding disturbance to upland vegetation and avoiding adverse effects to riparian dependent resources would protect riparian habitat for SWWF. Any minerals project with a potential to impact SWWF or its habitat would be developed per Guide-WL-1 discussed above including breeding season timing restrictions and other details relevant to the species and its habitat to alleviate or eliminate impacts to SWWF and its habitat. However, if a request for a plan of operation were submitted for a claim in SWWF habitat, under the 1872 Mining Law, the Prescott NF would be required to process and grant a plan of operation to the claimant, potentially having short and long adverse effects to SWWF and their habitat.

Rangeland Management

The proposed LRMP has no objectives that direct the Rangeland Management program activities.

There is currently ongoing livestock grazing on the Prescott NF. The Prescott NF authorizes livestock grazing on as many as 68 allotments covering 920,779 suitable acres (73 percent of the forest). Of the 62 active grazing allotments, 19 are used seasonally (31 percent) and 43 are used yearlong (69 percent). Allotments are managed using an adaptive management strategy whereby results from long and short term monitoring are used to guide managers concerning yearly stocking rates, pasture rotations, and whether other adjustments are needed in order to meet management objectives and desired conditions for rangelands.

Areas where grazing is excluded include: Prescott Municipal watershed (Goldwater Lake), Lane Mountain watershed, Lynx Lake and Granite Basin Recreation Areas, and the designated wild and scenic segments of the Verde River. Portions of SWWF habitat occur within the wild and scenic portions of the Verde River. None of the management area direction for the upper Verde River is specifically relevant to SWWF or its habitat. No livestock grazing currently occurs in SWWF habitat.

Standards and guidelines for the rangeland management program are not specifically relevant to SWWF or its habitat. However, Std-Range-2, Guide-Range-1, Guide-Range-5, and Guide-Range-6 do address protecting or providing for riparian habitat and other wildlife habitat needs which would indirectly protect or improve riparian habitat for SWWF and their prey species. This direction, in combination with the recovery actions listed in SWWF recovery plan through Guide-WL-1, would provide a framework for developing grazing strategies to provide for SWWF and their habitat needs. If livestock grazing were authorized in SWWF habitat, some short term adverse effects could occur to the habitat. Breeding season timing restrictions would minimize effects to individual birds. Std-Range-2 provides for seasonal grazing in riparian which would allow for breeding season timing restrictions where necessary and avoid adverse impacts to riparian habitats. Guide-Range-5 and Guide-Range-6 provide for managing livestock grazing in such a way as to maintain riparian habitat for wildlife including the SWWF.

Forestry and Forest Health

The proposed LRMP has three objectives (Obj-3, Obj-5, and Obj-6) that direct the Forest Health program activities. Obj-3 and Obj-5 are not relevant to SWWF or its habitat as they apply to upland PNVT vegetation types where SWWF is not found. If applied to any riparian situations, Obj-6 could be relevant to SWWF and its riparian habitat. Of course, Guide-WL-1 would apply, and thus, SWWF recovery plan guidance would ensure SWWF habitat needs are met and recovery plan guidance is incorporated into the project designs. Some short term adverse effects to riparian habitat may occur during project implementation. The project goals would be long term improvement of the riparian habitat providing beneficial effects to the SWWF.

None of the Forest Products standards or guidelines is specifically relevant to SWWF or its habitat.

Ongoing activities within the forest health program include site specific projects with site specific NEPA analyses for hazardous fuels reduction and forest health. Forest health tools include commercial timber sales, fuelwood sales, and contracts. Projects in this program area that may have any impact on SWWF habitat would be fuelwood sales on the upland designed to improve the watershed condition and the associated riparian habitat in the watershed. Any forest health project impacting SWWF or its habitat would be developed per Guide-WL-1 discussed above.

Cumulative Effects

A number of threats have been identified as contributing to the endangered status of SWWF. These threats are often interrelated and include: (1) habitat loss and modification from numerous processes and activities, (2) changes in abundance of other species, in particular, tamarisk and brown-headed cowbirds, (3) vulnerability of small populations to demographics and genetics, and (4) migration and winter range stresses associated with habitat quantity and quality especially in Central America.

Impacts from the LRMP include displacement of SWWF, short term adverse effects to riparian habitat components, long term adverse effects to SWWF and its habitat, as well as long term beneficial effects to SWWF habitat.

Non-Federal activities or actions contributing to these cumulative effects would include displacement of SWWF from its habitat by activities on private land, and adverse effects to SWWF riparian habitat on private land in both the short term as well as the long term. With regard to beneficial cumulative effects, where private land owners are returning their property to native riparian species, there would be short term adverse and long term beneficial impacts to the SWWF where it occurs on or adjacent to the private property.

Summary of Impacts to SWWF by Program (Species)

If the species were documented on the Prescott NF, most program areas would strive for long term beneficial effects to SWWF or its habitat. However, some short term adverse effects may occur in the process of moving toward desired conditions. Some of the other programs may have long term adverse effects to the SWWF through permit issuance required by law.

Table 39. Summary of impacts to Southwestern willow flycatcher by program

Program	Summary of Impacts
Watershed and Soils	Short term adverse and long term beneficial impacts
Wildlife/Fish/Rare Plants	
Wildland Fire and Fuels Management	
Recreation	May have both short and long term adverse impacts
Transportation	
Wilderness and Special Areas	No impacts
Lands and Special Uses	May have both short and long term adverse impacts
Mineral Management	
Rangeland Management	Short term adverse and long term beneficial impacts
Forestry and Forest Health	

Determination of Effects (Species)

If the species were documented on the Prescott NF at some time in the future, there is the possibility that certain facets of implementing the LRMP could have adverse effects to the SWWF or its habitat. Impacts among the various programs for the LRMP may range from none in the Wilderness program to adverse in the Minerals or Lands programs. Based on overall impacts, however, the LRMP would result in a "May Affect, Likely to Adversely Affect" determination to the SWWF.

Effects Analysis for Critical Habitat

For those species with designated critical habitat, the effects analysis approach identifies how the primary constituent elements (PCEs) or biological features essential to the conservation of the species are likely to be affected by the proposed LRMP. The primary constituent elements of critical habitat for SWFF are list below in Table 40.

Table 40. Southwestern willow flycatcher critical habitat – primary constituent elements

PCE#	Primary Constituent Elements
PCE-1	(1) Riparian habitat in a dynamic successional riverine environment (for nesting, foraging, migration, dispersal, and shelter) that comprises:
PCE-1a	(a) Trees and shrubs that include Gooddings willow (*Salix gooddingii*), coyote willow (*Salix exigua*), Geyers willow (*Salix geyerana*), arroyo willow (*Salix lasiolepis*), red willow (*Salix laevigata*), yewleaf willow (*Salix taxifolia*), pacific willow (*Salix lasiandra*), boxelder (*Acer negundo*), tamarisk (*Tamarix ramosissima*), Russian olive (*Eleagnus angustifolia*), buttonbush (*Cephalanthus occidentalis*), cottonwood (*Populus fremontii*), stinging nettle (*Urtica dioica*), alder (*Alnus rhombifolia, Alnus oblongifolia, Alnus tenuifolia*), velvet ash (*Fraxinus velutina*), poison hemlock (*Conium maculatum*), blackberry (*Rubus ursinus*), seep willow (*Baccharis salicifolia, Baccharis glutinosa*), oak (*Quercus agrifolia, Quercus chrysolepis*), rose (*Rosa californica, Rosa arizonica, Rosa multiflora*), sycamore (*Platinus wrightii*), false indigo (*Amorpha californica*), Pacific poison ivy (*Toxicodendron diversilobum*), grape (*Vitus arizonica*), Virginia

PCE#	Primary Constituent Elements
	creeper (*Parthenocissus quinquefolia*), Siberian elm (*Ulmus pumila*), and walnut (*Juglans hindsii*).
PCE-1b	(b) Dense riparian vegetation with thickets of trees and shrubs ranging in height from 2 m to 30 m (6 to 98 ft). Lower-stature thickets (2 to 4 m or 6 to 13 ft tall) are found at higher elevation riparian forests and tall-stature thickets are found at middle- and lower elevation riparian forests;
PCE-1c	(c) Areas of dense riparian foliage at least from the ground level up to approximately 4 m (13 ft) above ground or dense foliage only at the shrub level, or as a low, dense tree canopy;
PCE-1d	(d) Sites for nesting that contain a dense tree and/or shrub canopy (the amount of cover provided by tree and shrub branches measured from the ground) (*i.e.*, a tree or shrub canopy with densities ranging from 50 percent to 100 percent);
PCE-1e	(e) Dense patches of riparian forests that are interspersed with small openings of open water or marsh, or shorter/ sparser vegetation that creates a mosaic that is not uniformly dense. Patch size may be as small as 0.1 ha (0.25 ac) or as large as 70 ha (175 ac); and
PCE-2	(2) A variety of insect prey populations found within or adjacent to riparian floodplains or moist environments, including: flying ants, wasps, and bees (Hymenoptera); dragonflies (Odonata); flies (Diptera); true bugs (Hemiptera); beetles (Coleoptera); butterflies/moths and caterpillars (Lepidoptera); and spittlebugs (Homoptera).

Watershed and Soils

The proposed LRMP has four objectives (Obj-18, Obj-19, Obj-23, and Obj-31) that direct Watershed and Soils program activities. These are described in detail in the front section of this document. The first three objectives were assessed relevant to their general effects to riparian habitat and then as they related to SWWF critical habitat. Obj-31 is a process that involves acquiring instream flow water rights and the monitoring and reporting that goes along with those water rights. This objective does not involve making any on-the-ground decisions to modify the physical structure of the habitat. It would only have beneficial effects to the terrestrial and aquatic physical natural resources associated with riparian habitat that would benefit from the Forest Service having instream flow water rights.

There are no proposed objectives (e.g., treatments, management actions, projects) specifically for riparian PNVT habitats in the selected alternative.

The proposed LRMP would improve watershed resources and the associated riparian habitat (DEIS). Guide-WS-3 would ensure that riparian areas are at least maintained in their existing condition if not improved by any projects that may impact these habitat features, thus providing for the maintenance or improvement in quantity and quality of SWWF PCE-1a to PCE-1e and

SWWF PCE-2. Implementing Obj-18, Obj-19 and Obj-23 would likely improve riparian vegetation habitat features for all wildlife species. If implemented in SWWF critical habitat, these objectives could likely have the potential for short term adverse effects to the vegetative components of SWWF PCEs and long term beneficial effects that improve the quality of SWWF habitat in the project areas. Guide-WS-4 through Guide-WS-10 would provide direction for project design to avoid or minimize impacts to riparian habitat features, and thus, associated species' habitat.

All of these watershed objectives are proposed for the purpose of improving watershed integrity and would contribute to the long term maintenance or improvement for all SWWF PCEs through riparian habitat improvement.

The types of projects that are ongoing and proposed within the Watershed and Soils program are typically those that improve the function and physical condition of the vegetation and the soil in both upland habitat types as well as in riparian habitats. The projects would be expected to improve the condition of the riparian vegetation, and thus, provide for all aspects of SWWF PCEs in critical habitat for both SWWF and its prey species.

Wildlife/Fish/Rare Plants

The proposed LRMP has five objectives (Obj-24 through Obj-28) that direct Wildlife/Fish/Rare Plants program activities. None of the objectives for the Wildlife/Fish/Rare Plants program are relevant to SWWF or its habitat and would not have any impacts to critical habitat.

Guidelines for the Wildlife/Fish/Rare Plants program would, however, influence projects in other program areas. Guide-WL-1 is the only guideline relevant to SWWF critical habitat. By applying SWWF RP guidance to projects occurring within SWWF habitat, site specific projects in these areas should contribute to the recovery of the species by providing for all of SWWF PCEs. Recovery actions found in SWWF recover plan would be examples of project design features that would influence the details of site specific projects in such a way as to alleviate or minimize unwanted impacts to the species, improve habitat quality, and contribute to the recovery of the species.

Wildland Fire and Fuels Management

The proposed LRMP has five objectives (Obj-1 through Obj-5) that direct the Wildland Fire and Fuels program activities. None of the objectives are relevant to SWWF critical habitat as they are specific for vegetation types where SWWF critical habitat is not found or known to occur.

None of the Wildland Fire and Fuels standards or guidelines is specifically relevant to SWWF critical habitat. Guide-Wildland Fire-8 is indirectly relevant in as much as it would contribute to protecting riparian resources where prescribed fires may occur near riparian habitats, thus protecting all of SWWF PCEs.

The impacts from wildland fire and aviation operations would be addressed in an emergency consultation relevant to the associated suppression actions and are not included in the analysis of effects to SWWF critical habitat. All SWWF critical habitat is mapped as avoidance areas for retardant use. Ongoing activities within the Wildland Fire and Fuels program include site specific

projects with site specific NEPA analyses for hazardous fuels reduction and forest health, wildfire management, aviation operations, and fire prevention patrols. The NEPA projects are reviewed annually to ensure current compliance with law, policy and direction. Fire prevention patrols consist of fire personnel patrolling open roads to look for abandoned campfires and contact forest visitors.

Recreation

The proposed LRMP has 10 objectives (Obj-8 through Obj-17) that direct the Recreation program activities. None of the objectives is specifically relevant to SWWF critical habitat. Any recreation projects potentially impacting SWWF critical habitat would be developed per Guide-WL-1 discussed above to alleviate or eliminate impacts to SWWF critical habitat by providing for the continuance or maintenance of SWWF PCEs.

Ongoing activities within the Recreation program include developed recreation; dispersed camping; recreation special use permits for a variety of activities; and outfitter/guide permits for hunters, organizational camps, and several schools, and the nonmotorized trail system on the forest. The developed recreation is contained within particular areas, none of which occur in or near SWWF critical habitat. Dispersed camping occurs forestwide with only a few exceptions. Dispersed camping is not allowed within a recreation area boundary surrounding developed recreation facilities and is confined to designated dispersed campsites within the Prescott Basin. The special use permits are all reviewed by resource specialists and designed to comply with law, policy, and direction. These can occur forestwide and are in compliance with LRMP standards and guidelines. Only 0.7 miles of nonmotorized trails occur within SWWF critical habitat. Trail maintenance would not be expected to have any adverse effects to SWWF PCEs.

Transportation

The proposed LRMP has three objectives (Obj-20, Obj-21, and Obj-22) that direct the Transportation program activities. All of these Transportation objectives are proposed for the purpose of improving watershed integrity. While implementing any of these projects may have localized, short term impacts including changing of current upland or riparian vegetation habitat features, the site specific projects would all be designed with the long term objective and intent of improving physical characteristics as either a means or a result of improving watershed integrity. The end effect would inherently be improved vegetative habitat quality as uplands and riparian areas are moved towards desired conditions. These would inherently and eventually improve the quantity and quality of SWWF PCEs where they occur in riparian corridors.

Implementing these objectives would likely improve any riparian vegetation habitat features associated with the project for all wildlife species. None of the objectives is specifically relevant to SWWF critical habitat. Any of the objectives could have site specific projects that occur within SWWF critical habitat. All of the objectives are designed to improve the physical condition of watershed integrity and alleviate or eliminate any negative impacts from transportation facilities to other resources including riparian and terrestrial habitat components.

None of the Transportation guidelines is specifically relevant to SWWF critical habitat. Any transportation project potentially impacting SWWF critical habitat would be developed per

Guide-WL-1 discussed above to alleviate or eliminate impacts to SWWF critical habitat. By considering recovery actions in SWWF recovery plan, SWWF PCEs would be maintained or improved by projects occurring in SWWF critical habitat.

Ongoing activities within the Transportation program include the operation and maintenance of the transportation system on the Prescott NF which consists of roads and trails that provide access to areas on the forest including private land, structures and improvements under special use permit, recreational opportunities, and facilities that support land and resource management activities. There are 2.2 miles of roads and 0.7 miles of nonmotorized trails within SWWF critical habitat.

Open roads and trails occur within SWWF critical habitat. Road and trail maintenance in SWWF critical habitat is typically done year round due to the lack of presence of SWWF. Important aspects of SWWF critical habitat PCEs would be considered and provided for in projects involving SWWF critical habitat also through Guide-WL-1. Any future new roads, trails, or changes in type of use or location would be site specifically assessed for effects to SWWF critical habitat. Short term adverse effects to SWWF PCEs could occur during road maintenance or other management actions and would be expected to transition to long term benefits to SWWF PCEs when designed and implemented per Guide-WL-1, which would consider SWWF recovery plan management conservation measures.

Wilderness and Special Areas

The proposed LRMP has no objectives that direct the Wilderness and Special Areas program activities. The selected alternative recommends 23,000 acres for future wilderness designation adjacent to the existing 8 wilderness areas. The ongoing program includes 8 designated wilderness areas, totaling over 100,000 acres.

None of the standards or guidelines for this program area is specifically relevant to SWWF critical habitat. There is no SWWF critical habitat within wilderness or special areas on the Prescott NF.

None of the potential wilderness areas are adjacent to current SWWF critical habitat locations on the Prescott NF. Based on the potential wilderness evaluations, none of the potential wilderness areas have any habitat for SWWF. Therefore, any future designation of the potential areas as wilderness would not have any impacts to SWWF critical habitat.

Lands and Special Uses

The proposed LRMP has two Objectives (Obj-29 and Obj-30) that direct the Lands and Special Uses program activities. Both of these objectives could potentially be located in SWWF critical habitat. Obj-29 is particularly relevant in the Verde Valley and could have beneficial effects to SWWF critical habitat where lands are acquired in SWWF critical habitat. Obj-30 could have mixed impacts to SWWF critical habitat as access across private parcels to NFS lands is acquired. Providing additional public access to areas currently not accessed could increase impacts to SWWF critical habitat from dispersed camping. Meanwhile, acquiring access to these same areas would provide additional USFS presence and opportunities to actively manage the areas for the improvement or protection of the resources. Any Lands and Special Uses project occurring in or

impacting SWWF critical habitat would be developed per Guide-WL-1 discussed above to alleviate or eliminate impacts to SWWF critical habitat.

Program guidelines relevant to SWWF critical habitat include Guide-Lands-2 through Guide-Lands-5. These include some facet of considering the importance of wildlife habitat or some aspect of wildlife needs in the purpose, need, or design of Lands projects. These guidelines would all contribute to alleviating or eliminating undesirable impacts to any SWWF critical habitat as well as providing for all of SWWF PCEs. However, some adverse effects could occur to PCEs of the SWWF critical habitat as the result of vegetation manipulation, utility or road construction, or increased use or activity authorized through a legally mandated permit, right-of-way, or easement issued in SWWF habitat. Most adverse effects could hopefully be ameliorated when designed and implemented per Guide-WL-1, which would consider SWWF recovery plan management conservation measures.

Minerals Management

The proposed LRMP has no objectives that direct the Minerals Management program activities. Ongoing activities within the program area include various types of mining activities described previously.

None of the Minerals standards or guidelines is specifically relevant to SWWF critical habitat. Some may be indirectly relevant in as much as they provide direction for associated habitat such as riparian (Guide-Locatable Minerals-1, Guide-Locatable Minerals-2, and Guide-Mineral Materials-1). Minimizing disturbance to riparian vegetation, avoiding disturbance to upland vegetation and avoiding adverse effects to riparian dependent resources would protect riparian habitat and provide for maintaining or improving all of SWWF PCEs. If a request for a plan of operation were submitted for a claim in SWWF critical habitat, under the 1872 Mining Law, the Prescott NF would be required to issue a permit for a plan of operation to the claimant. Short and long term adverse effects to the vegetative components of SWWF PCEs could occur during minerals management actions. Any Minerals project with a potential to impact SWWF critical habitat would be developed per Guide-WL-1 discussed above, including recovery actions in SWWF recovery plan and other details relevant to the species habitat to minimize or eliminate impacts to SWWF critical habitat.

Rangeland Management

The proposed LRMP has no objectives that direct the Rangeland Management program activities.

There is currently ongoing livestock grazing on the Prescott NF. Areas where grazing is excluded include: Prescott Municipal watershed (Goldwater Lake), Lane Mountain watershed, Lynx Lake and Granite Basin Recreation Areas, and the designated wild and scenic segments of the Verde River. Portions of SWWF habitat occur within the wild and scenic portions of the Verde River. None of the management area direction for the upper Verde River is relevant to SWWF critical habitat.

Standards and guidelines for Rangeland Management Program are not specifically relevant to SWWF critical habitat. However, Std-Range-2, Guide-Range-1, Guide-Range-5, and Guide-Range-6 do address protecting or providing for riparian habitat and other wildlife habitat needs

which would indirectly protect or improve all of SWWF PCEs associated with riparian habitat for SWWF and their prey species. This direction, in combination with the recovery actions listed in SWWF recovery plan, would provide a framework for developing grazing strategies to provide for SWWF critical habitat. The LRMP does not preclude livestock grazing in the Prescott NF portions of the SWWF critical habitat. Herbivory of the vegetative components of SWWF PCEs would have short term adverse impacts to the critical habitat. However, any grazing strategy in SWWF critical habitat would be developed per Guide-WL-1, which would consider recovery actions in the SWWF recovery plan and be designed so as not to have any long term adverse effects to the PCE of SWWF critical habitat.

Forestry and Forest Health

The proposed LRMP has three objectives (Obj-3, Obj-5, and Obj-6) that direct the Forest Health program activities. Obj-3 and Obj-5 are not relevant to SWWF critical habitat as they apply to upland PNVT vegetation types where SWWF habitat is not found. If applied to any riparian situations, Obj-6 could be relevant to SWWF critical habitat. Short term adverse effects to the vegetative components of SWWF PCEs would be expected to occur as nonnative plants and organisms are removed. Of course, Guide WL-1 would apply, and thus, SWWF recovery plan guidance would ensure SWWF habitat needs are met and recovery actions in the recovery plan are incorporated into the project designs for long term benefits.

None of the Forest Products standards or guidelines is specifically relevant to SWWF critical habitat.

Ongoing activities within the Forest Health program include site specific projects with site specific NEPA analyses for hazardous fuels reduction and forest health. Any Forest Health project impacting SWWF critical habitat would be developed per Guide-WL-1 discussed above.

Cumulative Effects

While a number of threats have been identified as contributing to the endangered status of SWWF, those related to critical habitat on the Prescott NF include: (1) habitat loss and modification from numerous processes and activities and (2) changes in abundance of other species, in particular, tamarisk and brown-headed cowbirds. The two main categories for PCEs are nesting habitat in dense riparian understory vegetation and insect prey species associated with healthy riparian vegetation.

Impacts from the LRMP include short term adverse effects to riparian habitat components, long term adverse effects to SWWF habitat, as well as long term beneficial effects to SWWF habitat.

Non-Federal activities or actions contributing to these cumulative effects would include adverse modification of SWWF riparian habitat on private land in both the short and long terms. With regard to beneficial cumulative effects, where private land owners are returning their property to native riparian species, there would be short term adverse and long term beneficial impacts to the SWWF where it occurs on or adjacent to the private property.

Summary of Impacts to SWWF by Program (Critical Habitat)

While most program areas would strive for long term beneficial effects to SWWF critical habitat, some short term adverse effects may occur in the process of moving toward desired conditions. Some of the other programs may have long term adverse effects to the PCEs of SWWF critical habitat through permit issuance required by law.

Table 41. Summary of impacts to Southwestern willow flycatcher critical habitat by program

Program	Determination of Impacts
Watershed and Soils	Short term adverse and long term beneficial impacts
Wildlife/Fish/Rare Plants	
Wildland Fire and Fuels Management	
Recreation	Potential for both short and long term adverse impacts
Transportation	
Wilderness and Special Areas	No impacts
Lands and Special Uses	Potential for both short and long term adverse impacts
Mineral Management	
Rangeland Management	Short term adverse and long term beneficial impacts
Forestry and Forest Health	

Determination of Effects (Critical Habitat)

There is the possibility that certain facets of implementing the LRMP could have adverse effects to the primary constituent elements of SWWF critical habitat. Therefore, the Prescott NF LRMP would result in a "May Affect, Likely to Adversely Affect" determination to SWWF critical habitat.

Yellow-Billed Cuckoo (*Coccyzus americanus occidentalis*)

Endangered Species Act Status:	Proposed Threatened, 2013
Recovery Plan:	No
Critical Habitat:	Soon to be Proposed - Potential
Determination of Effects (Species):	May Affect, Likely to Adversely Affect
Determination of Effects (Potential Critical Habitat):	May Affect, Likely to Adversely Affect

Natural History and Distribution

The yellow-billed cuckoo (eastern and western populations) is a neo-tropical migrant bird that winters in South America and historically bred throughout most of continental North America, including portions of eastern and western Canada, northern and central Mexico, and the Greater Antilles (AZGFD, 2011).

The western yellow-billed cuckoo is a riparian-obligate species. Nesting and foraging habitat includes open cottonwood woodlands with an understory of dense vegetation, especially near

water. In the arid west, this type of habitat usually occurs along river corridors. Nests are usually in willows. The larger populations of western yellow-billed cuckoos in the U.S. are in Arizona and New Mexico. The species is now extirpated as a breeder in western Canada, Washington, and Oregon, and it is rare and patchily distributed throughout the areas west of the Rocky Mountains outside New Mexico and Arizona. The primary threats to the species are destruction, modification, or curtailment of its habitat or range and natural or human-made factors affecting its continued existence (Fish and Wildlife Service, 2013).

Yellow-billed cuckoos (YBC) typically occur in narrow riparian cottonwood-willow galleries and are known to use salt cedar. Dense understory foliage is an important factor in nest site selection in Arizona. YBC are also known to use mesquite bosques in Arizona.

A stick platform nest thinly lined with leaves, mesquite, cottonwood strips, grass, and catkins is built by the male and female in willow or mesquite thickets, 4 to 30 feet above ground. Clutches of 3 to 4 eggs are laid and incubated for 4 to 11 days to hatch synchronously. While young are altricial, they leave the nest in 7 to 8 days. Double clutching can occur in this species.

The Western Distinct Population nests west of the Rocky Mountains in North America, south to southern Baja California. The species migrates south in the winter to Argentina and Uruguay in South America (Terres in HDMS). Historically the species was locally common and widespread in California and Arizona, locally common in New Mexico, Oregon, and Washington, and it was uncommon in Colorado, Wyoming, Idaho, Nevada, Utah, and British Columbia in Canada.

Currently, the largest remaining population west of the Rocky Mountains is in Arizona as the species is rare in Colorado and Idaho and possibly extirpated in Nevada. There is some discussion as to whether the Texas population is more similar to the eastern than western population. Regardless, cuckoos are widespread and uncommon to common in central and eastern Texas.

The proposed Western Distinct Population of YBC includes areas west of the continental divide including parts or the entire States of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington, and Wyoming. The boundary also includes areas of southwestern British Columbia in Canada and northwestern Mexico.

Status of the Species Rangewide and within the Action Area

In the western U.S., declines in riparian habitat have been identified as the primary cause in YBC population declines. For the Western population, states average over 90 percent declines in riparian habitat and 70 percent declines nationwide. YBC is relatively common in much of the eastern U.S.

The species is generally found in southern and central Arizona and extreme northeast portion of the state. Despite declines in riparian habitats from historic levels, the cuckoo is still found in all counties in Arizona.

On the Prescott NF, YBC have been documented along the Verde River, Sycamore Creek and Little Sycamore Creek. YBC have also been documented breeding on the adjacent important bird areas (IBAs), Aqua Fria National Monument, and the Upper Verde River.

At this time, YBC is a Forest Service sensitive species and a federally proposed threatened species. Until such time as a recovery plan is completed for the species, LRMP Guide-WL-2 will direct the management for the species and its habitat. When the YBC recovery plan is completed, then Guide-WL-1 and the management recommendations of the YBC recovery plan will direct the management for the species and its habitat.

Potential Critical Habitat

Potential critical habitat has not been designated yet for the YBC; however, it is on the horizon. On the Prescott NF, YBC critical habitat would occur in two different general areas. The first main large critical habitat unit would extend from Sullivan Dam on the Verde River downstream to below Cottonwood. Potential critical habitat would also occur on the Agua Fria and its tributaries. The portions on the Prescott NF include a small piece along Ash Creek, portions of Little Ash, Sycamore, and possibly Indian Creek as well. Electronic shape files were not available at the time of this analysis to calculate miles or acres of potential critical habitat.

Threats

The USFWS have identified the following issues of concern for YBC: habitat modification and loss from dam construction and operations, water diversions, riverflow management, stream channelization and stabilization, conversion of land to agricultural uses, urban and transportation infrastructure, and increased incidence of wildfire. Other identified threats include: fluctuating availability of prey populations, increased or improper use of pesticides (e.g., insecticides impacting the prey base), and collisions with tall vertical structures during migration (Fish and Wildlife Service, 2013).

Climate Change

For a discussion on climate change refer to the Climate Change section in this BA.

The potential effects of climate change could include loss of riparian habitats that SWWF depends on and long term drought and hotter average temperatures, which could also result in a higher risk of stand-replacing fires near and within riparian habitats. However, there are no expectations of measurable changes within the temporal bounds of this action.

Effects Analysis for the Species

All of the proposed LRMP desired conditions, objectives, standards and guidelines, management area direction, and monitoring were reviewed to determine potential affects to YBC. The following analysis is grouped by program area and includes the ongoing and future activities for the life of the LRMP.

Watersheds and Soils

The proposed LRMP has four objectives (Obj-18, Obj-19, Obj-23, and Obj-31) that direct Watershed and Soils program activities. These are described in detail in the front section of this

document. The first three Objectives were assessed relevant to their general effects to riparian habitat and then as they related to YBC habitat. Obj-31 is a process to apply for instream water rights that does not involve any on-the-ground projects to physically manipulate the riparian habitat. Obj-31 would only have beneficial effects to the terrestrial and aquatic physical natural resources associated with riparian habitat.

Specific aspects or features of riparian habitat were not identified in the ESR. For the purposes of this analysis, the focus of the assessment will be on the "terrestrial" aspect of riparian habitat features, the vegetation associated with riparian habitats. The existing condition of the riparian habitat on the Prescott NF is a "low" departure from reference conditions; or, to state that another way, it closely resembles reference or historic conditions. There are no proposed objectives (treatments/management actions/projects) specifically for riparian PNVT habitats in the selected alternative.

The proposed LRMP would improve watershed resources and the associated riparian habitat (Forest Service, 2012). Guide-WS-3 would ensure that riparian areas are at least maintained in their existing condition if not improved by any projects that may impact these habitat features. Implementing Obj-18, Obj-19, and Obj-23 would likely improve riparian vegetation habitat features for all wildlife species. Obj-19 in particular could likely have the most potential to impact and improve the quality of YBC habitat in riparian areas. Guide-WS-4 through Guide-WS-10 would provide direction for project design to avoid or minimize impacts to riparian habitat features, and thus, associated species.

The purpose of these proposed watershed objectives is to improve watershed integrity. While implementing these projects may have localized, short term adverse effects (including animal displacement or changes in current riparian vegetation habitat features), site specific projects would be designed with the intent of improving the quality of riparian vegetation habitat for long term beneficial effects, either as a means to or a result of improving watershed integrity.

The types of projects that are ongoing and proposed within the watershed and soils program are typically those that improve the function and physical condition of the vegetation and the soil in both upland habitat types as well as in riparian habitats. By implementing breeding season timing restrictions, the projects would be expected to avoid unwanted impacts to nesting YBC as the actual projects improve habitat for both the YBC and its prey species.

Wildlife, Fish and Rare Plants

The proposed LRMP has five objectives (Obj-24 through Obj-28) that direct Wildlife/Fish/Rare Plants program activities. None of the objectives for the Wildlife/Fish/Rare Plants program are relevant to YBC or its habitat and would not have any impacts to the species or its habitat.

Guidelines for the Wildlife/Fish/Rare Plants program would, however, influence projects in other program areas. Until a recovery plan is written for the YBC, LRMP Guide-WL-2 will be the only guideline relevant to the YBC and its habitat. By applying design features and mitigations measures to projects occurring within YBC habitat, site specific projects in these areas should contribute to the recovery of the species. Breeding season timing restrictions and other design features would influence the details of site specific projects in such a way as to alleviate or

minimize unwanted impacts to the species, improve habitat quality, and contribute to the recovery of the species.

Wildland Fire and Fuels Management

The proposed LRMP has five objectives (Obj-1 through Obj-5) that direct the Wildland Fire and Fuels program activities. None of the objectives is relevant to the YBC or its habitat as they are specific for vegetation types where the YBC is not found or known to occur.

None of the Wildland Fire and Fuels standards or guidelines is specifically relevant to the YBC or its habitat. Guide-Wildland Fire-8 is indirectly relevant in as much as it would contribute to protecting riparian resources where prescribed fires may occur near riparian habitats. Guide-WL-2 would also provide for designing projects so that YBC and their habitat needs are addressed through breeding season timing restrictions and design features.

The impacts from wildland fire and aviation operations would be addressed in an emergency consultation relevant to the associated suppression actions and are not included in the analysis of effects to the YBC or its habitat. As it is associated with riparian corridors, YBC habitat would be mapped as retardant avoidance areas for wildland fire suppression activities.

Ongoing activities within the Wildland Fire and Fuels program include site specific projects with site specific NEPA analyses for hazardous fuels reduction and forest health, wildfire management, aviation operations, and fire prevention patrols. NEPA projects are reviewed annually to ensure current compliance with law, policy and direction. Fire prevention patrols consist of fire personnel patrolling open roads to look for abandoned campfires and contact forest visitors.

Recreation

The proposed LRMP has 10 objectives (Obj-8 through Obj-17) that direct the Recreation program activities. None of the objectives is specifically relevant to the YBC or its habitat. Any recreation projects potentially impacting YBC or occurring in its habitat would be developed per Guide-WL-2 discussed above to alleviate or eliminate impacts to YBC and its habitat.

Ongoing activities within the Recreation program include developed recreation; dispersed camping; recreation special use permits for a variety of activities; outfitter/guide permits for hunters, organizational camps, and several schools; and the nonmotorized trail system on the forest. The developed recreation is contained within particular areas, none of which occur in or near YBC or its habitat. Dispersed camping occurs forestwide with only a few exceptions. Dispersed camping is not allowed within a recreation area boundary surrounding developed recreation facilities and is confined to designated dispersed campsites within the Prescott Basin. Ongoing camping and OHV use in the Yellow Jacket area along Little Ash Creek is occurring within known occupied YBC habitat. Possible actions to address and manage the situation would be developed using Guide-WL-1 and Guide-WL-2 to implement breeding season timing restrictions and project design for YBC habitat needs. Some short term adverse effects could occur to the vegetation within the YBC habitat that may affect the species but not adversely. These would be designed to have long term beneficial effects to the habitat and the species. The special use permits are all reviewed by resource specialists and designed to comply with law,

policy and direction. These can occur forestwide and are in compliance with LRMP standards and guidelines. Nonmotorized trails occur forestwide, including within YBC habitat. Guide-Rec-7 and Guide-Rec-8 would be followed where impacts to YBC habitat are a concern. During trail maintenance, some short term adverse effects could occur to the vegetation within the YBC habitat that may affect the species but not adversely. Breeding season timing restrictions would minimize impacts to individuals.

Transportation

The proposed LRMP has three objectives (Obj-20 through Obj-22) that direct the Transportation program activities. All of these Transportation objectives are proposed for the purpose of improving watershed integrity. While implementing any of these projects may have localized, short term effects, the site specific projects would all be designed with the long term objective and intent of improving physical characteristics as either a means or a result of improving watershed integrity. The end effect would inherently be improved vegetative habitat quality as uplands and riparian areas are moved towards desired conditions.

Implementing Obj-20 through Obj-22 would likely improve any riparian vegetation habitat features associated with the project for all wildlife species. None of the objectives is specifically relevant to the YBC or its habitat. Any of the objectives could have site specific projects that occur within YBC habitat. All of the objectives are designed to improve the physical condition of watershed integrity and alleviate or eliminate any negative impacts from transportation facilities to other resources including riparian and terrestrial habitat components. Guide-WL-2 would provide for design features, including breeding season timing restrictions, to minimize adverse effects to the species.

None of the Transportation guidelines is specifically relevant to the YBC or its habitat. Guide-Trans-1 through Guide-Trans-4 would contribute to better designed projects for the YBC and its habitat. Any transportation project potentially impacting YBC or occurring in its habitat would be developed per Guide-WL-2 discussed above to alleviate or eliminate impacts to YBC and its habitat.

Ongoing activities within the Transportation program include the operation and maintenance of the transportation system on the Prescott NF which consists of roads and trails that provide access to areas on the forest including private land, structures and improvements under special use permit, recreational opportunities, and facilities that support land and resource management activities.

Open roads and trails occur within YBC habitats. Road and trail maintenance in YBC habitat would typically have a breeding season timing restriction included to eliminate disturbance impacts from maintenance activities. Any future new roads, trails, or changes in type of use or location would be site specifically assessed for effects to YBC and their habitat through Guide-WL-2. The need for any future new roads, trails, or changes in type of use or location would be assessed in an interdisciplinary assessment at the site specific level for effects to YBC and its habitat. If required by the Alaska National Interest Lands Conservation Act (ANILCA), a new road could possibly be constructed in YBC habitat that could have adverse effects to the YBC.

Ongoing camping and OHV use in the Yellow Jacket area along Little Ash Creek is occurring within known occupied YBC habitat and is adversely affecting the species and its habitat. Possible actions to address and manage the situation would be developed using Guide-WL-1 and Guide-WL-2 to implement breeding season timing restrictions and project design for YBC habitat needs. Some short term adverse effects could occur to the vegetation within the YBC habitat that may affect the species but not adversely. These would be designed to have long term beneficial effects to the habitat and the species. Nonmotorized trails occur forestwide, including within YBC habitat, and during trail maintenance, some short term adverse effects could occur to the vegetation within the YBC habitat that may affect the species but not adversely. Breeding season timing restrictions would minimize impacts to individuals.

Wilderness and Special Areas

The proposed LRMP has no objectives that direct the Wilderness and Special Areas program activities. The selected alternative recommends 23,000 acres for future wilderness designation adjacent to the existing 8 wilderness areas.

None of the standards or guidelines for this program area is specifically relevant to the YBC or its habitat. There are a few known YBC locations within the southern portion of the Sycamore Canyon wilderness on the Prescott NF.

The Sycamore Canyon Contiguous A Potential Wilderness Area contains current YBC locations and is adjacent to additional YBC habitat locations on the Prescott NF. Any future designation of the potential areas as wilderness would not be expected to have any impacts to YBC or their habitat.

Lands and Special Uses

The proposed LRMP has two objectives (Obj-29 and Obj-30) that direct the Lands and Special Uses program activities. Both of these objectives could potentially be located in YBC habitat. Obj-29 is particularly relevant in the Verde Valley and could have beneficial effects to YBC where lands are acquired in YBC habitat. Obj-30 could have mixed impacts to YBC and its habitat as access across private parcels to NFS lands is acquired. Providing additional public access to areas currently not accessed could increase disturbance to YBC or their habitat from dispersed camping. Meanwhile, acquiring access to these same areas would provide additional USFS presence and opportunities to actively manage the areas for the improvement or protection of the resources. Any Lands and Special Uses project occurring in or impacting YBC or its habitat would be developed per Guide-WL-2 discussed above to alleviate or eliminate impacts to YBC.

Program guidelines relevant to the YBC and its habitat include Guide-Lands-2 through Guide-Lands-5. These all include some facet of considering the importance of wildlife habitat or some aspect of wildlife needs in the purpose, need, or design of Lands projects. These guidelines would all contribute to alleviating or eliminating undesirable impacts to any YBC or its habitat. However, some short and long term adverse effects could occur to individuals and the habitat as the result of vegetation manipulation, utility or road construction, or increased use or activity authorized through a legally mandated permit, right-of-way, or easement issued in YBC habitat.

Minerals Management

The proposed LRMP has no objectives that direct the Minerals Management program activities. Ongoing activities within the program area include various types of mining activities described previously.

Gold mining is limited to small-scale placer and/or lode mining and does not occur within YBC habitat along the Verde River or the Agua Fria tributaries.

Copper is the most abundant metallic mineral on the Prescott NF, and there is an active plan of operation for exploratory drilling of copper on the Verde Ranger District. High demand growth is expected for copper in the United States, and this is likely to increase the interest of mining on the Prescott NF. It is anticipated that most major mineral exploration and development will occur in the Bradshaw Mountains (Bureau of Mines, 1995), which is not YBC habitat.

Geologic surveys and studies suggest that the highest concentrations of metallic minerals exist in the western parts of the forest. Areas with exploration potential for large tonnage deposits of copper and gold are near Copper Basin, Groom Creek, Big Bug Creek, Crooks Canyon, Crown King, and Goodwin, none of which are areas of YBC habitat.

There is substantial production of construction related materials (e.g., cinders, crushed stone, dimension stone, and landscape rock) on the forest. Demand tends to be highly influenced by local conditions and has varied considerably in recent years, so mining activity for these minerals has been sporadic.

None of the Minerals standards or guidelines is specifically relevant to the YBC or its habitat. Some may be indirectly relevant in as much as they provide direction for associated habitat such as riparian (Guide-Locatable Minerals-1, Guide-Locatable Minerals-2, and Guide-Mineral Materials-1). Minimizing disturbance to riparian vegetation, avoiding disturbance to upland vegetation and avoiding adverse effects to riparian dependent resources would protect riparian habitat for YBC. Any Minerals project with a potential to impact YBC or its habitat would be developed per Guide-WL-2 discussed above including breeding season timing restrictions and other details relevant to the species and its habitat to alleviate or eliminate impacts to YBC and its habitat. However, if a request for a plan of operation were submitted for a claim in YBC habitat, under the 1872 Mining Law, the Prescott NF would be required to process and grant a plan of operation to the claimant, potentially having short and long adverse effects to the YBC and its habitat.

Rangeland Management

The proposed LRMP has no objectives that direct the Rangeland Management program activities.

There is currently ongoing livestock grazing on the Prescott NF. Areas where grazing is excluded include: Prescott Municipal watershed (Goldwater Lake), Lane Mountain watershed, Lynx Lake and Granite Basin Recreation Areas, and the designated wild and scenic segments of the Verde River. YBC habitat occurs within the wild and scenic portions of the Verde River. None of the Management Area direction for the upper Verde River is relevant to the YBC or its habitat. Livestock grazing is currently occurring in occupied YBC habitat in the Agua Fria tributaries along Sycamore Creek, Ash Creek, and Little Ash Creek near Dugas, AZ on the Verde Ranger

District. Proper livestock grazing that incorporates direction from the LRMP may have some short term adverse effects to YBC or their habitat. However, per Std-Range-2, any livestock grazing in riparian habitat would avoid yearlong grazing to prevent adverse impacts to water quality and riparian habitat in those areas.

Standards and guidelines for Rangeland Management Program are not specifically relevant to YBC or its habitat. However, Std-Range-2, Guide-Range-1, Guide-Range-5, and Guide-Range-6 do address protecting or providing for riparian habitat and other wildlife habitat needs which would indirectly protect or improve riparian habitat for YBC and their prey species. This direction, in concert with the design features developed for YBC and its habitat per Guide WL-2, would provide a framework for developing grazing strategies to provide for YBC and their habitat needs.

Forestry and Forest Health

The proposed LRMP has three objectives (Obj-3, Obj-5, and Obj-6) that direct the Forest Health program activities. Obj- 3 and Obj-5 are not relevant to the YBC or its habitat as they apply to upland PNVT vegetation types where the YBC is not found. If applied to any riparian situations, Obj-6 could be relevant to the YBC and its riparian habitat. In the process of removing nonnative plants or organisms, some short term adverse effects could occur to YBC habitat that may affect the species and may be expected to adversely affect individuals in the short term. Of course, Guide WL-2 would apply, and thus, design features developed for YBC and its habitat would ensure YBC habitat needs are met and incorporated into the project designs. Thus, long term effects would be expected to be beneficial for the habitat as well as the species.

None of the Forest Products standards or guidelines is specifically relevant to the YBC or its habitat.

Ongoing activities within the Forest Health program include site specific projects with site specific NEPA analyses for hazardous fuels reduction and forest health. Forest health tools include commercial timber sales, fuelwood sales, and contracts. The projects in this program area that may have any impact on YBC habitat would be fuelwood sales on the upland designed to improve the watershed condition and the associated riparian habitat in the watershed. Any Forest Health project impacting YBC or its habitat would be developed per Guide-WL-2 (discussed above).

Cumulative Effects

The USFWS have identified the following as issues of concern for YBC: habitat modification and loss from dam construction and operations, water diversions, riverflow management, stream channelization and stabilization, conversion of land to agricultural uses, urban and transportation infrastructure, and increased incidence of wildfire. Other identified threats include: fluctuating availability of prey populations, increased or improper use of pesticides (e.g., insecticides impacting the prey base), and collisions with tall vertical structures during migration (Fish and Wildlife Service, 2013).

Effects from projects developed under the proposed LRMP would not be similar to the effects from these threats; therefore, the proposed LRMP would not contribute to cumulative effects for the YBC.

Impacts from the LRMP include displacement of YBC, short term adverse effects to riparian habitat components, long term adverse effects to YBC and its habitat, as well as long term beneficial effects to YBC habitat.

Non-Federal activities or actions contributing to these cumulative effects would include displacement of YBC from its habitat by activities on private land and adverse effects to YBC riparian habitat on private land in both the short and long terms. With regard to beneficial cumulative effects, where private land owners are returning their property to native riparian species, there would be short term adverse and long term beneficial impacts to the YBC where it occurs on or adjacent to the private property.

Summary of Impacts to YBC by Program (Species)

While most program areas would strive for long term beneficial effects to YBC or its habitat, some short term adverse effects may occur in the process of moving toward desired conditions. Some of the other programs may have long term adverse effects to the YBC through permit issuance required by law.

Table 42. Summary of impacts to yellow-billed cuckoo by program

Program	Determination of Impacts
Watershed and Soils	Short term adverse and long term beneficial impacts
Wildlife/Fish/Rare Plants	
Wildland Fire and Fuels Management	
Recreation	May have both short and long term adverse impacts
Transportation	
Wilderness and Special Areas	No impacts
Lands and Special Uses	May have both short and long term adverse impacts
Mineral Management	
Rangeland Management	Short term adverse and long term beneficial impacts
Forestry and Forest Health	

Determination of Effects (Species)

Impacts among the various programs for the LRMP may range from none in the Wilderness program to adverse in the Minerals or Lands programs. Based on overall impacts, however, the LRMP would result in a “May Affect, Likely to Adversely Affect” determination to the YBC.

Effects Analysis for Potential Critical Habitat

For a species with potential critical habitat, the effects analysis approach identifies how the potential primary constituent elements (PCEs) or biological features essential to the conservation of the species are likely to be affected by the proposed LRMP.

Potential Primary Constituent Elements

The potential primary constituent elements (PCEs) of the physical or biological features essential to the conservation of the western yellow-billed cuckoo consist of three components as described in Table 43.

Table 43. Western yellow-billed cuckoo critical habitat – proposed primary constituent elements

PCE #	Potential Primary Constituent Elements
PCE-1	Riparian woodlands with mixed willow-cottonwood vegetation, mesquite-thorn-forest vegetation, tamarisk woodland vegetation, or a combination of these that contain habitat for nesting and foraging in contiguous or nearly contiguous patches, that are greater than 325 feet (100 meters) in width, 100 acres (40 hectares) or more in extent. These habitat patches contain one or more nesting groves, generally willow-dominated, with above average canopy closure (greater than 70 percent) and a cooler, more humid environment than the surrounding riparian and uplands habitats.
PCE-2	Presence of a prey base consisting of large insect fauna (e.g., cicadas, caterpillars, katydids, grasshoppers, large beetles, dragonflies) and tree frogs for adults and young in breeding areas during the nesting season and in post-breeding dispersal areas.
PCE-3	River systems that are dynamic and provide hydrologic processes that encourage sediment movement and deposits that allow seedling germination and promote plant growth, maintenance, health and vigor. This allows habitat to regenerate at regular intervals, leading to riparian vegetation with variously aged patches from young to old. These dynamic riverine processes are considered essential for developing and maintaining PCE-1 and PCE-2.

Watersheds and Soils

The proposed LRMP has four objectives (Obj-18, Obj-19, Obj-23, and Obj-31) that direct Watershed and Soils program activities. These are described in detail in the front section of this BA. The first three objectives were assessed relevant to their general effects to riparian habitat and then as they related to YBC potential critical habitat. Obj-31 is a process that involves acquiring instream flow water rights and completing the monitoring and reporting that goes along with those water rights. This objective does not involve making any on-the-ground decisions to modify the physical structure of the habitat. It would only have beneficial effects to the terrestrial and aquatic physical natural resources associated with riparian habitat.

There are no proposed objectives (e.g., treatments, management actions, projects) specifically for riparian PNVT habitats in the selected alternative.

The proposed LRMP would improve watershed resources and the associated riparian habitat (Forest Service, 2012). Guide-WS-3 would ensure that riparian areas are at least maintained in their existing condition if not improved by any projects that may impact these habitat features, thus providing for the maintenance or improvement in quantity and quality of YBC PCE-1 and thus YBC PCE-2. Implementing Obj-18, Obj-19 and Obj-23 would likely improve riparian vegetation habitat features for all wildlife species. If located in YBC potential critical habitat, Obj-19 in particular could likely have the potential to impact and improve the quality of YBC habitat in the project areas. Some short term adverse effects to the vegetation associated with potential PCEs might be expected during implementation, followed by long term beneficial effects to potential PCEs. Guide-WS-4 through Guide-WS-10 would provide direction for project design to avoid or minimize impacts to riparian habitat features, and thus, associated species' habitat.

All of these Watershed objectives are proposed for the purpose of improving watershed integrity and would contribute to the long term maintenance or improvement for all YBC potential PCEs through riparian habitat improvement.

The types of projects that are ongoing and proposed within the watershed and soils program are typically those that improve the function and physical condition of the vegetation and the soil in both upland habitat types as well as in riparian habitats. The projects would be expected to improve the condition of the riparian vegetation and thus provide for all aspects of YBC potential PCEs in potential critical habitat for both the YBC and its prey species.

Wildlife, Fish and Rare Plants

The proposed LRMP has five objectives (Obj-24 through Obj-28) that direct Wildlife/Fish/Rare Plants program activities. None of the objectives for the Wildlife/Fish/Rare Plants program are relevant to YBC or its habitat and would not have any impacts to potential critical habitat.

Guidelines for the Wildlife/Fish/Rare Plants program would, however, influence projects in other program areas. Guide-WL-2 is the only guideline relevant to the YBC potential critical habitat. By applying design features specific for YBC to projects occurring within YBC habitat, site specific projects in these areas should contribute to the recovery of the species by providing for all of the YBC PCEs. Prescriptions to maintain or improve the PCE of potential critical habitat would be an example of project design features that would influence the details of site specific projects in such a way as to alleviate or minimize unwanted impacts to the species, improve habitat quality, and contribute to the recovery of the species.

Wildland Fire and Fuels Management

The proposed LRMP has five objectives (Obj-1 through Obj-5) that direct the Wildland Fire and Fuels program activities. None of the objectives is relevant to YBC potential critical habitat as they are specific for vegetation types where YBC potential critical habitat is not found or known to occur.

None of the Wildland Fire and Fuels standards or guidelines is specifically relevant to YBC potential critical habitat. Guide-Wildland Fire-8 is indirectly relevant in as much as it would

contribute to protecting riparian resources where prescribed fires may occur near riparian habitats, thus protecting all of the YBC PCEs.

The impacts from wildland fire and aviation operations would be addressed in an emergency consultation relevant to the associated suppression actions and are not included in the analysis of effects to YBC potential critical habitat. All YBC potential critical habitat is mapped as avoidance areas for retardant use. Ongoing activities within the Wildland Fire and Fuels program include site specific projects with site specific NEPA analyses for hazardous fuels reduction and forest health, wildfire management, aviation operations, and fire prevention patrols. The NEPA projects are reviewed annually to ensure current compliance with law, policy and direction. Fire prevention patrols consist of fire personnel patrolling open roads to look for abandoned campfires and contact forest visitors.

Recreation

The proposed LRMP has 10 objectives (Obj-8 through Obj-17) that direct the Recreation program activities. None of the objectives is specifically relevant to YBC potential critical habitat. Any recreation projects potentially impacting YBC potential critical habitat would be developed per Guide-WL-2 discussed above to alleviate or eliminate impacts to YBC potential critical habitat by providing for the continuance or maintenance of YBC PCEs.

Ongoing activities within the Recreation program include developed recreation, dispersed camping, recreation special use permits for a variety of activities, and outfitter/guide permits for hunters, organizational camps, and several schools, and the nonmotorized trail system on the forest. The developed recreation is contained within particular areas, none of which occur in or near YBC potential critical habitat. Dispersed camping occurs forestwide with only a few exceptions. Dispersed camping is not allowed within a recreation area boundary surrounding developed recreation facilities and is confined to designated dispersed campsites within the Prescott Basin. The special use permits are all reviewed by resource specialists and designed to comply with law, policy and direction. These can occur forestwide and are in compliance with LRMP standards and guidelines.

Ongoing camping and OHV use in the Yellow Jacket area along Little Ash Creek is occurring within potential YBC critical habitat and is adversely affecting the vegetative components of the potential PCEs. Possible actions to address and manage the situation would be developed using Guide-WL-1 and Guide-WL-2 to implement project design for YBC potential PCEs. Some short term adverse effects could occur to the vegetation within the YBC habitat that may affect the potential PCEs but would not adversely modify the habitat. These would be designed to have long term beneficial effects to the habitat. Nonmotorized trails occur forestwide, including within YBC potential critical habitat. During trail maintenance, some short term adverse effects could occur to the vegetation within the YBC potential critical habitat that may affect the potential PCEs but would not adversely modify the habitat.

Transportation

The proposed LRMP has three objectives (Obj-20 through Obj-22) that direct the Transportation program activities. All of these Transportation objectives are proposed for the purpose of

improving watershed integrity. While implementing any of these projects may have localized, short term impacts including changing of current upland or riparian vegetation habitat features, the site specific projects would all be designed with the long term objective and intent of improving physical characteristics as either a means or a result of improving watershed integrity. The end effect would inherently be improved vegetative habitat quality as uplands and riparian areas are moved towards desired conditions. These would inherently and eventually improve the quantity and quality of YBC PCEs where they occur in riparian corridors.

Implementing Obj-20 through Obj-22 would likely improve any riparian vegetation habitat features associated with the project for all wildlife species. None of the objectives is specifically relevant to the YBC potential critical habitat. Any of the objectives could have site specific projects that occur within YBC potential critical habitat. All of the objectives are designed to improve the physical condition of watershed integrity and alleviate or eliminate any negative impacts from transportation facilities to other resources including riparian and terrestrial habitat components. Some short term adverse effects might be expected to occur to potential PCEs during project implementation as vegetation is impacted. However, it would be expected that the projects would be designed to avoid long term adverse effects to YBC potential critical habitat PCEs.

None of the Transportation guidelines is specifically relevant to the YBC potential critical habitat. Any transportation project potentially impacting YBC potential critical habitat would be developed per Guide-WL-2 discussed above to alleviate or eliminate impacts to YBC potential critical habitat. By including design features specific to the YBC habitat needs, YBC PCEs would be maintained or improved by projects occurring in YBC potential critical habitat. Some short term adverse effects might be expected to occur to PCEs during project implementation as vegetation is impacted. However, it would be expected that the projects would be designed to avoid long term adverse effects to YBC potential critical habitat PCEs.

Ongoing activities within the Transportation program include the operation and maintenance of the transportation system on the Prescott NF which consists of roads and trails that provide access to areas on the forest including private land, structures and improvements under special use permit, recreational opportunities, and facilities that support land and resource management activities.

Open roads and trails occur within YBC potential critical habitat. Important aspects of YBC potential critical habitat PCEs would be considered and provided for in projects involving YBC potential critical habitat also through Guide WL-2. Any future new roads, trails, or changes in type of use or location would be site specifically assessed for effects to YBC potential critical habitat. Some short term adverse effects might be expected to occur to potential PCEs during project implementation as vegetation is impacted. However, it would be expected that the projects would be designed to avoid long term adverse effects to YBC potential critical habitat PCEs.

Wilderness and Special Areas

The proposed LRMP has no objectives that direct the Wilderness and Special Areas program activities. The selected alternative recommends 23,000 acres for future wilderness designation

adjacent to the existing 8 wilderness areas. The ongoing program includes 8 designated wilderness areas, totaling over 100,000 acres.

None of the standards or guidelines for this program area is specifically relevant to the YBC potential critical habitat. There is no YBC potential critical habitat within wilderness or special areas on the Prescott NF.

The Sycamore Canyon Contiguous A Potential Wilderness Areas contains and is adjacent to current YBC habitat locations on the Prescott NF as well as potential critical habitat along the Verde River. Any future designation of the potential areas as wilderness would not be expected to have any impacts to YBC potential critical habitat.

Lands and Special Uses

The proposed LRMP has two objectives (Obj-29 and Obj-30) that direct the Lands and Special Uses program activities. Both of these objectives could potentially be located in YBC potential critical habitat. Obj-29 is particularly relevant in the Verde Valley and could have beneficial effects to YBC potential critical habitat where lands are acquired in YBC potential critical habitat. Obj-30 could have mixed impacts to YBC potential critical habitat as access across private parcels to NFS lands is acquired. Providing additional public access to areas currently not accessed could increase impacts to YBC potential critical habitat from dispersed camping. Meanwhile, acquiring access to these same areas would provide additional USFS presence and opportunities to actively manage the areas for the improvement or protection of the resources. Any Lands and Special Uses project occurring in or impacting YBC potential critical habitat would be developed per Guide-WL-2 discussed above to alleviate or eliminate impacts to YBC potential critical habitat.

Program guidelines relevant to the YBC potential critical habitat include Guide-Lands-2 through Guide-Lands-5. These all include some facet of considering the importance of wildlife habitat or some aspect of wildlife needs in the purpose, need or design of Lands projects. These guidelines would all contribute to alleviating or eliminating undesirable impacts to any YBC potential critical habitat as well as providing for all of the YBC PCEs. However, some adverse effects could occur to the PCEs of potential critical habitat as the result of vegetation manipulation, utility or road construction, or increased use or activity authorized through a legally mandated permit, right-of-way, or easement issued in YBC potential critical habitat. There could be the potential for adverse habitat modification depending on the nature of the permit or right-of-way.

Minerals Management

The proposed LRMP has no objectives that direct the Minerals Management program activities. Ongoing activities within the program area include various types of mining activities described previously.

None of the minerals standards or guidelines is specifically relevant to the YBC potential critical habitat. Some may be indirectly relevant in as much as they provide direction for associated riparian habitat (Guide-Locatable Minerals-1, Guide-Locatable Minerals-2, Guide-Mineral Materials-1). Minimizing disturbance to riparian vegetation, avoiding disturbance to upland

vegetation and avoiding adverse effects to riparian dependent resources would protect riparian habitat and provide for maintaining or improving all of the YBC PCEs. Any Minerals project with a potential to impact YBC potential critical habitat would be developed per Guide-WL-2 discussed above, including design features with details relevant to the species' habitat, to alleviate or eliminate impacts to YBC potential critical habitat and YBC PCEs. However, if a request for a plan of operation were submitted for a claim in YBC potential critical habitat, under the 1872 Mining Law, the Prescott NF would be required to process and grant a plan of operation to the claimant, potentially having adverse effects to the PCEs of potential critical habitat for YBC.

Rangeland Management

The proposed LRMP has no objectives that direct the Rangeland Management program activities.

There is currently ongoing livestock grazing on the Prescott NF. Areas where grazing is excluded include: Prescott Municipal watershed (Goldwater Lake), Lane Mountain watershed, Lynx Lake and Granite Basin Recreation Areas, and the designated wild and scenic segments of the Verde River. Portions of YBC habitat occur within the wild and scenic portions of the Verde River. None of the management area direction for the upper Verde is relevant to the YBC potential critical habitat. Livestock grazing is currently occurring in YBC potential critical habitat in the Agua Fria tributaries along Sycamore Creek, Ash Creek, and Little Ash Creek near Dugas, AZ on the Verde Ranger District. Proper livestock grazing that incorporates direction from the LRMP may have some short term adverse effects to PCE-1 of potential critical habitat for YBC, which would also impact PCE-2. However, per Std-Range-2, any livestock grazing in riparian habitat would avoid yearlong grazing to prevent adverse impacts to water quality and riparian habitat in those areas.

Standards and guidelines for Rangeland Management Program are not specifically relevant to YBC potential critical habitat. However, Std-Range-2, Guide-Range-1, Guide-Range-5, and Guide-Range-6 do address protecting or providing for riparian habitat and other wildlife habitat needs which would indirectly protect or improve all of the YBC PCEs associated with riparian habitat for YBC and their prey species. This direction, in concert with the design features for the YBC, would provide a framework for developing grazing strategies to provide for YBC potential critical habitat.

Forestry and Forest Health

The proposed LRMP has three objectives (Obj-3, Obj-5, and Obj-6) that direct the Forest Health program activities. Obj-3 and Obj-5 are not relevant to the YBC potential critical habitat as they apply to upland PNVT vegetation types where the YBC habitat is not found. If applied to any riparian situations, Obj-6 could be relevant to the YBC potential critical habitat. In the process of removing nonnative plants or organisms, some short term adverse effects could occur to the YBC potential critical habitat PCEs and would not be expected to adversely modify the habitat. Guide WL-2 would apply, and thus, design features developed for YBC potential critical habitat PCEs would ensure YBC critical habitat needs are met and incorporated into the project designs. Thus, long term effects would be expected to be beneficial for the habitat.

None of the Forest Products standards or guidelines is specifically relevant to the YBC potential critical habitat.

Ongoing activities within the Forest Health program include site specific projects with site specific NEPA analyses for hazardous fuels reduction and forest health. Any Forest Health project impacting YBC potential critical habitat would be developed per Guide-WL-2 discussed above.

Cumulative Effects

The USFWS have identified three facets of potential critical habitat for the YBC: dense riparian vegetation for nesting, abundant insect and tree frog prey base, and dynamic riverine systems to provide the nesting and prey habitat through time.

The USFWS have identified the following issues of concern for YBC: habitat modification and loss from dam construction and operations; water diversions, riverflow management, stream channelization and stabilization, conversion of land to agricultural uses, urban and transportation infrastructure, and increased incidence of wildfire. Other threats include: fluctuating availability of prey populations, increased or improper use of pesticides (e.g., insecticides impacting the prey base), and collisions with tall vertical structures during migration (Fish and Wildlife Service, 2013).

Impacts from the LRMP include short term adverse effects to riparian habitat components, long term adverse effects to YBC habitat, as well as long term beneficial effects to YBC habitat.

Non-Federal activities or actions contributing to these cumulative effects would include adverse modification of YBC riparian habitat on private land in both the short and long terms. With regard to beneficial cumulative effects, where private land owners are returning their property to native riparian species, there would be short term adverse and long term beneficial impacts to the YBC where it occurs on or adjacent to the private property.

Summary of Impacts to YBC by Program (Potential Critical Habitat)

While most program areas would strive for long term beneficial effects to YBC potential critical habitat, some short term adverse effects may occur in the process of moving toward desired conditions. Some of the other programs may have long term adverse effects to the potential PCEs of YBC potential critical habitat through permit issuance required by law.

Table 44. Summary of impacts to yellow-billed cuckoo potential critical habitat by program

Program	Determination of Impacts
Watershed and Soils	Short term adverse and long term beneficial impacts
Wildlife/Fish/Rare Plants	
Wildland Fire and Fuels Management	
Recreation	Potential for both short and long term adverse impacts
Transportation	
Wilderness and Special Areas	No impacts
Lands and Special Uses	Potential for both short and long term adverse impacts
Mineral Management	

Program	Determination of Impacts
Rangeland Management	Short term adverse and long term beneficial impacts
Forestry and Forest Health	

Determination of Effects (Potential Critical Habitat)

There is the possibility that certain facets of implementing the LRMP could have adverse effects to the potential primary constituent elements of YBC potential critical habitat. Therefore, the Prescott NF LRMP would result in a "May Affect, Likely to Adversely Affect" determination to YBC potential critical habitat.

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Appendix A. Consultation Agreement

United States Department of Agriculture **Forest Service** **Prescott National Forest**

344 South Cortez
Prescott, AZ 86303
Phone: (928) 443-8000
Fax: (928) 443-8008
TTY: (928) 443-8001

File Code: 1920/2670
Date: May 20, 2013

Mr. Steven Spangle
Field Supervisor
US Fish and Wildlife Service
2321 W. Royale Palm Rd, Suite 103
Phoenix, AZ 85021-4951

Dear Mr. Spangle,

Enclosed you will find a signed version of the Consultation Agreement (CA) between the USDA Forest Service, Prescott National Forest and U.S. Fish and Wildlife Service, Arizona Ecological Office for Endangered Species Act section 7(a)(2) Consultation on the proposed revised Land and Resource Management Plan for the Prescott National Forest.

This CA represents numerous email, phone calls, and recent face-to-face discussions among our respective staffs and reflects the mutual cooperation and interests between our agencies regarding our responsibilities for ensuring the protection and viability of federally listed and proposed species and their critical habitats found on the Prescott National Forest.

I am confident that our respective staffs will complete the documents associated with this programmatic level consultation, as outlined in the CA, in a manner that is accurate, timely, and legally sufficient.

I appreciate your willingness to cooperate and assist the Forest Service during the consultation process. If you have questions or comments, please contact me at the Prescott National Forest headquarters office, at (928) 443-8213.

Sincerely,

/S/ THOMAS A. TORRES
THOMAS A. TORRES
Acting Forest Supervisor

cc: Gilbert Zepeda

Bob Davis

Don G DeLorenzo

CONSULTATION AGREEMENT

between

USDA Forest Service, Prescott National Forest

and

U.S. Fish and Wildlife Service, Arizona Ecological Services Office
for

Endangered Species Act Section 7(a)(2)

Consultation for the

Revised Prescott National Forest Land and Resource Management Plan

Purpose

The purpose of this Consultation Agreement (Agreement) is to facilitate Endangered Species Act (ESA) section 7(a)(2) consultation on the revised Prescott National Forest (PNF) Land and Resource Management Plan (LRMP) to establish an effective and efficient cooperative interagency framework between the PNF, the Forest Service Region 3 Regional Office (RO),

and the U.S. Fish and Wildlife Service Arizona Ecological Services Office (AESO) for conducting this consultation. The programmatic complexity and relatively short timeframe of this project necessitate upfront and frequent coordination and communication between the agencies to complete the consultation in a timely manner. This agreement will help the agencies address timeframes, personnel, and procedures for completing this consultation.

The Federal Action under Consultation

The Federal action under consultation is the revised PNF LRMP. The revised LRMP provides a programmatic framework that guides site specific projects/activities that will be designed and implemented to achieve established Desired Conditions (DCs) (statements of the ecological, economic, and social outcomes to be achieved in the future). The revised LRMP does not make site specific decisions about exactly how, when, and where activities will be carried out; however, all site specific activities must conform to the programmatic framework established in the LRMP and must meet site specific National Environmental Policy Act (NEPA) and ESA requirements. Although the revised LRMP itself does not result in direct effects to listed or proposed species and/or their designated or proposed critical habitats, there may be future direct or indirect effects resulting from project implementation on the PNF under the LRMP programmatic framework. As a result, a tiered approach to ESA section 7(a)(2) consultation will be implemented. This approach will include a consultation at the LRMP programmatic level that will result in a biological opinion (BO) with an incidental take statement and reasonable and prudent measures with implementing terms and conditions (T&Cs), as applicable. Furthermore, each site specific project/activity implemented under the revised LRMP that may affect a listed species or critical habitat will

undergo a separate ESA section 7(a)(2) consultation, which will be tiered to the programmatic level LRMP BO.

During revised LRMP development, the basis for analysis for all species has been the departure from reference conditions of the habitat. "Reference conditions" are defined as the environmental conditions that infer ecological sustainability. When available, reference conditions are represented by the *characteristic* range of variation (not the total range of variation) prior to European settlement and under the current climatic period. For many ecosystems, the range of variation also reflects human-caused disturbance and effects prior to settlement. It may also be necessary to refine reference conditions according to contemporary factors (e.g., invasive species) or projected conditions (e.g., climate change).

Desired Conditions were developed to address (i.e., reduce or stabilize) the departure from reference conditions. In order to reduce departure from reference conditions (i.e., achieve DCs), habitat is proposed to be treated at a given rate through site specific projects as expressed in the PNF LRMP objectives. If applicable, standards and guidelines are developed for the various resource programs and/or any specific species. Standards and Guidelines are then used as fine filters, in combination with the LRMP DCs and objectives, to assess effects to listed, proposed, and candidate species and their designated or proposed critical habitats in a biological assessment (BA).

The revised PNF LRMP is intended to be in effect over the planning period of 10 to 15 years. The consultation will cover up to a 15-year period or until the LRMP is revised. For this consultation, the effects of plan implementation (achieving or progressing towards desired conditions through application of standards and guidelines and treatment rates [objectives] over 15 years) will be measured against current (baseline) conditions.

This agreement will help the agencies address timeframes, personnel, procedures for completing the consultation, and outline a dispute resolution process. This consultation will be conducted under the auspices of the August 30, 2000, National Memorandum of Agreement (MOA) for Endangered Species Act § 7 Programmatic Consultation and Coordination among Bureau of Land Management, FS, National Marine Fisheries Service, and FWS. Conservation of candidate species will be promoted, as well as proposed and listed species and their proposed and designated critical habitat.

Authority

Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1544)
National Forest Management Act of 1976 (16 U.S.C. 1601-1614)

Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701-1784)

Operations

PNF and RO agree to:

- Provide technical expertise on issues relating to this project and consultation process.

- Specialists such as district biologists, planners, and program management experts may be called upon to respond to specific issues or questions pertaining to particular DCs, objectives, and standards as they relate to species or management areas within the PNF.
- Provide relevant maps, survey information, resource conditions, and other relevant information to facilitate the consultation process.
- Address the effects to all threatened, endangered, proposed, and candidate species and their proposed or designated critical habitats.
- Work cooperatively with AESO to develop the Biological Assessment (BA) and provide assistance to AESO necessary to complete the (BO).
- Conduct this consultation pursuant to the 2000 National MOA (attached).
- Provide the AESO with a 30-day time frame to review the draft BA and submit written comments.
- Provide the AESO a 135-day time frame to complete a draft BO and a final BO, unless extension of this timeframe is mutually agreed upon by the PNF, RO, and AESO. This 135-day time frame includes 90 days for developing a draft BO; a 30-day period for the PNF to comment on the draft BO; and 15 days for the AESO to develop the final BO. Formal consultation will begin when the final BA, with AESO comments and any additional information requested addressed, is received electronically by the AESO.
- Provide draft and final BAs in both hard copy and electronic (Word) formats.
- Review and provide comments to the AESO within 30 days of receiving the draft LRMP BO.

AESO agrees to:

- Provide pertinent information and technical expertise regarding all threatened, endangered, proposed, and candidate species and designated and proposed critical habitats that may be affected by the LRMP.
- Review the draft BA, and provide comments and/or make requests for specific desired additional information necessary to initiate the formal consultation process, in accordance with 50 CFR section 402.14(c), to the PNF and RO within 30 days of receiving the draft BA.
- Complete a draft BO within 90 days of receiving a complete request for formal consultation from the Forest Service and a copy of the final BA.
- Provide the draft BO to the PNF and RO in both hard copy and electronic (Word) formats.
- Complete the final LRMP BO within 14 days after receiving comments on the draft from the PNF and RO.

PNF, RO, and AESO mutually agree to:

- Participate in meetings, conference calls, etc. as needed to complete the consultation within agreed-upon time frames.
- Work cooperatively in developing the BA and BO.
- Employ early notification, if any problems arise that would affect the documents or timeframes included in this Agreement.

- Implement a dispute resolution process (as outlined below) when there is a disagreement on the completeness of the BA, determination of effects, or contents of a draft BO or conference opinion, and the issue cannot be resolved directly between agency biologists and their immediate supervisors.
- Evaluate, share information, and provide input, as needed, on consultation issues or special status species from concurrent National Forest LRMP revisions and consultations, as relevant to the consultation on the Revised PNF LRMP.
- Develop any needed conservation measures to promote recovery of listed, proposed, or candidate species that are included in the LRMP consultation.

Staffing

The agencies mutually agree to provide staffing for the consultation team as follows:

Agency	Individual	Role
Forest Service – Prescott NF	Albert Sillas	Lead biologist, Aquatics
Forest Service – Prescott NF	Noel Fletcher	Wildlife biologist
Forest Service – Region 3	----	Assistant T&E Program Lead
Forest Service – Region 3	----	T&E Program Lead
Fish & Wildlife Service - AESO	Brian Wooldridge	Lead Consultation Biologist
Fish & Wildlife Service – AESO	Shaula Hedwall	Senior Staff Biologist
Fish & Wildlife Service – AESO	Brenda Smith	Assistant Field Supervisor

Dispute Resolution Process

Every effort will be made by PNF, RO, and AESO to prevent impasses by coordinating and communicating frequently throughout the consultation process. Interagency staff members assigned to the development of the BA and BO will attempt to resolve disputes as quickly and effectively as possible. If the agency biologists and their immediate supervisors cannot resolve an issue among themselves, in the interest of timeliness, the PNF and AESO agree to elevate the issue as follows:

Agency	Level 1	Level 2	Level 3
Forest Service	Forest Supervisor, Prescott NF	RO Wildlife/Fish/Rare Plants Director, FS	Regional Forester, FS
FWS	Field Supervisor, AESO	Deputy ARD, ES, FWS	Regional Director, FWS

Effective Date

This Agreement will be effective on the date of signature. It will expire on the date the final BO has been signed and delivered to the PNF and RO.

Funding and Resources

Nothing in this Consultation Agreement shall be construed as obligating any of the parties to the expenditure of funds in excess of appropriations authorized by the law. It is understood that the level of resources to be expended under this Agreement will be consistent with the level of resources available to the agencies to support such efforts.

Disclaimer

This Agreement is intended only to manage the ESA section 7(a)(2) consultation process on the revised PNF LRMP and does not create any right or benefit, substantive or procedural, separately enforceable at law or equity by a party against the United States, its agencies or instrumentalities, its officers or employees, or any other person. Furthermore, this agreement does not create a binding enforceable commitment between the agencies but constitutes a memorandum of agreement describing how the agencies intend to cooperate in this consultation as it proceeds; therefore, this Agreement is subject to change and can be modified or supplemented if needed in the future.

Consultation Timeline

Consultation steps	***Agency***	***Calendar days***
Informal consultation actions:		
Develop draft BA	PNF	
Review draft BA and request any desired additional information necessary to initiate formal consultations.	AESO	Within 30 days of receiving draft BA.
Formal consultation actions:		
Transmittal of final BA[1] and request for formal consultation.	FS RO	
Prepare draft BO	AESO	Within 90 days of receiving final BA and request for formal consultation.
Review and submit comments for draft BO	PNF/FS RO	Within 30 days of receiving draft BO
Complete final BO	AESO	Within 14 days of receiving draft BO comments.

[1] All information needed to initiate formal consultation is incorporated in the final BA

U.S. Department of Interior Fish and Wildlife Service
Southwest Region (Region 2) Arizona
Ecological Services Field Office
Signature Page

4/19/13

Steven L. Spangle
Field Supervisor
Arizona Ecological Services Office

Date

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U.S. Department of Agriculture Forest Service
Southwestern Region (Region 3)
Prescott National Forest
Signature Page

Th A Tuo 04-30-2013

Thomas A. Torres
Forest Supervisor
Prescott National Forest

Date

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