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Forest
Service

**Southwestern
Region**

Fisheries Specialist Report

Forest Plan Revision DEIS

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Contents

Specialist Report

Introduction

This section evaluates and discloses the potential environmental consequences to fish and their habitat on the Apache-Sitgreaves NFs through implementation of a new land management plan. Four alternatives are analyzed, which include the current forest plan (1987 plan) and three new alternatives. This section also provides a summary of the fish species viability assessment and the identification and descriptions of the endangered, threatened, and sensitive fish species and their occupied, critical, and recovery habitats that occur on the Apache-Sitgreaves NFs. Viability risks to fish species were determined by evaluating their abundance and distribution, current habitat conditions, and potential impacts to species populations and habitats from management actions that could occur within the planning area. For planning purposes, a viable population is defined as one which has the estimated numbers and distribution of reproductive individuals to ensure its continued existence is well distributed in the planning area.

This specialists report is being prepared for the National Environmental Policy Act document, which is the Draft Environmental Impact Statement (DEIS) for the A*pache-Sitgreaves National Forests Proposed Land Management Plan*. The report does not replicate the complete descriptions for the purpose and need, proposed action, and alternatives; as these are disclosed and discussed in detail within chapters one and two of the DEIS for the Proposed Land Management Plan (hereinafter referred to as the proposed plan or proposed land management plan). Additional and more specific details regarding desired conditions, objectives, standards, guidelines, suitability, forestwide and management area directions, and special areas can be found within the *Apache-Sitgreaves National Forests Proposed Land Management Plan*.

The analysis for this DEIS is primarily focused on the needs for change revision topics that were developed for the plan revision process. These three topics include the maintenance and improvement of ecosystem health, managed recreation, and community-forest interaction. The proposed plan addresses issues related to these three topics by updating the desired conditions, objectives, standards, guidelines, special areas, and management areas relative to the 1987 forest plan. The proposed land management plan provides a broad framework that guides project level decisions but does not authorize, fund, or carryout any site-specific activities. Therefore, the focus of this report will be disclose the potential environmental consequences that could occur from this programmatic decision as determined by the goals (i.e., desired conditions), objectives, standards, guidelines, suitability, special areas, and management areas.

Relevant Laws, Regulations, and Policy that Apply

The **National Forest Management Act of 1976** which requires forest plans to provide for the diversity of plant and animal communities.

The **Endangered Species Act of 1973** that requires Federal agencies to conserve threatened and the ecosystems on which they depend: Section 7(a)(1) outlines the procedures for Federal interagency cooperation designed to conserve federally listed species and their designated critical habitats. Section 7(a)(2) outlines the consultation process and the requirement that any action authorized, funded, or carried out by a Federal agency would not likely jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of designated critical habitat.

The provisions of the 1982 Planning Regulations requires that forest plans provide direction to manage fish and wildlife habitats to maintain the viability of populations of plant and animal species on national forest lands. Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population is regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area.

Forest Service Manual 2600 and **Forest Service Handbook 2600**: These directives provide direction, regulation, and policy regarding fish and wildlife management.

Appendix D within the proposed land management plan provides a more detailed description and discussion of the relevant law, regulations, and policy, and can be consulted for additional information.

Methodology and Analysis Process

This report describes the current condition and analyzes the environmental consequences of the four alternatives to endangered, threatened, proposed, candidate, and sensitive fish species and their habitats. The report examines two key factors that influence native fish species: risk of habitat alteration and the impact of non-native species. Habitat alteration is measured by comparing the amount (acres) of vegetation treatments in each alternative, the amount (acres) of land in each fish species drainage area that could receive mechanical or fire treatments and the amount (percent) of species action areas that are located in management areas where ground-disturbing activities are more likely to occur than other management areas. The impact of non-native species will be described qualitatively.

The analysis area includes the entire Apache-Sitgreaves NFs and also areas adjacent to the Apache-Sitgreaves NFs that could be impacted downstream from activities occurring on the Apache-Sitgreaves NFs. This analysis area will vary by the species present within and downstream of the Apache-Sitgreaves NFs, and the extent and location of proposed activities within the various alternatives on the Apache-Sitgreaves NFs. Drainage areas were developed for 13 of the 14 native fish species that are likely to occur on the Apache-Sitgreaves NFs.

Analysis areas (i.e., drainage areas) were defined for all of the native fish species occurring across the Apache-Sitgreaves NFs, with the exception of the speckled dace. The speckled dace was not included within the analysis as it has no status or special designation and is currently considered widespread and secure within the planning area. The drainage area specific to each fish population varies and is based on species presence, a stream within the drainage area has been identified as necessary for recovery, or a stream that has been designated critical habitat.

These drainage areas included all of the portions of the watersheds that drain into habitat that is occupied by the species or has been identified as recovery habitat for reintroduction of the species. For each species the analysis areas were kept separate for analyses purposes where the populations were discrete and no interactions occur or are possible. GIS layers were created for each species that contain all of the analyses areas for that species. A total of 13 fish species are being analyzed; two endangered, five threatened, one candidate, and five sensitive. These 13

species were derived from the latest concurrence list from the U. S. Fish and Wildlife service dated June 20, 2008, and the latest Regional Foresters Sensitive Animals list dated September 21, 2007. These documents, along with other supporting data and information, are located within the project record and attached bibliography; and include fish and habitat survey and sampling information from State, federal and non-governmental agencies, fish species life history and status information (e.g., recovery plans, biological opinions, etc.).

For the threatened, endangered, and candidate species the population mapping process resulted in a total of 38 analyses areas across the Apache-Sitgreaves NFs. Each species had between 1 to 14 analysis areas (table 1)

Table 1. Number and acres of drainage areas by species.

Species	Number of Drainage Areas	Acres
Apache trout	14	109,986
Gila chub	3	92,705
Gila trout	8	51,615
Loach minnow	3	724,558
Razorback sucker	2	637,401
Roundtail chub	3	543,293
Spikedace	2	653,098
Little Colorado spinedace	4	268,697
Bluehead sucker	5	374,967
Desert sucker	4	847,535
Little Colorado River sucker	2	180,663
Longfin dace	3	634,010
Sonora sucker	4	847,535

Appendix A contains an acreage summary table and maps of the Apache-Sitgreaves NFs that show the action areas for each individual species being analyzed, and two separate maps that show the overall action areas for all of the sensitive species and one that covers all of the threatened, endangered, and candidate species.

The two maps (Figures 1 and 2) below display the areas within the Apache-Sitgreaves NFs boundaries that will be analyzed for fish species and their habitats.

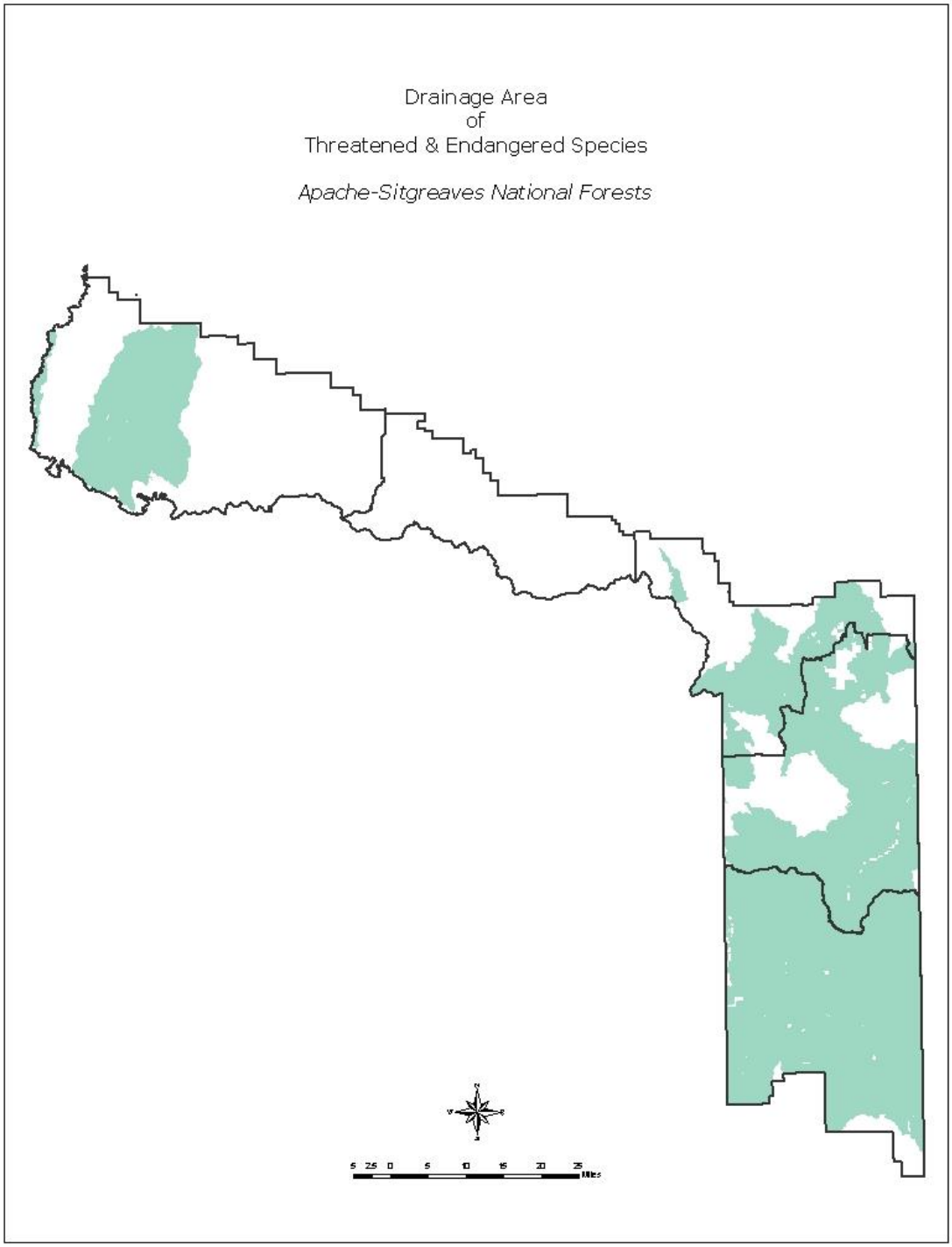

Figure 1. Map of Apache-Sitgreaves NFs showing areas being analyzed that have the potential to impact threatened, endangered, and candidate fish species or their habitats.

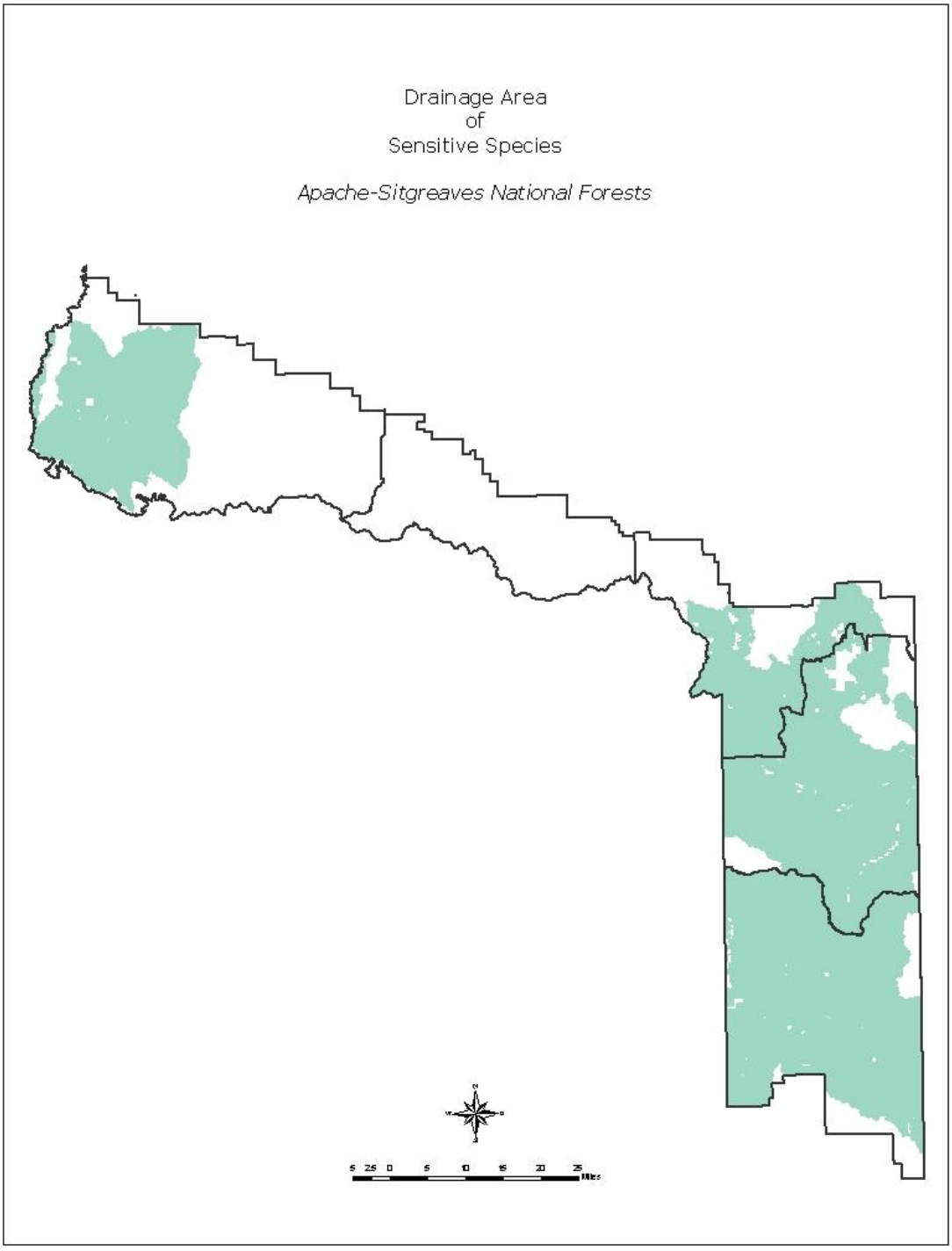

Figure 2. Map of Apache-Sitgreaves NFs showing areas being analyzed that have the potential to impact sensitive fish species or their habitats.

Much of the affected environment content was extracted from both the Comprehensive Evaluation Report (U.S. Forest Service 2008) and the Ecological Sustainability Report (U.S. Forest Service 2008a).

The Apache-Sitgreaves NFs has been divided into 14 vegetation types or PNVTs (potential natural vegetation types). PNVTs are coarse-scale groupings of ecosystem types that share similar geography, vegetation, and historic ecosystem disturbances such as fire and drought. PNVTs represent the vegetation type and characteristics that would occur when natural disturbance regimes and biological processes prevail. The PNVT mapping (located in the Apache-Sitgreaves GIS database) was derived from the forests' Terrestrial Ecosystem Survey mapping. This mapping is intended to be used for mid- and landscape-scale planning. It is important to validate the PNVTs at the project and activity level, and recognize that PNVTs (especially riparian) can and will exist at the site (fine scale) where most projects and management activities will be implemented.

Assumptions

In the analysis for this resource, the following assumptions have been made:

- The land management plan provides a programmatic framework for future site-specific actions.
- Land management plans do not have direct effects. They do 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.
- The plan decisions (desired conditions, objectives, standards, guidelines, management areas, monitoring) will be followed when planning or implementing site-specific projects and activities.
- Law, policy, and regulations will be followed when planning or implementing site-specific projects and activities.
- Monitoring will occur and the land management plan will be amended, as needed.
- We will be funded similar to past budget levels (past 5 years).
- The planning timeframe is 15 years; other timeframes may be analyzed depending on the resource (usually a discussion of anticipated trends into the future).
- It should be recognized that any and all literature, surveys of habitat conditions, surveys and monitoring for the presence and distribution of fish species, and other sources of data all have aspects that may or may not be relevant and specifically applicable to this analysis.
- Data and other information being used in this analysis are recognized to have differences in analyses approaches, designs, scales (both temporal and spatial), methods, levels of significance and confidence; this results in limits to inferences and conclusions relative to the proposed actions and their potential impacts to fish species and their habitats.
- Both historical and more recent data are very limited for fish species populations, abundances, and habitat conditions; and the data that are available vary considerably in their analysis approaches, scales, and other types of information gathered and analyzed. Information usually occurs across large spatial and temporal scales (e.g., multi-state,

statewide, basin wide) for species population and distribution changes and trends, and habitat information is usually collected at much smaller temporal and spatial scales. These approaches and limitations should be considered and recognized for the information provided and discussed herein.

- Current and future ecosystem restoration strategies are primarily focused on woody (forest canopy) species density and composition and the return of those parameters to their historic or near historic condition (desired conditions). This approach does not adequately address function and structure relative to aquatic habitat (e.g., stream sinuosity or gradient, that were present pre-European settlement and which are characteristic of healthy and resilient aquatic and riparian systems).
- It is assumed that mid-scale (100-1000 acres) restoration identified in the proposed plan that addresses the woody component within a riparian or stream system would have some positive outcome for aquatic systems (e.g., reduced likelihood of uncharacteristic wildfire).
- Aquatic and riparian systems can be very resilient; however, restoration is often less of implementing actions than removing impacting factors. Full restoration of aquatic habitat is not usually possible nor the goal. During activity and project-level decisionmaking, the specific desired aquatic and riparian conditions, beyond forest canopy considerations, should be determined.
- As the demands and use of the Apache-Sitgreaves NFs continues to increase, the ability to provide for all of the needs and desired outputs likely cannot be met. Our understanding of the interactions and complexities of the complete ecosystems we are trying to manage is limited; and it must be recognized that at higher levels of biological systems (and ecosystems) they become more increasingly complex, while we have a limited capacity to predict the direction or extent of changes with certainty.
- For estimating the consequences of alternatives at the programmatic forest plan level, the assumption has been made that the kinds of resource management activities allowed under the prescriptions will in fact occur to the extent necessary to achieve the objectives and move towards or achieve the desired conditions of each alternative. However, the actual locations, design, and extent of such activities are generally not known at this time. That will be a site-specific (project-by-project) decision. It is also unsure if the budgets needed to implement the specific activities will be forthcoming. Thus, the discussions here refer to the potential for the consequences to occur, realizing that in many cases, these are only estimates. This analysis is useful in comparing and evaluating alternatives on a forestwide basis but is not to be applied to specific locations on the forests.
- Because this document is a forestwide programmatic level analysis, it does not predict what will occur when forestwide standards and guidelines are implemented on individual, site-specific projects. It also does not convey the long-term environmental consequences of any site-specific projects. These effects will depend on the extent of each project, the environmental conditions at the site, the site-specific mitigation measures implemented within each project, and their effectiveness.
- Plant and animal species have adapted and evolved over thousands of years into complex natural communities and ecosystems that resulted from various disturbance processes, climatic variations, topography, and soil conditions. These processes can support a diverse assemblage of native plant and animal species at various scales and patterns across the landscape. European settlement has severely disrupted these ecosystems, and

the plant and animal populations and the associated disturbance process with unprecedented magnitude within an incredible short temporal scale. These rapidly altered landscapes and disruptions of disturbance processes have produced current vegetation types and ecosystems that are in structural, successional, and compositional disequilibrium.

- The approach to managing for diverse and sustainable natural communities is to restore their structural vegetative condition and maintain the historical disturbance processes and functions under which natural communities evolved and to which they are uniquely adapted. This ecosystem restoration approach will place a greater emphasis on how management activities are related to historical landscape patterns, specifically described natural communities, and historical disturbance processes. This underlying concept is that a representative grouping of natural communities will include appropriate variations in habitat structure and plant species composition to provide for most plant and animal species. This approach will be limited in its potential for restoration of aquatic habitat and fish populations, especially at the project and species level, where recovery of species and their habitats cannot be met by the ecological sustainability of the adjacent PNVTs.

Revision Topics Addressed in this Analysis

The three revision topics selected for the DEIS include maintenance and improvement of ecosystem health, managed recreation, and community-forest interaction. The desired conditions are described in detail in the proposed land management plan, and management areas are used to allocate land for a unique emphasis. All of the action alternatives use the same basic set of management areas. The alternatives do differ in the total acreages and locations of the management areas. The criteria for the suitability of various uses (e.g., livestock grazing, timber harvest) are the same in all action alternatives. However, when the criteria is applied to the different alternatives, there may be variations in the amount of land suitable for certain uses (i.e., if an alternative has more recommended wilderness, there would be less land suitable for timber harvest).

Given the programmatic approach of the DEIS and the action alternatives developed to address the three revision topics, their associated management direction and emphasis, allocations of management areas, and restoration and management activities proposed; there is limited specificity available to determine potential impacts to fish species and their habitats. Although all the alternatives provide for meeting various aspects of the "purpose and need", they do vary in their restoration vegetation treatment types for improving and moving to desired conditions and improving fire regime condition class, amount of suitable timber production lands, allocations by management areas, and specific treatments to improve watershed/riparian/aquatic habitat conditions. These differences and variations among the alternatives will be used to evaluate the potential positive, negative, or neutral environmental consequences that may occur through implementation at the programmatic scale.

This document addresses the 'other analysis topic' of **Fish Habitat:** The provisions of the 1982 planning rule require that habitat be provided to maintain populations of existing native and desired non-native species in the planning area. The Endangered Species Act requires federal agencies to conserve endangered and threatened species and their habitats. There are 12 threatened, endangered, proposed, and sensitive fish species on the Apache-Sitgreaves NFs.

Although there are numerous factors that can influence native fish species and their habitat, the primary factors that are helpful in comparing alternatives are: risk of habitat alteration and impact from non-native species.

To better understand the potential risk of habitat alteration, the environmental consequences section will compare potential outcomes associated with:

- The amount (acres) vegetation restoration treatments (mechanical and fire) planned by alternative
- The potential land area (acres) of each species action area that could be affected by mechanical or fire treatments.
- The amount (percent) of species action areas that occur in management areas where ground-disturbing activities are more likely to occur than other management areas

To understand the impact to fish from non-native species, the environmental consequences section will include:

- A qualitative discussion of the effects of non-native species.

Summary of Alternatives

A summary of alternatives, including the key differences among alternatives, is outlined in the Draft Environmental Impact Statement.

Description of Affected Environment (Existing Condition)

Fish Species of the Apache-Sitgreaves NFs

There are presently 14 native fish species located throughout the Apache-Sitgreaves NFs (table 2). Seven of the 14 native fish species are protected under the Endangered Species Act (ESA); five are listed as endangered, and two are listed as threatened. The roundtail chub is a candidate species under ESA and is also on the Southwestern Region Regional Forester-designated sensitive species list dated September 21, 2007; along with five other fish species that are also considered sensitive. The speckled dace is not federally listed or classified as sensitive. The razorback sucker was introduced into Eagle Creek and the Blue River in the 1980s; these introductions were not successful and the species is not currently present within or downstream of the Apache-Sitgreaves NFs, although designated critical habitat does occur approximately 7 to 15 miles south of the forests, in the Gila River.

Table 2. Endangered, threatened, and sensitive fish species and their miles of occupied, critical, and recovery habitat on Apache-Sitgreaves NFS lands.

Species (Status)	Occupied Habitat	Critical Habitat	Recovery Habitat[1]
Apache trout (threatened)	32.5 miles	N/A	34.5 miles
Gila chub (endangered)	5.5 miles	31.3 miles	N/A
Gila trout (threatened)	3.5 miles	N/A	28.5 miles

Species (Status)	Occupied Habitat	Critical Habitat	Recovery Habitat[1]
Loach minnow (endangered)	50.3 miles	110.2 miles	N/A
Razorback sucker (endangered)	None	None, downstream	N/A
Roundtail chub (candidate/senstive)	41.4 miles	N/A	N/A
Spikedace (endangered)	Unknown	90.4 miles	N/A
Little Colorado spinedace (threatened)	28.9 miles	5 miles	33.7 miles
Bluehead sucker (sensitive)	79.6 miles	N/A	N/A
Desert sucker (sensitive)	168 miles	N/A	N/A
Little Colorado River sucker (sensitive)	41.6 miles	N/A	N/A
Longfin dace (sensitive)	104.7 miles	N/A	N/A
Sonora sucker (sensitive)	147.8 miles	N/A	N/A

[1] Habitat that has been identified as necessary for recovery/restoration of the species.

Along with the native fish species, there are 24 non-native fish species occurring on the Apache-Sitgreaves NFs. Several of these species are coldwater fish that generally do not occur below 6,500 feet in elevation, especially the trout species. Most are warm water centrarchid (sunfish family) and cyprinid (minnow family) species that occur below 8,000 feet elevation.

The following are a list of non-native fish species that occur within the forests.

Black Bullhead	Channel Catfish	Golden Shiner	Black Crappie
Goldfish	Green Sunfish	Cutthroat Trout	Flathead Catfish
Western mosquitofish	Bluegill	Rainbow Trout	Brown Trout
Red Shiner	Redear Sunfish	Yellow Perch	Brook Trout
Common Carp	Smallmouth Bass	Fathead Minnow	Walleye
Northern Pike	Largemouth Bass	White Crappie	Arctic Grayling

Native Fish Population, Distribution, and Habitat

The Apache-Sitgreaves NFs historically provided habitat for 14 native fish species, from high elevation coldwater trout streams to lower elevation warm water streams with primarily cyprinid species. Together, these 14 species occur on approximately 477 miles (63 percent) of the 763 miles of perennial streams that exist on the forests (Vander Lee et al., 2006).

Aquatic and riparian habitat on the Apache-Sitgreaves NFs is extremely limited (less than 3 percent of the forests) but provides for a wide array of aquatic biota and terrestrial flora and fauna. These habitats are critical to sustaining aquatic biota diversity in the Southwest. Overall, the Apache-Sitgreaves NFs account for 41 percent of the perennial streams and 38 percent of the stream reaches with native fish on national forests in Arizona (Vander Lee et al., 2006).

The speckled dace, Sonora sucker, and desert sucker have the largest distributions on the Apache-Sitgreaves NFs; while the Gila trout, Gila chub, and spikedace have the smallest. All of the streams with loach minnow on national forests in Arizona are on the Apache-Sitgreaves NFs. In addition, within national forests in Arizona, over two-thirds of the stream reaches with the bluehead sucker (95 percent), Apache trout (80 percent), Gila trout (71 percent), Little Colorado sucker (70 percent), and Little Colorado spinedace (66 percent) are on the Apache-Sitgreaves NFs (Vander Lee et al., 2006).

Current information regarding aquatic and riparian habitats and aquatic biota primarily consists of surveys and studies completed by State and Federal agencies over the last 10 to 20 years. These surveys show that approximately 70 percent of the stream reaches that have been surveyed are not meeting a minimum Habitat Condition Index (HCI) standard of 60 percent[1]. Where repeat surveys have occurred, conditions on approximately 50 percent of those stream reaches have declined in their HCI rating over the last 20 years, while the other 50 percent have increased in their HCI rating.

Fish population surveys and sampling efforts have also shown declines for many species over the last 20 years. According to Robinson et al. (2006), most of Arizona's stream length was assessed to be in the "most-disturbed"[2] ecological condition; 70 percent was in most-disturbed condition based on the aquatic vertebrate index of biotic integrity (IBI) and 57 percent was in most-disturbed based on a macroinvertebrate IBI.

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[1] The 1987 plan provides management emphasis and monitoring for fish species and riparian habitat using the Habitat Condition Index (HCI) and the Biologic Condition Index (BCI) for aquatic macroinvertebrates. The HCI is a multivariate rating of existing habitat conditions based on several factors: pool frequency and occurrence; substrate conditions and types; and stream bank cover, soil, and vegetation stability. The HCI evaluates the streams existing habitat conditions relative to its potential. The BCI incorporates stream habitat, water quality, and environmental tolerances of aquatic macroinvertebrate community species. The BCI is a function of a Predicted Community Tolerance Quotient divided by the Actual Community Tolerance Quotient, and it evaluates a stream's condition in relation to its own potential. As required in the forest plan, minimum conditions (values) for the HCI should be 60 percent and 80 percent for the BCI.

[2] Most disturbed ecological condition for macroinvertebrates is defined as having lost more than 50 percent of the expected taxa (species naming hierarchy). For native aquatic vertebrates and habitat, it is the 5 percent most divergent relative to the reference condition.

Most streams and aquatic and riparian habitats have experienced considerable degradation and alteration from a variety of human and management related activities; their ability to recover and improve has been affected, especially as ongoing and new impacts occur. Habitat quality and complexity have resulted from loss of pool habitat, loss of large wood within streams, riparian area impacts, channel alterations, and down cutting. Increased sedimentation rates can adversely impact habitat and species through negative impacts to water quantity and quality. Fish population surveys and sampling efforts have also shown declines for some species, while some non-native species have shown increases.

Historic impacts (e.g., grazing, water developments and diversions, timber harvest and roads, fire suppression) that occurred 20 to over 100 years ago caused impacts to aquatic communities and their watersheds. The species and habitats of today have not yet recovered. Fish populations have been reduced from large interconnected populations to isolated populations within severely altered and degraded habitats. All the native species have lost much of their population redundancy[3] within and outside the forests. This is reflected in the historic and recent (last 20 years) population declines and fragmentation of fish species on the Apache-Sitgreaves NFs (Forest Service, 2008e). Historically, seventeen of the thirty-three 5th level HUC watersheds on the forests contained one or more fish species. Currently, only 12 of these watersheds contain native fish, and those that still contain native fish have lost one to several species. There are two watersheds on the forests where there were no fish historically present, but they are currently occupied by Apache trout (table 3).

[3] Redundancy means having several distinct populations of a species, so that if some catastrophic event killed one population, the species would not become extinct.

Table 3. Current and historical occurrences of native fish species by 4th and 5th level hydrologic unit code (HUC)

4th Level HUC Name	5th Level HUC Name	Longfin dace	Sonora sucker	Gila chub	Roundtail chub	Spinedace/ Spikedace	Apache trout	Gila trout	Desert sucker	Bluehead sucker	Speckled dace	Loach minnow	Little Colorado River Sucker	Razorback sucker	(Historic)	(Current)
Little Colorado River Headwaters	Nutrioso Creek				H[1]	C[2]	H			C	C				5	3
	South Fork Little Colorado River-Little Colorado River Headwaters					H	C			C	C		H		5	3
	Coyote Creek						C[3]									1
	Carnero Creek-Little Colorado River Headwaters															0
Upper Little	Big Hollow Wash															0

4th Level HUC Name	5th Level HUC Name	Longfin dace	Sonora sucker	Gila chub	Roundtail chub	Spinedace/ Spikedace	Apache trout	Gila trout	Desert sucker	Bluehead sucker	Speckled dace	Loach minnow	Little Colorado River Sucker	Razorback sucker	(Historic)	(Current)
Colorado River	Oso Draw						C[3]									1
Silver Creek	Show Low Creek		H		H	H					H		H		5	0
	Upper Silver Creek					H				H	H	H			4	0
	Cottonwood Creek		H		H	H					H				4	0
Middle Little Colorado River	Phoenix Park Wash-Dry Lake															0
	Upper Clear Creek				H	H				C	C		C		5	3
	Lower Clear Creek				H	H				C	C		C		5	3
Chevelon Canyon	Upper Chevelon Canyon				H	H				C	C		C		5	3

4th Level HUC Name	5th Level HUC Name	Longfin dace	Sonora sucker	Gila chub	Roundtail chub	Spinedace/ Spikedace	Apache trout	Gila trout	Desert sucker	Bluehead sucker	Speckled dace	Loach minnow	Little Colorado River Sucker	Razorback sucker	(Historic)	(Current)
	Black Canyon				H					H	H				3	0
	Lower Chevelon Canyon				H	H				H	H		C		5	1
Mangus Creek-Upper Gila River	Apache Creek-Upper Gila River															0
San Francisco River	Centerfire Creek-San Francisco River	H	H						H		H				4	0
	Upper Blue River	C	C	H	H		C	C	C		C	C			9	7
	Pueblo Creek-San Francisco River															0
	Lower Blue River	C	C	H	H	H			C		C	C		H	9	5
	Mule	C	C	C	H	H			C		C	H		H	9	5

4th Level HUC Name	5th Level HUC Name	Longfin dace	Sonora sucker	Gila chub	Roundtail chub	Spinedace/ Spikedace	Apache trout	Gila trout	Desert sucker	Bluehead sucker	Speckled dace	Loach minnow	Little Colorado River Sucker	Razorback sucker	(Historic)	(Current)
	Creek-San Francisco River															
	Chase Creek-San Francisco River	C	C	H	H	H			C		C	H		H	9	4
Upper Gila River – San Carlos Reservoir	Willow Creek															0
	Upper Eagle Creek	C	C	C	C	C		H	C		C	C		H	10	8
	Lower Eagle Creek	C	C	H	H	H			C		C	H		H	9	4
Black River	Upper Black River		C		C		C		C		C	C				6
	Middle Black River		C		C		C		C		C					5
White River	Upper North Fork White															0

4th Level HUC Name	5th Level HUC Name	Longfin dace	Sonora sucker	Gila chub	Roundtail chub	Spinedace/ Spikedace	Apache trout	Gila trout	Desert sucker	Bluehead sucker	Speckled dace	Loach minnow	Little Colorado River Sucker	Razorback sucker	(Historic)	(Current)
	River															
	East Fork White River															0
Upper Salt River	Canyon Creek															0
Carrizo Creek	Corduroy Creek															0
	Carrizo Creek (local drainage)															0
Tonto Creek	Haigler Creek-Tonto Creek															0

[1] H=historic occurrence only, no current occurrences of this fish species
[2] C=current and historic occurrence of this fish species
[3] C=current occurrence where there was no historic occurrence of this fish species

The native fish species and populations analyzed here (especially federally listed) lack the resiliency to survive environmental disturbances from either natural or anthropogenic actions (e.g., fire and suppression of fire, climate variation, degraded watersheds and aquatic habitat, altered hydrologic conditions, loss of riparian and aquatic habitat, recreation demands, non-native species introductions, roads). The watersheds and ecosystems that these aquatic species and their habitats depend are also altered and departed from historical conditions; and while most of these impacts have occurred slowly over many decades, the individual and collective impacts still remain. Current conditions for fisheries at the 5th level HUC watershed can be attributed to many factors. Changes throughout vegetation types have altered fire regimes, successional structure, composition and cover classes, and processes from historic conditions. Several vegetation types also have impaired soil conditions. Additionally, riparian condition is predominantly functioning-at-risk and hydrologic conditions (e.g., groundwater, water quality, stream flow) have also changed from historic conditions. See Vegetation, Soil, Water Resources, and Riparian sections for more information.

The razorback sucker has not been found on the forests since the late 1980s, and the spikedace has not been found recently, although razorback sucker is considered extirpated (locally extinct) at this time, the spikedace is not. The Little Colorado spinedace, spikedace, and loach minnow are likely declining range-wide. The roundtail chub, Little Colorado sucker, and the bluehead sucker have recently been included within a multi-state conservation agreement in an attempt to improve their status and potentially prevent them from future listing under ESA. The longfin dace, Sonora sucker, desert sucker, and speckled dace are also likely declining in their numbers and/or distributions across the Apache-Sitgreaves NFs. Recent declines for the speckled dace are associated with chemical treatments of streams for Apache trout recovery projects. Although this has likely impacted large numbers of individuals and reduced distribution, no populations have been lost and the species is considered secure within the planning area.

Endangered and Threatened Species and Critical Habitat

Apache Trout (Oncorhynchus apache)

The life history, ecology, historical distributions and abundances, habitat requirements, and other information relevant to this species are limited; and data and information that has been collected has primarily occurred on White Mountain Apache Tribal lands. Some of this information has been summarized and reviewed within the three Apache Trout Recovery Plans, the first version completed in 1979 and the latest version in 2009. Recovery efforts for this species began as early as the 1940s on the White Mountain Apache Tribe lands, and began later on NFS lands in the 1960s. Over the last 5 to 10 years, the Arizona Game and Fish Department with assistance from the Apache-Sitgreaves NFs has expended considerable efforts on recovery actions to improve the species status. These have primarily included barrier construction and maintenance, chemical treatments to remove nonnative fish, and the subsequent introductions of Apache trout. Despite these considerable efforts, recovery of populations has been very limited due to barrier and chemical treatment efficacy, and the genetic purity and availability of Apache trout to place into historical habitats on the forests.

The historical distribution of Apache trout has been somewhat confused with that of Gila trout. Originally Apache trout were thought to have historically occurred and occupied the headwaters of the Little Colorado, Salt, and San Francisco Rivers. The more recent view is that the headwaters of the San Francisco River were historically occupied by the Gila trout. Regardless, the former widespread distribution of Apache trout in the Black, White, and Little Colorado drainages is not disputed based on historical and more recent documented collections. The San

Francisco River headwaters are now considered within historic range of Gila trout, although some Apache trout populations are still present from past recovery actions (i.e., Coleman, Grant, and KP Creeks).

Existing and potential Apache trout recovery populations occur on the forests and White Mountain Apache Tribal lands in Arizona within the historic range of the species. Outside of their historic range, several introduced populations occur on the Coronado NF and one occurs on the Kaibab NF. Existing and recovery populations on the forests included within this analysis are Bear Wallow Creek, Centerfire/Boggy/Wildcat Creeks, Coleman Creek, Conklin Creek, Coyote/Mamie Creeks, East Fork Little Colorado River (and Lee Valley Creek), Fish Creek, Grant Creek, Hannagan Creek, Hayground Creek, Home Creek, KP Creek, Mineral Creek, Snake Creek, Soldier Creek, South Fork Little Colorado River, Stinky Creek, West Fork Black River, and West Fork Little Colorado River.

The Apache trout was listed as threatened with extinction under the Endangered Species Preservation Act of 1966. A final rule was issued in the Federal Register on July 16, 1975 that determined the Apache trout is a threatened species as defined by the Endangered Species Act of 1973. Discussion with the reasons for listing and threats to the species can be found within the three versions of the recovery plans, and the final rule "Threatened Status for Three Species of Trout" published in the Federal Register in 1975. Threats to the species include: the destruction, modification, and curtailment of its habitat or range; logging operations and the associated erosion, siltation, and increases in water temperatures; and the introduction of nonnative trout species that hybridize and compete with the Apache trout.

Gila Chub (Gila intermedia) and Critical Habitat

Life history, ecology, historical distributions and abundances, habitat requirements, and other information relevant to this species are limited; and data and information that has been collected has primarily occurred on populations outside the Apache-Sitgreaves NFs. Most of the available information for this species has been summarized and reviewed within the Proposed and Final Rules for the "Listing Gila Chub as Endangered with Critical Habitat" completed in 2002 and in 2005, respectively. This species is found in pools in smaller streams and cienegas ranging in elevation from approximately 600 to 1675 meters. They are highly secretive, and adults prefer deeper water in pools and eddies below riffles or runs; often remaining in cover from terrestrial vegetation, boulders, and fallen logs. Young use the shallow margins of pools with aquatic vegetation or debris for cover, while older juveniles may be found in higher velocity runs and riffles. Primary food items are aquatic and terrestrial insects and filamentous algae. Breeding primarily occurs in late spring to summer, males follow the larger females over beds of aquatic plants, and there is no parental care of the young. Temperature may be the primary cue for initiation of spawning.

Gila chub potentially occur within six streams on the Apache-Sitgreaves NFs; Eagle Creek, East Eagle Creek, Dix Creek, Left Prong Dix Creek, Right Prong Dix Creek, and Harden Cienega Creek. These six streams are considered to be three distinct populations; Dix Creek, Eagle/East Eagle Creek, and Harden Cienega Creek. The Eagle/East Eagle Creek population is located within the upper portion of this watershed, and Eagle Creek drains off the Apache-Sitgreaves NFs before entering the Gila River approximately 15 miles downstream of the Apache-Sitgreaves NFs' boundary. Dix Creek and Harden Cienega Creek are located south of the San Francisco River, and both flow north directly into the San Francisco River. The Dix Creek Watershed is entirely within the Apache-Sitgreaves NFs, while the upper portion of the Harden Cienega Watershed is located in New Mexico on the Gila NF.

Gila chub was listed with critical habitat by the U.S. Fish and Wildlife Service as endangered in 2005. Gila chub are becoming rare, especially where land use practices such as overgrazing lead to incision of floodplains and lowering of water tables, which, in turn, drain marshlands and other stream-associated habitats. Threats to the chub include introduction of nonnative aquatic competitors and predators (e.g., fish, bullfrogs, crayfish), continued water use for development purposes, and habitat degradation due to improper land management on the watershed. Erosion from roads or off bare ground on the watersheds can fill in the deep pools needed by the species, thus degrading the habitat. Where it is still present, populations are often small, fragmented, and at risk from known and potential threats and from random events such as drought, flood events, and wildfire.

Critical habitat was designated for the Gila chub on November 2, 2005. Critical habitat for the Apache-Sitgreaves NFs was designated in six streams for the three separate populations as follows:

- Eagle Creek and East Eagle Creek for 39.2 kilometers (24.4 miles) of creek extending from the confluence of Eagle Creek with an unnamed tributary upstream to its confluence with East Eagle Creek, and including East Eagle Creek to its headwaters just south of Highway 191.
- Harden Cienega Creek for 22.6 kilometers (14.0 miles), beginning from its confluence with the San Francisco River and continuing upstream to its headwaters. Approximately 65 percent (9 miles) is located on the Apache-Sitgreaves NFs.
- The Dix Creek critical habitat includes the portion of the creek beginning 1 mile upstream from the confluence with the San Francisco River at a natural rock barrier and continuing upstream for 0.9 kilometers (0.6 miles) to the confluence of the right and left forks of Dix Creek. The critical habitat also includes the Left Prong Dix Creek as it continues upstream 2.0 kilometers (1.2 miles), and the Right Prong Dix Creek as it continues upstream 4.8 kilometers (3.0 miles).

Gila Trout (Oncorhynchus gilae)

Life history, ecology, historical distributions and abundances, habitat requirements, and other information relevant to this species are limited; and data and information that has been collected has primarily occurred on the Gila NF in New Mexico. Some of this information has been summarized and reviewed within the four Gila Trout Recovery Plans, the first version completed in 1979 and the latest version in 2003. Over the last 5 to 10 years, the Arizona Game and Fish Department and Apache-Sitgreaves NFs have implemented some recovery actions to improve the species status on the Apache-Sitgreaves NFs, although most efforts have been focused on Apache trout recovery.

The historical distribution of Gila trout has been somewhat confused with that of Apache trout. Originally Apache trout were thought to have historically occurred and occupied the headwaters of the Little Colorado, Salt, and San Francisco Rivers. The more recent view is that the headwaters of the San Francisco River were historically occupied by the Gila trout. The San Francisco River headwaters are now considered within historic range of Gila trout, although some Apache trout populations are still present from past recovery actions (i.e., Coleman, Grant, and KP Creeks).

Existing and potential Gila trout recovery populations occur on the Apache-Sitgreaves NFs within the Blue River and Eagle Creek drainages. Existing and recovery populations on the Apache-

Sitgreaves NFs included within this analysis are Castle/Buckalou Creeks, Chitty Creek, Grant Creek, KP Creek, Lanphier Creek, McKittrick Creek, and Raspberry Creek.

The Gila trout was listed as threatened with extinction under the Endangered Species Preservation Act of 1966. Discussion with the reasons for listing and threats to the species can be found within the four versions of the recovery plans, and the final rule "Reclassification of the Gila Trout From Endangered to Threatened; Special Rule for Gila Trout in New Mexico and Arizona" published in the Federal Register in 2006. Threats to the species include: the destruction, modification, and curtailment of its habitat or range; livestock grazing; fire; timber harvest operations and the associated erosion, siltation, and increases in water temperatures; and the introduction of nonnative trout species that hybridize and compete with the Gila trout.

The most recent version of the recovery plan has identified eight candidate streams on the Apache-Sitgreaves NFs for potential Gila trout introduction. These include one stream within the Eagle Creek drainage (Chitty Creek), and seven streams within the Blue River drainage (Castle/Buckalou Creek, Coleman Creek, Grant Creek, KP Creek, Lanphier Creek, McKittrick Creek, and Raspberry Creek). Some streams are also currently occupied by hybridized Apache trout, and Raspberry Creek is the only stream that could potentially have Gila trout present, as they were introduced into this stream in 2000. The eight populations being considered here cover approximately 51,686 acres and 25 miles of streams. The Arizona Game and Fish Department surveyed a portion of Raspberry Creek in 2006. Five fish were observed, and three were captured in the electrofishing efforts. The current status is unknown, but if Gila trout have persisted, it is likely their numbers are very low.

Little Colorado Spinedace (Lepidomeda vittata) and Critical Habitat

The natural history of Little Colorado spinedace can be found in the "Little Colorado River Spinedace Recovery Plan", and the "Final Rule to Determine Lepidomeda vittata (Little Colorado Spinedace) To Be a Threatened Species with Critical Habitat". The Little Colorado spinedace is a member of the Cyprinidae family and is typically less than 10 cm long. This species is predacious, feeding on aquatic and terrestrial insects, as well as filamentous algae. This species inhabits medium to small streams and is characteristically found in pools with water flowing over fine gravel and silt-mud substrates. Many of the streams are seasonally intermittent, at which times the Little Colorado spinedace persists in the deep pools that retain water. During flooding the spinedace redistributes itself throughout the stream. Spawning primarily occurs in early summer, but some spawning continues until early fall. Typical habitat ranges in elevation from 4,000 to 8,000 feet.

Most of the existing and potential Little Colorado spinedace recovery streams or populations occur on and downstream of the Apache-Sitgreaves NFs and the Coconino NF. Existing populations on the Apache-Sitgreaves NFs are within Nutrioso Creek and one of its tributaries, Rudd Creek. On July 23, 2007, 95 fish were introduced into West Chevelon Creek. Potential recovery streams on the Apache-Sitgreaves NFs also include Chevelon Creek and Willow Creek (and its tributaries). Leonard Canyon is the boundary between the Apache-Sitgreaves NFs and the Coconino NF, and it is currently occupied by Little Colorado spinedace. Critical habitat occurs on the Apache-Sitgreaves NFs within the lower five miles of Nutrioso Creek on the Springerville Ranger District, from Nelson Reservoir Dam downstream to the forests boundary. Primary constituent elements for critical habitat include clean, permanent flowing water, with pools and a fine gravel or silt-mud substrate.

Past threats and declines of this species have resulted from habitat alterations and loss due to impoundment, removal of water from streams, channelization, grazing, road building, urban growth, and other human activity. Their decline is also related to the introduction and spread of non-native predatory and competitive fish species, and the use of pesticides (ichthyotoxins) in many of its native streams. Current threats to the survival of the species include changes in stream flow patterns, declines in water quality and quantity, modifications of watersheds (logging, dams, road construction), manipulations of fish populations (use of chemicals and other factors) and interactions with introduced fishes and other aquatic species.

Existing and potential recovery populations of Little Colorado spinedace occur in Chevelon Creek, Leonard Canyon, Nutrioso Creek, Rudd Creek, West Chevelon Creek, and Willow Creek on the Apache-Sitgreaves NFs; all of these except Chevelon and Willow creeks are currently occupied by the species. All of these streams are contained within three watersheds that all drain into the Little Colorado River; the Nutrioso Creek, Chevelon Creek, and East Clear Creek watersheds. Recent impacts to the species are due to drought, non-native species, and alteration of natural hydrographs in occupied habitat. Livestock and wild ungulate grazing have also been identified as contributing to poor watershed conditions which exacerbate the effects of drought and result in diminished habitat quality. Fuels reduction, forest restoration projects, and fire management actions have also contributed to altered hydrographs and sediment loads in streams occupied by spinedace.

Loach Minnow (Tiaroga cobitis) and Critical Habitat

Loach minnows are found in turbulent, rocky riffles of rivers and tributaries from approximately 2,300 to 8,000 feet in elevation. Loach minnow are bottom-dwelling inhabitants of shallow, swift waters flowing over gravel and cobble substrates in mainstream rivers and tributaries. They use the spaces between, and the protective shelter of larger substrates for resting and spawning. The species is rare or absent from habitats where fine sediments fill the spaces between larger substrate. The first spawn of loach minnow generally occurs in their second year, primarily from March through May; and they may also spawn in the fall. Spawning occurs in the same riffles occupied by adults during the non-spawning season. The adhesive eggs of the loach minnow are attached under the downstream side of a rock that forms the roof of a small cavity in the substrate. Longevity is typically 15 months to two years, although loach minnow can live as long as three years. Loach minnow feed exclusively on aquatic insects; and they are opportunistic bottom-feeding insectivores, feeding primarily on riffle-dwelling larval mayflies and midges. They actively seek their food on bottom substrates, rather than pursuing food items in the drift.

The loach minnow is endemic to the Gila River basin of Arizona and New Mexico, and Sonora, Mexico. Its historic range included the basins of the Verde, Salt, San Pedro, San Francisco, and Gila rivers. During the last century, both the distribution and abundance of the loach minnow have been greatly reduced throughout its range. Extant populations are geographically isolated and inhabit the upstream reaches of their historic range. Historically in Arizona, the loach minnow occupied up to 1,400 miles of streams, but it is now found in less than 140 miles. The loach minnow is generally rare to uncommon where it is found in the following areas: Aravaipa Creek (Pinal and Graham counties); limited reaches of the White River (Gila County) and the North and East Forks of the White River (Navajo County); Three Forks area of the East Fork Black River; throughout the Blue River; Campbell Blue Creek; Eagle Creek; and in the San Francisco River between Clifton and the New Mexico border.

The loach minnow is currently listed as an endangered species. On February 23, 2012, a final rule was published by the U.S. Fish and Wildlife Service to change the status to endangered and

designate critical habitat for both spikedace and loach minnow. During the last century, both the distribution and abundance of the loach minnow has 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. Both historic and present landscapes surrounding loach minnow habitats have been impacted to varying degrees by domestic livestock grazing, mining, agriculture, timber harvest, recreation, development, or impoundments. These activities degrade loach minnow habitats by altering flow regimes, increasing watershed and channel erosion and thus sedimentation, and adding contaminants to streams and rivers. As a result, these activities may affect loach minnow through direct mortality, interference with reproduction, and reduction of invertebrate food supplies.

Within the Apache-Sitgreaves NFs the loach minnow has been known to occur in the Three Forks area of the East Fork Black River; throughout the Blue River, lower Campbell Blue Creek, Eagle Creek, and the San Francisco River. All the populations listed above are experiencing low abundance, and can be attributed to many factors. Recent surveys (last 5 to 20 years) have not documented the presence of this species within the East Fork Black River, Eagle Creek, or the San Francisco River populations; and it is likely that these populations may no longer occur on the Apache-Sitgreaves NFs. Recent surveys on the Blue River have documented the continued presence of this species in this system, and this population is likely more stable than the others on the Apache-Sitgreaves NFs.

Approximately 110 miles of critical habitat was designated for loach minnow in the Blue River (45.3 miles), Campbell Blue Creek (6 miles), Little Blue Creek (3.1 miles), Eagle Creek (12.1 miles), East Fork Black River (11.9 miles), North Fork East Fork Black River (4.4 miles), Boneyard Creek (1.4 miles), Coyote Creek (2.1 miles), and the San Francisco River (23.7 miles) within the Apache-Sitgreaves NFs.

Razorback Sucker (Xyrauchen texanus) and Critical Habitat

The razorback sucker, also known as the humpback sucker, is a member of the Catostomidae family. The species can grow more than 600mm (2 feet) in length, weigh more than 3kg (6 pounds), and live over 40 years. Examination of stomach contents of adult razorback suckers from Lake Mohave indicates that the species is a bottom-feeder, whose diet includes planktonic crustaceans, diatoms, filamentous algae, and detritus. Spawning occurs in the lower Colorado River basin from January through April; and in the upper basin, observation indicates that spawning occurs from late April through mid-June. Spawning occurs over mixed substrates that range from silt to cobble and at water temperatures ranging from 10.5 to 21º C (51 to 70º F). Razorback sucker inhabit riverine systems which provide a wide variety of habitats including backwaters, sloughs, oxbow lakes, and seasonally inundated flood plains, which are used to satisfy various life history requirements. Adult razorback suckers prefer shallow and swift waters of mid-channel sandbars (less than 12 feet in depth) during the summer months and slow runs, slack waters, and eddies in the winter. The Razorback Sucker Recovery Plan describes the life history and habitat use for this species in detail.

Detailed information relative to the distribution and abundance of the razorback sucker can be found in the Recovery Plan. Razorback sucker are listed as occurring in the Verde and Salt Rivers with designated critical habitat in both systems. Razorback sucker have been stocked in the Verde River on a regular basis since the 1980s. Stockings in the Salt River sub-basin have not occurred since the early 1990s. Surveys do detect the species in the Verde River. However, a viable population is not thought to be extant. Razorback sucker are thought to no longer occur in Eagle Creek and in the Blue River on the Apache-Sitgreaves NFs. These populations were stocked

during the 1980s, and surveys conducted since stocking have failed to detect the species. It is likely that the razorback sucker is not currently present in the Salt River sub-basin of the Gila River Basin.

Fifteen river reaches covering about 49 percent of the historic habitat of the razorback sucker (2,775 km; 1,724 miles) are designated critical habitat within the Colorado River Basin. The Gila River from the Arizona-New Mexico state line to Coolidge Dam is included within this designation. After leaving the Apache-Sitgreaves NFs, both Eagle Creek and the San Francisco River enter this portion of critical habitat, approximately 15 to 20 miles downstream of the Apache-Sitgreaves NFs boundary. Three primary constituent elements have been identified for razorback sucker critical habitat: water, physical habitat, and the biological environment. The water element includes consideration of water quality and quantity. Water quality is defined by parameters such as temperature, dissolved oxygen, environmental contaminants, nutrients, turbidity, and others. Water quantity refers to the amount of water that must reach specific locations at a given time of year to maintain biological processes and to support the various life stages of the species. The physical habitat elements include areas of the Colorado River system that are or could be suitable habitat for spawning, nursery, rearing, and feeding, as well as corridors between such areas.

Decline of the razorback sucker has been associated with major changes in its riverine ecosystem including water diversion, water depletion, and construction and operation of dams. The species decline is also attributed to predation by green sunfish, warmouth, channel catfish, flathead catfish, threadfin shad, smallmouth bass, and largemouth bass.

Razorback suckers were introduced into Eagle Creek and the Blue River on the Apache-Sitgreaves NFs in the 1980s. There are no historical records of this species occurring in either of these streams, although it is more likely that they would have occurred historically within the San Francisco River on the Apache-Sitgreaves NFs. From 1983 through 1989, 335,506 razorback suckers were introduced into Eagle Creek within and downstream of the Apache-Sitgreaves NFs. Within the Blue River on the Apache-Sitgreaves NFs from 1986 through 1989, 167,457 razorback suckers were introduced. Only 5to10 individuals were ever recaptured, and these recaptures occurred within the stocking years of 1983 to 1989. The fate of these fish is unknown, but they are no longer considered to be present within either of these streams on or downstream of the Apache-Sitgreaves NFs boundary.

Spikedace (Meda fulgida) and Critical Habitat

Adult spikedace are 2.5 to 3.0 inches long; the eyes are large, the snout fairly pointed, and the mouth is slightly sub-terminal with no barbells present. The species is slender and somewhat anteriorly compressed. Spikedace can live up to 24 months, although few survive more than 13 months; and reproduction occurs primarily in one-year-old fish. Spawning extends from the middle of March into June and occurs in shallow riffles with gravel and sand bottoms and moderate flow. By the middle of May, most spawning has occurred, although in years of high water flows, spawning may continue into late May or early June. Spikedace feed primarily on aquatic and terrestrial insects.

Spikedace occupy mid-water habitats usually less than 3 feet deep, with slow to moderate water velocities over sand, gravel, or cobble substrates. Adults often occur in shear zones along gravel-sand bars where rapid water borders slower flow, quiet eddies on the downstream edges of riffles, and broad shallow areas above gravel-sand bars. The preferred habitat of the spikedace varies seasonally and with maturation. In winter, the species congregates along stream margins with

cobble substrates. The erratic flow patterns of southwestern streams that include periodic and recurrent flooding are essential to the feeding and reproduction of the spikedace by scouring the fine sediment and keeping gravels clean. Spikedace larvae and juveniles tend to occupy shallow, peripheral portions of streams that have slow currents and sand or fine gravel substrates, but will also occupy backwater habitats.

The spikedace is native to the Gila River drainage, including the San Francisco drainage, except in the extreme headwaters. The spikedace currently persists only in the upper Verde River and Aravaipa Creek in Arizona and portions of the Gila River in New Mexico. Although, spikedace have not been collected in the Verde River in recent years. In New Mexico the species is generally absent from the Gila River from the confluence of the West and East Forks downstream to the mouth of Turkey Creek, and occurs irregularly downstream from the mouth of the Middle Box of the Gila River to the Arizona-New Mexico state line.

The majority of historic habitat for the spikedace has been drastically altered or destroyed by human uses of the rivers, streams, and watersheds. Causes of such alterations and degradation include damming, water diversion, channel down-cutting, excessive groundwater pumping, lowering water tables, channelization, riparian vegetation destruction, erosion, mining, grazing, and other watershed disturbances. An increasing threat to spikedace includes the introduction and spread of non-native species that compete or predate upon spikedace.

Distribution and abundance of spikedace has declined due to riparian degradation, water diversion, and groundwater pumping. Introduction and spread of nonnative predatory and competitive fishes also contributed to its decline. Resource activities that affect water quality, such as removal of riparian vegetation, sedimentation, or control of water levels, can affect spikedace habitat quality. All of these activities have impacted the Apache-Sitgreaves NFs to varying degrees. The only documentation of spikedace on the Apache-Sitgreaves NFs has been in Eagle Creek; although it is likely historical habitat could have been within the San Francisco River. The species is still considered to be present within Eagle Creek, even though it has not been collected for over 20 years.

Critical habitat for spikedace in the recently published Final Rule (February 23, 2012) designates approximately 90 miles of streams that includes the Blue River (45.3 miles), Campbell Blue Creek (6 miles), Little Blue Creek (3.1 miles), Eagle Creek (12.1 miles), and the San Francisco River (23.7 miles) on the Apache-Sitgreaves NFs.

Sensitive Species

Roundtail Chub

Roundtail chub utilize slow moving, deep pools for cover and feeding. They are found in the main stems of major rivers and smaller tributary streams. Roundtail chub utilize a variety of substrate types (silt, sand, gravel, and rocks) and prefer murky water to clear. Habitat use varies by life stages (adult, juvenile, and young-of-year). Juveniles and young-of-year are found in quiet water near the shore or backwaters with low velocity and frequent pools rather than glides and riffles. Juveniles use instream boulders for cover, while young-of-year are found in gaps between and under boulders or the slack-water area behind boulders. Adults generally do not frequent vegetation and avoid shallow water cover types, such as overhanging and shoreline vegetation. Adults are found in eddies and pools adjacent to strong current and use instream boulders as cover. Roundtail chub are carnivorous and opportunistic feeders, and food items include aquatic and terrestrial insects, fish, snails, crustaceans, and algae.

Threats to the roundtail chub include habitat alteration and degradation from water diversions, groundwater pumping, dewatering, mining, contaminants, urban and agricultural development, livestock grazing, and predation and competition by non-native aquatic species. Only three populations are on the Apache-Sitgreaves NFs, and they occur in lower Chevelon Creek, Black River, and Eagle Creek. Although the historical distribution and reference conditions for this species on the Apache-Sitgreaves NFs are unknown, it is likely that the approximately 40 miles of occupied habitat for this species has been reduced. Trends in population and habitat for roundtail chub on the Apache-Sitgreaves NFs have decreased from historical levels; primarily resulting from the reduction in habitat quantity and quality, along with establishment of non-native aquatic species.

Bluehead, Desert, Little Colorado River, and Sonora Suckers

Bluehead suckers tend to utilize swifter velocity, higher gradient streams than those occupied by Little Colorado River suckers. They are found in warm to cool streams with rocky substrates, and habitat use varies by life state. Larval and juvenile fish inhabit near-shore, low velocity habitats; and as they mature, they move to deeper habitats further from shore and with more cover. The Little Colorado River sucker occurs primarily in pools with abundant cover. Both of these sucker species occur within the upper Little Colorado River watershed, and their ranges and occurrences often overlap. For the bluehead sucker approximately 80 miles of occupied habitat occurs on the Apache-Sitgreaves NFs, and streams include Chevelon Creek, Leonard Canyon, Little Colorado River, Nutrioso Creek, and Willow Creek. The Little Colorado River suckers occupied habitat is approximately half that of the bluehead sucker (approximately 40 miles), and the streams occupied are Chevelon Creek and Leonard Canyon. Desert suckers are found in the rapids and pools, primarily over areas of gravel-cobble with sand-silt in between the larger substrate; and elevations range from approximately 500 to 8,500 feet. They occur within numerous streams within the planning area (168 miles) and are found throughout the Black River, Eagle Creek, Blue River, San Francisco River and their tributaries. Sonora suckers are found in a variety of habitats from warm rivers to higher elevation trout streams between 1,500 to 8,750 feet. They also occur throughout the planning area in the same streams as the desert sucker, with a somewhat reduced distribution of approximately 148 miles. Threats to these species and their habitats include the alteration and destruction of habitat from anthropogenic and management activities, and the introduction and establishment of non-native aquatic species.

Longfin Dace

The distribution and habitat of longfin dace is wide ranging, from intermittent hot low-desert streams to clear and cold streams at higher elevations. They tend to occupy relatively small to medium size streams, with sand or gravel bottoms; and occupying eddies and pools near overhanging banks or other cover. They are rarely abundant in large streams or above 5,000 feet elevation. They are generally found in water less than 75° F, but are tolerant of high temperatures and low dissolved oxygen. Occupied habitat on the Apache-Sitgreaves NFs is approximately 105 miles; streams include Eagle Creek, San Francisco River and a few tributaries, and the Blue River and numerous tributaries. Threats to the longfin dace are similar to those of the suckers, primarily being non-native aquatic species and habitat destruction and alteration.

Non-Native Species

Non-native species currently present a significant threat to all native fish species on the Apache-Sitgreaves NFs. Prior to Euro-American settlement, non-native species were not present. However, due to past and current management, most of the streams and lakes on the Apache-

Sitgreaves NFs are managed by the Arizona Game and Fish Department for or contain socially desirable non-native species (e.g, sport fish). Crayfish are also widely distributed across the Apache-Sitgreaves NFs, and are usually found in high densities, but they are considered a non-desirable, non-native species.

Fish Recovery Efforts

Fisheries habitat improvement in streams began in the 1930s on the Apache-Sitgreaves NFs. These efforts were likely in response to highly degraded habitat conditions (likely from livestock grazing) and were focused on higher elevation trout streams to stabilize steams and provide pool habitat that had been reduced. Later efforts did not occur until the 1970s through the 1980s. These efforts were focused on areas that had been impacted by past management activities and concentrated recreational use (e.g., East Fork of the Black River and West Fork of the Little Colorado River). Considerable efforts were made in the 1990s to improve habitat conditions for Apache trout recovery by installing habitat improvements within several streams on the Apache-Sitgreaves NFs, primarily on the Springerville Ranger District. Recent efforts related to Apache trout recovery have focused on barrier maintenance and chemical treatment of streams to remove non-native species. Efforts to provide for other federally listed and other native fish species have been minimal and limited to the introduction of one Little Colorado spinedace population in West Chevelon Canyon and a recently completed analysis for construction of a fish barrier on the lower Blue River.

Environmental Consequences

The proposed land management plan provides a programmatic framework that guides site-specific actions but does not authorize, fund, or carryout any project or activity. Because the proposed land management plan does not authorize or mandate any site-specific projects or activities (including ground-disturbing actions) there can be no direct effects. However, there may be implications, or longer term environmental consequences, of managing the forests under this programmatic framework.

Fish Species Viability

The process to assess the diversity of ecosystems and wildlife for the Apache-Sitgreaves NFs began prior to plan revision and was prepared in support of the Apache-Sitgreaves NFs Ecological Sustainability Report that was completed in 2009. The Ecological Sustainability Report summarized the diversity of ecosystems, including the diversity of animals and plants, on the Apache-Sitgreaves NFs. As a result of this report species were initially identified as having potential or possible risk to their viability, and the identification of these species and their potential viability risks helped with the development of plan direction to address or reduce risk. Since 2009, this list has been refined and updated, with a final list of 109 species considered "forest planning species" (i.e., species with potential risk to their viability). For more detail, see the Iterative Update to Species Considered and Identification of Forest Planning Species Report.

A total of fourteen native fish species occur on the Apache-Sitgreaves NFs, of which seven are listed as endangered or threatened under the Endangered Species Act, and six are listed by the Regional Forester as sensitive. All fourteen fish are considered as forest planning species.

As part of the revision process plan decisions were developed that describe desired conditions for ecosystems, PNVT types, fire regimes, riparian and aquatic habitat, and wildlife within the

planning area. For species determined to be at low risk, these "coarse filter" plan decisions (e.g. desired conditions and objectives) would provide and maintain viability for those species. For those species at some risk to their viability, additional "fine filter" plan decisions were developed (e.g., standards and guidelines) to contribute and provide for viability to a low risk. Table 4 provides a summary of the plan decisions, at the coarse filter and fine filter level, for fish species that are necessary to reduce population viability concerns to a low risk level. A listing of the coarse filter plan decisions can be found below and the fine filter plan decisions can be found in appendix E.

Table 4. Sections of the plan containing plan decisions that address fish species viability concerns for the Apache-Sitgreaves NFs

Viability/Plan decision	Desired Conditions	Objectives	Standards	Guidelines
Coarse Filter plan decisions that provide viability for: bluehead sucker, desert sucker, Little Colorado sucker, longfin dace, razorback sucker, Sonora sucker, and speckled dace	Ecosystem Health Soils Water Resources Aquatic Habitat and Species Vegetation Riparian Areas Invasive species	Ecosystem Health Soils Aquatic Habitat and Species All Forest PNVTs All Woodland PNVTs Grasslands Invasive Species Water Uses		
Fine Filter plan decisions that are in addition to the coarse filter plan decisions above that provide viability for: Apache trout, Gila chub, Gila trout, Little Colorado spinedace, roundtail chub, loach minnow, and spikedace			Water resources Aquatic Habitat and Species Vegetation Invasive Species Water Uses	Soils Water Resources Aquatic Habitat and Species Vegetation Riparian Invasive Species Landscape Scale Disturbance Events Motorized Opportunities Non-motorized Opportunities Livestock Grazing Minerals and Geology

Coarse Filter

All alternatives would provide for the viability of all native fish species by maintaining and/or improving their habitat and populations through implementation of various plan decisions. The desired conditions below are the same for **all alternatives** and address viability concerns for all native fish species and their habitats that have primarily been impacted by habitat loss and alteration and the introduction and spread of non-native fish and other aquatic invasive species.

The implementation of plan decisions for **all alternatives** may have some short-term indirect effects to aquatic habitat and fish populations, but would result in long-term benefits to the maintenances and improvement of aquatic habitat and species populations. Long-term benefits would occur by moving overall conditions closer to reference conditions while increasing and improving ecosystem resiliency and, therefore, the aquatic habitat and fish species they contain (see the Soil, Watershed, Water Resources Riparian, Vegetation, and Invasive Species sections).

Desired conditions (coarse filter plan decisions) as described in the Overall Ecosystem Health, Soils, Water Resources, Water Uses, Aquatic Habitat and Species, Vegetation, Riparian Areas, and Invasive Species of the plan would provide for the viability for bluehead sucker, desert sucker, Little Colorado sucker, longfin dace, razorback sucker, Sonora sucker, and speckled dace as described in the next several paragraphs. These desired conditions would also contribute to the viability of Apache trout, Gila chub, Little Colorado spinedace, roundtail chub, loach minnow, and spikedace.

The desired conditions in overall ecosystem health that contribute and provide for viability include:

- Ecological components are resilient to disturbances including human activities and climate variability.
- Natural ecological processes (e.g., fire, drought, wind, insects, disease, pathogens) return to their innate role within the ecosystem. Fire, in particular, is restored to a more natural function.
- Natural ecological processes allow for a shifting of plant communities, structure, and ages across the landscape. Ecotone shifts are influenced at both the landscape and watershed scale by ecological processes. The mosaic of plant communities and the variety within the communities are resilient to disturbances.
- Ecological conditions for habitat quality, distribution, and abundance contribute to self-sustaining populations of native and desirable non-native plants and animals that are healthy, well-distributed, connected, and genetically diverse. Conditions provide for the life history, distribution, and natural population fluctuations of the species within the capability of the landscape.
- Large blocks of habitat are interconnected, allowing for behavioral and predator-prey interactions, and the persistence of metapopulations and highly interactive wildlife species across the landscape. Ecological connectivity extends through all plant communities and ecotones.
- Habitat configuration and availability allows wildlife populations to adjust their movements (e.g., seasonal migration, foraging) in response to climate change and promote genetic flow between wildlife populations.
- Habitat quality, distribution, and abundance exist to support the recovery of federally listed species and the continued existence of all native and desirable non-native species.
- Healthy ecosystems provide a wide range of ecosystem services.

- Watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.

Plan implementation towards these desired conditions would improve ecological conditions and move conditions closer to reference conditions for vegetation, watersheds, and riparian areas. Additionally, ecological processes across these areas and landscapes would improve overall ecosystem function and condition and reduce the potential for high severity fire. Restoration treatments and management actions for these desired conditions would improve vegetation, soil, watershed, riparian, and aquatic habitat conditions within the planning area, and provide long-term benefits to maintaining and improving aquatic habitat and fish species populations (i.e., viability) across the forests.

Desired conditions for soils that contribute and provide for viability include:

- Ecological and hydrologic functions are not impaired by soil compaction.
- Soil condition rating is satisfactory.
- Soils are stable within their natural capability. Vegetation and litter limit accelerated erosion (e.g., rills, gullies, root exposure, topsoil loss) and contribute to soil deposition and development.
- Soils provide for diverse native plant species. Vegetative ground cover is well-distributed across the soil surface to promote nutrient cycling and water infiltration.
- Biological soil crusts (mosses, lichens, algae, liverworts) are present and re-established if potential exists.
- Soil loss rates do not exceed tolerance soil loss rates.
- Logs and other woody material are distributed across the surface to maintain soil productivity.
- Vegetation and litter is sufficient to maintain and improve water infiltration, nutrient cycling, and soil stability.

The improvement in soil conditions resulting from plan implementation towards these desired conditions would improve and move hydrologic function and conditions of watershed towards reference conditions and greater resiliency. Soil condition improvements would improve water quality and aquatic habitat quality in the long-term, as sedimentation and water quality from runoff are reduced as watershed conditions are improved.

Desired conditions for all PNVTs that contribute and provide for viability include:

- Each PNVT contains a mosaic of vegetative conditions, densities, and structures. This mosaic occurs at a variety of scales across landscapes and watersheds. The distribution of physical and biological conditions is appropriate to the natural disturbance regimes affecting the area.
- The vegetative conditions and functions are resilient to the frequency, extent, and severity of ecological processes, especially fire, insects and disease, and climate variability. The landscape is a functioning ecosystem that contains all its components, processes, and functions.
- Natural processes and human disturbances (e.g., planned and unplanned fire ignitions, mechanical vegetation treatments) provide desired overall tree density, structure, species

composition, coarse woody debris, and nutrient cycling. Natural fire regimes are restored. Uncharacteristic fire behavior is minimal or absent on the landscape.

- Fire (planned and unplanned ignitions) maintains and enhances resources and, as nearly as possible, is allowed to function in its natural ecological role
- Native plant communities dominate the landscape.
- The range of species genetic diversity remains within native vegetation and animal populations, thus enabling species to adapt to changing environmental and climatic conditions.
- Vegetative connectivity provides for species dispersal, genetic exchange, and daily and seasonal movements across multiple spatial scales.
- Vegetation characteristics (e.g., density, litter) provide favorable conditions for water flow and quality.
- Organic soil cover and herbaceous vegetation protect soil, facilitate moisture infiltration, and contribute to plant and animal diversity and ecosystem function.
- Diverse vegetation structure, species composition, densities, and seral states provide quality habitat for native and desirable non-native plant and animal species throughout their lifecycle and at multiple spatial scales. Landscapes provide for the full range of ecosystem diversity at multiple scales, including habitats for those species associated with late seral states and old growth forests.
- Old growth is dynamic in nature and occurs in well-distributed patches that spatially shift across forest and woodland landscapes over time.
- Old or large trees, multi-storied canopies, large coarse woody debris, and snags provide the structure, function and associated vegetation composition as appropriate for each forested and woodland PNVT.
- Vegetation conditions allow for transition zones or ecotones between riparian areas, forests, woodlands, shrublands, and grasslands. Transition zones may shift in time and space due to changing site conditions (e.g., fire, climate).
- Insect and disease populations are at endemic levels with occasional outbreaks. A variety of seral states usually restricts the scale of localized insect and disease outbreaks.
- Stand densities and species compositions are such that vegetation conditions are resilient under a variety of potential future climates.
- Vegetation conditions provide hiding and thermal cover in contiguous blocks for wildlife. Native plant species are present in all age classes and are healthy, reproducing, and persisting.
- Ground cover, density, and height of vegetation exist to protect the soil and support water infiltration. There is a diverse mix of cool and warm season grass and desirable forb species. Plant canopy cover and composition are within or moving closer to reference conditions.
- Grasses, forbs, shrubs, and litter are abundant and continuous to maintain and support natural fire regimes.
- The composition, density, structure, and mosaic of vegetative conditions reduce uncharacteristic wildfire hazard to local communities and forest ecosystems.

Plan implementation towards these desired conditions would move the PNVTs closer to their ecological composition, structure, and processes relative to reference conditions. The closer each PNVT is functioning to reference conditions, the more secure dependent species are within the associated habitats. PNVT improvements would re-establish the natural patterns and processes

within these vegetation communities that allow for natural resiliency; especially important when faced with uncharacteristic wildfire, the presence of invasive species, and climate change.

Desired deconditions for water resources and uses that contribute and provide for viability include:

- Water quality, stream channel stability, and aquatic habitats retain their inherent resilience to natural and other disturbances.
- Water resources maintain the capability to respond and adjust to disturbances without long-term adverse changes.
- Vegetation and soil conditions above the floodplain contribute to downstream water quality, quantity, and aquatic habitat.
- Instream flows provide for channel and floodplain maintenance, recharge of riparian aquifers, water quality, and minimal temperature fluctuations.
- Stream flows provide connectivity among fish populations and provide unobstructed routes critical for fulfilling needs of aquatic, riparian-dependent, and many upland species of plants and animals.
- Stream channels and floodplains are dynamic and resilient to disturbances. The water and sediment balance between streams and their watersheds allow a natural frequency of low and high flows.
- Flooding does not disrupt normal stream characteristics (e.g., water transport, sediment, woody material) or alter stream dimensions (e.g., bankfull width, depth, slope, sinuosity).
- Floodplains are functioning and lessen the impacts of floods on human safety, health, and welfare.
- Water quality meets or exceeds Arizona State standards or Environmental Protection Agency water quality standards for designated uses.
- Water developments contribute to fish, wildlife, and riparian habitat as well as scenic and aesthetic values.
- Apache-Sitgreaves NFs water rights are secure and contribute to livestock, recreation, wildlife, and administrative uses.

Plan implementation towards these desired conditions would ensure water quality, quantity, and connectivity occurs across the forests; along with improving watershed and hydrologic conditions necessary for maintaining and improving riparian areas and aquatic habitats.

Desired conditions for aquatic habitat and species that provide viability for bluehead sucker, desert sucker, Little Colorado sucker, longfin dace, razorback sucker, Sonora sucker, and speckled dace include:

- Streams and aquatic habitats support native fish and/or other aquatic species providing the quantity and quality of aquatic habitat within reference conditions.
- Federally listed species are trending towards recovery.
- Stream flows, habitat, and water quality support native aquatic and riparian dependent species and habitat.
- Habitat and ecological conditions are capable of providing for self-sustaining populations of native, riparian-dependent plant and animal species.

- Native fish, reptile, and amphibian populations are free from or minimally impacted by non-native plant and animals.
- Aquatic species habitat conditions provide the resiliency and redundancy necessary to maintain species diversity and metapopulations.
- Desirable non-native fish species provide recreational fishing in waters where those opportunities are not in conflict with the recovery of native species.
- Wetlands are hydrologically functioning and have sufficient (composing 50 percent of the wetland) emergent vegetation and macroinvertebrate populations to support resident and migratory wetland-dependent species.

Plan implementation towards these desired conditions would improve aquatic habitat conditions for all native fish species, reduce impacts associated with non-native species, and improve distributions and resiliency for threatened and endangered fish species. Conditions for all native fish species would improve by addressing habitat and loss and alteration of habitat by moving conditions closer to reference conditions.

Desired conditions for riparian areas that provide for viability include:

- Natural ecological processes (e.g., flooding, scouring) promote a diverse plant structure consisting of herbaceous, shrub, and tree species of all ages and size classes necessary for the recruitment of riparian-dependent species.
- Riparian-wetland conditions maintain water-related processes (e.g., hydrologic, hydraulic, geomorphic). They also maintain the physical and biological community characteristics, functions, and processes.
- Stream (lotic) riparian-wetland areas have vegetation, landform, or large coarse woody debris to dissipate stream energy associated with high water flow.
- Streams and their adjacent floodplains are capable of filtering, processing, and storing sediment; aiding floodplain development; improving flood-water retention; and increasing groundwater recharge.
- Vegetation and root masses stabilize streambanks, islands, and shoreline features against the cutting action of water.
- Ponding and channel characteristics provide habitat, water depth, water duration, and the temperatures necessary for maintaining populations of riparian-dependent species and for their dispersal.
- Lentic riparian areas (e.g., wet meadows, fens, bogs) have vegetation and landform present to dissipate wind action, wave action, and overland flow from uplands.
- Wetland riparian areas are capable of filtering sediment and aiding floodplain development that contribute to water retention and ground water recharge.
- The spatial extent of wetlands is maintained.
- Sedimentation and soil compaction do not negatively impact riparian areas.
- Riparian vegetation consists mostly of native species that support a wide range of vertebrate and invertebrate species and are free of invasive plant and animal species.
- The ecological function of riparian areas is resilient to animal and human use.
- Floodplains and wet meadows provide sufficient herbaceous cover (55 percent or greater) and height (9 inches or longer) to trap sediment, mitigate flood energy, and provide wildlife habitat.

- Riparian areas that do not depend on geologic control features for stability have large coarse woody debris that provides key habitat for riparian-dependent species.
- Stream bottoms that are predominantly composed of sand and gravel have large coarse woody debris which provides habitat and food and helps dissipate hydraulic energy.

Plan implementation towards these desired conditions would improve conditions for all native fish species by addressing habitat and loss and alteration of habitat by moving conditions closer to reference conditions.

Fine Filter

While the above coarse filter desired conditions provide and maintain viability for numerous fish species; additional fine filter plan decisions were needed for those fish species with higher risk to their viability. These species include Apache trout, Gila chub, Little Colorado spinedace, roundtail chub, loach minnow, and spikedace. All of the plan decisions (i.e., fine filter standards and guidelines) discussed below are applicable and necessary for each and all of the six fish species listed. They are applicable to all six species as the potential impacts to watersheds, riparian areas, and aquatic habitats are similar; and the specific threats to all these species are also similar (e.g., sedimentation, non-native species).

The fine filter plan decisions are designed to address the threats and risks to these species, especially as they relate to potential short-term impacts. These standards and guidelines were developed to ensure species viability by improving and maintaining habitat and populations across the forests, while minimizing any potential short-term impacts associated with restoration treatments and management activities.

As these species are more vulnerable to short-term habitat impacts due to their lower population numbers and reduced distributions, these additional standards and guidelines would provide viability by addressing the primary concerns associated with habitat loss and alteration, non-native species, and uncharacteristic landscape scale disturbances (e.g., uncharacteristic fire).

The standards and guidelines identified in the Invasive Species, Landscape Scale disturbance Events, Riparian Areas, Water Resources, Water Uses, Motorized Opportunities, Aquatic Habitat and Species, and Livestock grazing sections of the plan under **all alternatives** contribute and provide for viability for Apache trout, Gila chub, Little Colorado spinedace, roundtail chub, loach minnow, and spikedace. A list of these fine filter plan decisions can be found in appendix G.

Fine filter plan decisions for invasive species include:

- Standard – “Projects and authorized activities shall be designed to reduce the potential for the introduction of new species or spread of existing invasive or undesirable aquatic or terrestrial non-native populations.”
- Guideline – “Project areas should be monitored to ensure there is no introduction or spread of invasive species.”
- Guideline – “Treatment of invasive species should be designed to effectively control or eliminate them, multiple treatments may be needed.”
- Guideline – “Pesticide use should minimize impacts on non-target plants and animals.”
- Guideline – “Projects and activities should not transfer water between drainages or between unconnected waterbodies within the same drainage to avoid spreading disease and aquatic invasive species.”

As non-native species are negatively impacting all federally listed fish species, these plan decisions would reduce current impacts and ensure restoration treatments and management actions do not result in additional impacts associated with invasive species or actions taken to control existing populations.

Fine filter plan decisions for landscape scale disturbance include:

- Guideline – "Erosion control mitigation features should be implemented to protect significant resource values and infrastructure such as stream channels, roads, structures, threatened and endangered species, and cultural resources."
- Guideline – "Projects and activities (e.g., revegetation, mulching, lop and scatter) should be designed to stabilize soils and restore nutrient cycling, if needed, and establish movement toward the desired conditions for the affected PNVT(s)."

Due to their limited and/or reduced distributions and isolated populations, federally listed fish species are more susceptible to large scale disturbances (e.g., fire) that can also negatively impact vegetation, watersheds, riparian areas, and aquatic habitat. When large scale disturbances occur these guidelines would ensure that conditions required for the restoration of ecological functions and processes would be in place, and any potential impacts to streams and federally listed species would be minimized.

Fine filter plan decisions for riparian areas include:

- Guideline – "Storage of fuels and other toxicants should be located outside of riparian areas to prevent spills that could impair water quality or harm aquatic species."
- Guideline – "Equipment should be fueled or serviced outside of riparian areas to prevent spills that could impair water quality or harm aquatic species."
- Guideline – "Construction or maintenance equipment service areas should be located and treated to prevent gas, oil, or other contaminants from washing or leaching into streams."
- Guideline – "Wet meadows and cienegas should not be used for concentrated activities (e.g., equipment storage, forest product or mineral stockpiling, livestock handling facilities, special uses) that cause damage to soil and vegetation."
- Guideline – "Active grazing allotments should be managed to maintain or improve to desired riparian conditions."

These guidelines would minimize potential impacts to riparian vegetation, water quality, aquatic habitat, and fish species associated with restoration treatments and/or management actions.

Fine filter plan decisions for water resources and water uses include:

- Guideline – "Streams, streambanks, shorelines, lakes, wetlands, and other bodies of water should be protected from detrimental changes in water temperature and sediment to protect aquatic species and riparian habitat."
- Guideline – "Streamside management zones should be in place between streams and disturbed areas and/or road locations to maintain water quality and suitable stream temperatures for aquatic species."
- Guideline – "As State of Arizona water rights permits (e.g., water impoundments, diversions) are issued, the base level of instream flow should be retained by the Apache-Sitgreaves NFs."
- Guideline – "Constraints (e.g., maximum limit to which water level can be drawn down, minimum distance from a connected river, stream, wetland, or groundwater-dependent

ecosystem) should be established for new groundwater pumping sites permitted on NFS lands in order to protect the character and function of water resources."

- Standard – "Streams on NFS lands with high aquatic values and at risk from new water diversions shall be preserved and protected with instream flow water rights."
- Standard – "Groundwater withdrawals shall not measurably diminish surface water flows on NFS lands without an appropriate surface water right."
- Standard – "Consistent with existing water rights, water diversions or obstructions shall at all times allow sufficient water to pass downstream to preserve minimum levels of water flow which maintain aquatic life and other purposes of national forest establishment."

Where water uses and management of resources occur, the potential to impact water quality, riparian areas and vegetation, aquatic habitat and fish may occur. The standards and guidelines for water resources and uses would minimize and mitigate any potential impacts by protecting aquatic habitat and species from disturbance by implementing streamside management zones.

Fine filter plan decisions for motorized opportunities include:

- Guideline – "New roads, motorized trails, or designated motorized areas should be located to avoid meadows, wetlands, riparian areas, stream bottoms, sacred sites, and areas with high concentrations of significant archaeological sites. The number of stream crossings should be minimized or mitigated to reduce impacts to aquatic species."
- Guideline – "Roads and motorized trails removed from the transportation network should be treated in order to avoid future risk to hydrologic function and aquatic habitat."
- Guideline – "As projects occur, existing meadow crossings should be relocated or redesigned, as needed, to maintain or restore hydrologic function using appropriate tools such as French drains and elevated culverts."
- Guideline – "New trails and trail relocations should be designed and located so as to not impede terrestrial and aquatic species movement and connectivity."

These guidelines for motorized opportunities would minimize potential impacts or conflicts to aquatic species and habitats by maintaining and improving hydrologic conditions and functions and avoiding riparian areas.

Fine filter plan decisions for aquatic habitat and species include:

- Guideline – "The needs of rare and unique species associated with wetlands, fens, bogs, and springs should be given priority consideration when developing these areas for waterfowl habitat and other uses."
- Guideline – "Sufficient water should be left in streams to provide for aquatic species and riparian vegetation."
- Guideline – "Projects and activities should avoid damming or impounding free-flowing waters to provide stream flows needed for aquatic and riparian-dependent species."
- Standard – "When drafting (withdrawing) water from streams or other waterbodies, measures will be taken to prevent entrapment of fish and aquatic organisms and the spread of parasites or disease (e.g., Asian tapeworm, chytrid fungus, whirling disease)."
- Guideline – "When new water diversions are created or existing water diversions are reanalyzed, measures should be taken to prevent entrapment of fish and aquatic organisms."

- Guideline – "To prevent degradation of native species habitat and the incidental or accidental introduction of diseases or non-native species, aquatic species should not be transferred through management activities from one 6th level HUC watershed to another."

As stated previously, habitat loss and alteration and non-native species are the primary concerns for most native and federally listed fish species. These standards and guidelines for aquatic habitat and species would provide for the habitat needs for fish species, while reducing and minimizing any potential impacts associated with non-native species.

Fine filter plan decisions for livestock grazing include:

- Guideline – "Critical areas should be managed to address the inherent or unique site factors, condition, values, or potential conflicts."
- Guideline – "New livestock troughs, tanks, and holding facilities should be located out of riparian areas to prevent concentration of livestock in these areas. Existing facilities in riparian areas should be modified, relocated, or removed where their presence is determined to inhibit movement toward desired riparian or aquatic conditions."
- Guideline – "To minimize potential resource impacts from livestock, salt or nutritional supplements should not be placed within a quarter of a mile of any riparian area or water source. Salt or nutritional supplements should also be located to minimize herbivory impacts to aspen clones."
- Guideline – "To prevent resource damage, trailing of livestock should not occur along riparian areas."

The removal and/or relocation of livestock trailing, waters, holding facilities, salt, and nutritional supplements away from waters and riparian areas would reduce any potential negative impacts to riparian vegetation, water quality, and aquatic habitats.

Overall Environmental Consequences

In **all alternatives** implementation of plan decisions (i.e., desired conditions, objectives, standards, guidelines, suitability, special areas, and monitoring) may have both short-term and long-term environmental consequences that are positive, negative, or neutral on aquatic and riparian habitat and fish populations. Improvements in vegetation conditions, primarily through mechanical treatments and fire management activities, along with watershed improvements may result in long-term beneficial impacts that could improve aquatic habitat conditions and fish populations. These potential beneficial impacts would be dependent on the extent to which these treatments occur within watersheds occupied or identified for the recovery of fish species. Although ecosystem, watershed, riparian, and aquatic habitat conditions have varying departure from reference conditions, achievement or movement towards desired conditions would improve these conditions across the Apache-Sitgreaves NFs.

Vegetation, fuels, and fire restoration treatments can influence and improve aquatic habitat conditions across the Apache-Sitgreaves NFs. Watershed, riparian, and aquatic habitat treatments would have the greatest potential to positively impact aquatic habitat. Through implementation of plan decisions (i.e., desired conditions and objectives) for ecosystem health, soils, water resources, aquatic habitat and species, vegetation, riparian areas, invasive species, and water uses; both the physical and biological processes for maintaining and improving aquatic habitat and fish populations would move towards reference conditions across the Apache-Sitgreaves NFs and provide for viability and recovery for threatened, endangered, and sensitive fish species.

Within the Apache-Sitgreaves NFs and areas downstream, management activities have the potential to impact fish species and their critical/potential habitat. Impacts to hydrologic conditions (i.e., changes in water quantity and quality) and riparian and aquatic habitats are due to vegetation alterations, soil erosion, and sedimentation from ground-disturbing activities; these include, but are not limited to: fire and mechanical treatments, timber harvesting, livestock grazing, road construction and maintenance, and recreation and developments. How watersheds, riparian areas, and streams respond to management impacts would be influenced by their geology, soils, vegetation conditions and cover, their existing conditions at the time of the impacts, and environmental conditions that exists after impacts have occurred. As mentioned in the previous section, **all alternatives** contain plan decisions to address and minimize any potential short-term negative impacts to all of the endangered, threatened, and sensitive fish species and their habitats on the Apache-Sitgreaves NFs.

Endangered and Threatened Species and Critical Habitat

In **all alternatives** the implementation of plan decisions related to ecosystem health, soils, water resources, aquatic habitat and species, vegetation, riparian areas, and invasive species may have short-term negative environmental consequences, but would also result in long-term beneficial environmental consequences to the maintenance and improvement of fish species populations and habitats on the Apache-Sitgreaves NFs. The implementation of **all alternatives** would provide and maintain viability for all seven of the endangered and threatened fish species on the Apache-Sitgreaves NFs; and would also result in a "may affect" determination for the Apache trout, Gila chub and its critical habitat, Gila trout, Little Colorado spinedace and its critical habitat, loach minnow and its critical habitat, and spikedace and its critical habitat. While a no effect determination would occur for the razorback sucker and its critical habitat.

While **all alternatives** provide for viability by moving habitat conditions closer to reference conditions, plan objectives vary between the alternatives, and their outcomes determine the potential for fish habitat and population improvements across the Apache-Sitgreaves NFs. Plan decisions associated with ecosystems, soils, vegetation, and other restoration activities are not specifically discussed here, and more specific information on these actions and their potential environmental consequences can be found within these sections within this document.

- Stream and riparian habitat restoration treatment objectives for native fish species for **alternatives B and C** are 5 to 15 miles per year, less than 10 miles per year for **alternative A**, and on an opportunity basis for **alternative C**.
- Objectives for riparian habitat vegetation treatments are five miles per year for **alternatives B, C, and D**, and on an opportunity basis for **alternative A**.
- Aquatic invasive treatment objectives are two miles per year for **alternatives B, C, and D**, and on an opportunity basis for **alternative A**.
- Riparian restoration treatments for **alternative D** are 300 to 600 acres per year, 200 to 500 acres per year for **alternative B**, and on an opportunity basis for **alternatives A and C**.
- Road and trail restoration for streams and riparian areas are four miles over the planning period for **alternatives B and D**, and on an opportunity basis for **alternatives A and C**.

The overall greatest improvements for all the endangered and threatened fish species are likely to result through implementation of **alternative D**. **Alternative B** would result in similar improvements, but to a somewhat lesser extent as compared to **Alternative D**. **Alternative C**

would not restore conditions to the extent of either **alternative D or alternative B**, but would be greater than **alternative A**.

Sensitive Species

In **all alternatives** the implementation of plan decisions related to ecosystem health, soils, water resources, aquatic habitat and species, vegetation, riparian areas, and invasive species for any of the alternatives may have short-term negative environmental consequences, but would also result in long-term beneficial environmental consequences to the maintenance and improvement of fish species populations and habitats on the Apache-Sitgreaves NFs. The implementation of **all alternatives** would provide and maintain viability for all six of the sensitive fish species on the Apache-Sitgreaves NFs; and would also result in a "may impact individuals, but is not likely to result in a trend toward federal listing or loss of viability" determination for the bluehead sucker, Desert sucker, Little Colorado River sucker, longfin dace, roundtail chub, and the Sonora sucker.

While **all alternatives** provide for viability by moving habitat conditions closer to reference conditions, plan objectives vary between the alternatives, and these differences among outcomes would determine the potential for habitat and population improvements for fish species across the Apache-Sitgreaves NFs. Plan decisions associated with ecosystems, soils, vegetation, and other restoration activities are not specifically discussed here, and more specific information on these actions and their potential environmental consequences can be found within these sections within this document.

- Stream and riparian habitat restoration treatment objectives for native fish species for **alternatives B and C** are 5 to 15 miles per year, less than 10 miles per year for **alternative A**, and on an opportunity basis for **alternative C**.
- Objectives for riparian habitat vegetation treatments are five miles per year for **alternatives B, C, and D**, and on an opportunity basis for **alternative A**.
- Aquatic invasive treatment objectives are two miles per year for **alternatives B, C, and D**, and on an opportunity basis for **alternative A**.
- Riparian restoration treatments for **alternative D** are 300 to 600 acres per year, 200 to 500 acres per year for **alternative B**, and on an opportunity basis for **alternatives A and C**.
- Road and trail restoration for streams and riparian areas are four miles over the planning period for **alternatives B and D**, and on an opportunity basis for **alternatives A and C**.

The overall greatest improvements for all the endangered and threatened fish species are likely to result through implementation of **alternative D**, and **alternative B** would result in similar improvements, but to a somewhat lesser extent as compared to **alternative D**. **Alternative C** would not restore conditions to the extent of either **alternative D** or **alternative B**, but would be greater than **alternative A**.

Restoration Treatment Activities

Under **all alternatives**, management actions to implement ecological restoration would include treating vegetation through fire, timber harvest, and mechanical treatments across the landscape over the planning period. Treatments could potentially result in some disturbances to watersheds through increased runoff, erosion, sediment, and stream flow that could impact aquatic habitat. All projects would minimize impacts to aquatic ecosystems and maintain habitat quantity and distribution within the planning area by implementing appropriate plan direction. All treatments

are intended to improve ecological conditions by restoring the natural fire regime, improving vegetation health and conditions, and reducing the potential for high severity fire wildfire. All treatments would result in improved watershed, soil, and vegetation conditions in the planning area, and thus would have long-term benefits of maintaining and improving aquatic habitats and fish species populations on the Apache-Sitgreaves NFs.

Watershed improvement projects would occur across the landscape across the forest, and these projects would move soil and vegetation conditions toward satisfactory conditions. Closing and obliterating unauthorized routes would improve watershed conditions and decrease erosion. Improvements of stream crossings would reduce impacts to aquatic habitats from sedimentation. These projects would follow plan direction to minimize impacts to aquatic ecosystems and habitats, and would have long-term benefits of maintaining or improving aquatic habitats and fish species populations across the Apache-Sitgreaves NFs.

The following sections provide further discussion and description of potential impacts. The severity of any unavoidable negative impacts may be reduced or minimized by designing mitigation measures for site-specific project implementation. Where management activities occur, some impacts cannot be avoided; therefore, some unavoidable impacts could occur to fish and aquatic habitats.

Table 3 in chapter 2 displays the restoration objectives, or planned treatment amounts, for each alternative. The restoration activities are used as indicators to compare the four alternatives relative to their potential impacts to fish and their habitats. Drainage areas were calculated for each species to aid these comparisons; and the acreages presented for each species contain all of the upland area that drains into occupied, critical, or recovery habitat for each fish species. By limiting the analyses to only those areas that can impact and influence each fish species, this allows for a more meaningful comparison of the potential environmental consequences for each individual fish species for each alternative.

Impacts Related to Mechanical, and Fire and Fuels Treatments

The primary vegetation management tools in **all alternatives** would be mechanical and fire treatments. While these activities would be implemented with the intent of restoring vegetative conditions (i.e., structure and composition) and natural fire regimes, their respective impacts and the potential short- and long-term environmental consequences could vary by the specific treatment types and combinations used.

Table 5 below summarizes each alternative's total acreages and percent of habitat for each species that could potentially be treated, during the planning period, by the treatment types. The total potential treatment acres would not vary for any species by alternative, but the potential treatment types would vary. These are primarily a result of the relative emphasis on mechanical treatments and lands managed for timber production on a regulated basis (with a concurrent reduction in the use of fire) in **alternatives A, B, and C**. There is a reduction in overall mechanical treatment lands (with no lands being managed for timber production on a regulated basis), along with the increased use of fire in **alternative D**. The total treatment acres for each species is 100 percent of their drainage areas, which would likely result in all species being potentially impacted within the planning period by one or more treatment types.

Table 5. Acres and percent of the forests by potential treatment types (mechanical and fire) by species drainage area and alternative

Species Drainage Area (acres)	Alternative A[1]		Alternative B		Alternative C		Alternative D	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Apache Trout (109,986)*								
Lands where Mechanical Treatments or Fire Could Occur	85,746	78%	82,663	75%	82,788	75%	72,986	66%
Lands where Only Fire Treatments Could Occur	24,018	22%	27,323	25%	27,198	25%	37,000	34%
Bluehead Sucker (374,967)*								
Lands where Mechanical Treatments or Fire Could Occur	326,673	87%	333,539	89%	333,533	89%	288,061	77%
Lands where Only Fire Treatments Could Occur	46,780	13%	41,429	11%	41,434	11%	86,907	23%
Desert Sucker (847,535)*								
Lands where Mechanical Treatments or Fire Could Occur	387,631	46%	396,467	47%	396,549	47%	238,983	28%
Lands where Only Fire Treatments Could Occur	459,140	54%	451,068	53%	450,986	53%	608,553	72%
Gila Chub (92,705)								
Lands where Mechanical Treatments or Fire Could	51,105	55%	51,105	55%	51,105	55%	8,657	9%

Species Drainage Area (acres)	Alternative A[1]		Alternative B		Alternative C		Alternative D	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Occur Lands where Only Fire Treatments Could Occur	41,600	45%	41,600	45%	41,600	45%	84,048	91%
Gila Trout (51,615)* Lands where Mechanical Treatments or Fire Could Occur	15,644	30%	15,645	30%	15,645	30%	12,126	23%
Lands where Only Fire Treatments Could Occur	35,971	70%	35,970	70%	35,970	70%	39,489	77%
Little Colorado Spinedace (268,697)* Lands where Mechanical Treatments or Fire Could Occur	237,847	89%	243,409	91%	243,403	91%	204,344	76%
Lands where Only Fire Treatments Could Occur	30,240	11%	25,289	9%	25,294	9%	64,353	24%
LCR Sucker (180,663)* Lands where Mechanical Treatments or Fire Could Occur	166,424	92%	172,386	95%	172,387	95%	140,187	78%
Lands where Only Fire Treatments Could Occur	13,734	8%	8,276	5%	8,276	5%	40,476	22%

Species Drainage Area (acres)	Alternative A[1]		Alternative B		Alternative C		Alternative D	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Loach Minnow (724,558)*								
Lands where Mechanical Treatments or Fire Could Occur	269,142	37%	279,439	39%	279,439	39%	131,468	18%
Lands where Only Fire Treatments Could Occur	454,651	63%	445,120	61%	445,120	61%	593,090	82%
Longfin Dace (634,010)*								
Lands where Mechanical Treatments or Fire Could Occur	201,812	32%	207,735	33%	207,734	33%	70,773	11%
Lands where Only Fire Treatments Could Occur	432,198	68%	426,276	67%	426,276	67%	563,237	89%
Razorback Sucker (637,401)								
Lands where Mechanical Treatments or Fire Could Occur	203,907	32%	212,115	33%	212,115	33%	69,183	11%
Lands where Only Fire Treatments Could Occur	433,494	68%	425,286	67%	425,286	67%	568,218	89%
Roundtail Chub (543,293)*								
Lands where Mechanical Treatments or Fire Could Occur	416,913	77%	425,790	78%	425,872	78%	321,579	59%

Species Drainage Area (acres)	Alternative A[1]		Alternative B		Alternative C		Alternative D	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Lands where Only Fire Treatments Could Occur	125,127	23%	117,503	22%	117,421	22%	221,715	41%
Sonora Sucker (847,535)*								
Lands where Mechanical Treatments or Fire Could Occur	387,631	46%	396,467	47%	396,549	47%	238,983	28%
Lands where Only Fire Treatments Could Occur	459,140	54%	451,068	53%	450,986	53%	608,553	72%
Spikedace (653,098)*								
Lands where Mechanical Treatments or Fire Could Occur	209,436	32%	217,655	33%	217,655	33%	69,684	11%
Lands where Only Fire Treatments Could Occur	443,662	68%	435,444	67%	435,444	67%	583,414	89%

[1] The sum of Alternative A's treatment acres do not equal the Drainange Area acres because the Water Management Area is not included in this calculation.

Mechanical treatments include vegetation treatments and associated skidding, road improvement and maintenance (e.g., road use, new construction, reconstruction, temporary construction of roads), log and/or biomass transportation, piling, and disposal/removal of slash, and site preparation. While these treatments could result in short-term impacts to the specific treatment sites and cumulatively within a watershed, standards and guidelines would ensure any short-term impacts are minimized. Mechanical and fire treatments improve forest health and vegetation conditions, and restore a more natural fire regime and reduce the potential for high severity wildfire. These ecological restoration actions would have long-term benefits to maintaining and improving aquatic habitats and maintaining fish species populations on the Apache-Sitgreaves NFs.

Alternatives A, B, and C would have the highest potential for short-term negative impacts to aquatic habitat and fish populations because they have the greatest area that could receive mechanical treatments. Negative impacts could occur when the hydrologic conditions, including increased rates of sedimentation, of watersheds and riparian areas are altered. Potential negative impacts from **alternative D** would be less than those under **alternatives A, B or C**, as there are much fewer lands that could be mechanically treated.

Potential long-term beneficial impacts would occur in **all alternatives** through the improvements in vegetation conditions. Additionally, beneficial impacts could occur through restoration of a more natural fire regime and reducing the potential for uncharacteristic wildfire that may benefit watersheds and desired conditions for riparian and aquatic habitat. All lands with potential to impact fish species and aquatic habitats have been identified as lands that can be treated either by mechanical or fire treatments, although the proportion of mechanical versus fire treated lands does vary for each fish species. While the proportion of treatment types varies between species, the outcomes associated with the treatments are similar for all species; as they would restore aquatic habitats and move toward desired conditions for all fish species.

Alternative A has the most acres (9 to 66 percent of species drainage areas) that would be managed as suitable timber production lands, followed by **alternatives C and B**. These lands would be subject to periodic mechanical entries over time, although it is likely there would be only one entry that would occur during the planning period. Potential negative environmental consequences could result from higher road densities and the associated watershed and hydrologic impacts from repeated entries that can result in impacts to water quality, riparian areas, and aquatic habitats.

Alternative D has no lands suitable for timber production. In terms of fire-only treatments, **alternatives A, B, and C** would potentially treat the least amount of acres; therefore, they would likely result in the least amount of beneficial impacts. **Alternative D** would result in the greatest amount of beneficial impacts, as it could potentially treat 22 to 91 percent more acres within each fish species drainage area compared to **alternatives A, B, and C**. Fire-only treatments require less ground disturbing impacts and infrastructure (e.g., roads, landings) as compared to mechanical treatments, and can reduce the potential for future wildfire impacts that can negatively impact watershed conditions, riparian areas, aquatic habitats, and fish populations from uncharacteristic amounts of moderate and high severity fire activity.

Impacts Associated with Management Area Allocations

The fish species drainage areas are located in a variety of management areas. It is assumed that certain management areas have a higher probability of management activities, including ground-disturbing activities.

For the **action alternatives**, these management areas include the General Forest, Community-Forest Intermix, High Use Developed Recreation Area, Energy Corridor, and Wild Horse Territory. **Alternative A** includes the Sandrock, Escudilla Demonstration Area, Forest Land, Grassland, Riparian, and Woodland Management Areas. Table 6 displays the percent species drainage area acres that occur in these management areas.

As management intensity (ground-disturbing activities) increases across the landscape, the likelihood of providing for the restoration of ecosystems and providing for ecological sustainability may be reduced. Increased management intensity can alter watershed and hydrologic process and functions, provide greater risks and threats to riparian and aquatic habitats, and limit and degrade aquatic habitat conditions and resiliency.

Table 6. Percent of species drainage area that is located in management areas where actions, including ground-disturbing activities, are most likely to occur

Species Drainage Area	Alt. A	Alt. B	Alt. C	Alt. D
Apache Trout	82%	70%	78%	69%
Bluehead Sucker	93%	89%	92%	70%
Desert Sucker	75%	35%	74%	30%
Gila Chub	100%	30%	100%	13%
Gila Trout	33%	26%	33%	24%
Little Colorado Spinedace	94%	92%	93%	66%
LCR Sucker	94%	93%	93%	57%
Loach Minnow	72%	24%	69%	20%
Longfin Dace	70%	18%	67%	13%
Razorback Sucker (see Spikedace)	70%	17%	68%	12%
Roundtail Chub	95%	70%	95%	55%
Sonora Sucker	75%	35%	74%	30%
Spikedace	70%	17%	67%	12%
Average of All Drainage Areas	**79%**	**47%**	**77%**	**36%**

The fish species in **alternatives C and A** are at higher risk of potential management activities. **Alternatives D and B** would have the least risk. Treatments and activities associated with vegetation, fire, recreation, specials uses, livestock grazing, and the transportation system can impact watersheds, riparian areas, aquatic habitat, and fish species. While the extent and

cumulative and collective impacts of future actions cannot be determined at this time, recognizing and minimizing these risks can help maintain existing conditions and reduce any potential negative environmental consequences.

Impacts Associated with Other Management Activities

Future activities would likely include the implementation of projects related to multiple-use management and would occur over most of the Apache-Sitgreaves NFs. Activities likely to occur are recreation, livestock grazing, special uses authorizations, watershed and soils, fisheries and wildlife improvement projects, and the associated transportation infrastructure.

Recreation

Potential impacts associated with recreation activities would be similar across **all alternatives** with the exception of **alternative C**, which would have a greater emphasis on motorized and developed recreation opportunities. Potential impacts could occur from recreation activities near or adjacent to ponds, lakes, streams, and riparian areas which could negatively impact these areas by reducing vegetation, increasing sedimentation, and altering water quality and aquatic habitat conditions. Increases in motorized recreation activities could also result in similar impacts, while also increasing the potential to transfer or introduce non-native species that can negatively impact riparian areas and aquatic habitat.

Water plays a critical role in many aspects of recreation on the Apache-Sitgreaves NFs. Lakes and streams attract visitors to the forests. The availability of water enhances and/or provides for most recreation uses, and conversely, recreation activities can have varying degrees of impacts on water, riparian, and aquatic resources.

Many developed and dispersed recreation sites are located on or near lakes and streams. This use typically results in trampling and altering of riparian areas and stream banks, damage to riparian vegetation, and soil compaction. Erosion and sedimentation can result, altering aquatic habitat and water quality. The risk of water pollution from human wastes, dishwashing, trash, fish cleaning, and livestock use can occur where recreationists congregate. These risks can be reduced by designing and locating recreation sites and trails to avoid riparian areas. Stream and drainage crossings must be minimized and routes should terminate a distance from water to avoid impacts to riparian areas and water quality.

Livestock Grazing

Livestock grazing activities in both uplands and riparian areas can have numerous impacts on the quality of aquatic resources and habitat. These impacts can be substantial and are a primary source of hydrologic alteration of watersheds, sedimentation, nutrient loading and changes to water quality, and fish habitat alteration and destruction.

The management strategy for livestock grazing does not vary by alternative; therefore, **all alternatives** would have similar impacts to hydrologic conditions, riparian vegetation, stream bank conditions, and aquatic habitat within the allotments on the Apache-Sitgreaves NFs. Livestock also have the potential to introduce non-native species, especially into the riparian areas. The introduction of some non-native plant species can displace native species, which can result in the loss of habitat diversity and alterations to the physical and biological components of the aquatic ecosystem.

Special Uses

Special uses for the occupancy and use of NFS lands for both private and public purposes occurs through the issuance of special use authorizations and easements. Under all alternatives, a wide range of uses may be permitted, including but not limited to: water storage and transmission, electric transmission and distribution lines, communications sites, alternative and renewable energy generating facilities, research permits, outfitter and guides, recreation events, large group gatherings, collecting permits, recreation residences, and target ranges.

While most of these activities either currently exist or could occur within many management areas, based on the suitability analysis, the General Forest Management Area likely has the greatest potential for these types of actions to occur. Special use authorizations and easements are not likely to contribute any potential beneficial impacts to watersheds, riparian areas, or aquatic habitats and the native species present. Many of these activities are long-term and many result in permanent alterations and impacts to various resources where they occur.

Dams and diversions can have substantial impacts to riparian areas and aquatic species, while providing beneficial impacts to non-native species that are not desired. Outfitters and guides, research permits, and road easement special uses occur within or adjacent to riparian areas and aquatic habitats, and depending on the activity, they can negatively impact these areas and alter riparian and aquatic habitat conditions through ground disturbance, sedimentation, vegetation alteration and removals, and impacts to water quality. Many of these activities are also highly conducive to promoting or spreading invasive plant species, especially those occurring within utility corridors or easements and riparian areas.

Motorized Routes

Generally, new road construction may occur when access to a particular resource or private inholding is needed. These roads may be permanent, if intended for long-term use, or they may be temporary for a one-time use and then removed. Less than 10 miles of new NFS road construction has occurred over the past 5 years. It has been limited to relocation of poorly located roads (e.g., routes located in or near riparian areas, wet meadows) and developed campground construction. Temporary roads have been used for forest product extraction where a permanent road is not needed for future access.

All alternatives would include the continued use and maintenance of the existing motorized road and trail systems. The existing system currently impacts riparian and aquatic ecosystems through erosion, sedimentation, changes to channel morphology, and to some extent, the movement of fish and other aquatic organisms. This infrastructure and its continued use may be the primary source of impacts to riparian and aquatic resources. However, **all alternatives** include objectives, standards, and guidelines to reduce impacts over time and to reduce impacts from construction and maintenance of motorized routes. Roads and trail systems can often contribute to the introduction of invasive species, either aquatic or terrestrial plant species, by providing access to lakes, reservoirs, ponds, streams, and riparian areas. Road crossings of streams provide access for many types of recreation activities, which can also increase the likelihood of the introduction of invasive plant, invertebrate, and fish species.

While none of the alternatives proposes to increase the transportation system, it is likely that maintenance and reconstruction would occur in all alternatives. **Alternatives A, B, and C** would likely have the greatest potential to increase sedimentation, erosion, and alteration of hydrologic

conditions due to its greater emphasis on mechanical vegetation treatments, commodity outputs, and the associated impacts from road maintenance and use, reconstruction, and temporary construction. **Alternative D** would likely result in the least amount of impacts associated with road reconstruction, temporary roads, and skid trail construction because it has a greater emphasis on fire treatments rather than mechanical treatments.

Watershed/Riparian/Aquatic Habitat Restoration

Watershed and riparian restoration objectives vary by alternative (see table 3 Indicator 1.1 in chapter 2). Although all watershed treatments would likely improve conditions for aquatic species and their habitats, restoration treatments within the riparian area and within aquatic habitats would likely result in the most beneficial impacts. Beneficial impacts should reduce sedimentation, improve riparian vegetation conditions, and increase the productivity of aquatic habitat. As **alternative D** has the greatest amount of total treatments, it would result in the most benefits to aquatic habitat followed by **alternatives B, C, and A**.

Impacts Associated with Non-Native Fish Species

The presence of non-native fish species has resulted in impacts across the Apache-Sitgreaves NFs. The harmful interactions are well documented and a primary cause of the current status of federally listed and sensitive fish species that are declining throughout the Southwest. There are approximately 25 non-native fish species known to occur within or adjacent to the Apache-Sitgreaves NFs. Along with non-native fish species, the deliberate or unintentional introductions of amphibians, invertebrates (e.g., crayfish, snails, clams, mussels), parasites and diseases, and aquatic invasive plants have also impacted aquatic communities and habitats.

The potential impacts from non-native fish would likely to be similar across **all alternatives**, with possibly the exception of **alternative C**, which could result in greater access and increased developed and motorized recreation opportunities. Roads and trails can contribute to the introduction of invasive species, either aquatic or terrestrial, by providing access to ponds, lakes, streams, and riparian areas. Boats and trailers are a primary source of introductions into lakes; while road crossings at rivers and streams provide recreation and angler access that can also increase the likelihood of the introduction of non-native fish, mollusks, crayfish, diseases, and parasites.

While watershed, riparian, and aquatic habitat restoration treatments are necessary and beneficial, they must consider the potential to increase the spread of invasive species by providing increased connectivity and by altering habitat. Improvement in habitat conditions may benefit some non-native species as well as native species. These interactions and interrelationships would also be considered when implementing restoration treatments.

Cumulative Environmental Consequences

The analysis area for fisheries cumulative environmental consequences includes lands managed by the Apache-Sitgreaves NFs, but it also considers lands of other ownership (e.g., State, tribal, private) that occur within and adjacent to the Apache-Sitgreaves NFs. These other lands can also influence and impact the Apache-Sitgreaves NFs and its management, as discussed below.

Aquatic habitats are very unique and limited over the Apache-Sitgreaves NFs. Habitat alteration is likely the major cause of declines in native aquatic species. The most common physical habitat

alterations are changes to stream channel and riparian vegetation, water impoundments (e.g., ponds, lakes), sedimentation and water quality changes, and stream flow changes. Additionally, other substantial human impacts include pollution, introduction and spread of invasive species, and, for some fish species, over-harvesting. Under **all alternatives**, aquatic habitat quality and quantity is determined and influenced by all the activities that occur within the watershed and can also be influenced and impacted by actions occurring on private lands within the Apache-Sitgreaves NFs and downstream outside the forests.

For example, fish stocking on adjacent lands and private inholdings (e.g., ponds, streams, reservoirs) continues to impact native fish species and their aquatic habitats on the Apache-Sitgreaves NFs. While providing for extensive and highly desirable recreational fishing opportunities, AZGFD also continues to impact native fish throughout the Apache-Sitgreaves NFs through stocking and management of non-native fish. Populations of non-native species (existing and those stocked) on both the San Carlos and White Mountain Apache tribal lands also contribute to the spread and persistence of non-native species and further degrade existing conditions for native fish species and aquatic habitats.

Private lands within and adjacent to the Apache-Sitgreaves NFs can influence watersheds and aquatic and riparian habitat in many ways. Urban development and the associated infrastructure can impact water quantity and quality from water diversions and consumptive use, groundwater pumping and septic and sewer systems. Roads and utility infrastructure can also impact watersheds, water quality, and aquatic habitat, and they can increase the spread of invasive species. All of these activities occur to varying degrees across the Apache-Sitgreaves NFs and within communities adjacent to the forests such as Alpine, Eagar, Heber, Forest Lakes, Show Low, and Springerville. In addition, numerous private inholdings, such as those on the Blue River and Eagle Creek, are located near riparian/aquatic corridors and have similar impacts to those discussed above.

Impacts Associated with Other Influential Programs

Future activities will likely include the implementation of the many types of projects that can occur relative to multiple-use management, and will occur over most of the Apache-Stigreaves NFs. Activities likely to occur are vegetation, fire and fuels, recreation, livestock grazing, special uses and authorizations, watershed and soils, fisheries and wildlife improvement projects, and the associated transportation infrastructure associated with these activities. Table 5 above lists and briefly describes many of these activities and the objectives during the planning period, and a complete list of LMP decisions (desired conditions, objectives, standards and guidelines) can be found in Appendix F.

Recreation

Water plays a critical role in many aspects of recreation on the Apache-Sitgreaves NFs. Lakes and streams are attractions to those recreating on the Apache-Sitgreaves NFs. The availability of water enhances and/or provides for most recreational uses, and conversely, recreational activities can have varying degrees of impacts on water, riparian, and aquatic resources.

Many developed and dispersed recreation sites are located on or near lakes and streams. This concentrated use typically results in trampling and altering of riparian areas and stream banks, damage to riparian vegetation, and soil compaction. Erosion and sedimentation can result, altering aquatic habitat and water quality. The risk of water pollution from human wastes, dishwashing, trash, fish cleaning, and livestock use can occur where recreationists congregate and facilities and resources are provided in high density use areas. These risks can be reduced by designing and locating recreation sites and trails to avoid riparian areas. Stream and drainage crossings must be minimized and routes should terminate a distance from water to avoid impacts to riparian areas and water quality.

Potential impacts associated with recreational activities will be similar across all alternatives with the exception of Alternative C, which will have a greater emphasis on motorized

Livestock Grazing

Livestock grazing activities in both uplands and riparian areas can have numerous impacts on the quality of aquatic resources and habitat. These impacts can be significant, and are a primary source of hydrologic alteration of watersheds, sedimentation, nutrient loading and changes to water quality, and habitat alteration and destruction.

Livestock grazing does not vary by alternative; therefore, all alternatives would have an impact to hydrologic conditions, riparian vegetation, stream bank conditions, and aquatic habitat within the allotments on the Apache-Sitgreaves NFs. Livestock also have the potential to introduce non-native species, especially into the riparian areas. The introduction of some non-native species can displace native species, which can result in the loss of habitat diversity, and alterations to the physical and biological components of the aquatic ecosystem.

Although some desired conditions and standards and guidelines may reduce some impacts associated with livestock grazing actions; site –specific conditions, such as soil, vegetation, livestock numbers and use periods, existing watershed, riparian, aquatic habitat, would determine the extent to which impacts will occur. The impacts will vary depending on the number of animals, timing, duration, natural community condition, and other factors that cannot be analyzed at the programmatic level.

Special Uses

Special uses for the occupancy and use of National Forest System Lands for both private and public purposes, occurs through the issuance of special use authorizations and easements. A wide range of uses may be permitted, including but not limited to, water storage and transmission, electric transmission and distribution lines, communication sites, alternative and renewable energy generating facilities, research permits, outfitter and guides, recreational events, large group gatherings, collecting permits, recreational residences, and target ranges.

While most of these activities either currently exist or could occur within all of the management area designations, based on the suitability analysis, the General Forest management area likely has the greatest potential in both extent and intensity for these types of actions to occur. Special use authorizations and easements are not likely to contribute any potential beneficial impacts to watersheds, riparian areas, or aquatic habitats and the native species present. Most of these activities are long-term, and many result in permanent alterations and impacts to various resources where they occur. Dams and diversions can have significant impacts to riparian areas and aquatic species, while providing beneficial impacts to non-native species that are not desired. Outfitters and guides, research permits, and road easement special uses occur within or adjacent to riparian areas and aquatic habitats, and depending on the activity, can negatively impact these areas and alter riparian and aquatic habitat conditions from ground disturbance, sedimentation, vegetation alteration and removals, and impacts to water quality. Many of these activities are also highly conducive to promoting or spreading invasive species, especially those occurring within utility corridors or easements and riparian areas.

Although some desired conditions and standards and guidelines may reduce some impacts associated with special uses actions; site –specific conditions, such as soil, vegetation, existing watershed, riparian, aquatic habitat, would determine the extent to which impacts will occur. The impacts will vary depending on the action or activity, timing, duration, natural community condition, and other factors that cannot be analyzed at the programmatic level.

Transportation system

Generally, new road construction may occur when access to a particular resource or private inholding is needed. These roads may be permanent, if intended for long-term use, or they may be temporary for a one time use and then obliterated. Less than 10 miles of new National Forest System Road construction has occurred over the past five years. It has been limited to relocation of poorly located roads (routes located in or near riparian areas, wet meadows, etc.) and developed campground construction. The use of temporary roads has been used for forests products extraction where a permanent road is not needed for future access.

All alternatives include the continued use and maintenance of the existing motorized road and trail systems. The existing system currently significantly impacts riparian and aquatic ecosystems through erosion, sedimentation, changes to channel morphology, and to some extent the movement of fish and other aquatic organisms. This infrastructure and its continued use may be the primary source of impacts to riparian and aquatic resources. However, all alternatives include objectives, and standards and guidelines to reduce impacts over time and to reduce impacts from new roads and trails. Roads and trail systems can often contribute to the introduction of non-native invasive species, either aquatic or terrestrial plant species by providing access to lakes, reservoirs, ponds, streams, and riparian areas. Road crossings of streams provide access for many types of recreational activities, which can also increase the likelihood of introductions of non-native species.

While none of the alternatives proposes to substantially increase the transportation system, it is likely that maintenance and reconstruction will occur in all alternatives. Alternatives A, B, C

would likely have the greatest potential to increase sedimentation, erosion, and alteration of hydrologic conditions due to its greater emphasis on timber production and commodity outputs and the associated roads and higher maintenance levels, road reconstruction, and temporary road construction. Alternative D would likely result in the least amount of impacts associated with temporary roads, skid trail construction and reconstruction of roads, due to its fire treatment emphasis as compared to the level of mechanical treatments.

Watershed/Riparian/Aquatic Habitat Restoration

Watershed restoration objectives will occur within 10 focus sub-watersheds over the planning period; and Alternatives B, C, And D will restore 350 acres per year, and Alternative A will only restore any acreage on an opportunity basis. Riparian restoration treatments to restore composition, structure, and function will only occur in alternatives A and C on an opportunity basis; and Alternative B will restore 200-500 acres per year, and Alternative D will restore 300-600 acres per year. Authorized and unauthorized roads and trails treated to reduce riparian and aquatic habitat impacts will vary by each alternative; Alternative A treatments will only occur on an opportunity basis, Alternative B will treat approximately 2 miles per year, and Alternatives C and D will treat approximately 3 miles per year. Aquatic habitat and riparian restoration treatments will also vary by alternative; Alternative A will treat less than 10 miles per year, Alternatives B and D will both treat 5-15 miles per year, and Alternative A treatments will only occur on an opportunity basis.

Although all watershed treatments will likely improve conditions for aquatic species and their habitats, restoration treatments within the riparian area and directly within aquatic habitats will likely result in the most beneficial impacts. These beneficial impacts should reduce sedimentation, improve riparian vegetation conditions, and improve and increase the conditions and productivity of aquatic habitat. As Alternative D has the greatest amount of total treatments, therefore, it should result in the most benefits to aquatic habitat. Alternatives B, C, and A have less total treatment amounts, respectively; therefore, beneficial impacts associated with all the treatments would likely decrease with these alternatives in this order.

Impacts Associated with Non-Native Fish Species

The presence of non-native fish species has resulted in impacts across the Apache-Sitgreaves NFs. The harmful interactions are well documented and a primary cause of the current status of federally listed and sensitive fish species that are declining throughout the Southwest. There are approximately 25 non-native fish species known to occur within or adjacent to the Apache-Sitgreaves NFs. Along with non-native fish species, the deliberate or unintentional introductions of amphibians, invertebrates (e.g., crayfish, snails, clams, mussels, etc.), parasites and diseases, and aquatic invasive plants have also impacted aquatic communities and habitats.

The potential impacts from non-native fish are likely to be similar across **all alternatives**, with possibly the exception of **Alternative C**, which could result in greater access and increased developed and motorized recreational opportunities. Roads and trails can contribute to the introduction of non-native invasive species, either aquatic or terrestrial, by providing access to ponds, lakes, streams, and riparian areas. Boats and trailers are a primary source of introductions into lakes while road crossings at rivers and streams provide recreational and angler access that can also increase the likelihood of the introduction of non-native fish, mollusks, crayfish, diseases, and parasites.

While watershed, riparian, and aquatic habitat restoration treatments are necessary and beneficial, they must consider the potential to increase the spread of invasive species by providing increased connectivity and through habitat alterations. Improvement in habitat conditions may benefit some non-native species as well as native species. These interactions and interrelationships would also be considered when implementing restoration treatments.

Cumulative Environmental Consequences

Aquatic habitats are very unique and limited over the Apache-Sitgreaves NFs. Habitat alteration is likely the major cause of declines in native aquatic species. The most common physical habitat alterations are changes to stream channel and riparian vegetation, water impoundments (e.g., ponds, lakes), sedimentation and water quality changes, and stream flow changes. Additionally, other substantial human impacts include pollution, introduction and spread of invasive species, and, for some fish species, over-harvesting. Under all alternatives aquatic habitat quality and quantity is determined and influenced by all the activities that occur within the watershed and can also be influenced and impacted by actions occurring on private lands within the Apache-Sitgreaves NFs and downstream outside the forests.

Fish stocking on adjacent lands and private inholdings (e.g., ponds, streams, reservoirs) continues to impact native fish species and their aquatic habitats on the Apache-Sitgreaves NFs. The Arizona Game and Fish Department, while providing for extensive and highly desirable recreational fishing opportunities, also continues to impact native fish throughout the Apache-Sitgreaves NFs through stocking and management of non-native fish as well. Populations of non-native species (existing and those stocked) on both the San Carlos and White Mountain Apache tribal lands also contribute to the spread and persistence of non-native species and further reduce existing conditions for native fish species and aquatic habitats.

Private lands within and adjacent to the Apache-Sitgreaves NFs can influence watersheds and aquatic and riparian habitat in many ways. Urban development and the associated infrastructure can impact water quantity and quality from water diversions and consumptive use, groundwater pumping, and septic and sewer systems. Roads and utility infrastructure can also impact watersheds, water quality, and aquatic habitat, and they can increase the spread of non-native invasive species. All of these activities occur to varying degrees across the Apache-Sitgreaves NFs and within communities adjacent to the forests such as Alpine, Nutrioso, Springerville, Eagar, Heber, Forest Lakes, and Show Low. In addition, numerous private inholdings, such as those on the Blue River and Eagle Creek, are located near riparian/aquatic corridors and have similar impacts to those discussed above.

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Appendix A. Fish Species of the Apache-Sitgreaves NFs

Introduction

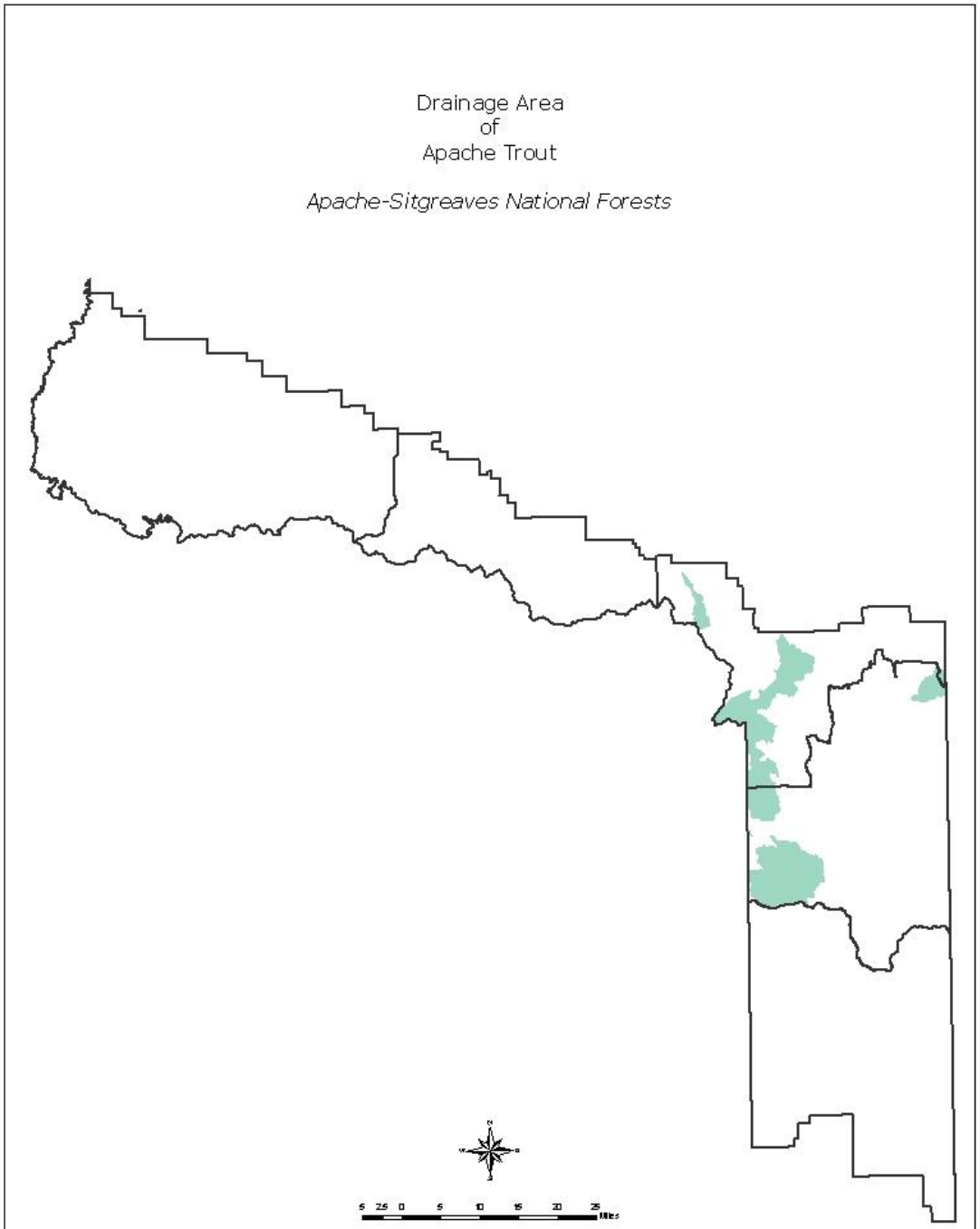
The following 14 native and 25 non-native fish species occur on or downstream of the Apache-Sitgreaves NFs:

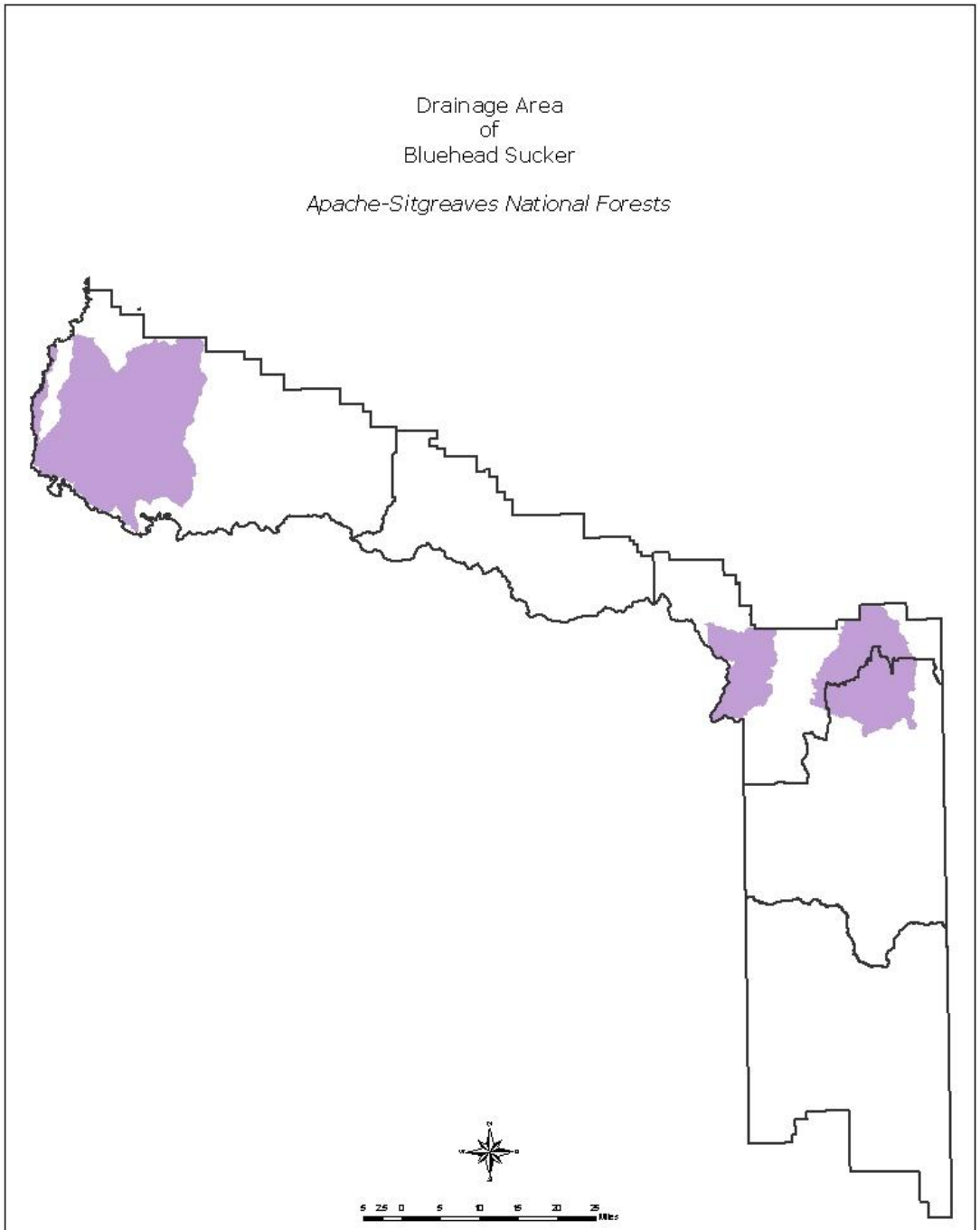
Status	Scientific name	Common name
NATIVE FISHES		
Sensitive	*Agosia chrysogaster*	Longfin Dace
Sensitive	*Catostomus insignis*	Sonora Sucker
Sensitive	*Catostomus sp.*	Little Colorado Sucker
Endangered	*Gila intermedia*	Gila Chub
Candidate	*Gila robusta*	Roundtail Chub
Threatened	*Lepidomeda vittata*	Little Colorado Spinedace
Endangered	*Meda fulgida*	Spikedace
Threatened	*Oncorhynchus apache*	Apache Trout
Threatened	*Oncorhynchus gilae*	Gila Trout
Sensitive	*Pantosteus clarki*	Desert Sucker
Sensitive	*Pantosteus discobolus*	Bluehead Sucker
	Rhinichthys osculus	Speckled Dace
Endangered	*Tiaroga cobitis*	Loach Minnow
Endangered	*Xyrauchen texanus*	Razorback Sucker
NON-NATIVE FISHES		
	Ameiurus melas	Black Bullhead
	Carassius auratus	Goldfish
	Catostomus plebeius	Rio Grande Sucker
	Cyprinella lutrensis	Red Shiner

	Cyprinus carpio	Common Carp
	Esox lucius	Northern Pike
	Gambusia affinis	Mosquitofish
	Ictalurus punctatus	Channel Catfish
	Lepomis cyanellus	Green Sunfish
	Lepomis macrochirus	Bluegill
	Lepomis microlophus	Redear Sunfish
	Micropterus dolomieu	Smallmouth Bass
	Micropterus salmoides	Largemouth Bass
	Notemigonus crysoleucas	Golden Shiner
	Oncorhynchus clarki	Cutthroat Trout
	Oncorhynchus mykiss	Rainbow Trout
	Perca flavescens	Yellow Perch
	Pimephales promelas	Fathead Minnow
	Pomoxis annularis	White Crappie
	Pomoxis nigromaculatus	Black Crappie
	Pylodictis olivaris	Flathead Catfish
	Salmo trutta	Brown Trout
	Salvelinus fontinalis	Brook Trout
	Stizostedion vitreum	Walleye
	Thymallus arcticus	Arctic Grayling

APPENDIX B

This appendix contains maps showing the analysis area for each species.


Drainage Area
of
Apache Trout
Apache-Sitgreaves National Forests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of
Bluehead Sucker
Apache-Sitgreaves National Forests
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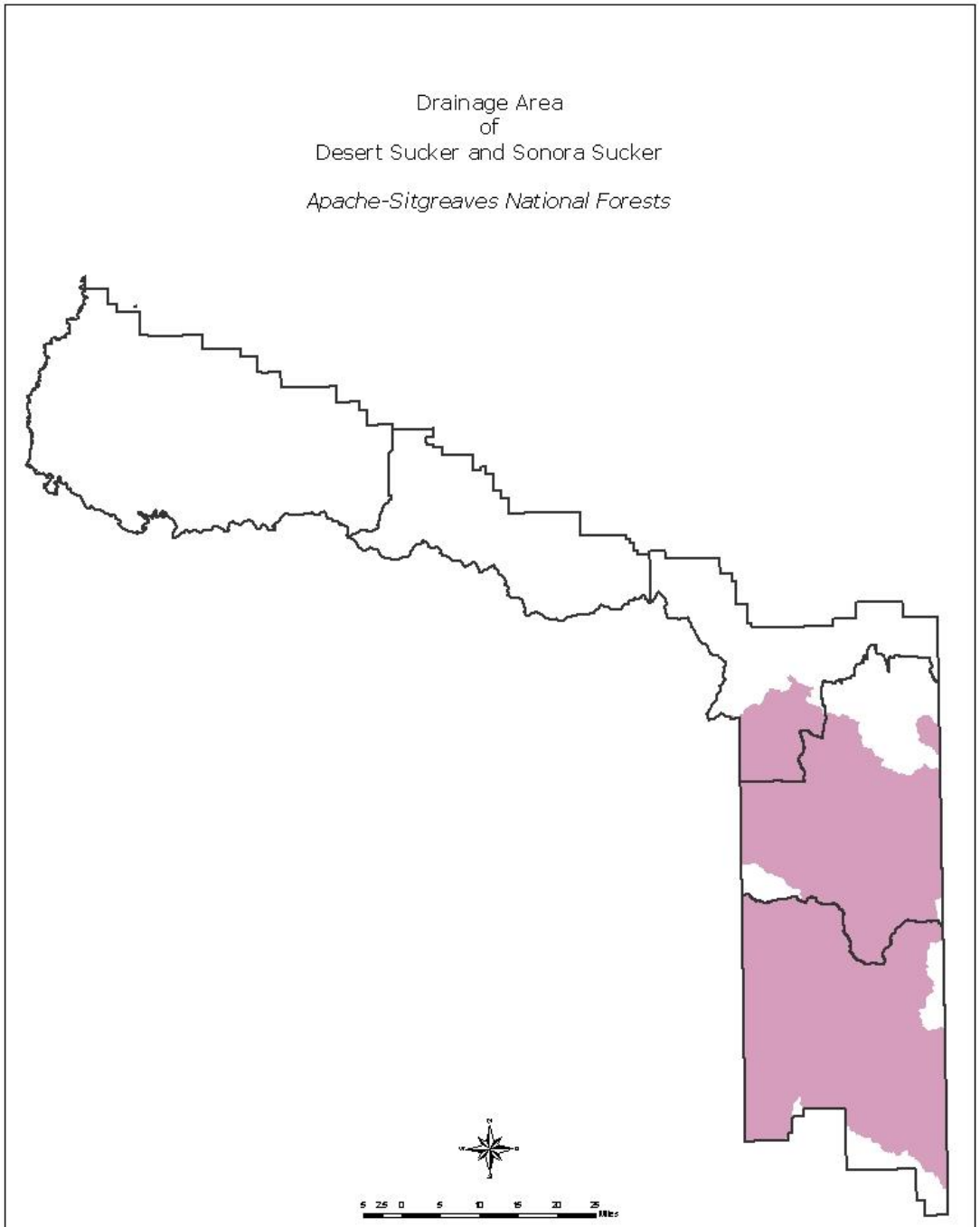
Drainage Area
of
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Apache-Sitgreaves National Forests
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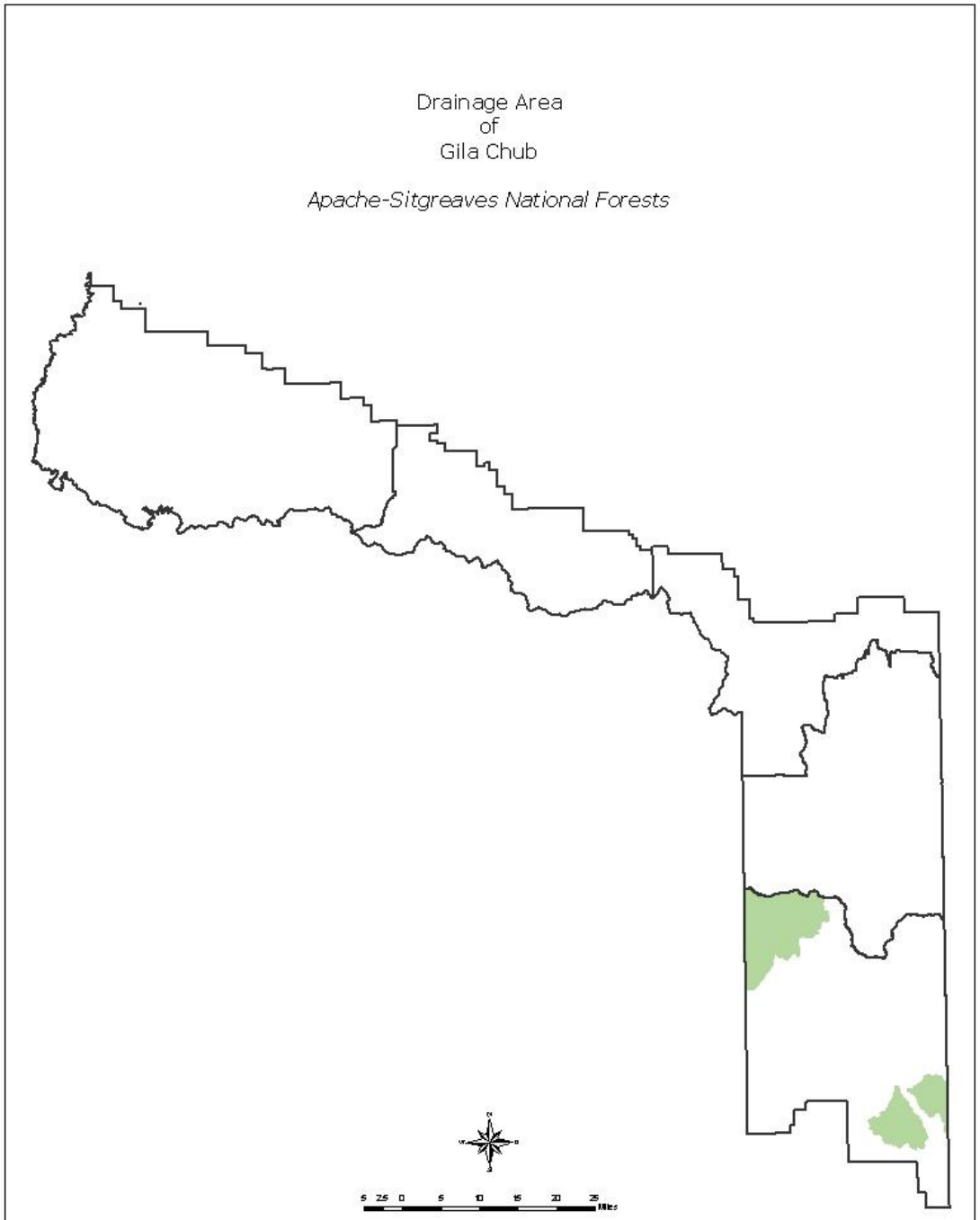
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of
Gila Chub
Apache-Sitgreaves National Forests
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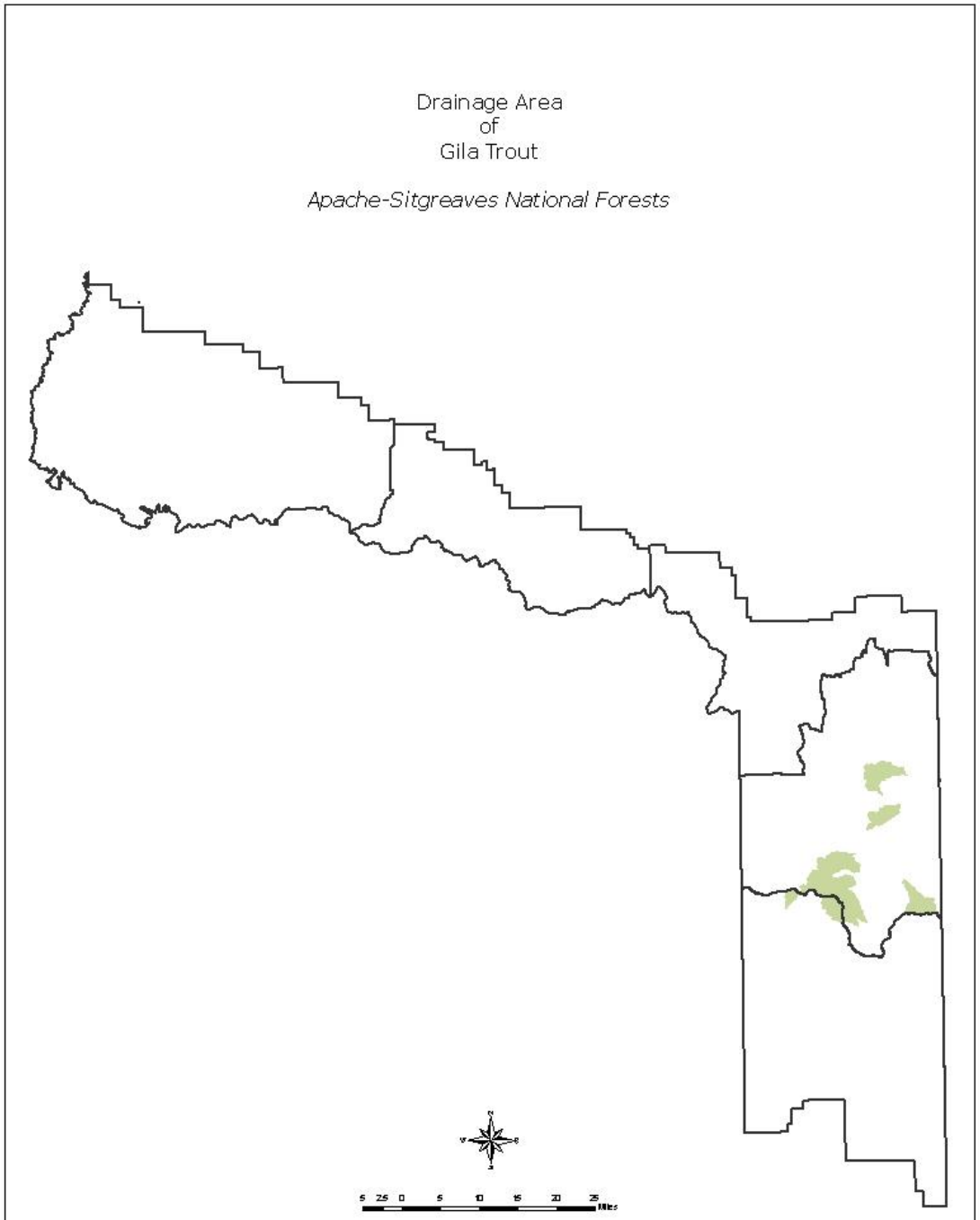
Miles


Drainage Area
of
Gila Trout
Apache-Sitgreaves National Forests
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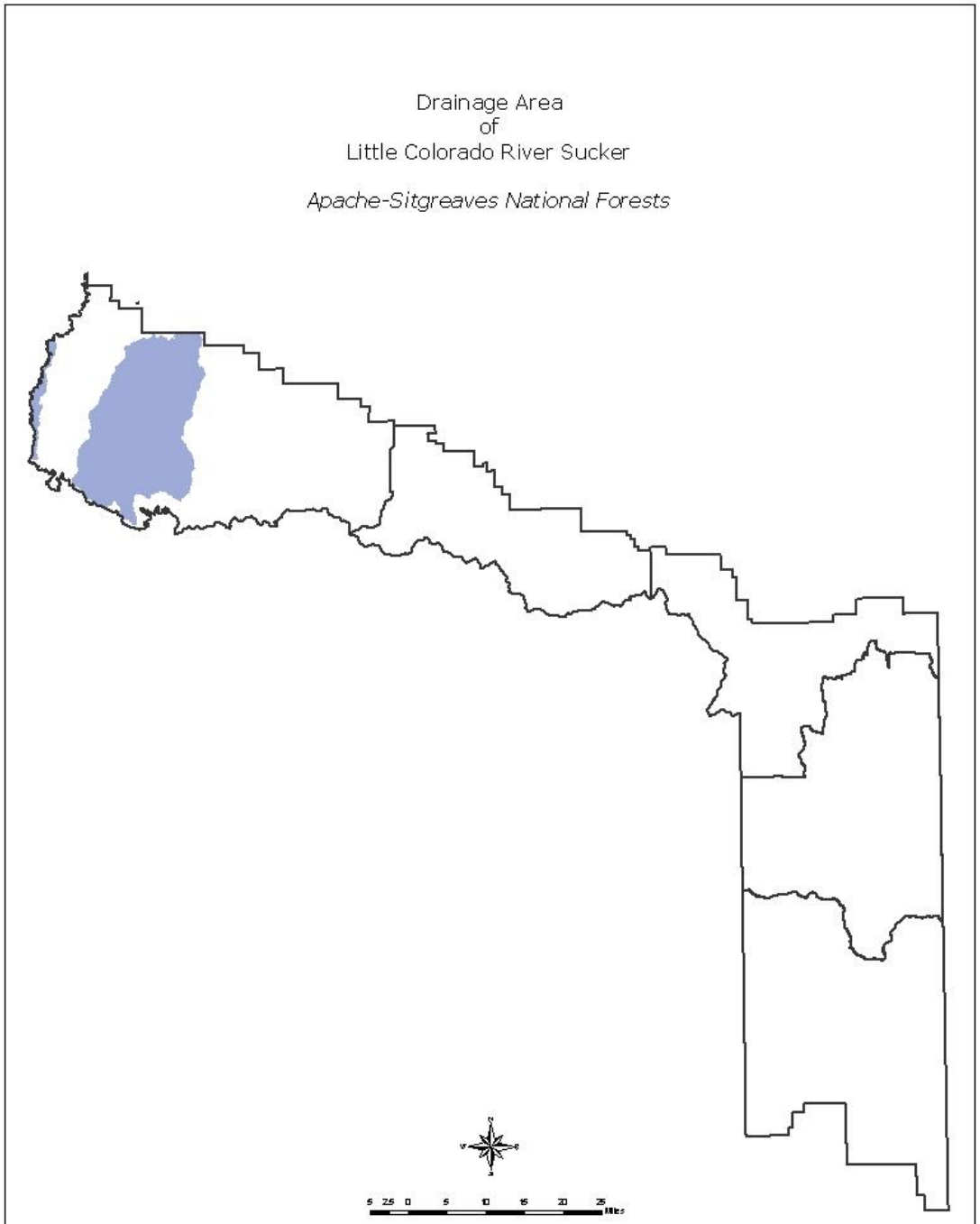
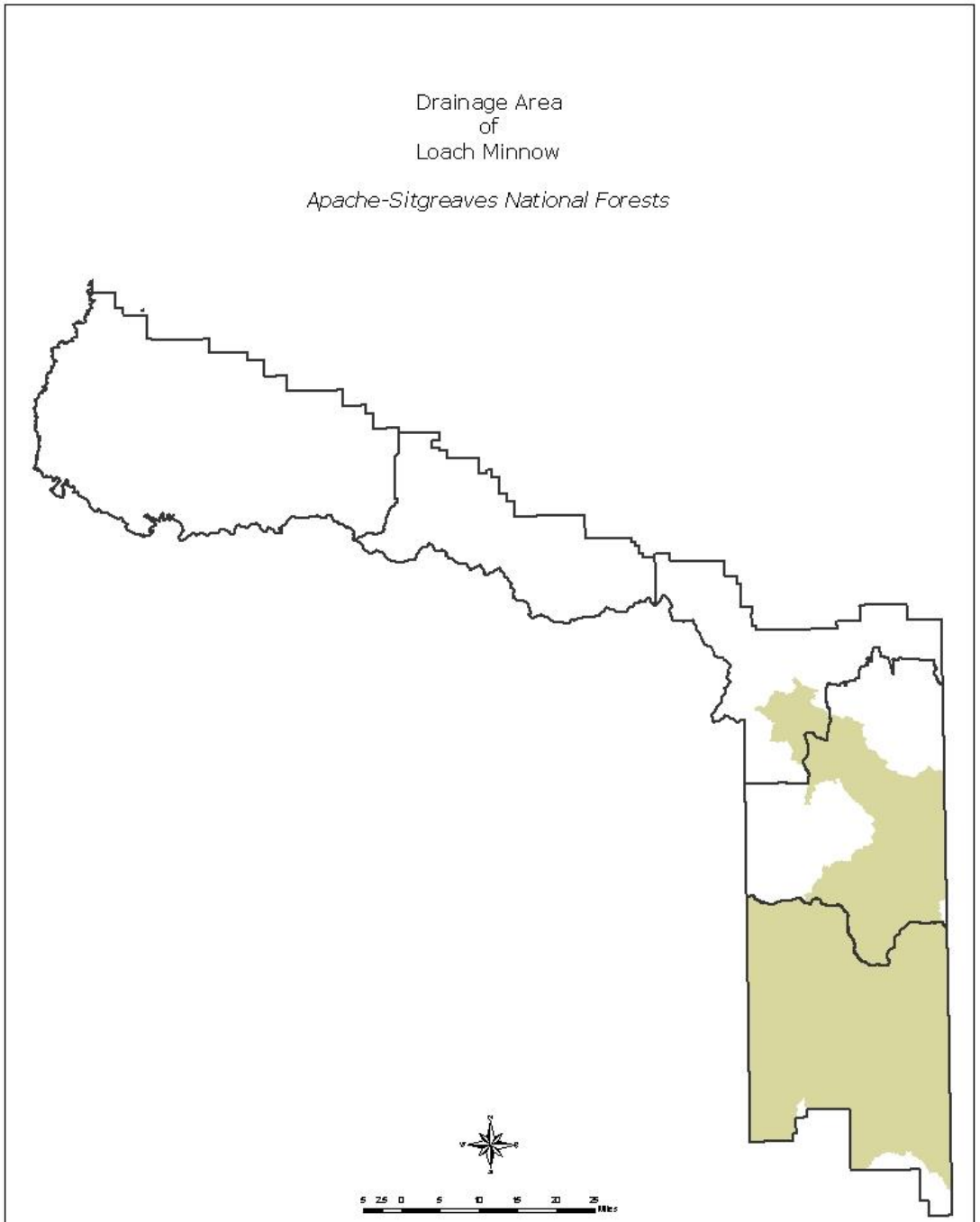
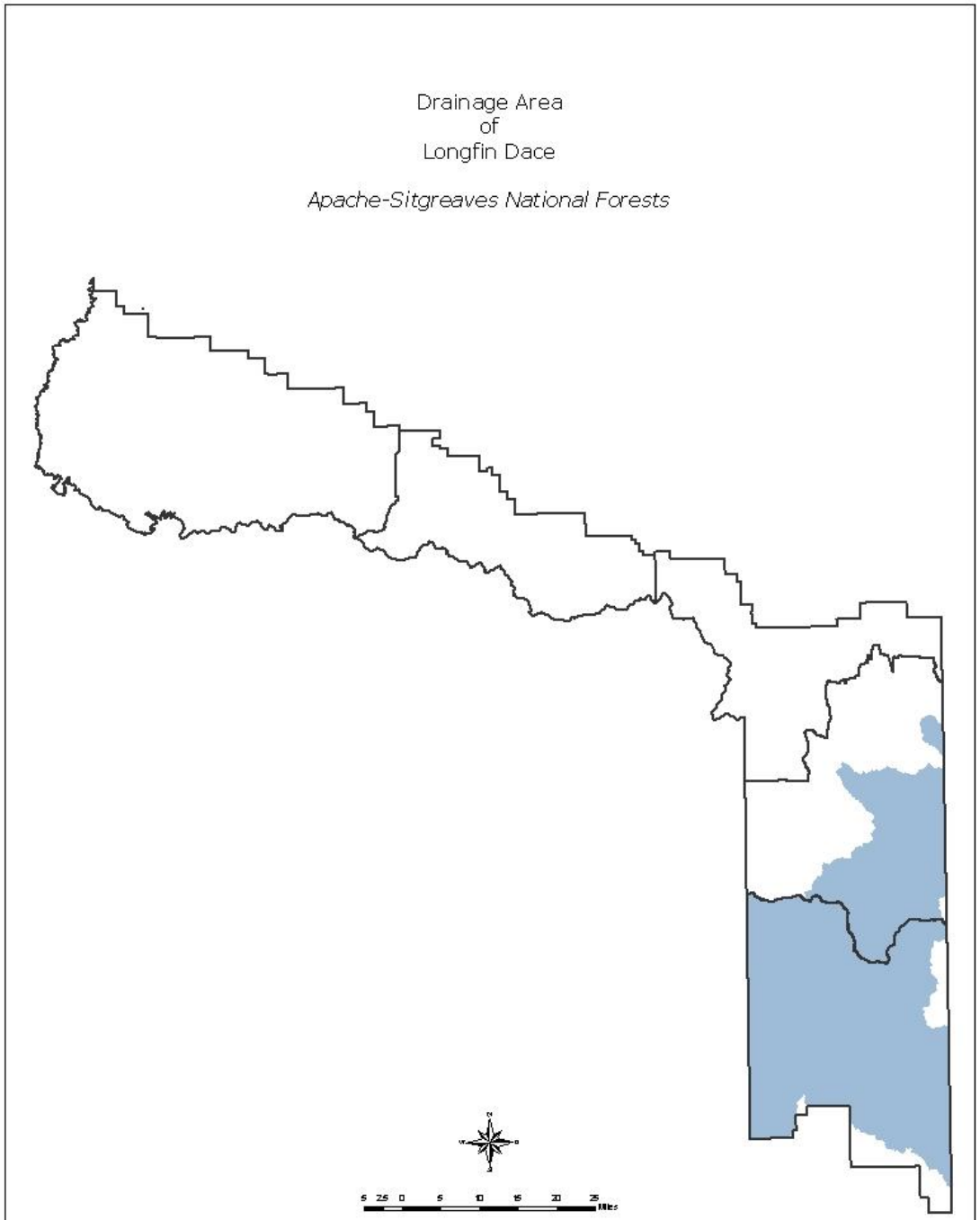
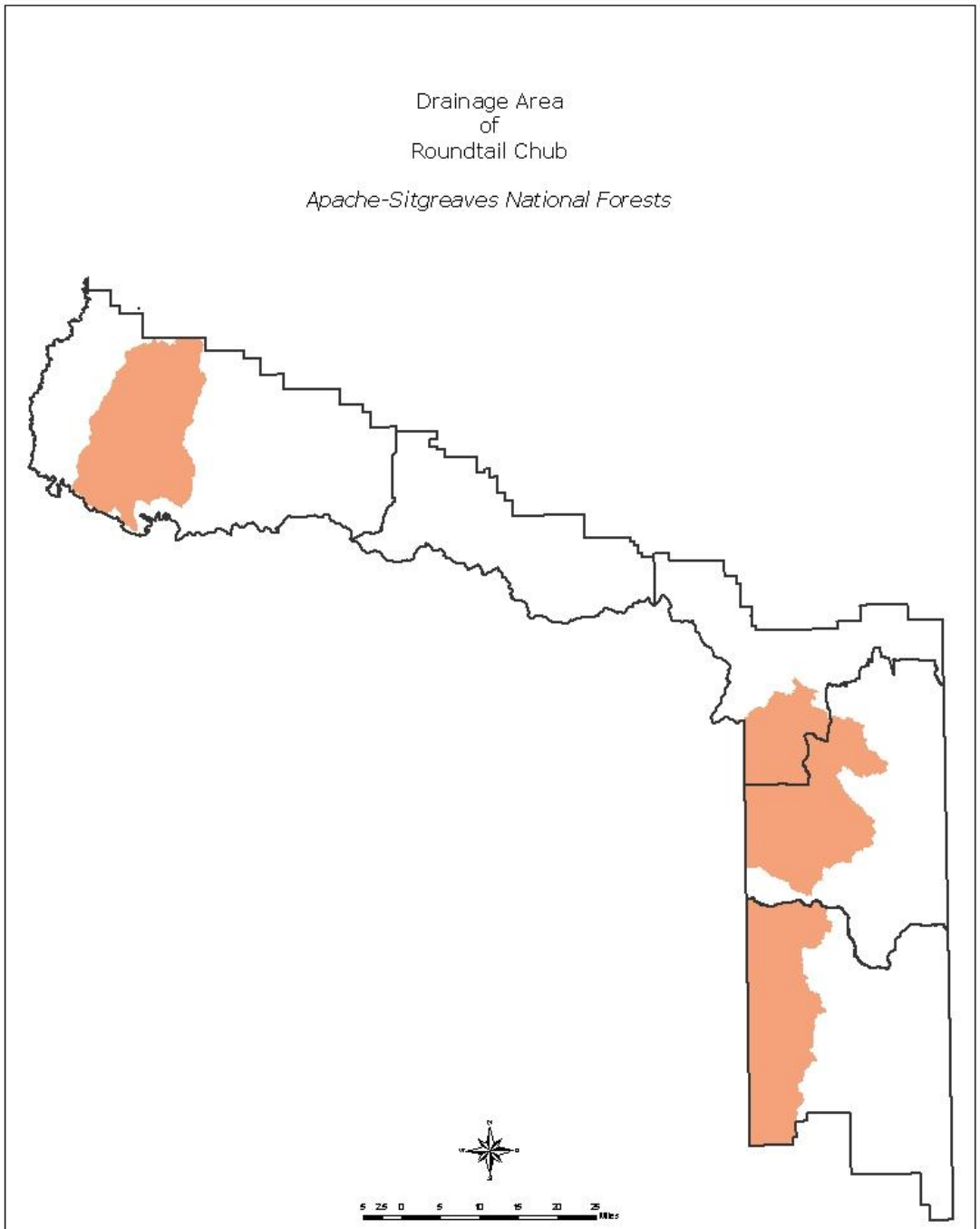
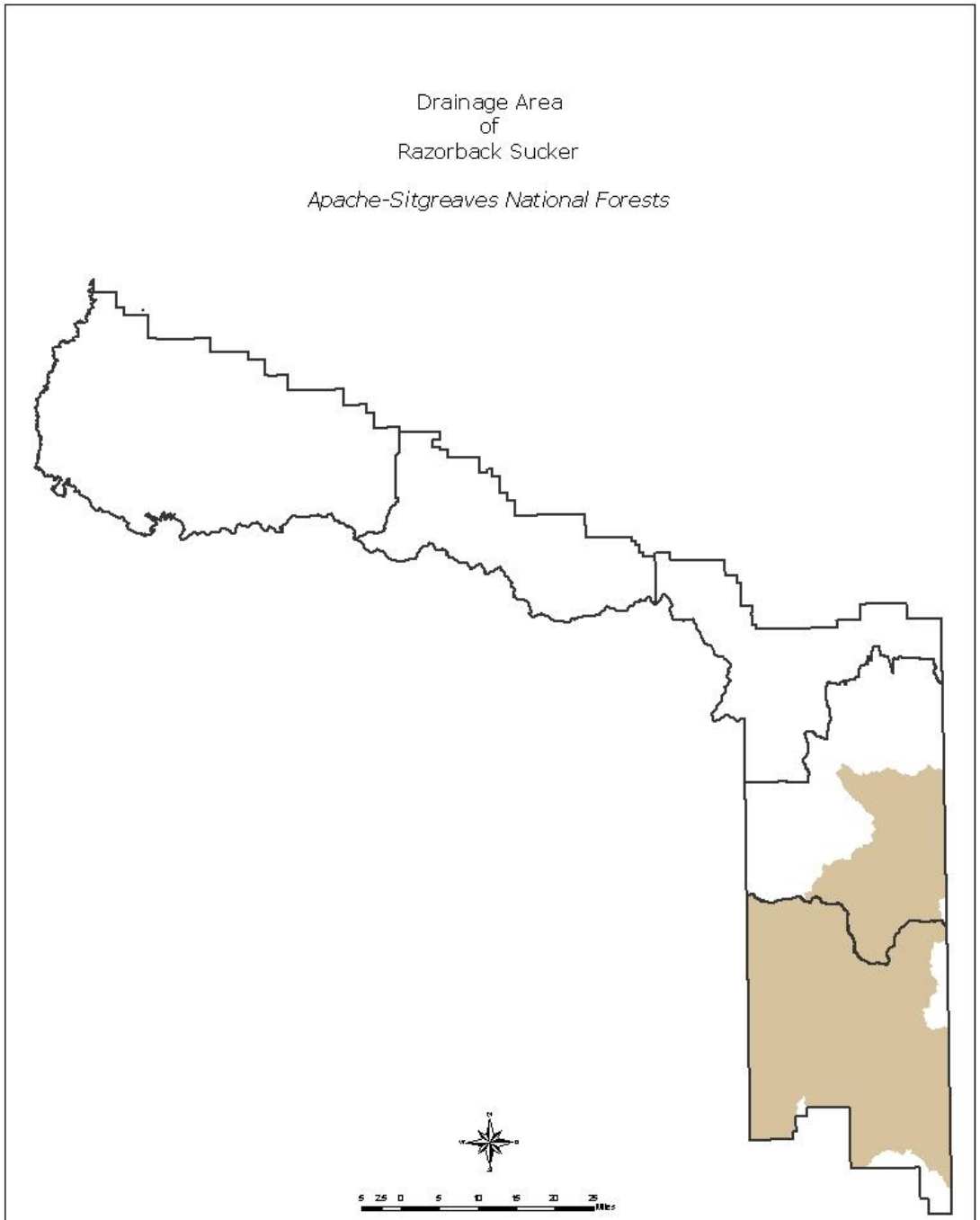
Miles

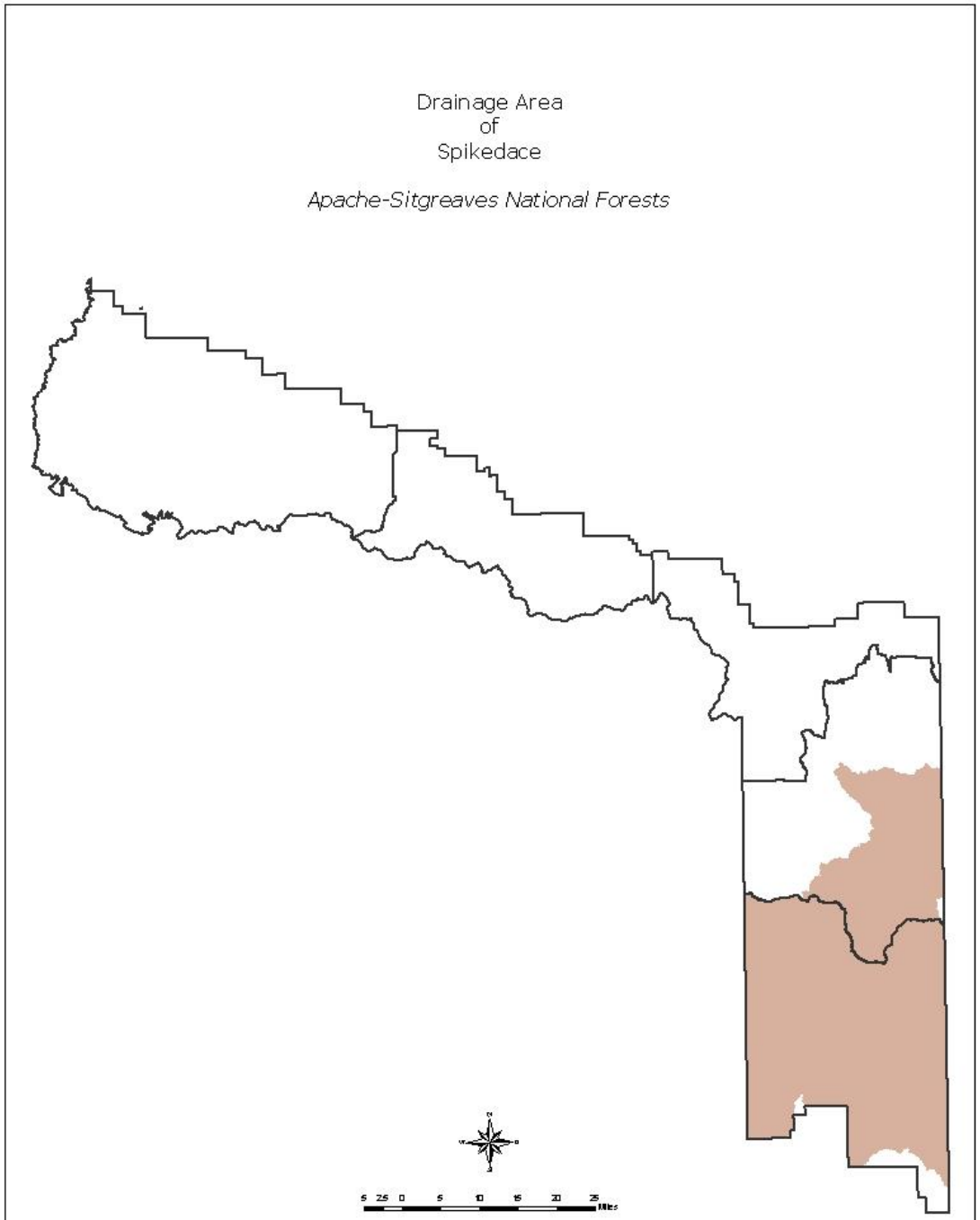

Drainage Area
of
Little Colorado River Sucker
Apache-Sitgreaves National Forests

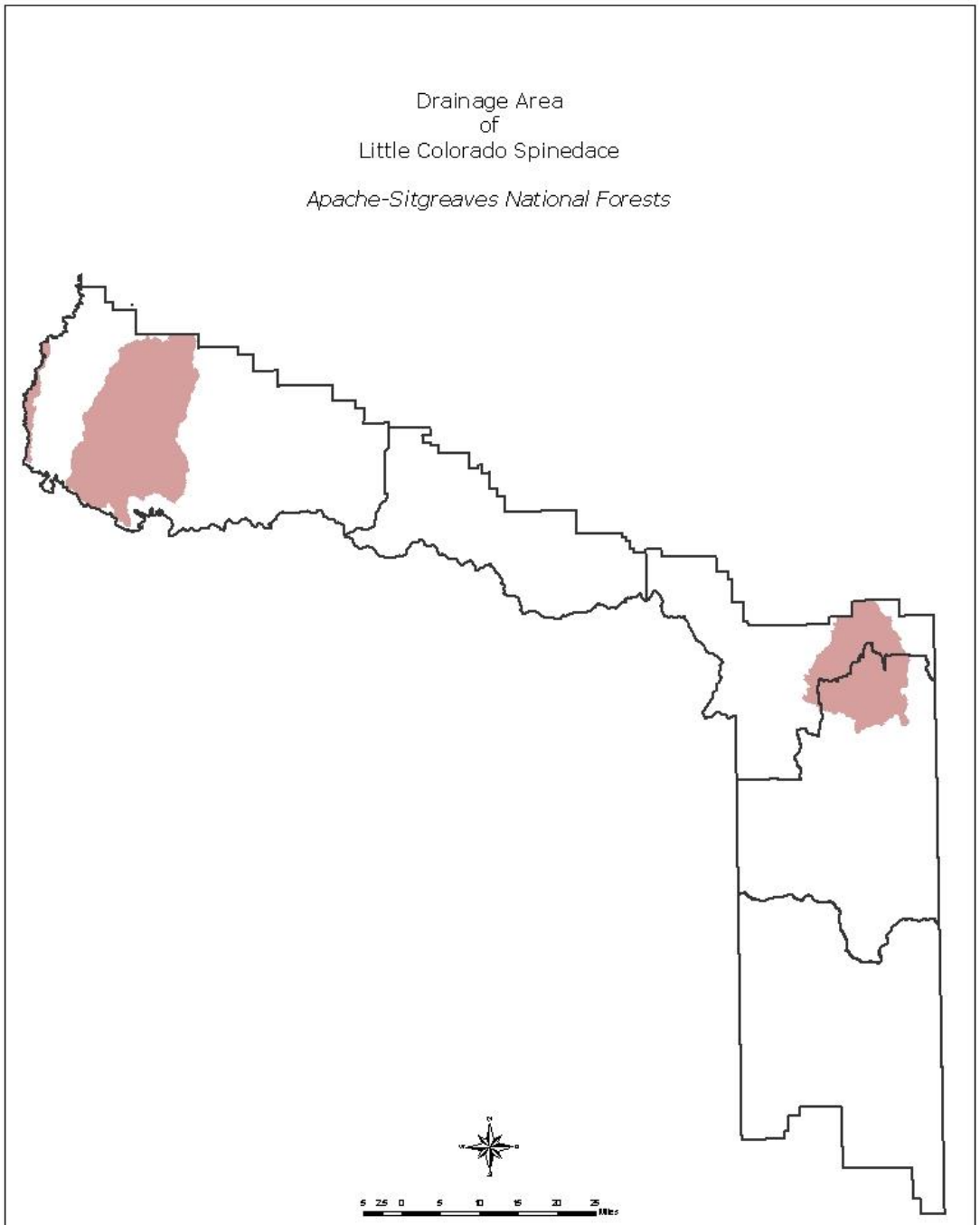

Drainage Area
of
Loach Minnow
Apache-Sitgreaves National Forests
5 2.5 0 5 10 15 20 25
Miles


Drainage Area
of
Longfin Dace
Apache-Sitgreaves National Forests
5 2.5 0 5 10 15 20 25
Miles


Drainage Area
of
Roundtail Chub
Apache-Sitgreaves National Forests


Drainage Area
of
Razorback Sucker
Apache-Sitgreaves National Forests


Drainage Area
of
Spikedace
Apache-Sitgreaves National Forests
5 2.5 0 5 10 15 20 25
Miles


Drainage Area
of
Little Colorado Spinedace
Apache-Sitgreaves National Forests

Appendix C – Potential Treatment Types and Acres by Alternatives

Mechanical treatments include treatments that occur on lands that are suitable and not suitable for timber production

TREATMENT TYPES AND ACRES BY ALTERNATIVE	Alt A	Alt B	Alt C	Alt D
Apache Trout (109,763)		**109,986**	**109,986**	**109,986**
Suitable Timber Production Lands	66,296	42,119	43,190	0
Mechanical Treatments	19,450	40,544	39,598	72,986
Fire Treatments	24,018	27,323	27,198	37,000
Bluehead Sucker (373,453)		**374,967**	**374,967**	**374,967**
Suitable Timber Production Lands	220,719	168,720	169,900	0
Mechanical Treatments	105,954	164,819	163,633	288,061
Fire Treatments	46,780	41,429	41,434	86,907
Desert Sucker (846,771)		**847,535**	**847,535**	**847,535**
Suitable Timber Production Lands	209,483	144,365	150,948	0
Mechanical Treatments	178,148	252,102	245,601	238,983
Fire Treatments	459,140	451,068	450,986	608,553
Gila Chub (92,705)				

Suitable Timber Production Lands	8,435	239	2153	0
Mechanical Treatments	42,670	50,866	48,952	8,657
Fire Treatments	41,600	41,600	41,600	84,048
Gila Trout (51,615)				
Suitable Timber Production Lands	13,850	9,881	10,529	0
Mechanical Treatments	1,794	5,764	5,116	12,126
Fire Treatments	35,971	35,970	35,970	39,489
Little Colorado Spinedace (268,087)		**268,697**	**268,697**	**268,697**
Suitable Timber Production Lands	152,495	117,393	117,542	0
Mechanical Treatments	85,352	126,016	125,861	204,344
Fire Treatments	30,240	25,289	25,294	64,353
LCR Sucker (180,158)		**180,663**	**180,663**	**180,663**
Suitable Timber Production Lands	119,755	98,744	98,786	0
Mechanical Treatments	46,669	73,642	73,601	140,187
Fire Treatments	13,734	8,276	8,276	40,476
Loach Minnow (723,794)		**724,558**	**724,558**	**724,558**
Suitable Timber Production Lands	90,828	66,146	69,988	0
Mechanical Treatments	178,314	213,293	209,451	131,468
Fire Treatments	454,651	445,120	445,120	593,090
Longfin Dace (634,010)				
Suitable Timber Production Lands	54,457	27,882	31,723	0
Mechanical Treatments	147,355	179,853	176,011	70,773
Fire Treatments	432,198	426,276	426,276	563,237
Razorback Sucker (637,401)				
Suitable Timber Production Lands	50,633	27,580	31,422	0
Mechanical Treatments	153,274	184,535	180,693	69,183
Fire Treatments	433,494	425,286	425,286	568,218

Roundtail Chub (542,040)		**543,293**	**543,293**	**543,293**
Suitable Timber Production Lands	278,331	210,882	215,562	0
Mechanical Treatments	138,582	214,908	210,310	321,579
Fire Treatments	125,127	117,503	117,421	221,715
Sonora Sucker (846,771)		**847,535**	**847,535**	**847,535**
Suitable Timber Production Lands	209,483	144,365	150,948	0
Mechanical Treatments	178,148	252,102	245,601	238,983
Fire Treatments	459,140	451,068	450,986	608,553
Spikedace (653,098)				
Suitable Timber Production Lands	50,633	27,580	31,422	0
Mechanical Treatments	158,803	190,075	186,233	69,684
Fire Treatments	443,662	435,444	435,444	583,414

Percent of total combined management area acres for each species and their respective analysis areas (populations) where most management activity will likely occur.

	Alt A	Alt B	Alt C	Alt D
Apache Trout	**82%**	**70%**	**78%**	**69%**
Bear Wallow Creek	25%	10%	10%	10%
Centerfire/Boggy/Wildcat/Blow/East	100%	95%	100%	95%
Conklin Creek	100%	77%	100%	77%
Coyote/Mamie Creeks	82%	71%	71%	71%
E Fk Little Colorado River/Lee Valley Creek	69%	66%	72%	67%

Fish Creek	100%	54%	79%	55%
Hay Creek	87%	100%	100%	100%
Mineral Creek/Udall	100%	99%	99%	99%
Snake Creek	98%	82%	100%	85%
Soldier Creek	100%	0%	100%	1%
S Fk Little Colorado River	99%	100%	100%	90%
Stinky Creek	87%	100%	100%	100%
W Fk Black River/Thompson/Burro Creeks	95%	97%	97%	95%
W Fk Little Colorado River	25%	16%	32%	19%
Bluehead Sucker	**93%**	**89%**	**92%**	**70%**
Leonard Canyon	100%	90%	100%	88%
Nutrioso Creek	95%	89%	93%	85%
S Fk Little Colorado River-LCR Headwaters	80%	79%	85%	78%
Upper Chevelon Canyon	93%	93%	93%	56%
Willow Creek (and tributaries)	100%	86%	95%	56%
Desert Sucker	**75%**	**35%**	**74%**	**30%**
Black River	92%	85%	93%	82%
Blue-Chase-Mule-San Francisco River	59%	16%	56%	10%
Eagle Creek	100%	23%	99%	19%
Stone Creek	99%	54%	54%	53%
Gila Chub	**100%**	**30%**	**100%**	**13%**
Dix Creek	100%	76%	100%	6%
Eagle Creek	100%	10%	100%	10%
Harden Cienega Creek	100%	37%	100%	34%
Gila Trout	**33%**	**26%**	**33%**	**24%**
Castle/Buckalou Creeks	100%	76%	99%	76%
Chitty Creek	100%	4%	100%	2%

Coleman Creek	100%	95%	100%	95%
Grant Creek	1%	1%	1%	0%
KP Creek	15%	15%	15%	7%
Lanphier Canyon	0%	0%	0%	0%
McKittrick Creek	0%	0%	0%	0%
Raspberry Creek	4%	0%	4%	0%
Little Colorado Spinedace	**94%**	**92%**	**93%**	**73%**
Leonard Canyon	100%	90%	100%	88%
Nutrioso Creek	95%	89%	93%	85%
Upper Chevelon Canyon	93%	93%	93%	56%
West Chevelon Canyon	100%	99%	100%	43%
LCR Sucker	**94%**	**93%**	**93%**	**57%**
Leonard Canyon	100%	90%	100%	88%
Upper Chevelon Canyon	93%	93%	93%	56%
Loach Minnow	**72%**	**24%**	**69%**	**20%**
Blue River-San Francisco River	60%	15%	57%	10%
Eagle Creek	100%	23%	99%	19%
N Fk E Fk Black River	91%	91%	91%	91%
Longfin Dace	**70%**	**18%**	**67%**	**13%**
Blue-Chase-Mule-San Francisco River	60%	16%	56%	10%
Eagle Creek	100%	23%	99%	19%
Stone Creek	99%	54%	54%	53%
Razorback Sucker	**70%**	**17%**	**68%**	**12%**
Blue River	60%	15%	57%	10%
Eagle Creek	100%	23%	99%	19%
Roundtail Chub	**95%**	**70%**	**95%**	**55%**
Black River	92%	85%	93%	82%

Eagle Creek	100%	23%	100%	19%
Upper Chevelon Canyon	93%	93%	93%	56%
Sonora Sucker	**75%**	**35%**	**74%**	**30%**
Black River	92%	85%	93%	82%
Blue-Chase-Mule-San Francisco River	59%	16%	56%	10%
Eagle Creek	100%	23%	99%	19%
Stone Creek	99%	54%	54%	53%
Spikedace	**70%**	**17%**	**67%**	**12%**
Blue River – San Francisco River	60%	15%	56%	10%
Eagle Creek	100%	23%	99%	19%

Appendix D. Fish Species of the Apache-Sitgreaves NFs Status Tables

Determining, Analyzing, and Documenting the Status of Species or the Surrogate Group within the Plan Area.

SPECIES NAME: APACHE TROUT (ONCORHYNCHUS APACHE)

FACTOR	POSSIBLE DESCRIPTORS	HISTORIC RANGE	CURRENT	TREND	STATUS
HABITAT					
Amount	High	X			
	Moderate				
	Low		X	X	X
Quality	High	X			
	Moderate				
	Low		X	X	X
Distribution	Even	X			
	Restricted				
	Highly fragmented		X	X	X
Processes that	Functioning	X			

create/sustain	Disrupted		X	X	X
POPULATION					
Range	Provide geographic description	GILA AND LCR BASINS	ISOLATED STREAMS	DECLINING	DECLINING
Distribution within range	High degree of interaction	X			
	Moderate isolation				
	High isolation		X	X	X
Size of population(s)	Large	X			
	Moderate				
	Small		X	X	X
Known locations	Provide geographic description and estimate of protection/loss	GILA AND LCR BASINS	5	DECLINING	DECLINING
Phenotypic, ecological and genetic diversity	High	X			
	Medium				
	Low		X	X	X
OTHER FACTORS					
Biological interactions **NON-NATIVE SPECIES**	Describe degree species is supported or threatened by key interactions	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
Other threats – **MANAGEMENT**	Describe status of threats	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
STATUS SUMMARY: **ALL POPULATIONS ARE HIGHLY ISOLATED ABOVE BARRIERS SUBJECT TO PERIODIC FAILURE, AND THE SUBSEQUENT LOSS OF GENETIC PURITY.**					

Determining, Analyzing, and Documenting the Status of Species or the Surrogate Group within the Plan Area.

SPECIES NAME: BLUEHEAD SUCKER (CATOSTOMUS DISCOBOLUS)

FACTOR	POSSIBLE DESCRIPTORS	HISTORIC RANGE	CURRENT	TREND	STATUS
HABITAT					
Amount	High	X			
	Moderate				

	Low		X	X	X
Quality	High	X			
	Moderate				
	Low		X	X	X
Distribution	Even	X			
	Restricted				
	Highly fragmented		X	X	X
Processes that create/sustain	Functioning	X			
	Disrupted		X	X	X
POPULATION					
Range	Provide geographic description	LCR BASIN	ISOLATED	DECLINING	DECLINING
Distribution within range	High degree of interaction				
	Moderate isolation	X			
	High isolation		X	X	X
Size of population(s)	Large	X			
	Moderate				
	Small		X	X	X
Known locations	Provide geographic description and estimate of protection/loss	LCR BASIN	5 - 10	DECLINING	DECLINING
Phenotypic, ecological and genetic diversity	High	X			
	Medium				
	Low		X	X	X
OTHER FACTORS					
Biological interactions	Describe degree species is supported or threatened by key interactions	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
Other threats – MANAGEMENT	Describe status of threats	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT

STATUS SUMMARY: CONTINUED POPULATION DECLINES AND FRAGMENTATION

Determining, Analyzing, and Documenting the Status of Species or the Surrogate Group within the Plan Area.

SPECIES NAME: DESERT SUCKER (PANTOSTEUS CLARKI)

FACTOR	POSSIBLE DESCRIPTORS	HISTORIC RANGE	CURRENT	TREND	STATUS
HABITAT					
Amount	High	X			
	Moderate		X	X	X
	Low				
Quality	High	X			
	Moderate				
	Low		X	X	X
Distribution	Even	X			
	Restricted		X	X	X
	Highly fragmented				
Processes that create/sustain	Functioning	X			
	Disrupted		X	X	X
POPULATION					
Range	Provide geographic description	GILA BASIN	DECLINING/STABLE	DECLINING/STABLE	DECLINING/STABLE
Distribution within range	High degree of interaction	X			
	Moderate isolation		X	X	X
	High isolation				
Size of population(s)	Large	X			
	Moderate				
	Small		X	X	X
Known locations	Provide geographic description and estimate of protection/loss	GILA BASIN	8 - 10	DECLINING/STABLE	DECLINING/STABLE

Phenotypic, ecological and genetic diversity	High	X			
	Medium				
	Low		X	X	X
OTHER FACTORS					
Biological interactions **NON-NATIVE SPECIES**	Describe degree species is supported or threatened by key interactions	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
Other threats – **MANAGEMENT**	Describe status of threats	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
STATUS SUMMARY: **SOME POPULATION DECLINES AND SOME FRAGMENTATION**					

Determining, Analyzing, and Documenting the Status of Species or the Surrogate Group within the Plan Area.

SPECIES NAME: GILA CHUB (GILA INTERMEDIA)

FACTOR	POSSIBLE DESCRIPTORS	HISTORIC RANGE	CURRENT	TREND	STATUS
HABITAT					
Amount	High	X			
	Moderate				
	Low		X	X	X
Quality	High	X			
	Moderate				
	Low		X	X	X
Distribution	Even				
	Restricted	X			
	Highly fragmented		X	X	X
Processes that create/sustain	Functioning	X			
	Disrupted		X	X	X
POPULATION					
Range	Provide geographic description	GILA BASIN	HIGHLY ISOLATED	DECLINING	DECLINING

Distribution within range	High degree of interaction				
	Moderate isolation	X			
	High isolation		X	X	X
Size of population(s)	Large				
	Moderate	X			
	Small		X	X	X
Known locations	Provide geographic description and estimate of protection/loss	GILA BASIN	DIX, EAGLE, & HARDEN CIENEGA	DECLINING	DECLINING
Phenotypic, ecological and genetic diversity	High	X			
	Medium				
	Low		X	X	X
OTHER FACTORS					
Biological interactions **NON-NATIVE SPECIES**	Describe degree species is supported or threatened by key interactions	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
Other threats – **MANAGEMENT**	Describe status of threats	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
STATUS SUMMARY: **POPULATION DECLINES AND LOSSES WITHIN EXISTING HIGHLY ISOLATED POPULATIONS**					

Determining, Analyzing, and Documenting the Status of Species or the Surrogate Group within the Plan Area.

SPECIES NAME: GILA TROUT (ONCORHYNCHUS GILAE)

FACTOR	POSSIBLE DESCRIPTORS	HISTORIC RANGE	CURRENT	TREND	STATUS
HABITAT					
Amount	High				
	Moderate				
	Low	LOW/ MODERATE	X	X	X
Quality	High	X			
	Moderate				

	Low		X	X	X
Distribution	Even				
	Restricted	X			
	Highly fragmented		X	X	X
Processes that create/sustain	Functioning	X			
	Disrupted		X	X	X
POPULATION					
Range	Provide geographic description	BLUE/EAGLE	RASPBERRY	DECLINING	DECLINING
Distribution within range	High degree of interaction				
	Moderate isolation	X			
	High isolation		X	X	X
Size of population(s)	Large				
	Moderate	X			
	Small		X	X	X
Known locations	Provide geographic description and estimate of protection/loss	GILA BASIN	RASPBERRY CREEK	DECLINING	DECLINING
Phenotypic, ecological and genetic diversity	High				
	Medium	X			
	Low		X	X	X
OTHER FACTORS					
Biological interactions **NON-NATIVE SPECIES**	Describe degree species is supported or threatened by key interactions	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
Other threats - **MANAGEMENT**	Describe status of threats	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
STATUS SUMMARY: **ONLY EXISTING POPULATION WILL LIKELY CONTINUE TO DECLINE**.					

Determining, Analyzing, and Documenting the Status of Species or the Surrogate Group within the Plan Area.

SPECIES NAME: LITTLE COLORADO SPINEDACE (LEPIDOMEDA VITTATA)

FACTOR	POSSIBLE DESCRIPTORS	HISTORIC RANGE	CURRENT	TREND	STATUS
HABITAT					
Amount	High	X			
	Moderate				
	Low		X	X	X
Quality	High	X			
	Moderate				
	Low		X	X	X
Distribution	Even	X			
	Restricted				
	Highly fragmented		X	X	X
Processes that create/sustain	Functioning	X			
	Disrupted		X	X	X
POPULATION					
Range	Provide geographic description	LCR BASIN	ISOLATED STREAMS	DECLINING	DECLINING
Distribution within range	High degree of interaction	X			
	Moderate isolation				
	High isolation		X	X	X
Size of population(s)	Large	X			
	Moderate				
	Small		X	X	X
Known locations	Provide geographic description and estimate of protection/loss	LCR BASIN	2	DECLINING	DECLINING
Phenotypic, ecological and genetic diversity	High	X			
	Medium				
	Low		X	X	X
OTHER FACTORS					

Biological interactions **NON-NATIVE SPECIES**	Describe degree species is supported or threatened by key interactions	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
Other threats – **MANAGEMENT**	Describe status of threats	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT

STATUS SUMMARY: **CONTINUED POPULATION DECLINES WITHIN THE HIGHLY FRAGMENTED POPULATIONS**

Determining, Analyzing, and Documenting the Status of Species or the Surrogate Group within the Plan Area.

SPECIES NAME: LITTLE COLORADO SUCKER (CATOSTOMUS SP.)

FACTOR	POSSIBLE DESCRIPTORS	HISTORIC RANGE	CURRENT	TREND	STATUS
HABITAT					
Amount	High				
	Moderate	X			
	Low		X	X	DECLINING
Quality	High	X			
	Moderate				
	Low		X	X	DECLINING
Distribution	Even	X			
	Restricted				
	Highly fragmented		X	X	X
Processes that create/sustain	Functioning	X			
	Disrupted		X	X	X
POPULATION					
Range	Provide geographic description	LCR BASIN	CHEVELON CREEK	DECLINING	DECLINING
Distribution within range	High degree of interaction	X			
	Moderate isolation				
	High isolation		X	X	
Size of population(s)	Large				

	Moderate	X			
	Small		X	X	X
Known locations	Provide geographic description and estimate of protection/loss	LCR BASIN	CHEVELON CREEK	DECLINING	DECLINING
Phenotypic, ecological and genetic diversity	High	X			
	Medium				
	Low		X	X	X
OTHER FACTORS					
Biological interactions **NON-NATIVE SPECIES**	Describe degree species is supported or threatened by key interactions	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
Other threats – **MANAGEMENT**	Describe status of threats	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
STATUS SUMMARY: **ONLY ONE POPULATION IN CHEVELON CREEK, LIKELY DECLINING; SPECIES INCLUDED IN RECENT STATEWIDE CONSERVATION AGREEMENT**.					

Determining, Analyzing, and Documenting the Status of Species or the Surrogate Group within the Plan Area.

SPECIES NAME: LOACH MINNOW (TIAROGA COBITIS)

FACTOR	POSSIBLE DESCRIPTORS	HISTORIC RANGE	CURRENT	TREND	STATUS
HABITAT			DECLINING		
Amount	High	X			
	Moderate				
	Low		X	X	DECLINING
Quality	High	X			
	Moderate				
	Low		X	X	DECLINING
Distribution	Even	X			
	Restricted				
	Highly fragmented		X	X	DECLINING

Processes that create/sustain	Functioning	X			
	Disrupted		X	X	X
POPULATION				DECLINING	
Range	Provide geographic description	GILA BASIN	ISOLATED STREAMS	DECLINING	DECLINING
Distribution within range	High degree of interaction	X			
	Moderate isolation				
	High isolation		X	X	X
Size of population(s)	Large	X			
	Moderate				
	Small		X	X	X
Known locations	Provide geographic description and estimate of protection/loss	GILA BASIN	2-4	DECLINING	DECLINING
Phenotypic, ecological and genetic diversity	High	X			
	Medium				
	Low		X	X	X
OTHER FACTORS					
Biological interactions **NON-NATIVE SPECIES**	Describe degree species is supported or threatened by key interactions	LOW THREAT	HIGH THREAT	HIGH THREAT	HIGH THREAT
Other threats – **MANAGEMENT**	Describe status of threats	LOW THREAT	HIGH THREAT	HIGH THREAT	HIGH THREAT
STATUS SUMMARY: **CONTINUED POULATION DECLINES, LOSS OF POPULATIONS, AND ADDITIONAL FRAGMENTATION OF POPULATIONS**.					

Determining, Analyzing, and Documenting the Status of Species or the Surrogate Group within the Plan Area.

SPECIES NAME: LONGFIN DACE (AGOSIA CHRYSOGASTER)					
FACTOR	POSSIBLE DESCRIPTORS	HISTORIC RANGE	CURRENT	TREND	STATUS
HABITAT					

Amount	High	X			
	Moderate				
	Low		X	X	DECLINING
Quality	High	X			
	Moderate				
	Low		X	X	DECLINING
Distribution	Even	X			
	Restricted		X	X	DECLINING
	Highly fragmented				
Processes that create/sustain	Functioning	X			
	Disrupted		X	X	X
POPULATION					
Range	Provide geographic description	GILA BASIN	ISOLATED STREAMS	DECLINING	DECLINING
Distribution within range	High degree of interaction	X			
	Moderate isolation		X	X	DECLINING
	High isolation				
Size of population(s)	Large	X			
	Moderate				
	Small		X	X	DECLINING
Known locations	Provide geographic description and estimate of protection/loss	GILA BASIN	5-6	DECLINING	DECLINING
Phenotypic, ecological and genetic diversity	High	X			
	Medium				
	Low		X	X	X
OTHER FACTORS					
Biological interactions **NON-NATIVE**	Describe degree species is supported or threatened by key	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT

SPECIES	interactions				
Other threats – **MANAGEMENT**	Describe status of threats	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
STATUS SUMMARY: **CONTINUED POPULATION DECLINES WITH SOME ADDITIONAL FRAGMENTATION**.					

Determining, Analyzing, and Documenting the Status of Species or the Surrogate Group within the Plan Area.

SPECIES NAME: RAZORBACK SUCKER (XYRAUCHEN TEXANUS)

FACTOR	POSSIBLE DESCRIPTORS	HISTORIC RANGE	CURRENT	TREND	STATUS
HABITAT					
Amount	High				
	Moderate	X			
	Low		X	X	DECLINING
Quality	High	X			
	Moderate				
	Low		X	X	DECLINING
Distribution	Even	X*			
	Restricted				
	Highly fragmented		X	X	DECLINING
Processes that create/sustain	Functioning	X			
	Disrupted		X	X	DECLINING
POPULATION					
Range	Provide geographic description	GILA BASIN	UNKNOWN	UNKNOWN	UNKNOWN
Distribution within range	High degree of interaction	X			NO KNOWN
	Moderate isolation				
	High isolation				UNKNOWN
Size of population(s)	Large				
	Moderate	X			

	Small				UNKNOWN
Known locations	Provide geographic description and estimate of protection/loss	GILA BASIN	2	DECLINING	DECLINING
Phenotypic, ecological and genetic diversity	High				
	Medium	X			
	Low		X	DECLINING	DECLINING
OTHER FACTORS					
Biological interactions **NON-NATIVE SPECIES**	Describe degree species is supported or threatened by key interactions	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
Other threats - **MANAGEMENT**	Describe status of threats	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
STATUS SUMMARY: **STOCKINGS THAT OCCURRED IN THE 1980S ON THE BLUE RIVER AND EAGLE CREEK WERE LIKELY NOT SUCCESSFUL**.					

*Historical habitat likely included the lower portions of the Blue River and Eagle Creek, and the San Francisco River.

Determining, Analyzing, and Documenting the Status of Species or the Surrogate Group within the Plan Area.

SPECIES NAME: ROUNDTAIL CHUB (GILA ROBUSTA)

FACTOR	POSSIBLE DESCRIPTORS	HISTORIC RANGE	CURRENT	TREND	STATUS
HABITAT					
Amount	High	X			
	Moderate				
	Low		X	X	DECLINING
Quality	High	X			
	Moderate				
	Low		X	X	DECLINING
Distribution	Even	X			
	Restricted				
	Highly fragmented		X	X	DECLINING

Processes that create/sustain	Functioning	X			
	Disrupted		X	X	X
POPULATION					
Range	Provide geographic description	GILA & LCR BASINS	ISOLATED STREAMS	DECLINING	DECLINING
Distribution within range	High degree of interaction	X			
	Moderate isolation				
	High isolation		X	X	X
Size of population(s)	Large	X			
	Moderate				
	Small		X	X	X
Known locations	Provide geographic description and estimate of protection/loss	GILA & LCR BASINS	3	DECLINING	DECLINING
Phenotypic, ecological and genetic diversity	High	X			
	Medium				
	Low		X	X	X
OTHER FACTORS					
Biological interactions **NON-NATIVE SPECIES**	Describe degree species is supported or threatened by key interactions	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
Other threats – **MANAGEMENT**	Describe status of threats	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
STATUS SUMMARY: **CONTINUED POPULATION DECLINES AND FRAGMENTATION**					

Determining, Analyzing, and Documenting the Status of Species or the Surrogate Group within the Plan Area.

SPECIES NAME: SONORA SUCKER (CATOSTOMUS INSIGNIS)					
FACTOR	POSSIBLE DESCRIPTORS	HISTORIC RANGE	CURRENT	TREND	STATUS
HABITAT					
Amount	High	X			

	Moderate				
	Low		X	X	DECLINING
Quality	High	X			
	Moderate				
	Low		X	X	DECLINING
Distribution	Even	X			
	Restricted				
	Highly fragmented		X	X	DECLINING
Processes that create/sustain	Functioning	X			
	Disrupted		X	X	X
POPULATION					
Range	Provide geographic description	GILA BASIN	DECLINING/STABLE	DECLINING/STABLE	DECLINING/STABLE
Distribution within range	High degree of interaction	X			
	Moderate isolation		X	X	X
	High isolation				
Size of population(s)	Large	X			
	Moderate				
	Small		X	X	X
Known locations	Provide geographic description and estimate of protection/loss	GILA BASIN	~10	DECLINING/STABLE	DECLINING/STABLE
Phenotypic, ecological and genetic diversity	High	X			
	Medium				
	Low		X	X	X
OTHER FACTORS					
Biological interactions **NON-NATIVE SPECIES**	Describe degree species is supported or threatened by key interactions	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT

Other threats **MANAGEMENT**	Describe status of threats	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
STATUS SUMMARY: **SOME POPULATION DECLINES AND ADDITONAL FRAGMENTATION**					

Determining, Analyzing, and Documenting the Status of Species or the Surrogate Group within the Plan Area.

SPECIES NAME: SPECKLED DACE (RHINICHTHYS OSCULUS)

FACTOR	POSSIBLE DESCRIPTORS	HISTORIC RANGE	CURRENT	TREND	STATUS
HABITAT					
Amount	High	X			
	Moderate		X	X	DECLINING
	Low				
Quality	High	X			
	Moderate				
	Low		X	X	DECLINING
Distribution	Even	X			
	Restricted		X	X	DECLINING
	Highly fragmented				
Processes that create/sustain	Functioning	X			
	Disrupted		X	X	X
POPULATION					
Range	Provide geographic description				
Distribution within range	High degree of interaction	X			
	Moderate isolation		X	X	X
	High isolation				
Size of population(s)	Large	X			
	Moderate				
	Small		X	X	X
Known locations	Provide geographic description				

	and estimate of protection/loss				
Phenotypic, ecological and genetic diversity	High	X			
	Medium		X	X	X
	Low				
OTHER FACTORS					
Biological interactions **NON-NATIVE SPECIES**	Describe degree species is supported or threatened by key interactions	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
Other threats **MANAGEMENT**	Describe status of threats	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
STATUS SUMMARY: POPULATION DECLINES WITH SOME FRAGMENTATION					

Determining, Analyzing, and Documenting the Status of Species or the Surrogate Group within the Plan Area.

SPECIES NAME: SPIKEDACE (MEDA FULGIDA)

FACTOR	POSSIBLE DESCRIPTORS	HISTORIC RANGE	CURRENT	TREND	STATUS
HABITAT					
Amount	High				
	Moderate	X			
	Low		X	X	X
Quality	High	X			
	Moderate				
	Low		X	X	X
Distribution	Even	X			
	Restricted				
	Highly fragmented		X	X	X
Processes that create/sustain	Functioning	X			
	Disrupted		X	X	X
POPULATION					
Range	Provide geographic description	GILA BASIN	EAGLE	DECLINING	DECLINING

			CREEK		
Distribution within range	High degree of interaction	X			
	Moderate isolation				
	High isolation		X	X	X
Size of population(s)	Large	X			
	Moderate				
	Small		X	X	X
Known locations	Provide geographic description and estimate of protection/loss	GILA BASIN	EAGLE CREEK	DECLINING	DECLINING
Phenotypic, ecological and genetic diversity	High	X			
	Medium				
	Low		X	X	X
OTHER FACTORS					
Biological interactions **NON-NATIVE SPECIES**	Describe degree species is supported or threatened by key interactions	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
Other threats – **MANAGEMENT**	Describe status of threats	N/A	HIGH THREAT	HIGH THREAT	HIGH THREAT
STATUS SUMMARY: **LIKELY NO LONGER PRESENT WITHIN EAGLE CREEK ON THE FORESTS**					

Appendix E. Plan Decisions and Species Viability

The following table provides a crosswalk that shows how plan decisions meet species viability needs.

As part of the plan revision process, coarse filter plan decisions (i.e., desired condition statements) were developed that describe the desired outcomes and conditions for vegetation, riparian, and aquatic features, and other resources within the planning area. These desired conditions provide habitat for wildlife which helps to reduce risks to species and provide for their viability. Where desired conditions would result in low to moderate risk ratings for some species, meeting and maintaining those desired conditions would provide for their population viability. This is because low to moderate ratings of risk are assumed to be similar enough to normal ecosystem fluctuations and therefore within a species' ability to adjust, thus posing little risk to viability. Where the risk rating would be moderately-high, high, or very high, additional fine filter plan components (e.g., standards, guidelines) were developed to address or mitigate risk. However, the coarse-fine filter approach is not entirely discrete as standards and guidelines can contribute to viability for some coarse filter species, while the needs of fine filter species can also be provided for, in part, by coarse filter desired conditions and PNVTs.

The crosswalk in the table below lists those coarse and fine filter plan decisions that reduce risks to species and provide for viability. Other plan decisions (objectives, special areas, suitability, and monitoring) and management area allocations also contribute to species viability and are discussed in the Wildlife and Rare Plants and Fisheries sections of chapter 3 of the DEIS.

In the table below, the following abbreviations are used:

DC = desired condition
ST = standard
GL = guideline
PNVT = potential natural vegetation type
MA = management area
FPS = forest planning species

Species crosswalk for how plan decisions meet species' viability needs

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
All PNVTs, all habitat elements, and other factors of concern	All FPS	**DCs for Overall Ecosystem Health:** Ecological components are resilient to disturbances including human activities and climate variability. Natural ecological processes (e.g., fire, drought, wind, insects, disease, pathogens) return to their innate role within the ecosystem. Fire, in particular, is restored to a more natural function. Natural ecological processes allow for a shifting of plant communities, structure, and ages across the landscape. Ecotone shifts are influenced at both the landscape and watershed scale by ecological processes. The mosaic of plant communities and the variety within the communities are resilient to disturbances. Ecological conditions for habitat quality, distribution, and abundance contribute to self-sustaining populations of native and desirable non-native plants and animals that are healthy, well-distributed, connected, and genetically diverse. Conditions provide for the life history, distribution, and natural population fluctuations of the species within the capability of the landscape. Large blocks of habitat are interconnected, allowing for behavioral and predator-prey interactions, and the persistence of metapopulations and highly interactive wildlife species across the landscape. Ecological connectivity extends through all plant communities and ecotones. Habitat configuration and availability allows wildlife populations to adjust their movements (e.g., seasonal migration, foraging) in response to climate change and promote genetic flow between wildlife populations. Habitat quality, distribution, and abundance exist to support the recovery of federally listed species and the continued existence of all native and desirable non-native species. Healthy ecosystems provide a wide range of ecosystem services . Watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition. **DCs for Soil:** Ecological and hydrologic functions are not impaired by soil compaction. Soil condition rating is satisfactory. Soils are stable within their natural capability. Vegetation and litter limit accelerated erosion (e.g., rills, gullies, root exposure, topsoil loss) and contribute to soil deposition and development.

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
		Soils provide for diverse native plant species . Vegetative ground cover is well-distributed across the soil surface to promote nutrient cycling and water infiltration. Biological soil crusts (mosses, lichens, algae, liverworts) are present and re-established if potential exists. Soil loss rates do not exceed tolerance soil loss rates. Logs and other woody material are distributed across the surface to maintain soil productivity . Vegetation and litter is sufficient to maintain and improve water infiltration, nutrient cycling, and soil stability. **DCs for All PNVTs:** Each PNVT contains a mosaic of vegetative conditions, densities, and structures. This mosaic occurs at a variety of scales across landscapes and watersheds. The distribution of physical and biological conditions is appropriate to the natural disturbance regimes affecting the area. The vegetative conditions and functions are resilient to the frequency, extent, and severity of ecological processes, especially fire, insects and disease, and climate variability. The landscape is a functioning ecosystem that contains all its components, processes, and functions. Natural processes and human disturbances (e.g., planned and unplanned fire ignitions, mechanical vegetation treatments) provide desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling. Natural fire regimes are restored. Uncharacteristic fire behavior is minimal or absent on the landscape. Fire (planned and unplanned ignitions) maintains and enhances resources and, as nearly as possible, is allowed to function in its natural ecological role Native plant communities dominate the landscape. The range of species genetic diversity remains within native vegetation and animal populations, thus enabling species to adapt to changing environmental and climatic conditions. Vegetative connectivity provides for species dispersal, genetic exchange, and daily and seasonal movements across multiple spatial scales. Vegetation characteristics (e.g., density, litter) provide favorable conditions for water flow and quality. Organic soil cover and herbaceous vegetation protect soil, facilitate moisture infiltration, and contribute to

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
		plant and animal diversity and ecosystem function. Diverse vegetation structure, species composition, densities, and seral states provide quality habitat for native and desirable non-native plant and animal species throughout their lifecycle and at multiple spatial scales. Landscapes provide for the full range of ecosystem diversity at multiple scales, including habitats for those species associated with late seral states and old growth forests. Old growth is dynamic in nature and occurs in well-distributed patches that spatially shift across forest and woodland landscapes over time. Old or large trees, multi-storied canopies, large coarse woody debris, and snags provide the structure, function and associated vegetation composition as appropriate for each forested and woodland PNVT. Vegetation conditions allow for transition zones or ecotones between riparian areas, forests, woodlands, shrublands, and grasslands. Transition zones may shift in time and space due to changing site conditions (e.g., fire, climate). Insect and disease populations are at endemic levels with occasional outbreaks. A variety of seral states usually restricts the scale of localized insect and disease outbreaks. Herbivory is in balance with available forage (i.e., grazing and browsing by authorized livestock, wild horses, and wildlife do not exceed available forage production within established use levels). Shrub components contain a diverse array of native vegetation that is well-distributed across the landscape to provide nutritional needs for browsers. Stand densities and species compositions are such that vegetation conditions are resilient under a variety of potential future climates. Vegetation conditions provide hiding and thermal cover in contiguous blocks for wildlife. Native plant species are present in all age classes and are healthy, reproducing, and persisting. Ground cover, density, and height of vegetation exist to protect the soil and support water infiltration. There is a diverse mix of cool and warm season grass and desirable forb species. Plant canopy cover and composition are within or moving closer to reference conditions. Grasses, forbs, shrubs, and litter are abundant and continuous to maintain and support natural fire regimes. The composition, density, structure, and mosaic of vegetative conditions reduce uncharacteristic wildfire

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
		hazard to local communities and forest ecosystems. Rare or unique plant communities are intact and persisting. Herbaceous vegetation amount and structure (e.g., plant density, height, litter, seedheads) provides habitat to support prey species. Some isolated infestations of mistletoe provide for a diversity of habitat components (e.g., food, nesting, cover) for a variety of species such as owls, squirrels, and some birds and insects. **DCs for Wildlife and Rare Plants**: Habitat conditions contribute to the recovery of federally listed species. Localized rare plant and animal communities are intact and functioning. **DCs for Invasive Species:** Invasive species are in low abundance or non-existent. Undesirable non-native species are absent or present only to the extent that they do not adversely affect ecosystem composition, structure, or function, including native species populations or the natural fire regime. **DC for Overall Recreation Opportunities:** Recreation use does not negatively affect wildlife habitat and populations. Negative interactions between people and wildlife are minimized. **DC for Dispersed Recreation:** Water-based settings are available and the associated recreation opportunities (e.g., canoeing, fishing, waterfowl hunting) do not degrade aquatic resources. **DCs for Conservation Education:** Forest visitors have access to information about topics of concern related to the Apache-Sitgreaves NFs (e.g., ecosystem restoration, unmanaged recreation, uncharacteristic wildfire), including appropriate visitor behavior (e.g., follow forest orders, pack out trash, appropriate sanitation). Forest visitors have access to information about the features of the Apache-Sitgreaves NFs, its ecosystems, multiple-uses, and other management aspects of the forests. **DCs for Livestock Grazing:** Range developments for livestock minimize impacts to wildlife and blend with the natural environment. Livestock grazing is in balance with available forage (i.e., grazing and browsing by authorized livestock, wild horses, and wildlife do not exceed available forage production within established use levels).

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
		DC for Wild Horse Territory MA: Grazing is in balance with available forage (i.e., grazing and browsing by authorized livestock, wild horses, and wildlife do not exceed available forage production within established use levels). **DCs for Wildlife Quiet Area MA**: *all DCs* **DCs for Natural Landscape MA:** These areas contribute to ecosystem and species diversity and sustainability; serve as habitat for plants and animals; and offer wildlife corridors, reference areas, primitive and semi-primitive non-motorized recreation opportunities, and places for people seeking natural scenery and solitude. Natural landscapes contribute to preserving natural behaviors and processes that sustain wildlife populations. **DC for Research Natural Area MA**: The Phelps Cabin RNA provides opportunities for research, study, observation, monitoring, and educational activities that maintain the natural conditions for which the area was established. **DC for Recommended Research Natural Area MA:** The recommended RNAs provide opportunities for research, study, observation, monitoring, and educational activities that maintain the natural conditions for which the area was recommended. **DCs for Wilderness MA:** Ecological conditions are affected primarily by natural ecological processes, with the appearance of little or no human intervention. Wilderness contributes to preserving natural behaviors and processes that sustain wildlife populations. **DC for Primitive Area MA:** The Blue Range Primitive Area and presidential recommended additions maintain natural landscapes where generally only ecological changes occur (very high scenic integrity) and provide primitive recreation opportunities, except along the existing road (36 CFR 293.17(a)). **DCs for Recommended Wilderness MA:** Recommended wilderness areas display natural landscapes where generally only ecological changes occur (very high scenic integrity) and provide primitive or semi-primitive non-motorized recreation opportunities. Recommended wilderness contributes to preserving natural behaviors and processes that sustain wildlife populations.

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
		GLs for Soil: Projects with ground-disturbing activities should be designed to minimize long and short-term impacts to soil resources. Where disturbance cannot be avoided, project-specific soil and water conservation practices should be developed. Severely disturbed sites should be revegetated with native plant species when loss of long-term soil productivity is evident. Locally collected seed should be used where available and cost effective. Seeds should be tested to ensure they are free from noxious weeds and invasive non-native plants at a State-certified seed testing laboratory before acceptance and mixing. Coarse woody debris retention and/or creation should be used as needed to help retain long-term soil productivity. **GL for Water Resources:** Projects with ground-disturbing activities should be designed to minimize long and short-term impacts to water resources. Where disturbance cannot be avoided, project-specific soil and water conservation practices should be developed. **ST for All PNVTs:** Vegetation treatments shall include measures to reduce the potential for the introduction of invasive plants and animals and damage from non-native insects and diseases. **GL for All PNVTs:** During project design and implementation, precautions should be taken to reduce the potential for damage to residual vegetation in order to prevent premature or excessive mortality. Landscape scale restoration projects should be designed to spread out treatments spatially and/or temporally to reduce implementation impacts and allow reestablishment of vegetation and soil cover. **GLs for Wildlife and Rare Plants:** Management activities should not contribute to the trend toward Federal listing. Habitat management objectives and species protection measures from approved recovery plans should be applied to activities occurring within Federally-listed species habitat. Measures (e.g., fencing, planting/translocation, research) should be implemented to help ensure regional forester-identified sensitive species do not trend toward Federal listing. The needs of localized species (e.g., New Mexico meadow jumping mouse, Bebb's willow, White Mountains paintbrush) should be considered and provided for during project activities to ensure their limited or

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
		specialized habitats are not lost. **ST for Invasive Species:** Projects and authorized activities shall be designed to reduce the potential for the introduction of new species or spread of existing invasive or undesirable aquatic or terrestrial non-native populations. **GLs for Invasive Species:** Project areas should be monitored to ensure there is no introduction or spread of invasive species. Treatment of invasive species should be designed to effectively control or eliminate them; multiple treatments may be needed. **GLs for Landscape Scale Disturbance Events:** Erosion control mitigation features should be implemented to protect significant resource values and infrastructure such as stream channels, roads, structures, threatened and endangered species, and cultural resources. Projects and activities (e.g., revegetation, mulching, lop and scatter) should be designed to stabilize soils and restore nutrient cycling, if needed, and establish movement toward the desired conditions for the affected PNVT(s). **GL for Motorized Opportunities:** New roads or motorized trails should be located to avoid Mexican spotted owl protected activity centers (PACs), northern goshawk post-fledging family areas (PFAs), and other wildlife areas as identified; seasonal restrictions may be an option. **ST for Forest Products:** Permits which authorize the collection of forest products shall include permit provisions to ensure the needs of wildlife, which depend upon those forest products, will continue to be met (e.g., cone and mushroom collection and the overwinter forage needs of squirrels). **GL for Livestock Grazing:** Grazing use on seasonal allotments should be timed to the appropriate plant growth stage and soil moisture. Forage, browse, and cover needs of wildlife, authorized livestock, and wild horses should be managed in balance with available forage. **GL for Wildlife Quiet Area MA:** Restoration treatments should consider the needs of wildlife (e.g., calving/fawning areas, wallows, game crossings) to minimize potential impacts to the species and their habitat.

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
		ST for Wilderness MA: Human-caused disturbed areas that do not complement wilderness characteristics will be rehabilitated to a natural appearance, using species or other materials native to the area. **ST for Recommended Wilderness MA:** Human-caused disturbed areas that do not complement wilderness characteristics shall be rehabilitated to a natural appearance, using plant species or other materials native to the area. **GL for Research Natural Area MA:** To minimize impacts to unique and sensitive plant species, recreational activities, other than use on the designated trail, should not be encouraged. **GL for Recommended Research Natural Area MA:** To minimize impacts to unique and sensitive plant and animal species, recreational activities should not be encouraged.
Forested PNVTs	All FPS listed under ponderosa pine, dry mixed conifer, wet mixed conifer and spruce-fir PNVTs	**GLs for All Forested PNVTs:** Where current forests are lacking proportional representation of late seral states and species composition on a landscape scale, old growth characteristics should be retained or encouraged to the greatest extent possible within the scope of meeting other desired conditions (e.g., reduce impacts from insects and disease, reduce the threat of uncharacteristic wildfire). Healthy southwestern white pine should be retained to maintain the wide range of genetic variability that contributes to resistance against the non-native white pine blister rust disease. Tree species that are less susceptible to root disease should be retained within areas of root disease infection to reduce spread of disease. When thinning dwarf mistletoe infected sites, as much mistletoe should be removed as possible without sacrificing the healthiest, most desirable trees for the particular site (in some situations this may involve retaining some lightly infected trees in the upper canopy to meet multiple resource objectives). Trees, snags, and logs immediately adjacent to active red squirrel cone caches, Abert's squirrel nests, and raptor nests should be retained to maintain needed habitat components and provide tree groupings. Hiding cover, approach cover (by waters), and travel corridor cover should be provided where needed by wildlife. **GLs for Wildlife and Rare Plants:** A minimum of six nest areas (known and replacement) should be located per northern goshawk territory. Northern goshawk nest and replacement nest areas should be located around active nests, in drainages, at the base of slopes, and on northerly (NW to NE) aspects. Nest areas

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
		should be 25 to 30 acres each in size. Northern goshawk post-fledging family areas (PFAs) of approximately 420 acres in size should be designated around the nest sites. During treatments, snags should be retained in the largest diameter classes available as needed to meet wildlife or other resource needs. Active raptor nests should be protected from treatments and disturbance during the nesting season to provide for successful reproduction. Specifically for goshawk nest areas, human presence should be minimized during nesting season of March 1 through September 30.
Ponderosa pine forest PNVT	Arizona myotis bat, Abert's squirrel, Northern goshawk, Zone-tailed hawk, Grace's warbler, flammulated owl, Mexican spotted owl (where Gambel oak)	**DCs for Ponderosa Pine:** Where it naturally occurs, Gambel oak is present with all age classes represented. It is reproducing to maintain or expand its presence on capable sites across the landscape. Large Gambel oak snags are typically 10 inches or larger diameter and are well-distributed. Where Gambel oak occurs, the majority are single-trunk trees over 8 inch diameter with full crowns. Trees typically occur in irregularly-shaped groups and are variably-spaced with some tight clumps. Crowns in the mid- to old-aged groups are interlocking or nearly interlocking providing for species such as Abert's squirrel. Northern goshawk post-fledging family areas (PFAs) may contain 10 to 20 percent higher basal area in mid-aged to old tree groups than Northern goshawk foraging areas and the surrounding forest. Northern goshawk nest areas have forest conditions that are multi-aged and dominated by large trees with relatively denser canopies than the surrounding forest. **GL for Ponderosa Pine:** Where Gambel oak or other native hardwood trees and shrubs are desirable to retain for diversity, treatments should improve vigor and growth of these species. **GLs for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives.

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
Dry mixed conifer forest PNVT	Arizona myotis bat, red squirrel, Northern goshawk, flammulated owl, Mexican spotted owl	**DCs for Dry Mixed Conifer:** Where they naturally occur, groups of Gambel oak are healthy and maintained or increased. Tree density may be greater in some locations, such as north-facing slopes and canyon bottoms. Where Gambel oak occurs, the majority are single-trunk trees over 8 inch diameter with full crowns. Trees typically occur in irregularly-shaped groups and are variably-spaced with some tight clumps with crowns of mid- to old-aged trees interlocking (clumped trees) or nearly interlocking providing for species such as Abert's squirrel. Northern goshawk post-fledging family areas (PFAs) may contain 10 to 20 percent higher basal area in mid-aged to old tree groups than northern goshawk foraging areas and the surrounding forest. Goshawk nest areas have forest conditions that are multi-aged but are dominated by large trees with relatively denser canopies than the surrounding forest. **GL for Dry Mixed Conifer:** Where Gambel oak or other native hardwood trees and shrubs are desirable to retain for diversity, treatments should improve vigor and growth of these species. **GL for Aspen:** Restoration of aspen clones should occur where aspen is over-mature or in decline to maintain a sustainable presence of this species at the landscape level. **GLs for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives.
Wet mixed conifer forest PNVT	Red squirrel, black bear, Northern goshawk, red-faced warbler, dusky blue grouse, MacGillvray's warbler, Mexican spotted owl, yellow lady's slipper, wood nymph, heathleaf ragwort, yellow Jacob's	**DCs for Wet Mixed Conifer:** Northern goshawk post-fledging family areas (PFAs) may contain 10 to 20 percent higher basal area in mid-aged to old tree groups than Northern goshawk foraging areas and the surrounding forest. Northern goshawk nest areas have forest conditions that are multi-aged but are dominated by large trees with relatively denser canopies than the surrounding forest. Mid-aged and older trees are typically variably-spaced with crowns interlocking (grouped and clumped trees) or nearly interlocking providing for species such as red squirrel. Trees within groups can be of similar

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
	ladder, hooded lady's tress	or variable species and ages. Small openings are present as a result of disturbances. Coarse woody debris, including logs, varies by seral state, ranging from 5 to 20 tons per acre for early-seral states; 20 to 40 tons per acre for mid-seral states; and may be as high as 35 tons per acre, or greater, for late-seral states. These conditions also provide an abundance of fungi including mushrooms and truffles used by small mammals. **GL for Aspen:** Restoration of aspen clones should occur where aspen is over-mature or in decline to maintain a sustainable presence of this species at the landscape level. **GLs for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives.
Spruce-fir forestPNVT	Red squirrel, black bear, Mexican spotted owl, crenulate moonwort, White Mountains paintbrush, yellow lady's slipper, wood nymph, heathleaf ragwort, yellow Jacob's ladder, hooded lady's tress	**DCs for Spruce-fir:** Northern goshawk post-fledging family areas (PFAs) may contain 10 to 20 percent higher basal area in mid-aged to old tree groups than Northern goshawk foraging areas and the surrounding forest. Northern goshawk nest areas have forest conditions that are multi-aged but are dominated by large trees with relatively denser canopies than the surrounding forest. Coarse woody debris, including logs, varies by seral state, ranging from 5 to 30 tons per acre for early-seral states; 30 to 40 tons per acre for mid-seral states; and 40 tons per acre or greater for late-seral states. These conditions also provide an abundance of fungi including mushrooms and truffles used by small mammals. **GLs for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives.
Madrean pine-oak woodland PNVT	Mule deer (winter), juniper titmouse, Mexican spotted owl (often in association with canyons), gray vireo, Bigelow's	**DC for Madrean Pine Oak:** Some large patches in the Madrean pine-oak woodland are closed canopy, have multiple age classes, and old growth-like characteristics (e.g., numerous snags, large coarse woody debris) in order to provide for wildlife such as Mexican spotted owl and black bear that need denser habitat. **GL for All Woodland PNVTs:** Treatments should leave single or small groups of medium to large trees that are widely-spaced with expanses of herbaceous vegetation and coarse woody debris to provide for soil

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
	onion	productivity and wildlife needs. **GL for Madrean pine-oak**: Where Mexican spotted owls are found nesting in canyons or on north slopes within the Madrean pine-oak woodland, adjacent treatments should be modified to meet the needs of foraging owls consistent with the species' recovery plan. **GLs for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. During treatments, snags should be retained in the largest diameter classes available as needed to meet wildlife or other resource needs. Active raptor nests should be protected from treatments and disturbance during the nesting season to provide for successful reproduction. Specifically for goshawk nest areas, human presence should be minimized during nesting season of March 1 through September 30.
Montane/subalpine grasslands PNVT	pronghorn antelope, Gunnison's prairie dog, dwarf shrew, savannah sparrow, splachnoid dung moss	**DCs for Grasslands:** Prairie dogs are present and support healthy grassland soil development and the diversity of other species associated with them such as the western burrowing owl. During the critical pronghorn fawning period (May through June), cool season grasses and forbs provide nutritional forage, while shrubs and standing grass growth from the previous year provide adequate hiding cover (10 to 18 inches) to protect fawns from predation. **ST for Grasslands:** A moderate to high similarity to vegetation climax conditions for plant canopy cover and composition as described in each ecological mapping unit shall be achieved and/or maintained. **GLs for Grasslands:** Grasslands and openings should provide for sufficient vegetative ground cover (45 percent of greater in Great Basin grasslands, 35 percent or greater in semi-desert grasslands, and 60 percent or greater in montane/subalpine grasslands) to prevent accelerated erosion, dissipate rainfall, facilitate the natural fire regime, and provide wildlife and insect habitat. New fence construction or reconstruction should have a barbless bottom wire which is 18 inches from the ground where pronghorn antelope may be present to facilitate movement between pastures and other fenced areas. Pole and other types of fences should also provide for pronghorn antelope passage where they are present.

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
		Pronghorn antelope fence and other crossings should be installed along known movement corridors to prevent habitat fragmentation. **GLs for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. Prairie dog controls should not be authorized except when consistent with approved State of Arizona Gunnison's prairie dog conservation strategies. **GL for Livestock Grazing:** Grazing use on seasonal allotments should be timed to the appropriate plant growth stage and soil moisture.
Great Basin grassland PNVT	pronghorn antelope, Gunnison's prairie dog, Arizona sunflower	**DCs for Grasslands:** Prairie dogs are present and support healthy grassland soil development and the diversity of other species associated with them such as the western burrowing owl. During the critical pronghorn fawning period (May through June), cool season grasses and forbs provide nutritional forage, while shrubs and standing grass growth from the previous year provide adequate hiding cover (10 to 18 inches) to protect fawns from predation. **ST for Grasslands:** A moderate to high similarity to vegetation climax conditions for plant canopy cover and composition as described in each ecological mapping unit shall be achieved and/or maintained. **GLs for Grasslands:** Grasslands and openings should provide for sufficient vegetative ground cover (45 percent of greater in Great Basin grasslands, 35 percent or greater in semi-desert grasslands, and 60 percent or greater in montane/subalpine grasslands) to prevent accelerated erosion, dissipate rainfall, facilitate the natural fire regime, and provide wildlife and insect habitat. New fence construction or reconstruction should have a barbless bottom wire which is 18 inches from the ground where pronghorn antelope may be present to facilitate movement between pastures and other fenced areas. Pole and other types of fences should also provide for pronghorn antelope passage where they are present. Pronghorn antelope fence and other crossings should be installed along known movement corridors to prevent habitat fragmentation. **GLs for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to

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		reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. Prairie dog controls should not be authorized except when consistent with approved State of Arizona Gunnison's prairie dog conservation strategies.
Semi-desert grassland PNVT	Bigelow's onion, Arizona sunflower, superb penstemon	**DC for Grasslands:** Prairie dogs are present and support healthy grassland soil development and the diversity of other species associated with them such as the western burrowing owl. **ST for Grasslands:** A moderate to high similarity to vegetation climax conditions for plant canopy cover and composition as described in each ecological mapping unit shall be achieved and/or maintained. **GLs for Grasslands:** Grasslands and openings should provide for sufficient vegetative ground cover (45 percent of greater in Great Basin grasslands, 35 percent or greater in semi-desert grasslands, and 60 percent or greater in montane/subalpine grasslands) to prevent accelerated erosion, dissipate rainfall, facilitate the natural fire regime, and provide wildlife and insect habitat. New fence construction or reconstruction should have a barbless bottom wire which is 18 inches from the ground where pronghorn antelope may be present to facilitate movement between pastures and other fenced areas. Pole and other types of fences should also provide for pronghorn antelope passage where they are present. Pronghorn antelope fence and other crossings should be installed along known movement corridors to prevent habitat fragmentation. **GLs for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives.
Sometimes shaded or often wet meadow or forest opening (ponderosa pine, dry mixed conifer, wet mixed	Mogollon vole, Merriam's shrew, four-spotted skipperling butterfly, Arizona sneezeweed, Mogollon clover, Oak Creek triteleia	**DC for Riparian Areas:** Vegetation is structurally diverse, often dense, providing for high bird species diversity and abundance, especially neotropical migratory birds. It includes large trees and snags in the cottonwood willow and mixed broadleaf deciduous riparian forests to support species such as beaver, yellow-billed cuckoo, bald eagles, Arizona gray squirrel, and various bat species. **GL for All PNVTs:** Restoration methods, such as thinning or burning, should leave a mosaic of undisturbed areas within the larger treated project area, especially within meadows, openings, and swales, to retain or

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conifer, and spruce-fir forests and Madrean pine-oak woodland PNVTs)		allow recolonization of small mammals and insects (e.g., long-tailed voles, fritillary butterflies). **GL for Ponderosa Pine and Dry Mixed Conifer:** Where consistent with project or activity objectives, canopy cover should be retained on the south and southwest sides of small, existing forest openings that are naturally cooler and moister. These small (generally one-tenth to one-quarter acre) shaded openings provide habitat conditions needed by small mammals, plants, and insects (e.g., Merriam's shrew, Mogollon clover, four-spotted skipperling butterfly). Where these openings naturally occur across a project area, these conditions should be maintained on an average of 2 or more such openings per 100 acres. **GLs for Riparian Areas:** Wet meadows and active floodplains with riparian-obligate species should provide sufficient herbaceous cover (55 percent or greater) and height (6 to 9 inches or longer) to trap sediment, mitigate flood energy, stabilize banks, and provide for wildlife and plant needs. Wet meadows and cienegas should not be used for concentrated activities (e.g., equipment storage, forest product or mineral stockpiling, livestock handling facilities, special uses) that cause damage to soil and vegetation. **GLs for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. **GLs for Motorized Opportunities:** New roads, motorized trails, or designated motorized areas should be located to avoid meadows, wetlands, riparian areas, stream bottoms, sacred sites, and areas with high concentrations of significant archaeological sites. The number of stream crossings should be minimized or mitigated to reduce impacts to aquatic species. As projects occur in riparian or wet meadow areas, unneeded roads or motorized trails should be closed or relocated, drainage restored, and native vegetation reestablished to move these areas towards their desired condition. **GLs for Non-motorized Opportunities:** New non-motorized routes should avoid meadows, wetlands, riparian areas, stream bottoms, sacred sites, and areas with high concentrations of significant archaeological sites. The number of stream crossings should be minimized or mitigated to reduce impacts to aquatic habitat. **GL for Livestock Grazing**: Critical areas [e.g., meadow] should be managed to address the inherent or

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		unique site factors, condition, values, or potential conflicts. **GL for Special Uses:** As applicable, issuance of special use authorizations should incorporate measures to reduce potential impacts to wildlife and avoid rare and unique habitats (e.g., bogs, fens).
Cool understory micro-climate (dry mixed conifer forest and Madrean pine-oak woodland PNVTs)	Goodding's onion, Mexican hemlock parsley	**GLs for Wildlife and Rare Plants:** Cool and/or dense vegetation cover should be provided for species needing these habitat components (e.g., Goodding's onion, black bear, White Mountains chipmunk). The needs of localized species (e.g., New Mexico meadow jumping mouse, Bebbs willow, White Mountains paintbrush) should be considered and provided for during project activities to ensure their limited or specialized habitats are not lost. **GL for Special Uses:** As applicable, issuance of special use authorizations should incorporate measures to reduce potential impacts to wildlife and avoid rare and unique habitats (e.g., bogs, fens).
Mosaic of conditions (species that need adjacent untreated areas for persistence)	Lesser long-nosed bat, long-tailed vole, dwarf shrew, White Mountains ground squirrel, Springerville pocket mouse, western burrowing owl, Montezuma's quail, plateau giant tiger beetle, Greene milkweed	**GL for All PNVTs:** Restoration methods, such as thinning or burning, should leave a mosaic of undisturbed areas within the larger treated project area, especially within meadows, openings, and swales, to retain or allow recolonization of small mammals and insects (e.g., long-tailed voles, fritillary butterflies). **GLs for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. **ST for Grasslands:** A moderate to high similarity to vegetation climax conditions for plant canopy cover and composition as described in each ecological mapping unit shall be achieved and/or maintained.
Dense, low-mid canopy with ample ground vegetation/litter and/or woody debris (dry mixed conifer, wet mixed conifer, and	Southern red-backed vole, dusky blue grouse, western red bat, ocelot, White Mountains chipmunk, black bear, red-faced warbler, MacGillvray's warbler (mixed broadleaf	**DC for Ponderosa Pine:** Uneven-aged groups and patches, comprising about 20 percent of this PNVT, provide for species such as the black bear and red-faced warbler that need multi-storied canopies with dense low to mid canopy layers. **DC for Dry Mixed Conifer:** Uneven-aged groups and patches, comprising about 20 percent of this PNVT, provide for species such as the MacGillvray's warbler and Swainson's thrush that need multi-storied canopies with dense low to mid canopy layers. **DC for Madrean Pine Oak:** Some large patches in the Madrean pine-oak woodland are closed canopy, have

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spruce-fir forests and riparian forest PNVTs)	deciduous riparian forest), Swainson's thrush, gray catbird (forested riparian PNVTs), Southwestern willow flycatcher (montane willow riparian forest)	multiple age classes, and old growth-like characteristics (e.g., numerous snags, large coarse woody debris) in order to provide for wildlife such as Mexican spotted owl and black bear that need denser habitat. **DC for Riparian Areas:** Vegetation is structurally diverse, often dense, providing for high bird species diversity and abundance, especially neotropical migratory birds. It includes large trees and snags in the cottonwood willow and mixed broadleaf deciduous riparian forests to support species such as beaver, yellow-billed cuckoo, bald eagles, Arizona gray squirrel, and various bat species. **GL for Soil:** Coarse woody debris retention and/or creation should be used as needed to help retain long-term soil productivity. **GLs for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. Cool and/or dense vegetation cover should be provided for species needing these habitat components (e.g., Goodding's onion, black bear, White Mountains chipmunk).
Seasonally wetted swales (montane/subalpine and Great Basin grassland PNVTs)	Ferris' copper butterfly, Alberta artic butterfly, nitocris fritillary butterfly, nanomis fritillary butterfly, Parish alkali grass (alkali soils only)	**GL for All PNVTs:** Restoration methods, such as thinning or burning, should leave a mosaic of undisturbed areas within the larger treated project area, especially within meadows, openings, and swales, to retain or allow recolonization of small mammals and insects (e.g., long-tailed voles, fritillary butterflies). **GL for Special Uses:** As applicable, issuance of special use authorizations should incorporate measures to reduce potential impacts to wildlife and avoid rare and unique habitats (e.g., bogs, fens).
High quality water (all riparian PNVTs)	water shrew, bald eagle, Arizona toad, Chiricahua leopard frog, northern leopard frog, lowland leopard frog, northern Mexican gartersnake, narrow-headed gartersnake, false ameletus mayfly,	**DCs for Water Resources:** Water quality, stream channel stability, and aquatic habitats retain their inherent resilience to natural and other disturbances. Vegetation and soil conditions above the floodplain contribute to downstream water quality, quantity, and aquatic habitat. Instream flows provide for channel and floodplain maintenance, recharge of riparian aquifers, water quality, and minimal temperature fluctuations. Water quality meets or exceeds Arizona State standards or Environmental Protection Agency water quality standards for designated uses.

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	California floater, Mosely caddisfly, Arizona snaketail dragonfly, White Mountains water penny beetle, Three Forks springsnail, Blumer's dock, carnivorous bladderwort, Apache trout, Gila chub, Gila trout, Little Colorado spinedace, roundtail chub, loach minnow, and spikedace	**DCs for Aquatic Habitat and Species:** Streams and aquatic habitats support native fish and/or other aquatic species providing the quantity and quality of aquatic habitat within reference conditions. Federally listed species are trending towards recovery. Stream flows, habitat, and water quality support native aquatic and riparian dependent species and habitat. Habitat and ecological conditions are capable of providing for self-sustaining populations of native, riparian-dependent plant and animal species. **GL for Aquatic Habitat and Species:** Sufficient water should be left in streams to provide for aquatic species and riparian vegetation. **GLs for Riparian Areas:** Storage of fuels and other toxicants should be located outside of riparian areas to prevent spills that could impair water quality or harm aquatic species. Equipment should be fueled or serviced outside of riparian areas to prevent spills that could impair water quality or harm aquatic species. Construction or maintenance equipment service areas should be located and treated to prevent gas, oil, or other contaminants from washing or leaching into streams. **GLs for Water Resources:** Streams, streambanks, shorelines, lakes, wetlands, and other bodies of water should be protected from detrimental changes in water temperature and sediment to protect aquatic species and riparian habitat. Streamside management zones should be in place between streams and disturbed areas and/or road locations to maintain water quality and suitable stream temperatures for aquatic species. As State of Arizona water rights permits (e.g., water impoundments, diversions) are issued, the base level of instream flow should be retained by the Apache-Sitgreaves NFs. Constraints (e.g., maximum limit to which water level can be drawn down, minimum distance from a connected river, stream, wetland, or groundwater-dependent ecosystem) should be established for new groundwater pumping sites permitted on NFS lands in order to protect the character and function of water resources. Short-term impacts in watersheds containing Outstanding Arizona Waters may be allowed when long-term benefits to water quality, riparian areas, and aquatic resources would occur.

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		To protect water quality and aquatic species, heavy equipment and vehicles driven into a water body to accomplish work should be completely clean of petroleum residue. Water levels should be below the gear boxes of the equipment in use. Lubricants and fuels should be sealed such that inundation by water should not result in leaks. **GLs for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. Any action likely to cause a disturbance and take to bald and golden eagles in nesting and young rearing areas should be avoided per the Bald and Golden Eagle Protection Act. **ST for Dispersed Recreation:** Dispersed campsites shall not be designated in areas with sensitive soils or within 50 feet of streams, wetlands, or riparian areas to prevent vegetation and bank damage, soil compaction, additional sediment, or soil and water contamination. **ST for Motorized Opportunities:** Road maintenance and construction activities shall be designed to reduce sediment (e.g., water bars, sediment traps, grade dips) while first providing for user safety. **GL for Motorized Opportunities:** New roads, motorized trails, or designated motorized areas should be located to avoid meadows, wetlands, riparian areas, stream bottoms, sacred sites, and areas with high concentrations of significant archaeological sites. The number of stream crossings should be minimized or mitigated to reduce impacts to aquatic species. **GL for Non-motorized Opportunities:** New non-motorized routes should avoid meadows, wetlands, riparian areas, stream bottoms, sacred sites, and areas with high concentrations of significant archaeological sites. The number of stream crossings should be minimized or mitigated to reduce impacts to aquatic habitat. **GL for Livestock Grazing**: To minimize potential resource impacts from livestock, salt or nutritional supplements should not be placed within a quarter of a mile of any riparian area or water source. Salt or nutritional supplements should also be located to minimize herbivory impacts to aspen clones. **STs for Water Uses:** Special uses for water diversions shall maintain fish, wildlife, and aesthetic values and otherwise protect the environment. Streams on NFS lands with high aquatic values and at risk from new water diversions shall be preserved and protected with instream flow water rights.

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		Groundwater withdrawals shall not measurably diminish surface water flows on NFS lands without an appropriate surface water right.
Healthy riparian conditions (i.e., well vegetated and untrampled streambanks and floodplains) (all riparian PNVTs)	Arizona montane vole, water shrew, NM meadow jumping mouse, Southwestern willow flycatcher, peregrine falcon, Lincoln's sparrow (montane willow riparian forest), northern Mexican gartersnake, narrow-headed gartersnake, Blumer's dock, Arizona willow (montane willow riparian forest only), Bebbs willow, Apache trout, Gila chub, Gila trout, Little Colorado spinedace, roundtail chub, loach minnow, and spikedace	**DCs for Water Resources:** Water quality, stream channel stability, and aquatic habitats retain their inherent resilience to natural and other disturbances. Water resources maintain the capability to respond and adjust to disturbances without long-term adverse changes. Vegetation and soil conditions above the floodplain contribute to downstream water quality, quantity, and aquatic habitat. Instream flows provide for channel and floodplain maintenance, recharge of riparian aquifers, water quality, and minimal temperature fluctuations. Stream flows provide connectivity among fish populations and provide unobstructed routes critical for fulfilling needs of aquatic, riparian-dependent, and many upland species of plants and animals. Stream channels and floodplains are dynamic and resilient to disturbances. The water and sediment balance between streams and their watersheds allow a natural frequency of low and high flows. Flooding does not disrupt normal stream characteristics (e.g., water transport, sediment, woody material) or alter stream dimensions (e.g., bankfull width, depth, slope, sinuosity). Floodplains are functioning and lessen the impacts of floods on human safety, health, and welfare. **DCs for Aquatic Habitat and Species:** Streams and aquatic habitats support native fish and/or other aquatic species providing the quantity and quality of aquatic habitat within reference conditions. Federally listed species are trending towards recovery. Stream flows, habitat, and water quality support native aquatic and riparian dependent species and habitat. Habitat and ecological conditions are capable of providing for self-sustaining populations of native, riparian-dependent plant and animal species. Native fish, reptile, and amphibian populations are free from or minimally impacted by non-native plant and

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		animals. Aquatic species habitat conditions provide the resiliency and redundancy necessary to maintain species diversity and metapopulations. Desirable non-native fish species provide recreational fishing in waters where those opportunities are not in conflict with the recovery of native species. Wetlands are hydrologically functioning and have sufficient (composing 50 percent of the wetland) emergent vegetation and macroinvertebrate populations to support resident and migratory wetland-dependent species. **DCs for Riparian Areas:** Natural ecological processes (e.g., flooding, scouring) promote a diverse plant structure consisting of herbaceous, shrub, and tree species of all ages and size classes necessary for the recruitment of riparian-dependent species. Riparian-wetland conditions maintain water-related processes (e.g., hydrologic, hydraulic, geomorphic). They also maintain the physical and biological community characteristics, functions, and processes. Stream (lotic) riparian-wetland areas have vegetation, landform, or large coarse woody debris to dissipate stream energy associated with high water flow. Streams and their adjacent floodplains are capable of filtering, processing, and storing sediment; aiding floodplain development; improving flood-water retention; and increasing groundwater recharge. Vegetation and root masses stabilize streambanks, islands, and shoreline features against the cutting action of water. Ponding and channel characteristics provide habitat, water depth, water duration, and the temperatures necessary for maintaining populations of riparian-dependent species and for their dispersal. Lentic riparian areas (e.g., wet meadows, fens, bogs) have vegetation and landform present to dissipate wind action, wave action, and overland flow from uplands. Wetland riparian areas are capable of filtering sediment and aiding floodplain development that contribute to water retention and ground water recharge. The spatial extent of wetlands is maintained. Diversity and density of riparian forest vegetation provides for escape, hiding, and resting cover for wildlife

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		and provides travelways between other habitat areas and seasonal ranges. Sedimentation and soil compaction do not negatively impact riparian areas. Riparian vegetation consists mostly of native species that support a wide range of vertebrate and invertebrate species and are free of invasive plant and animal species. The ecological function of riparian areas is resilient to animal and human use. Floodplains and wet meadows provide sufficient herbaceous cover (55 percent or greater) and height (9 inches or longer) to trap sediment, mitigate flood energy, and provide wildlife habitat. Riparian areas that do not depend on geologic control features for stability have large coarse woody debris that provides key habitat for riparian-dependent species. Stream bottoms that are predominantly composed of sand and gravel have large coarse woody debris which provides habitat and food and helps dissipate hydraulic energy. Willows (e.g., Bebbs, Geyer, Arizona) are reproducing with all age classes present. **DCs for Water Uses:** Water developments contribute to fish, wildlife, and riparian habitat as well as scenic and aesthetic values. Apache-Sitgreaves NFs water rights are secure and contribute to livestock, recreation, wildlife, and administrative uses. **GLs for Aquatic Habitat and Species:** The needs of rare and unique species associated with wetlands, fens, bogs, and springs should be given priority consideration when developing these areas for waterfowl habitat and other uses. Sufficient water should be left in streams to provide for aquatic species and riparian vegetation. Projects and activities should avoid damming or impounding free-flowing waters to provide stream flows needed for aquatic and riparian-dependent species. **GLs for Riparian Areas:** Wet meadows and active floodplains with riparian-obligate species should provide sufficient herbaceous cover (55 percent or greater) and height (6 to 9 inches or longer) to trap sediment, mitigate flood energy, stabilize banks, and provide for wildlife and plant needs. Ground-disturbing projects (including planned ignition) which may degrade long-term riparian conditions,

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		should be avoided. Wet meadows and cienegas should not be used for concentrated activities (e.g., equipment storage, forest product or mineral stockpiling, livestock handling facilities, special uses) that cause damage to soil and vegetation. Active grazing allotments should be managed to maintain or improve to desired riparian conditions. **ST for Water Resources:** Consistent with existing water rights, water diversions or obstructions shall at all times allow sufficient water to pass downstream to preserve minimum levels of water flow which maintain aquatic life and other purposes of national forest establishment. **GLs for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. **ST for Motorized Opportunities:** Road maintenance and construction activities shall be designed to reduce sediment (e.g., water bars, sediment traps, grade dips) while first providing for user safety. **GLs for Motorized Opportunities:** New roads, motorized trails, or designated motorized areas should be located to avoid meadows, wetlands, riparian areas, stream bottoms, sacred sites, and areas with high concentrations of significant archaeological sites. The number of stream crossings should be minimized or mitigated to reduce impacts to aquatic species. As projects occur in riparian or wet meadow areas, unneeded roads or motorized trails should be closed or relocated, drainage restored, and native vegetation reestablished to move these areas towards their desired condition. Roads and motorized trails removed from the transportation network should be treated in order to avoid future risk to hydrologic function and aquatic habitat. **GLs for Non-motorized Opportunities:** New non-motorized routes should avoid meadows, wetlands, riparian areas, stream bottoms, sacred sites, and areas with high concentrations of significant archaeological sites. The number of stream crossings should be minimized or mitigated to reduce impacts to aquatic habitat. **GLs for Livestock Grazing**: Critical areas [e.g., riparian] should be managed to address the inherent or

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		unique site factors, condition, values, or potential conflicts. New livestock troughs, tanks, and holding facilities should be located out of riparian areas to prevent concentration of livestock in these areas. Existing facilities in riparian areas should be modified, relocated, or removed where their presence is determined to inhibit movement toward desired riparian or aquatic conditions. To minimize potential resource impacts from livestock, salt or nutritional supplements should not be placed within a quarter of a mile of any riparian area or water source. Salt or nutritional supplements should also be located to minimize herbivory impacts to aspen clones. To prevent resource damage, trailing of livestock should not occur along riparian areas. **GL for Minerals and Geology:** Streambed and floodplain alteration or removal of material should not occur if it prevents attainment of riparian, channel morphology, or streambank desired conditions. **GLs for Energy Corridor MA:** Trees and shrubs in riparian areas should only be removed when there is an imminent threat to facilities and, in these cases, trees should be left for large coarse woody debris recruitment to the stream and riparian system. When planning and implementing vegetation treatments (e.g., corridor maintenance), vegetation within riparian zones that provides rooting strength important for bank stability should be encouraged.
Large trees, snags, and/or dense canopies (mixed broadleaf deciduous, cotton-willow, and montane willow riparian forested PNVTs)	beaver, greater western mastiff bat, Allen's big-eared bat, Arizona gray squirrel, common black-hawk, evening grosbeak, yellow-billed cuckoo, bald eagle	**DCs for All PNVTs:** Old growth is dynamic in nature and occurs in well-distributed patches that spatially shift across forest and woodland landscapes over time. Old or large trees, multi-storied canopies, large coarse woody debris, and snags provide the structure, function and associated vegetation composition as appropriate for each forested and woodland PNVT. **DCs for Riparian Areas:** Beavers occupy capable stream reaches and help promote the function and stability of riparian areas. Vegetation is structurally diverse, often dense, providing for high bird species diversity and abundance, especially neotropical migratory birds. It includes large trees and snags in the cottonwood willow and mixed broadleaf deciduous riparian forests to support species such as beaver, yellow-billed cuckoo, bald eagles, Arizona gray squirrel, and various bat species. **GLs for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to

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		reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. Cool and/or dense vegetation cover should be provided for species needing these habitat components (e.g., Goodding's onion, black bear, White Mountains chipmunk). During treatments, snags should be retained in the largest diameter classes available as needed to meet wildlife or other resource needs. **GLs for Wildlife and Rare Plants: GL for Landscape Scale Disturbance Events:** An adequate number and size of snags and logs, appropriate for the affected PNVT, should be retained individually and in clumps to provide benefits for wildlife and coarse woody debris for soil and other resource benefits.
Permanent wet meadow-like areas (wetland-cienega riparian area PNVT including fens and bogs)	Ferris' copper butterfly, nitocris fritillary butterfly, nokomis fritillary butterfly, Apache trout, Gila chub, Gila trout, Little Colorado spinedace, roundtail chub, loach minnow, and spikedace	**GL for All PNVTs:** Restoration methods, such as thinning or burning, should leave a mosaic of undisturbed areas within the larger treated project area, especially within meadows, openings, and swales, to retain or allow recolonization of small mammals and insects (e.g., long-tailed voles, fritillary butterflies). **GLs for Aquatic Habitat and Species:** The needs of rare and unique species associated with wetlands, fens, bogs, and springs should be given priority consideration when developing these areas for waterfowl habitat and other uses. **GL for Motorized Opportunities:** As projects occur, existing meadow crossings should be relocated or redesigned, as needed, to maintain or restore hydrologic function using appropriate tools such as French drains and elevated culverts. **GL for Non-motorized Opportunities:** Meadow crossings should be designed or redesigned to maintain or restore hydrologic function using appropriate tools such as French drains and elevated culverts. **GL for Special Uses:** As applicable, issuance of special use authorizations should incorporate measures to reduce potential impacts to wildlife and avoid rare and unique habitats (e.g., bogs, fens).
Canyon slopes/cliffs, caves, rocky slopes (often in vicinity of riparian areas, often cool micro-climate)	Townsend's big-eared bat, spotted bat, greater western mastiff bat, Allen's big-eared bat, peregrine falcon,	**DCs for Minerals and Geology:** Caves and abandoned mines are available for roosting bats, reducing the potential for displacement, abandonment of young, and possible mortality. Sinkholes remain intact to support wildlife habitat, recreation opportunities, and unique vegetation. **GLs for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs,

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
(all PNVTs)	Eastwood alumroot, Arizona alumroot, Davidson's cliff carrot	consistent with project or activity objectives. Rare, unique habitats (e.g., talus slopes, cliffs, canyon slopes, caves, fens, bogs, sinkholes) should be protected. The needs of localized species (e.g., New Mexico meadow jumping mouse, Bebbs willow, White Mountains paintbrush) should be considered and provided for during project activities to ensure their limited or specialized habitats are not lost. **GL for Special Uses:** As applicable, issuance of special use authorizations should incorporate measures to reduce potential impacts to wildlife and avoid rare and unique habitats (e.g., bogs, fens).
Habitat connectivity (all PNVTs)	Mexican wolf, jaguar, mountain lion, bear, Apache trout, Gila chub, Gila trout, Little Colorado spinedace, roundtail chub, loach minnow, and spikedace	**DC for Wildlife and Rare Plants:** Habitat is well distributed and connected. **DC for Riparian Areas**: Diversity and density of riparian forest vegetation provides for escape, hiding, and resting cover for wildlife and provides travelways between other habitat areas and seasonal ranges. **GL for All PNVTs:** Landscape scale restoration projects should be designed to spread out treatments spatially and/or temporally to reduce implementation impacts and allow reestablishment of vegetation and soil cover. **GL for Aquatic Habitat and Species:** Sufficient water should be left in streams to provide for aquatic species and riparian vegetation. **GL for All Woodland PNVTs:** Hiding cover, approach cover (by waters), and travel corridor cover should be provided where needed by wildlife. **GL for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. **GLs for Overall Recreation Opportunities:** Developed and dispersed recreation sites and other authorized activities should not be located in places that prevent wildlife or livestock access to available water. Constructed features should be maintained to standard or removed when no longer needed. **GLs for Motorized Opportunities:** Roads and motorized trails should be designed and located so as to not impede terrestrial and aquatic species movement and connectivity.

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
		GL for Non-motorized Opportunities: New trails and trail relocations should be designed and located so as to not impede terrestrial and aquatic species movement and connectivity. **ST for Livestock Grazing:** New or reconstructed fencing shall allow for wildlife passage, except where specifically intended to exclude wildlife (e.g., elk fencing). **GLs for Wildlife Quite Area MA:** Fences surrounding and within WQAs should be inspected and improved to allow wildlife movement within and outside of the areas. Fences should be removed if no longer needed. Hiding cover and travelways for wildlife should be maintained to provide for security and connectivity of habitat. Restoration treatments should consider the needs of wildlife (e.g., calving/fawning areas, wallows, game crossings) to minimize potential impacts to the species and their habitat.
Collection or loss from management	nitocris fritillary butterfly, nokomis fritillary butterfly, yellow lady's slipper, hooded lady's tress, Apache trout, Gila chub, Gila trout, Little Colorado spinedace, roundtail chub, loach minnow, and spikedace	**DC for Wildlife and Rare Plants:** Collection of animals and plants does not negatively impact species abundance. **DC for Forest Products:** The collection of live plants, mushrooms, and other forest products does not impact species persistence on site. **DC for Recommended Research Natural Area MA:** Unique plant species, including willows, paintbrushes and gentians, thrive in the recommended Phelps Cabin RNA addition. **ST for Aquatic Habitat and Species**: When drafting (withdrawing) water from streams or other waterbodies, measures will be taken to prevent entrapment of fish and aquatic organisms and the spread of parasites or disease (e.g., Asian tapeworm, chytrid fungus, whirling disease). **GL for Aquatic Habitat and Species:** When new water diversions are created or existing water diversions are reanalyzed, measures should be taken to prevent entrapment of fish and aquatic organisms. **GL for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. **GL for Invasive Species:** Pesticide use should minimize impacts on non-target plants and animals. **ST for Forest Products**: Permits which authorize the collection of forest products shall include permit provisions to ensure the needs of wildlife, which depend upon those forest products, will continue to be

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
		met (e.g., cone and mushroom collection and the overwinter forage needs of squirrels). **GL for Forest Products**: Permits issued for forest products should include stipulations to protect resources. **ST for Special Uses:** Special use authorizations for the collection of live species with limited distribution (e.g., some invertebrates, plants) shall include permit provisions to ensure the species persist on site. **GL for Special Uses:** As applicable, issuance of special use authorizations should incorporate measures to reduce potential impacts to wildlife and avoid rare and unique habitats (e.g., bogs, fens). **GL for Energy Corridor MA:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. **GLs for Research Natural Area MA**: Management measures should be used (e.g., fencing) to protect unique features. To minimize impacts to unique and sensitive plant species, recreational activities, other than use on the designated trail, should not be encouraged. Research special use authorizations should limit impacts to sensitive resources, unique features, and species within the RNA. **GLs for Recommended Resarch Natural Area MA:** To minimize impacts to unique and sensitive plant and animal species, recreational activities should not be encouraged. If necessary, recommended RNAs should be fenced to manage unique features. Research special use authorizations should limit impacts to sensitive resources, unique features, and species within recommended RNAs. Recommended RNAs should be managed for non-motorized access within the area to minimize ground disturbances and protect the resources which make these areas unique.
Nest parasitism	Southwestern willow flycatcher, Grace's warbler	**GL for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. **ST for Invasive Species:** Projects and authorized activities shall be designed to reduce the potential for the

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
		introduction of new species or spread of existing invasive or undesirable aquatic or terrestrial non-native populations.
Disease	Townsend's big-eared bat, spotted bat, western red bat, Arizona toad, Chiricahua leopard frog, northern leopard frog, lowland leopard frog, Apache trout, Gila chub, Gila trout, Little Colorado spinedace, roundtail chub, loach minnow, and spikedace	**GL for Aquatic Habitat and Species:** To prevent degradation of native species habitat and the incidental or accidental introduction of diseases or non-native species, aquatic species should not be transferred through management activities from one 6th level HUC watershed to another. **GL for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. **GL for Livestock Grazing:** Efforts (e.g., temporary fencing, increased herding, herding dogs) should be made to prevent transfer of disease from domestic sheep and goats to bighorn sheep wherever bighorn sheep occur. Permit conversions to domestic sheep or goats should not be allowed in areas inhabited by bighorn sheep. **GL for Minerals and Geology:** To reduce disturbances from human activities and prevent the spread of disease, bat gates should be constructed and installed in cave and mine entrances used as shelter for bats within 3 years of discovery when there are no conflicts with cultural resources. Caves and abandoned mines that are used by bats should be managed to prevent disturbance to species and spread of disease (e.g., white-nose syndrome).
Entrapment	FPS that are small mammals, bats, young of other species, Apache trout, Gila chub, Gila trout, Little Colorado spinedace, roundtail chub, loach minnow, and spikedace	**GL for Aquatic Habitat and Species:** Sufficient water should be left in streams to provide for aquatic species and riparian vegetation. When new water diversions are created or existing water diversions are reanalyzed, measures should be taken to prevent entrapment of fish and aquatic organisms. **GL for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. **STs for Livestock Grazing:** New or reconstructed fencing shall allow for wildlife passage, except where

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
		specifically intended to exclude wildlife (e.g., elk fencing). New livestock watering facilities shall be designed to allow wildlife access and escape. **GL for Livestock Grazing:** During maintenance of existing watering facilities, escape ramps that are ineffective or missing should be replaced. **GLs for Special Uses:** Environmental disturbance should be minimized by co-locating pipelines, powerlines, fiber optic lines, and communications facilities. Power pole installation or replacement under special use authorization should include raptor protection devices in open habitat such as large meadows and grasslands. Raptor protection devices should be installed on existing poles where raptors have been killed. **GLs for Wildlife Quite Area MA:** Fences surrounding and within WQAs should be inspected and improved to allow wildlife movement within and outside of the areas. Fences should be removed if no longer needed.
Substantial predation or competition from invasive species	pronghorn antelope, Three Forks springsnail, Apache trout, Gila chub, Gila trout, Little Colorado spinedace, roundtail chub, loach minnow, and spikedace	**DC for Grasslands:** During the critical pronghorn fawning period (May through June), cool season grasses and forbs provide nutritional forage, while shrubs and standing grass growth from the previous year provide adequate hiding cover (10 to 18 inches) to protect fawns from predation. **ST for All PNVTs:** Vegetation treatments shall include measures to reduce the potential for the introduction of invasive plants and animals and damage from non-native insects and diseases. **GL for Aquatic Habitat and Species:** To prevent degradation of native species habitat and the incidental or accidental introduction of diseases or non-native species, aquatic species should not be transferred through management activities from one 6th level HUC watershed to another. **GL for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. **ST for Invasive Species:** Projects and authorized activities shall be designed to reduce the potential for the introduction of new species or spread of existing invasive or undesirable aquatic or terrestrial non-native populations. **GL for Invasive Species:** Projects and activities should not transfer water between drainages or between unconnected waterbodies within the same drainage to avoid spreading disease and aquatic invasive

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
		species. **ST for Special Uses:** Noxious plants and non-native invasive species monitoring and control shall be included in contracts, permits, and agreements. **GL for High Use Developed Recreation Area MA:** Management should focus on operation and maintenance, safety, aesthetics, and control of noxious weeds and non-native invasive species. **GL for Energy Corridor MA:** Invasive plant species should be aggressively controlled within energy corridors to prevent or minimize spread.
Intentional harassment, forced removal, or avoidable disturbance	Mexican wolf, Gunnison's prairie dog, black bear, many FPS (at least during important life cycle periods)	**DC for Wildlife and Rare Plants:** Wildlife are free from harassment and from disturbance at a scale that impacts vital functions (e.g., breeding, rearing young) that could affect persistence of the species. **DC for Minerals and Geology:** Archaeological, geological, and biological features of caves and abandoned mines are not adversely affected by visitors. **DC for Recommended Research Natural Area:** The Three Forks Closure Area (30 acres) of the recommended Three Forks RNA is free from human trampling and other disturbances to protect very sensitive and unique species, such as the Three Forks springsnail, California floater, New Mexico meadow jumping mouse, Chiricahua leopard frog, and loach minnow. **GL for All Forested PNVTs:** Hiding cover, approach cover (by waters), and travel corridor cover should be provided where needed by wildlife. **GL for All Woodland PNVTs:** Hiding cover, approach cover (by waters), and travel corridor cover should be provided where needed by wildlife. **GLs for Wildlife and Rare Plants:** Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives. Cool and/or dense vegetation cover should be provided for species needing these habitat components (e.g., Goodding's onion, black bear, White Mountains chipmunk). Spike camps (i.e., a remote camp usually near a fireline) should be located to avoid disturbance to critical species. **GLs for Overall Recreation Opportunities:** Developed and dispersed recreation sites and other authorized

PNVT, Habitat Element, or Other Factors of Concern	Associated Forest Planning Species (FPS)	Plan Decisions That Address Risks to Species Viability
		activities should not be located in places that prevent wildlife or livestock access to available water Food and other items that attract wildlife should be managed to prevent reliance on humans and to reduce human-wildlife conflicts. **GLs for Dispersed Recreation:** Timing restrictions on recreation uses should be considered to reduce conflicts with wildlife needs or soil moisture conditions. Dispersed campsites should not be located on or adjacent to archaeological sites or sensitive wildlife areas. **ST for Developed Recreation:** Where trash facilities are provided, they shall be bear-resistant. **GLs for Special Uses:** Large group and recreation event special uses should not be authorized within wilderness, recommended wilderness, primitive area, wildlife quiet areas, eligible "wild" river corridors, Phelps Cabin Botanical Area, Phelps Cabin Research Natural Area (RNA), or recommended RNAs to protect the unique character of these areas. The use of below-ground utilities should be favored to avoid potential conflicts with resources (e.g., scenic integrity, wildlife, wildfire, heritage). **GLs for Minerals and Geology:** To reduce disturbances from human activities and prevent the spread of disease, bat gates should be constructed and installed in cave and mine entrances used as shelter for bats within 3 years of discovery when there are no conflicts with cultural resources. Caves and abandoned mines that are used by bats should be managed to prevent disturbance to species and spread of disease (e.g., white-nose syndrome). **GLs for Wildlife Quiet Area MA:** All WQAs should be managed to preclude snowmobile use to minimize disturbance during the critical winter period. WQA boundaries should be signed to identify the areas and educate the public about their purpose. **GLs for Research Natural Area MA**: Research special use authorizations should limit impacts to sensitive resources, unique features, and species within the RNA. **GLs for Recommended Resarch Natural Area MA:** Research special use authorizations should limit impacts to sensitive resources, unique features, and species within recommended RNAs.

Appendix F.

ASNFs LMP Decisions: Desired Conditions, Objectives, Standards and Guidelines – May 30, 2014

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Overall Ecosystem Health	Landscape	DC 1	Ecological components (e.g., soil, vegetation, water) are resilient to disturbances including human activities, and natural ecological disturbances (e.g., climate variability, fire, drought, wind, insects, disease, pathogens).
Overall Ecosystem Health	Landscape	DC 2	Natural ecological disturbances return to their characteristic roles within the ecosystem. Fire, in particular, is restored to a more natural function.
Overall Ecosystem Health	Landscape	DC 3	Natural ecological cycles (i.e., hydrologic, energy, nutrient) facilitate shifting of plant communities, structure, and ages across the landscape. Ecotone shifts are influenced at both the landscape and watershed scale by ecological processes. The mosaic of plant communities and the variety within the communities are resilient to disturbances.
Overall Ecosystem Health	Landscape	DC 4	Ecological conditions for habitat quality, distribution, and abundance contribute to self-sustaining populations of native and desirable nonnative plants and animals that are healthy, well distributed, connected, and genetically diverse. Conditions provide for the life history, distribution, and natural population fluctuations of the species within the capability of the landscape.
Overall Ecosystem Health	Landscape	DC 5	Large blocks of habitat are interconnected, allowing for behavioral and predator-prey interactions, and the persistence of metapopulations and highly interactive wildlife species across the landscape. Ecological connectivity extends through all plant communities.
Overall Ecosystem Health	Landscape	DC 6	Habitat configuration and availability allows wildlife populations to adjust their movements (e.g., seasonal migration, foraging) in response to climate change and promote genetic flow between wildlife populations.
Overall Ecosystem Health	Landscape	DC 7	Habitat quality, distribution, and abundance exist to support the recovery of federally listed species and the continued existence of all native and desirable nonnative species.
Overall Ecosystem Health	Landscape	DC 8	Healthy ecosystems provide a wide range of ecosystem services.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Overall Ecosystem Health	Landscape	DC 9	Watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.
Overall Ecosystem Health	--	OBJ 1	During the planning period, improve the condition class on at least 10 priority 6th level HUC watersheds by removing or mitigating degrading factors [2].
Air	Landscape	DC 10	Air quality related values, including high quality visual conditions, are maintained within the Class I airshed over Mount Baldy Wilderness.
Air	Landscape	DC 11	Class II airsheds meet State of Arizona air quality standards including those for visibility and public health.
Air	--	GL 1	During extended periods of burning, smoke should be monitored, in cooperation with the Arizona Department of Environmental Quality, for levels that may have impacts to human health from fine particulates.
Soil	Landscape	DC 12	Ecological and hydrologic functions are not impaired by soil compaction.
Soil	Mid-Scale	DC 13	Soil condition rating is satisfactory [4].
Soil	Mid-Scale	DC 14	Soils are stable within their natural capability. Vegetation and litter limit accelerated erosion (e.g., rills, gullies, root exposure, topsoil loss) and contribute to soil deposition and development.
Soil	Mid-Scale	DC 15	Soils provide for diverse native plant species [5]. Vegetative ground cover (herbaceous vegetation and litter) is distributed evenly across the soil surface to promote nutrient cycling, water infiltration, and to maintain natural fire regimes.
Soil	Mid-Scale	DC 16	Biological soil crusts (e.g., mosses, lichens, algae, liverworts) are present and reestablished if potential exists.
Soil	Fine Scale	DC 17	Soil loss rates do not exceed tolerance soil loss rates [6].
Soil	Fine Scale	DC 18	Logs and other woody material are distributed across the surface to maintain soil productivity [7].
Soil	Fine Scale	DC 19	Vegetation and litter is sufficient to maintain and improve water infiltration, nutrient cycling, and soil stability.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Soil	--	OBJ 2	Annually, enhance or restore an average of 350 acres within priority 6th level HUC watersheds, including treating the causes of State and federally designated impaired or threatened water to improve watershed condition and water quality.
Soil	--	OBJ 3	During the planning period, update the Terrestrial Ecosystem Survey to reflect current conditions and concepts.
Soil	--	GL 2	Projects with ground-disturbing activities should be designed to minimize long and short term impacts to soil resources. Where disturbance cannot be avoided, project specific soil and water conservation practices should be developed.
Soil	--	GL 3	Severely disturbed sites should be revegetated with native plant species when loss of long term soil productivity is predicted.
Soil	--	GL 4	Locally collected seed should be used where available and cost effective. Seeds should be tested to ensure they are free from noxious weeds and invasive nonnative plants at a State certified seed testing laboratory before acceptance and mixing.
Soil	--	GL 5	Coarse woody debris retention and/or creation should be used as needed to help retain long term soil productivity.
Water Resources	4th and 5th HUC Watershed Scale	DC 20	Water quality, stream channel stability, and aquatic habitats retain their inherent resilience to natural and other disturbances.
Water Resources	4th and 5th HUC Watershed Scale	DC 21	Water resources maintain the capability to respond and adjust to disturbances without long term adverse changes.
Water Resources	4th and 5th HUC Watershed Scale	DC 22	Vegetation and soil conditions above the floodplain protect downstream water quality, quantity, and aquatic habitat.
Water Resources	6th HUC Watershed	DC 23	Instream flows provide for channel and floodplain maintenance, recharge of riparian aquifers, water quality, and minimal temperature fluctuations.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
	Scale		
Water Resources	6th HUC Watershed Scale	DC 24	Streamflows provide connectivity among fish populations and provide unobstructed routes critical for fulfilling needs of aquatic, riparian dependent, and many upland species of plants and animals.
Water Resources	6th HUC Watershed Scale	DC 25	Water quantity meets the needs for forest administration and authorized activities (e.g., livestock grazing, recreation, firefighting, domestic use, road maintenance).
Water Resources	6th HUC Watershed Scale	DC 26	Stream channels and floodplains are dynamic and resilient to disturbances. The water and sediment balance between streams and their watersheds allow a natural frequency of low and high flows.
Water Resources	6th HUC Watershed Scale	DC 27	Stream condition is sufficient to withstand floods without disrupting normal stream characteristics (e.g., water transport, sediment, woody material) or altering stream dimensions (e.g., bankfull width, depth, slope, sinuosity).
Water Resources	6th HUC Watershed Scale	DC 28	Floodplains are functioning and lessen the impacts of floods on human safety, health, and welfare.
Water Resources	6th HUC Watershed Scale	DC 29	Water quality meets or exceeds Arizona State standards or Environmental Protection Agency water quality standards for designated uses.
Water Resources	6th HUC Watershed Scale	DC 30	Water quality meets the needs of desirable aquatic species such as the California floater, northern and Chiricahua leopard frog, and invertebrates that support fish populations.
Water Resources	--	ST 1	Consistent with existing water rights, water diversions or obstructions shall at all times allow sufficient water to pass downstream to preserve minimum levels of waterflow that maintain aquatic life and other purposes of national forest establishment.
Water Resources	--	GL 6	Projects with ground-disturbing activities should be designed to minimize long and short term impacts to water resources. Where disturbance cannot be avoided, project specific soil and water conservation practices and BMPs should

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
			be developed.
Water Resources	--	GL 7	Streams, streambanks, shorelines, lakes, wetlands, and other bodies of water should be protected from detrimental changes [11] in water temperature and sediment to protect aquatic species and riparian habitat.
Water Resources	--	GL 8	Streamside management zones should be in place between streams and disturbed areas and/or road locations to maintain water quality and suitable stream temperatures for aquatic species.
Water Resources	--	GL 9	As State of Arizona water rights permits (e.g., water impoundments, diversions) are issued, the base level of instream flow should be retained by the Apache-Sitgreaves NFs.
Water Resources	--	GL 10	Constraints (e.g., maximum limit to which water level can be drawn down or minimum distance from a connected river, stream, wetland, or groundwater-dependent ecosystem) should be established for new groundwater pumping sites permitted on NFS lands in order to protect the character and function of water resources.
Water Resources	--	GL 11	Short term impacts in watersheds containing Outstanding Arizona Waters may be allowed when long term benefits to water quality, riparian areas, and aquatic resources would occur.
Water Resources	--	GL 12	Treated wastewater may be used to provide wetland habitats.
Water Resources	--	GL 13	To protect water quality and aquatic species, heavy equipment and vehicles driven into a water body to accomplish work should be completely clean of petroleum residue. Water levels should be below the gear boxes of the equipment in use. Lubricants and fuels should be sealed such that inundation by water should not result in leaks.
Aquatic Habitat and Species	4th and 5th HUC Watershed Scale	DC 31	Streams and aquatic habitats support native fish and/or other aquatic species providing the quantity and quality of aquatic habitat within reference conditions [12].
Aquatic Habitat and Species	4th and 5th HUC Watershed	DC 32	Habitat conditions contribute to the recovery of federally listed species.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
	Scale		
Aquatic Habitat and Species	4th and 5th HUC Watershed Scale	DC 33	Streamflows, habitat, and water quality support native aquatic and riparian-dependent species and habitat.
Aquatic Habitat and Species	6th HUC Watershed Scale	DC 34	Habitat and ecological conditions are capable of providing for self-sustaining populations of native, riparian dependent plant and animal species.
Aquatic Habitat and Species	6th HUC Watershed Scale	DC 35	Native fish, reptile, amphibian, and invertebrate populations are free from or minimally impacted by nonnative plants and animals.
Aquatic Habitat and Species	6th HUC Watershed Scale	DC 36	Aquatic species habitat conditions provide the resiliency and redundancy necessary to maintain species diversity and metapopulations.
Aquatic Habitat and Species	6th HUC Watershed Scale	DC 37	Desirable nonnative fish species provide recreational fishing in waters where those opportunities are not in conflict with the recovery of native species.
Aquatic Habitat and Species	6th HUC Watershed Scale	DC 38	Wetlands are hydrologically functioning and have sufficient (composing 50 percent of the wetland) emergent vegetation and macroinvertebrate populations to support resident and migratory wetland dependent species.
Aquatic Habitat and Species	--	OBJ 4	Annually, enhance or restore 5 to 15 miles of stream and riparian habitat to restore structure, composition, and function of physical habitat for native fisheries and riparian-dependent species.
Aquatic Habitat	--	OBJ 5	During the planning period, complete at least five projects (e.g., remove barriers, restore dewatered stream segments, or connect fragmented habitat) to provide

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
and Species			for aquatic and riparian associated species and migratory species.
Aquatic Habitat and Species	--	ST 2	When drafting (withdrawing) water from streams or other water bodies, measures will be taken to prevent entrapment of fish and aquatic organisms and the spread of parasites or disease (e.g., Asian tapeworm, chytrid fungus, whirling disease).
Aquatic Habitat and Species	--	GL 14	Management and activities should not contribute to a trend toward the Federal listing of a species.
Aquatic Habitat and Species	--	GL 15	Activities occurring within federally listed species habitat should apply habitat management direction and species protection measures from recovery plans.
Aquatic Habitat and Species	--	GL 16	PLACEHOLDER
Aquatic Habitat and Species	--	GL 17	To prevent degradation of native species habitat and the incidental or accidental introduction of diseases or nonnative species, aquatic species should not be transferred through management activities from one 6th level HUC watershed to another.
Aquatic Habitat and Species	--	GL 18	Sufficient water should be left in streams to provide for aquatic species and riparian vegetation.
Aquatic Habitat and Species	--	GL 19	Projects and activities should avoid damming or impounding free-flowing waters to provide streamflows needed for aquatic and riparian-dependent species.
Aquatic Habitat and Species	--	GL 20	The needs of rare and unique species associated with wetlands, fens, bogs, and springs should be given priority consideration when developing these areas for waterfowl habitat and other uses.
Aquatic Habitat and Species	--	GL 21	When new water diversions are created or existing water diversions are reanalyzed, measures should be taken to prevent entrapment of fish and aquatic organisms.
All PNVTs	Landscape	DC 39	Each PNVT contains a mosaic of vegetative conditions, densities, and structures. This mosaic occurs at a variety of scales across landscapes and watersheds. The distribution of physical and biological conditions is appropriate to the natural disturbance regimes affecting the area.
All PNVTs	Landscape	DC 40	The vegetative conditions and functions are resilient to the frequency, extent, and severity of ecological disturbances (e.g., fire, insects and disease, flood, climate variability). The landscape is a functioning ecosystem that contains all its components, processes, and better able to cope with climate change.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
All PNVTs	Landscape	DC 41	Natural processes and human and natural disturbances (e.g., wildland fire, mechanical vegetation treatments) provide desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling. Natural fire regimes are restored. Uncharacteristic fire behavior is minimal or absent on the landscape.
All PNVTs	Landscape	DC 42	Wildfire maintains and enhances resources and, as nearly as possible, is allowed to function in its natural ecological role.
All PNVTs	Landscape	DC 43	Native plant communities dominate the landscape.
All PNVTs	Landscape	DC 44	The range of species genetic diversity remains within native vegetation and animal populations, thus enabling species to adapt to changing environmental and climatic conditions.
All PNVTs	Landscape	DC 45	Vegetative connectivity provides for species dispersal, genetic exchange, and daily and seasonal movements across multiple spatial scales.
All PNVTs	Landscape	DC 46	Vegetation characteristics (e.g., density, litter) provide favorable conditions for waterflow and quality.
All PNVTs	Landscape	DC 47	Organic soil cover and herbaceous vegetation protect soil, facilitate moisture infiltration, and contribute to plant and animal diversity and ecosystem function.
All PNVTs	Landscape	DC 48	Diverse vegetation structure, species composition, densities, and seral states 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 late seral states and old growth forests.
All PNVTs	Landscape	DC 49	Old growth is dynamic in nature and occurs in well-distributed patches that spatially shift across forest and woodland landscapes over time.
All PNVTs	Landscape	DC 50	Old or large trees, multistoried canopies, large coarse woody debris, and snags provide the structure, function, and associated vegetation composition as appropriate for each forested and woodland PNVTs.
All PNVTs	Landscape	DC 51	Vegetation conditions allow for transition zones or ecotones between riparian areas, forests, woodlands, shrublands, and grasslands. Transition zones may shift in time and space due to changing site conditions from disturbances (e.g., fire, climate variability).

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
All PNVTs	Landscape	DC 52	Insect and disease populations are at endemic levels with occasional outbreaks. A variety of seral states usually restricts the scale of localized insect and disease outbreaks.
All PNVTs	Landscape	DC 53	Disjunct populations of Chihuahua pine, Arizona cypress, and Rocky Mountain maple are present with the ability to reproduce on capable sites.
All PNVTs	Landscape	DC 54	Herbivory is in balance with available forage (i.e., grazing and browsing by authorized livestock, wild horses, and wildlife do not exceed available forage production within established use levels).
All PNVTs	Landscape	DC 55	Shrub components contain a diverse array of native vegetation that is well distributed across the landscape to provide nutritional needs for browsers.
All PNVTs	Landscape	DC 56	Vegetation provides products—such as wood fiber or forage—to help meet local and regional needs in a manner that is consistent with other desired conditions on a sustainable basis within the capacity of the land.
All PNVTs	Landscape	DC 57	Ecosystem services are available as forests, woodlands, grasslands, and riparian communities successfully adapt to a changing and variable climate.
All PNVTs	Mid-Scale	DC 58	Stand densities and species compositions are such that vegetation conditions are resilient under a variety of potential future climates.
All PNVTs	Mid-Scale	DC 59	Vegetation conditions provide hiding and thermal cover in contiguous blocks for wildlife. Native plant species are present in all age classes and are healthy, reproducing, and persisting.
All PNVTs	Mid-Scale	DC 60	Vegetative ground cover (herbaceous vegetation and litter cover) is optimized [15] to protect and enrich soils and promote water infiltration. There is a diverse mix of cool and warm season grasses and desirable forbs species.
All PNVTs	Mid-Scale	DC 61	Grasses, forbs, shrubs, and litter are abundant and continuous to support natural fire regimes.
All PNVTs	Mid-Scale	DC 62	The composition, density, structure, and mosaic of vegetative conditions reduce uncharacteristic wildfire hazard to local communities and forest ecosystems.
All PNVTs	Fine Scale	DC 63	Rare or unique plant communities (e.g., agaves, Chihuahuan pine) are intact and persisting.
All PNVTs	Fine Scale	DC 64	Herbaceous vegetation amount and structure (e.g., plant density, height, litter, seed heads) provides habitat to support wildlife and prey species.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
All PNVTs	Fine Scale	DC 65	Some isolated infestations of mistletoe provide for a diversity of habitat components (e.g., food, nesting, cover) for a variety of species such as owls, squirrels, and some birds and insects.
All PNVTs	--	ST 3	Within each PNVT, vegetation management activities shall be designed to maintain or move plant composition towards a moderate to high plant community similarity as compared to site potential.
All PNVTs	--	ST 4	Vegetation treatments shall include measures to reduce the potential for introduction of invasive plants and animals and damage from nonnative insects and diseases.
All PNVTs	--	GL 22	During project design and implementation, precautions should be taken to reduce the potential for damage to residual vegetation in order to prevent premature or excessive mortality.
All PNVTs	--	GL 23	Landscape scale restoration projects should be designed to spread treatments out spatially and/or temporally within the project area to reduce implementation impacts and allow reestablishment of vegetation and soil cover.
All PNVTs	--	GL 24	Restoration methods, such as thinning or prescribed fire, should leave a mosaic of untreated areas within the larger treated project area to allow recolonization of treated areas by plants, small mammals and insects (e.g., long-tailed voles, fritillary butterflies).
All PNVTs	--	GL 25	Wildfire may be used to meet desired resource conditions, maintain or promote desired vegetation species, and enable natural fires to return to their historic role.
All PNVTs	--	GL 26	Insect and disease infected trees should be removed to prevent spread beyond endemic levels.
All PNVTs	--	GL 27	Green slash and decked logs should be managed, in a timely manner, to make them unfavorable bark beetle habitat.
All PNVTs	--	GL 28	Project implementation should include bark beetle monitoring within and adjacent to all active slash-creating projects to help prevent beetle outbreak.
All PNVTs	--	GL 29	Project plans should include quantitative and/or qualitative objectives for implementation monitoring and effectiveness monitoring to assist in moving toward or maintaining desired conditions.
Riparian Areas	Landscape	DC 66	Natural ecological disturbances (e.g., flooding, scouring) promote a diverse plant structure consisting of herbaceous, shrub, and tree species of all ages and size

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
			classes necessary for the recruitment of riparian-dependent species.
Riparian Areas	Landscape	DC 67	Riparian-wetland conditions maintain water-related processes (e.g., hydrologic, hydraulic, geomorphic). They also maintain the physical and biological community characteristics, functions, and processes.
Riparian Areas	Mid-Scale	DC 68	Stream (lotic) riparian-wetland areas have vegetation, landform, and/or large coarse woody debris to dissipate stream energy associated with high waterflow.
Riparian Areas	Mid-Scale	DC 69	Streams and their adjacent floodplains are capable of filtering, processing, and storing sediment; aiding floodplain development; improving floodwater retention; and increasing groundwater recharge.
Riparian Areas	Mid-Scale	DC 70	Vegetation and root masses stabilize streambanks, islands, and shoreline features against the cutting action of water.
Riparian Areas	Mid-Scale	DC 71	Ponding and channel characteristics provide habitat, water depth, water duration, and the temperatures necessary for maintaining populations of riparian-dependent species and for their dispersal.
Riparian Areas	Mid-Scale	DC 72	Beavers occupy capable stream reaches and help promote the function and stability of riparian areas.
Riparian Areas	Mid-Scale	DC 73	Lentic riparian areas (e.g., wet meadows, fens, bogs) have vegetation and landform present to dissipate wind action, wave action, and overland flow from uplands.
Riparian Areas	Mid-Scale	DC 74	Wetland riparian areas are capable of filtering sediment and aiding floodplain development that contribute to water retention and groundwater recharge.
Riparian Areas	Mid-Scale	DC 75	Willows (e.g., Bebb, Geyer, Arizona, Goodding's) are reproducing with all age classes present, where the potential exists.
Riparian Areas	Mid-Scale	DC 76	The spatial extent of wetlands is maintained [20].
Riparian Areas	Mid-Scale	DC 77	Soil compaction from forest activities (e.g., vehicle use, recreation, livestock grazing) does not negatively impact riparian areas.
Riparian Areas	Mid-Scale	DC 78	Riparian vegetation consists mostly of native species that support a wide range of vertebrate and invertebrate species and are free of invasive plant and animal species.
Riparian Areas	Mid-	DC 79	Diversity and density of riparian forest vegetation provides for breeding, escape, hiding, and resting cover for wildlife and provides travelways between other

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
	Scale		habitat areas and seasonal ranges.
Riparian Areas	Fine Scale	DC 80	The ecological function of riparian areas is resilient to animal and human use.
Riparian Areas	Fine Scale	DC 81	Riparian obligate species within wet meadows, along streambanks, and active floodplains provide sufficient [15] vegetative ground cover (herbaceous vegetation and litter cover) to protect and enrich soils, trap sediment, mitigate flood energy, stabilize streambanks, and provide for wildlife and plant needs.
Riparian Areas	Fine Scale	DC 82	Riparian soil productivity is optimized as described by the specific TES map unit[15] as indicated by the vigor of the herbaceous vegetation community. Based on species composition, ungrazed plant heights [21] range from 10 inches to 36 inches.
Riparian Areas	Fine Scale	DC 83	Floodplains and adjacent upland areas provide diverse habitat components (e.g., vegetation, debris, logs) as necessary for migration, hibernation, and brumation (extended inactivity) specific to the needs of riparian-obligate species (e.g., New Mexico meadow jumping mouse, Arizona montane vole, narrow-headed gartersnake).
Riparian Areas	Fine Scale	DC 84	Large coarse woody debris provides stability to riparian areas and stream bottoms lacking geologic control (e.g., bedrock) or geomorphic features (e.g., functioning floodplains, stream sinuosity, width/depth ratio).
Riparian Areas	Fine Scale	DC 85	Vegetation is structurally diverse, often dense, providing for high bird species diversity and abundance, especially neotropical migratory birds. It includes large trees and snags in the cottonwood-willow and mixed broadleaf deciduous riparian forests to support species such as beaver, yellow-billed cuckoo, bald eagles, Arizona gray squirrel, and various bat species.
Riparian Areas	--	OBJ 6	Annually, move 200 to 500 acres toward desired composition, structure, and function of streams, floodplains, and riparian vegetation.
Riparian Areas	--	OBJ 7	Within the planning period, relocate, repair, improve, or decommission a minimum of 4 miles of National Forest System roads or trails that add sediment to streams, damage riparian vegetation, erode streambanks, cause gullies, and/or compact floodplain soils.
Riparian Areas	--	OBJ 8	Annually, remove an average of 2 miles of unauthorized roads or trails that add sediment to streams, damage riparian vegetation, erode streambanks, cause gullies, and/or compact floodplain soils.
Riparian Areas	--	OBJ 9	Within the planning period, enhance or restore 5 to 25 wet meadows or cienegas

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			to proper hydrologic function and native plant and animal species composition.
Riparian Areas	--	OBJ 10	Annually, work with partners to reduce animal damage to native willows and other riparian species on an average of 5 miles of riparian habitat.
Riparian Areas	--	GL 30	Ground-disturbing projects (including prescribed fire) which may degrade long term riparian conditions should be avoided.
Riparian Areas	--	GL 31	Wet meadows and cienegas should not be used for concentrated activities (e.g., equipment storage, forest product or mineral stockpiling, livestock handling facilities, special uses) that cause damage to soil and vegetation.
Riparian Areas	--	GL 32	Active grazing allotments should be managed to maintain or improve to desired riparian conditions.
Riparian Areas	--	GL 33	Storage of fuels and other toxicants should be located outside of riparian areas to prevent spills that could impair water quality or harm aquatic species.
Riparian Areas	--	GL 34	Equipment should be fueled or serviced outside of riparian areas to prevent spills that could impair water quality or harm aquatic species.
Riparian Areas	--	GL 35	Construction or maintenance equipment service areas should be located and treated to prevent gas, oil, or other contaminants from washing or leaching into streams.
All Forested PNVTs	--	OBJ 11	Annually, treat 5,000 to 35,000 acres to reduce tree densities, restore natural fire regimes, promote species habitat and ecosystem health, reduce fire hazard, maintain desired conditions, initiate recovery from uncharacteristic disturbance, and provide forest products, leaving a desired mix of species with the range of desired densities that are resilient to changing climatic conditions.
All Forested PNVTs	--	ST 5	Regulated timber harvest activities shall occur only on those lands classified as suitable for timber production.
All Forested PNVTs	--	ST 6	If individual harvest openings created by even-aged silvicultural practices are proposed that would exceed 40 acres, then National Forest Management Act (NFMA) requirements regarding public notification and regional forester approval shall be followed. These requirements do not apply to the size of areas harvested because of natural catastrophic conditions such as, but not limited to, fire, insect and disease attacks, or windstorms.
All Forested PNVTs	--	ST 7	On lands suitable for timber production, timber harvest activities shall only be used when there is reasonable assurance of restocking within 5 years after final regeneration harvest. This also applies where wildland fire is used to create openings for tree regeneration purposes on suitable timber lands. Restocking

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
			level is prescribed in a site specific silvicultural 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 or prescribed burned to create openings for firebreaks and vistas or to prevent encroaching trees, it is appropriate not to restock.
All Forested PNVTs	--	ST 8	On lands suitable for timber production, even-aged stands shall have reached or surpassed culmination of mean annual increment (95 percent of culmination of mean annual increment of growth, as measured by cubic volume) prior to regeneration harvest, unless the following conditions have been identified during project development: (1) when such harvesting would assist in reducing fire hazard within the wildland-urban interface, or (2) when harvesting of stands will trend landscapes toward vegetation desired conditions (e.g., uneven-aged structure).
All Forested PNVTs	--	ST 9	Harvesting systems shall be selected based on their ability to meet desired conditions and not strictly on their ability to provide the greatest dollar return.
All Forested PNVTs	--	ST 10	Clearcutting shall be used only where it is the optimum method for meeting desired conditions.
All Forested PNVTs	--	GL 36	Where current forests are lacking proportional representation of late seral states and species composition on a landscape scale, old growth characteristics should be retained or encouraged to the greatest extent possible within the scope of meeting other desired conditions (e.g., reduce impacts from insects and disease, reduce the threat of uncharacteristic wildfire).
All Forested PNVTs	--	GL 37	Healthy southwestern white pine should be retained to maintain the wide range of genetic variability that contributes to resistance against the nonnative white pine blister rust disease.
All Forested PNVTs	--	GL 38	Tree species that are less susceptible to root disease should be retained within areas of root disease infection to reduce spread of disease.
All Forested PNVTs	--	GL 39	On single species dominated sites, uneven-aged management may be used where less than 20 percent of the host tree species—or less than 25 percent of the area—is infected by dwarf mistletoe. Thinning and under-burning may be used to keep dwarf mistletoe levels from increasing. Even-aged management or deferral should be considered when greater than 20 percent of the host species, or 25 percent of the area, is infected with dwarf mistletoe.
All Forested PNVTs	--	GL 40	On single species dominated sites, thinning should not be attempted where more than 80 percent of the host species—or 90 percent of the area—is infected with dwarf mistletoe. Regeneration and/or deferral may be used in these cases. However, in the Community-Forest Intermix Management Area additional

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
			treatment options may be used.
All Forested PNVTs	--	GL 41	On mixed species dominated sites, even-aged management or deferral should be used instead of uneven-aged management where more than 50 percent of conifer trees (excluding white fir) are infected by dwarf mistletoe.
All Forested PNVTs	--	GL 42	When thinning dwarf mistletoe infected sites, as much mistletoe should be removed as possible without sacrificing the healthiest, most desirable trees for the particular site (in some situations, this may involve retaining some trees in the upper canopy that are lightly infected to meet multiple resource objectives).
All Forested PNVTs	--	GL 43	Where a seed cut treatment (even-aged method to promote natural seedling establishment) is applied for dwarf mistletoe control, it should be followed within 10 years of seedling establishment by a final removal treatment or other effective means to prevent further infection.
All Forested PNVTs	--	GL 44	Where a site specific analysis indicates the need to reduce fire-kill of desired residual trees, fuel continuity and/or loading should be reduced before use of prescribed fire.
All Forested PNVTs	--	GL 45	Trees, snags, and logs immediately adjacent to active red squirrel cone caches, Abert's squirrel nests, and raptor nests should be retained to maintain needed habitat components and provide tree groupings.
All Forested PNVTs	--	GL 46	Hiding cover, approach cover (by waters), and travel corridor cover should be provided where needed by wildlife.
Ponderosa Pine	Landscape	DC 86	The ponderosa pine forest is a mosaic of structural states ranging from young to old trees. Forest structure is variable but uneven-aged and open in appearance. Sporadic areas of even-aged structure may be present on 10 percent or less of the landscape to provide structural diversity.
Ponderosa Pine	Landscape	DC 87	The forest arrangement consists of individual trees, small clumps, and groups of trees interspersed within variably-sized openings of grasses, forbs, and shrubs. Vegetation associations are similar to reference conditions. The size, shape, and number of trees per group and the number of groups per area vary across the landscape. Tree density may be greater in some locations, such as north-facing slopes and canyon bottoms.
Ponderosa Pine	Landscape	DC 88	The ponderosa pine forest is composed predominantly of vigorous trees, but declining, top-killed, lightning-scarred, and fire-scarred trees provide snags and coarse woody debris. Snags and coarse woody debris are well distributed throughout the landscape. Ponderosa pine snags are typically 18 inches or greater in diameter and average 1 to 2 per acre.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Ponderosa Pine	Landscape	DC 89	Coarse woody debris, including logs, ranges from 3 to 10 tons per acre. Logs average 3 per acre within the forested area of the landscape.
Ponderosa Pine	Landscape	DC 90	Where it naturally occurs, Gambel oak is present with all age classes represented. It is reproducing to maintain or expand its presence on capable sites across the landscape. Large Gambel oak snags are typically 10 inches or larger in diameter and are well distributed.
Ponderosa Pine	Landscape	DC 91	Grasses, forbs, shrubs, needles, leaves, and small trees support the natural fire regime. The larger proportion (60 percent or greater) of soil cover is composed of grasses and forbs as opposed to needles and leaves.
Ponderosa Pine	Landscape	DC 92	Old growth occurs throughout the landscape, in small, discontinuous areas consisting of clumps of old trees, or occasionally individual old trees. Other old growth components are also present including dead trees (snags), downed wood (coarse woody debris), and/or structural diversity. The location of old growth shifts on the landscape over time as a result of succession and disturbance (tree growth and mortality).
Ponderosa Pine	Landscape	DC 93	Frequent, low to mixed severity fires (fire regime I), occurring approximately every 2 to 17 years, are characteristic in this PNVT.
Ponderosa Pine	Mid-Scale	DC 94	Ponderosa pine forest is characterized by variation in the size and number of tree groups depending on elevation, soil type, aspect, and site productivity. The more biologically productive sites contain more trees per group and more groups per area, resulting in less space between groups. Openings typically range from 10 percent in more biologically productive sites to 70 percent in the less productive sites. Tree density within forested areas ranges from 20 to 80 square feet basal area per acre.
Ponderosa Pine	Mid-Scale	DC 95	The tree group mosaic comprises an uneven-aged forest with all age classes, size classes, and structural stages present. Occasionally, patches of even-aged forest structure are present (less than 50 acres). Disturbances sustain the overall age and structural distribution.
Ponderosa Pine	Mid-Scale	DC 96	Fires burn primarily on the forest floor and do not spread between tree groups as crown fire.
Ponderosa Pine	Mid-Scale	DC 97	Forest structure in the wildland-urban interface (WUI) may have smaller, more widely spaced groups of trees than in the non-WUI areas.
Ponderosa Pine	Mid-Scale	DC 98	Northern goshawk post-fledging family areas (PFAs) may contain 10 to 20 percent higher basal area in mid-aged to old tree groups than northern goshawk foraging areas and the surrounding forest.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Ponderosa Pine	Mid-Scale	DC 99	Northern goshawk nest areas have forest conditions that are multi-aged and dominated by large trees with relatively denser canopies than the surrounding forest.
Ponderosa Pine	Fine Scale	DC 100	Trees typically occur in irregularly shaped groups and are variably spaced with some tight clumps. Tree crowns in the mid- to old-aged groups are interlocking or nearly interlocking providing for species such as Abert's squirrel.
Ponderosa Pine	Fine Scale	DC 101	Openings surrounding tree groups are variably shaped and composed of a grass, forb, and shrub mix. Some openings may contain individual trees.
Ponderosa Pine	Fine Scale	DC 102	Trees within groups are of similar or variable ages and may contain species other than ponderosa pine. Tree groups are typically less than 1 acre and average ½ acre. Mid- to old-aged tree groups consist of approximately 2 to 40 trees with interlocking canopies.
Ponderosa Pine	Fine Scale	DC 103	Where Gambel oak occurs, the majority are single trunk trees over 8 inches in diameter with full crowns.
Ponderosa Pine	--	GL 47	Where Gambel oak or other native hardwood trees and shrubs are desirable to retain for diversity, treatments should improve vigor and growth of these species.
Ponderosa Pine	--	GL 48	Where consistent with project or activity objectives, canopy cover should be retained on the south and southwest sides of small, existing forest openings that are naturally cooler and moister. These small (generally one-tenth to one-quarter acre) shaded openings provide habitat conditions needed by small mammals, plants, and insects (e.g., Merriam's shrew, Mogollon clover, four-spotted skipperling butterfly). Where these openings naturally occur across a project area, these conditions should be maintained on an average of 2 or more such openings per 100 acres.
Dry Mixed Conifer	Landscape	DC 104	The dry mixed conifer forest is a mosaic of conditions composed of structural states ranging from young to old trees. Forest structure and density are similar to ponderosa pine forest. Forest appearance is variable but uneven-aged and open. Sporadic areas of even-aged structure may be present on 10 percent or less of the landscape to provide structural diversity.
Dry Mixed Conifer	Landscape	DC 105	The forest arrangement consists of small clumps and groups of trees interspersed within variably-sized openings of grass, forb, and shrub vegetation associations similar to reference conditions. Size, shape, number of trees per group, and number of groups per area are variable across the landscape. Where they naturally occur, groups of Gambel oak are healthy and maintained or increased. Tree density may be greater in some locations, such as north-facing slopes and

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
			canyon bottoms.
Dry Mixed Conifer	Landscape	DC 106	The dry mixed conifer forest is composed predominantly of vigorous trees, but declining, top-killed, lightning-scarred, and fire-scarred trees provide snags and coarse woody debris. Snags and coarse woody debris are well distributed throughout the landscape. Snags are typically 18 inches in diameter or greater and average 3 per acre.
Dry Mixed Conifer	Landscape	DC 107	Coarse woody debris, including logs, ranges from 5 to 15 tons per acre. Logs average 3 per acre within the forested area of the landscape.
Dry Mixed Conifer	Landscape	DC 108	Southwestern white pine is present with the ability to reproduce on capable sites.
Dry Mixed Conifer	Landscape	DC 109	PLACEHOLDER
Dry Mixed Conifer	Landscape	DC 110	Grasses, forbs, shrubs, needles, leaves, and small trees support the natural fire regime. The larger proportion (60 percent or greater) of soil cover is composed of grasses and forbs as opposed to needles and leaves.
Dry Mixed Conifer	Landscape	DC 111	Old growth occurs throughout the landscape, in small, discontinuous areas consisting of clumps of old trees, or occasionally individual old trees. Other old growth components are also present including dead trees (snags), downed wood (coarse woody debris), and/or structural diversity. The location of old growth shifts on the landscape over time as a result of succession and disturbance (tree growth and mortality).
Dry Mixed Conifer	Landscape	DC 112	Frequent, low to mixed severity fires (fire regime I) occurring every 10 to 22 years are characteristic in this PNVT.
Dry Mixed Conifer	Mid-Scale	DC 113	The dry mixed conifer forest is characterized by a variety of size and number of tree groups depending on elevation, soil type, aspect, and site productivity. The more biologically productive sites contain more trees per group and more groups per area, resulting in less space between groups. Openings typically range from 10 percent in more biologically productive sites to 50 percent in less productive sites. Tree density within forested areas ranges from 30 to 100 square feet basal area per acre.
Dry Mixed Conifer	Mid-Scale	DC 114	The mosaic of tree groups is composed of uneven-aged forest. All age classes and structural stages are present. Occasionally, there are small patches (less than 50 acres) of even-aged forest present. Disturbances sustain the overall age and structural distribution.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Dry Mixed Conifer	Mid-Scale	DC 115	Fire burns primarily on the forest floor and does not spread between tree groups as crown fire.
Dry Mixed Conifer	Mid-Scale	DC 116	Forest structure in the wildland-urban interface (WUI) may have smaller, more widely spaced groups of trees than in the non-WUI areas.
Dry Mixed Conifer	Mid-Scale	DC 117	Northern goshawk post-fledging family areas (PFAs) may contain 10 to 20 percent higher basal area in mid-aged to old tree groups than northern goshawk foraging areas and the surrounding forest.
Dry Mixed Conifer	Mid-Scale	DC 118	Northern goshawk nest areas have forest conditions that are multi-aged but are dominated by large trees with relatively denser canopies than the surrounding forest.
Dry Mixed Conifer	Fine Scale	DC 119	Trees typically occur in irregularly-shaped groups and are variably spaced with some tight clumps. Tree crowns in the mid- to old-aged groups are interlocking or nearly interlocking providing for species such as red squirrel.
Dry Mixed Conifer	Fine Scale	DC 120	Openings surrounding tree groups are composed of a grass, forb, and shrub mix. Some openings may contain individual trees or snags.
Dry Mixed Conifer	Fine Scale	DC 121	Trees within groups are of similar or variable ages and one or more species. Tree group sizes typically are less than 5 acres, but often less than 1 acre, and at the mature and old stages consist of approximately 2 to 50 trees.
Dry Mixed Conifer	Fine Scale	DC 122	Where Gambel oak occurs, the majority are single trunk trees over 8 inches in diameter with full crowns.
Dry Mixed Conifer	--	GL 49	Where Gambel oak or other native hardwood trees and shrubs are desirable to retain for diversity, treatments should improve vigor and growth of these species.
Dry Mixed Conifer	--	GL 50	Where consistent with project or activity objectives, canopy cover should be retained on the south and southwest sides of small, existing forest openings that are naturally cooler and moister. These small (generally one-tenth to one-quarter acre) shaded openings provide habitat conditions needed by small mammals, plants, and insects (e.g., Merriam's shrew, Mogollon clover, four-spotted skipperling butterfly). Where these openings naturally occur across a project area, these conditions should be maintained on an average of 2 or more such openings per 100 acres.
Wet Mixed Conifer	Landscape	DC 123	The wet mixed conifer forest is a mosaic of structural stages and seral states ranging from young to old trees. The landscape arrangement is an assemblage of variably sized and aged groups and patches of trees and other vegetation

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
			associations similar to reference conditions.
Wet Mixed Conifer	Landscape	DC 124	All seral states are present across the landscape, with each state characterized by distinct dominant species composition, biological and physical conditions, and enough of each state is present to develop into the next state progressively over time.
Wet Mixed Conifer	Landscape	DC 125	Canopies are more closed than dry mixed conifer. An understory, consisting of native grass, forbs, and/or shrubs, is present.
Wet Mixed Conifer	Landscape	DC 126	The wet mixed conifer forest is composed predominantly of vigorous trees, but declining, top-killed, lightning-scarred, and fire-scarred trees provide snags and coarse woody debris. Snags and coarse woody debris are well distributed throughout the landscape. The number of snags and logs and amount of coarse woody debris varies by seral state ranging from 8 to more than 16 tons per acre.
Wet Mixed Conifer	Landscape	DC 127	Old growth occurs over large, continuous areas. Old growth components include old trees, dead trees (snags), downed wood (coarse woody debris), and/or structural diversity. The location of old growth shifts on the landscape over time as a result of succession and disturbance (tree growth and mortality).
Wet Mixed Conifer	Landscape	DC 128	Mixed severity fire (fire regime III) is characteristic of this forest. High severity fires (fire regimes IV and V) rarely occur.
Wet Mixed Conifer	Mid-Scale	DC 129	The size and number of groups and patches vary depending on disturbance, elevation, soil type, aspect, and site productivity. Patch sizes vary but are frequently hundreds of acres and rarely thousands of acres. Groups of tens of acres or less are relatively common. There is a mosaic of primarily even-aged groups and patches, which vary in size, species composition, and age. Grass, forb, and shrub openings created by disturbances may comprise 10 to 100 percent of the area depending on the type of disturbance.
Wet Mixed Conifer	Mid-Scale	DC 130	Uneven-aged groups and patches, comprising about 20 percent of this PNVT, provide for species such as the black bear and red-faced warbler that need multistoried canopies with dense low- to mid-canopy layers.
Wet Mixed Conifer	Mid-Scale	DC 131	Tree density ranges from 30 to 180 square feet basal area per acre depending upon time since disturbance and seral states of groups and patches.
Wet Mixed Conifer	Mid-Scale	DC 132	There are 20 or more snags greater than 8 inches in diameter per acre and 1 to 5 of those snags are 18 inches or greater in diameter.
Wet Mixed Conifer	Mid-Scale	DC 133	Coarse woody debris, including logs, varies by seral state, ranging from 5 to 20 tons per acre for early-seral states; 20 to 40 tons per acre for mid-seral states; and may be as high as 35 tons per acre, or greater, for late-seral states. These

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
			conditions also provide an abundance of fungi including mushrooms and truffles used by small mammals.
Wet Mixed Conifer	Mid-Scale	DC 134	Forested PNVTs in the wildland-urban interface (WUI) are dominated by early-seral, fire-adapted species growing in an overall more open condition than the surrounding forest. These conditions result in fires that burn primarily on the forest floor and rarely spread as crown fire.
Wet Mixed Conifer	Mid-Scale	DC 135	Mixed (fire regime III) and high (fire regime IV) severity fires in this PNVT, occurring every 22 to 150 years along with other disturbances, maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling. High severity fires do not exceed patches of 1,000 acres of mortality. Other smaller disturbances occur more frequently.
Wet Mixed Conifer	Mid-Scale	DC 136	Northern goshawk post-fledging family areas (PFAs) may contain 10 to 20 percent higher basal area in mid-aged to old tree groups than northern goshawk foraging areas and the surrounding forest.
Wet Mixed Conifer	Mid-Scale	DC 137	Northern goshawk nest areas have forest conditions that are multi-aged but are dominated by large trees with relatively denser canopies than the surrounding forest.
Wet Mixed Conifer	Fine Scale	DC 138	In mid-aged and older forests, trees are typically variably spaced with crowns interlocking (grouped and clumped trees) or nearly interlocking providing for species such as red squirrel. Trees within groups can be of similar or variable species and ages.
Wet Mixed Conifer	Fine Scale	DC 139	Small openings are present as a result of disturbances (e.g., wind, disease).
Spruce-Fir	Landscape	DC 140	The spruce-fir forest is a mosaic of structural stages and seral states ranging from young to old trees and is composed of multiple species. The landscape arrangement is an assemblage of variably sized and aged groups and patches of trees and other vegetation similar to reference conditions.
Spruce-Fir	Landscape	DC 141	Tree canopies in this forest are closed. An understory, consisting of native grass, forbs, and/or shrubs, is present in early seral states and is replaced by trees in later seral states.
Spruce-Fir	Landscape	DC 142	The spruce-fir forest is composed predominantly of vigorous trees, but declining top-killed, lightning-scarred, and fire-scarred trees provide snags and coarse woody debris. Snags and coarse woody debris are well distributed throughout the landscape.

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Spruce-Fir	Landscape	DC 143	Corkbark fir is present with the ability to reproduce on late-seral sites appropriate for the species.
Spruce-Fir	Landscape	DC 144	Old growth occurs over large, continuous areas. Old growth components include old trees, dead trees (snags), downed wood (coarse woody debris), and/or structural diversity. The location of old growth shifts on the landscape over time as a result of succession and disturbance (tree growth and mortality).
Spruce-Fir	Landscape	DC 145	In the spruce-fir PNVT, mixed to high severity fires (fire regimes III and IV) occur infrequently.
Spruce-Fir	Mid-Scale	DC 146	The size and number of groups and patches vary depending on disturbance, elevation, soil type, aspect, and site productivity. Patch sizes vary but are mostly hundreds of acres and rarely thousands of acres. There may be frequent small disturbances resulting in groups of tens of acres or less. A mosaic of primarily even-aged groups and patches, which vary in size, species composition, and age is present. Grass, forb, and shrub openings created by disturbances may comprise 10 to 100 percent of the area depending on time since disturbances. Aspen is occasionally present in large patches.
Spruce-Fir	Mid-Scale	DC 147	Uneven-aged groups and patches, comprising about 20 percent of this PNVT, provide for species such as the MacGillivray's warbler and Swainson's thrush that need multistoried canopies with dense low- to mid-canopy layers.
Spruce-Fir	Mid-Scale	DC 148	Tree density ranges from 30 to 250 square feet basal area per acre, depending upon disturbance and seral states of the groups and patches.
Spruce-Fir	Mid-Scale	DC 149	In general, there are 13 to 30 snags greater than 8 inches in diameter per acre and 1 to 3 of those snags are 18 inches or greater in diameter.
Spruce-Fir	Mid-Scale	DC 150	Coarse woody debris, including logs, varies by seral state, ranging from 5 to 30 tons per acre for early-seral states; 30 to 40 tons per acre for mid-seral states; and 40 tons per acre or greater for late-seral states. These conditions also provide an abundance of fungi including mushrooms and truffles used by small mammals.
Spruce-Fir	Mid-Scale	DC 151	The wildland-urban interface (WUI) is comprised primarily of grass/forb/shrub vegetation. Structures in the WUI are surrounded by grassy openings with very few or no trees. These conditions result in ground fires.
Spruce-Fir	Mid-Scale	DC 152	Mixed and high severity fires (fire regime III and IV)—occurring every 150 to 400 years—along with other disturbances maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.

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Spruce-Fir	Mid-Scale	DC 153	Northern goshawk post-fledging family areas (PFAs) may contain 10 to 20 percent higher basal area in mid-aged to old tree groups than northern goshawk foraging areas and the surrounding forest.
Spruce-Fir	Mid-Scale	DC 154	Northern goshawk nest areas have forest conditions that are multi-aged but are dominated by large trees with relatively denser canopies than the surrounding forest.
Spruce-Fir	Fine Scale	DC 155	Mid-aged to old trees grow tightly together with interlocking crowns. Trees are of the same size and/or age class in early group/patch development. In late development, they may be multilayered.
Spruce-Fir	Fine Scale	DC 156	Small openings are present as a result of localized disturbances (e.g., wind, disease).
Aspen	Landscape	DC 157	Areas of aspen occur across the forested landscape and are successfully regenerating and being recruited into older and larger size classes. Size classes have a natural distribution, with the greatest number of stems in the smaller size classes.
Aspen	Mid-Scale	DC 158	Aspen may comprise 10 to 100 percent of the area depending on disturbance (e.g., fire, insects, silvicultural treatments) in multistoried patches.
Aspen	Mid-Scale	DC 159	As an early seral species, aspen reproduction and recruitment benefit from low severity surface fires in association with ponderosa pine and dry mixed conifer PNVTs, and mixed-severity fires in association with wet mixed conifer and spruce-fir PNVTs.
Aspen	--	OBJ 12	Aspen dominated and codominated acres within forested PNVTs, representing a range of age classes, are maintained on at least 50,000 acres during the planning period.
Aspen	--	GL 51	To preclude concentrated herbivore impacts, new surface water development should not be constructed within proximity to aspen stands (approximately a quarter of a mile).
Aspen	--	GL 52	Restoration of aspen clones should occur where aspen is over mature or in decline to maintain a sustainable presence of this species at the landscape level.
Aspen	--	GL 53	When managing for early seral states, competing conifers should be removed from aspen stands when needed to increase aspen longevity and increase diversity of aspen age classes.
Aspen	--	GL 54	Aspen restoration and retention efforts should include measures to ensure

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
			viability of the aspen stand.
All Woodland PNVTs	--	OBJ 13	Annually, treat or maintain 5,000 to 15,000 acres to promote a highly diverse structure.
All Woodland PNVTs	--	GL 55	Mechanical restoration of woodlands should emphasize individual tree removal to limit ground disturbance.
All Woodland PNVTs	--	GL 56	Tree species that are less susceptible to root disease should be retained within areas of root disease infection to reduce spread of disease.
All Woodland PNVTs	--	GL 57	Treatments should leave single or small groups of medium to large trees that are widely spaced with expanses of herbaceous vegetation and coarse woody debris. This would provide for soil productivity, traditional uses (e.g., piñon nut gathering), and wildlife needs such as foraging habitat for migratory birds (e.g., black-throated gray warbler, pinyon jay) and other birds.
All Woodland PNVTs	--	GL 58	Hiding cover, approach cover (by waters), and travel corridor cover should be provided where needed by wildlife.
Madrean Pine-Oak	Landscape	DC 160	A mix of desired species [15], ages, heights, and groupings of trees create a mosaic across the landscape.
Madrean Pine-Oak	Landscape	DC 161	The majority of this woodland has an open canopy consisting of large trees and an herbaceous understory, with some groups of closed canopy. Overall, canopy cover is 10 to 50 percent.
Madrean Pine-Oak	Landscape	DC 162	Snags, averaging 1 to 2 per acre, and older trees are scattered across the landscape. Coarse woody debris averages 1 to 5 tons per acre.
Madrean Pine-Oak	Landscape	DC 163	Understory vegetation includes evergreen oaks, mountain mahogany, grasses, and forbs.
Madrean Pine-Oak	Landscape	DC 164	Ground cover consists of perennial grasses and forbs that frequently carry fire through the landscape.
Madrean Pine-Oak	Landscape	DC 165	Grasses, forbs, shrubs, needles, leaves, and small trees support the natural fire regime. The larger proportion (60 percent or greater) of soil cover is composed of grasses and forbs as opposed to needles and leaves.
Madrean Pine-Oak	Landscape	DC 166	Fires are typically of low or occasionally moderate severity (fire regime I) and occur every 5 to 20 years.
Madrean Pine-	Mid-	DC 167	Some large patches in the Madrean pine-oak woodland are closed canopy, have multiple age classes, large trees, and old growth-like characteristics (e.g.,

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Oak	Scale		numerous snags, large coarse woody debris) in order to provide for wildlife such as Mexican spotted owl and black bear that need denser habitat.
Madrean Pine-Oak	Mid-Scale	DC 168	The size and number of groups and patches vary depending on disturbance, elevation, soil type, aspect, and site productivity. Patch sizes vary but are mostly tens of acres, with rare disturbances of hundreds of acres. There may be frequent small disturbances resulting in groups and patches of tens of acres or less. A mosaic of groups and patches of trees, primarily even-aged, that are variable in size, species composition, and age, is present. Grass, forb, and shrub openings created by disturbance may comprise 10 to 100 percent of the area depending on the disturbances.
Madrean Pine-Oak	Mid-Scale	DC 169	Woodland densities range from 15 to 50 square feet basal area per acre.
Madrean Pine-Oak	Mid-Scale	DC 170	Grasses, forbs, shrubs, leaves, needles, and small trees maintain the natural fire regime with a greater proportion of the soil cover as grasses and forbs as opposed to leaves and needles.
Madrean Pine-Oak	Fine Scale	DC 171	Single large trees or small groups are widely spaced between large expanses of herbaceous vegetation and shrubs.
Madrean Pine-Oak	--	GL 59	Where Mexican spotted owls are found nesting in canyons or on north slopes within the Madrean pine-oak woodland, adjacent treatments should be modified to meet the needs of foraging owls.
Piñon-Juniper – Savanna	Landscape	DC 172	The piñon-juniper savanna is open in appearance with trees occurring as individuals or in small groups and ranging from young to old. Overall, tree canopy cover is 10 to 15 percent, but may range up to 30 percent.
Piñon-Juniper – Savanna	Landscape	DC 173	Scattered shrubs and a continuous herbaceous understory, including native grasses, forbs, and annuals, are present to support a natural fire regime.
Piñon-Juniper – Savanna	Landscape	DC 174	Vegetative ground cover (herbaceous vegetation and litter cover) is optimized as defined by the specific TES map unit [15] under consideration to protect and enrich soils and promote water infiltration.
Piñon-Juniper – Savanna	Landscape	DC 175	Grasses, forbs, shrubs, needles, leaves, and small trees support the natural fire regime. The larger proportion (60 percent or greater) of soil cover is composed of grasses and forbs as opposed to needles and leaves.
Piñon-Juniper –	Landscape	DC 176	Old growth occurs in isolated locations scattered throughout the landscape, as individual old trees or as clumps of old trees. Other old growth components may also be present including dead trees (snags), downed wood (coarse woody

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Savanna			debris), and/or structural diversity.
Piñon-Juniper – Savanna	Landscape	DC 177	Fires are low to mixed severity (fire regime I), occurring every 1 to 35 years.
Piñon-Juniper – Persistent Woodland	Landscape	DC 178	A mix of desired species [15], ages, heights, and groupings of trees create a mosaic across the landscape.
Piñon-Juniper – Persistent Woodland	Landscape	DC 179	Tree canopy cover is closed (greater than 30 percent), shrubs are sparse to moderate, and herbaceous cover is patchy.
Piñon-Juniper – Persistent Woodland	Landscape	DC 180	Snags, averaging one to two per acre, and older trees with dead limbs and tops are scattered across the landscape. Coarse woody debris averages 2 to 5 tons per acre.
Piñon-Juniper - Persistent Woodland	Landscape	DC 181	Old growth includes old trees, dead trees (snags), downed wood (coarse woody debris), and/or structural diversity. The location of old growth shifts on the landscape over time as a result of succession and disturbance (tree growth and mortality).
Piñon-Juniper - Persistent Woodland	Landscape	DC 182	Fire is less frequent and more variable than in the savanna due to patchiness of ground cover. The fires that do occur are mixed to high severity (fire regimes II, III, IV, and V).
Piñon-Juniper - Persistent Woodland	Mid-Scale	DC 183	Grass and forb cover is maximized, based on site capability, to protect and enrich soils.
Grasslands	Landscape	DC 184	Perennial herbaceous species dominate and include native grasses, grass-like plants (sedges and rushes), and forbs, and in some locations, a diversity of shrubs.
Grasslands	Landscape	DC 185	Vegetative ground cover (herbaceous vegetation and litter cover) is optimized (as defined by the TES map unit [15] under consideration) to prevent accelerated erosion, dissipate rainfall, facilitate the natural fire regimes, and provide wildlife and insect habitat. Ungrazed herbaceous vegetation heights [21] range from 7 to 32 inches [22] depending on grassland type.
Grasslands	Landsca	DC 186	Herbaceous vegetation and litter provides for and maintains the natural fire regime (fire regime I and II). In semi-desert grasslands, the natural fire return

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	pe		interval is approximately every 2 to 10 years. In Great Basin grasslands the natural fire return interval is approximately every 10 to 30 years. In montane/subalpine grasslands it ranges from approximately 2 to 400 years, depending on the adjacent forested PNVT.
Grasslands	Landscape	DC 187	Landscapes associated with montane/subalpine grasslands vary from natural appearing where human activities do not stand out (high scenic integrity) to unaltered where only natural ecological changes occur (very high scenic integrity).
Grasslands	Mid-Scale	DC 188	Woody (tree and shrub) canopy cover is less than 10 percent.
Grasslands	Mid-Scale	DC 189	Prairie dogs are present and support healthy grassland soil development and the diversity of associated species (e.g., western burrowing owl).
Grasslands	Fine Scale	DC 190	Average herbaceous vegetation heights [22] vary by grassland PNVT and yearly weather conditions. Ungrazed herbaceous vegetation heights [21] range from 7 to 29 inches in Great Basin grasslands, 7 to 26 inches in montane/subalpine grasslands, and 10 to 32 inches in semi-desert grasslands.
Grasslands	Fine Scale	DC 191	During the critical pronghorn fawning period (May through June [24]), cool season grasses and forbs provide nutritional forage; while shrubs and standing grass growth from the previous year provide adequate hiding cover (10 to 18 inches) to protect fawns from predation.
Grasslands	--	OBJ 14	Decrease or maintain the woody canopy cover at less than 10 percent by treating up to 25,000 acres annually.
Grasslands	--	GL 60	Restoration treatment of grasslands should result in a woody canopy cover of less than 10 percent; more than one treatment may be required.
Grasslands	--	GL 61	Mechanical restoration of grasslands should emphasize individual tree removal to limit soil disturbance.
Grasslands	--	GL 62	New fence construction or reconstruction where pronghorn antelope may be present should have a barbless bottom wire which is 18 inches from the ground to facilitate movement between pastures and other fenced areas. Pole and other types of fences should also provide for pronghorn antelope passage where they are present.
Grasslands	--	GL 63	Pronghorn antelope fence and other crossings should be installed along known movement corridors to prevent habitat fragmentation.

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Interior Chaparral	--	DC 192	In the early seral state, chaparral contains an herbaceous component in the understory. Later seral states are dense, nearly impenetrable thickets with considerable leaf litter. Standing dead material may accumulate in areas that have not burned for several decades. Chaparral is in a constant state of transition from early to late seral state and back again, with fire being the major ecological process.
Interior Chaparral	--	DC 193	Ground cover consists primarily (85 to 95 percent) of shrub litter (e.g., small stems, leaves).
Interior Chaparral	--	DC 194	The majority (85 to 95 percent) of chaparral is closed canopy with some openings of grasses and forbs.
Interior Chaparral	--	DC 195	High severity fires occur every 35 to 100 years (fire regime IV) in a mosaic pattern.
Wildlife and Rare Plants	Landscape	DC 196	Habitat conditions contribute to the recovery of federally listed species.
Wildlife and Rare Plants	Landscape	DC 197	Habitat is well distributed and connected.
Wildlife and Rare Plants	Mid-Scale	DC 198	Wildlife are free from harassment and disturbance at a scale that impacts vital functions (e.g., breeding, rearing young) that could affect persistence of the species.
Wildlife and Rare Plants	Fine Scale	DC 199	Collection of animals and plants does not negatively impact species abundance.
Wildlife and Rare Plants	Fine Scale	DC 200	Localized rare plant and animal communities are intact and functioning.
Wildlife and Rare Plants	--	OBJ 15	Annually, improve wildlife connectivity by removing at least five unneeded structures (e.g., fence).
Wildlife and Rare Plants	--	GL 64	Management and activities should not contribute to a trend toward the Federal listing of a species.
Wildlife and Rare Plants	--	GL 65	Activities occurring within federally listed species habitat should apply habitat management objectives and species protection measures from recovery plans.
Wildlife and Rare Plants	--	GL 66	PLACEHOLDER

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Wildlife and Rare Plants	--	GL 67	Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives.
Wildlife and Rare Plants	--	GL 68	A minimum of six nest areas (known and replacement) should be located per northern goshawk territory. Northern goshawk nest and replacement nest areas should be located around active nests, in drainages, at the base of slopes, and on northerly (northwest to northeast) aspects. Nest areas should be 25 to 30 acres each in size.
Wildlife and Rare Plants	--	GL 69	Northern goshawk post-fledging family areas (PFAs) of approximately 420 acres in size should be designated around the nest sites.
Wildlife and Rare Plants	--	GL 70	During treatments, snags should be retained in the largest diameter classes available as needed to meet wildlife or other resource needs.
Wildlife and Rare Plants	--	GL 71	Cool and/or dense vegetation cover should be provided for species needing these habitat components (e.g., Goodding's onion, black bear, White Mountains chipmunk, western yellow-billed cuckoo).
Wildlife and Rare Plants	--	GL 72	Active raptor nests should be protected from treatments and disturbance during the nesting season to provide for successful reproduction. Specifically for northern goshawk nest areas, human presence should be minimized during nesting season of March 1 through September 30.
Wildlife and Rare Plants	--	GL 73	Any action likely to cause a disturbance and take to bald and golden eagles in nesting and young rearing areas should be avoided per the Bald and Golden Eagle Protection Act.
Wildlife and Rare Plants	--	GL 74	Prairie dog controls [27] should not be authorized except when consistent with approved State of Arizona Gunnison's prairie dog conservation strategies.
Wildlife and Rare Plants	--	GL 75	Rare and unique features (e.g., talus slopes, cliffs, canyon slopes, caves, fens, bogs, sinkholes) should be protected from damage or loss to retain their distinctive ecological functions and maintain viability of associated species.
Wildlife and Rare Plants	--	GL 76	The needs of localized species (e.g., New Mexico meadow jumping mouse, Bebb willow, White Mountains paintbrush) should be considered and provided for during project activities to ensure their limited or specialized habitats are not lost or degraded.
Wildlife and Rare Plants	--	GL 77	Constructed features should be maintained to standard or removed when no longer needed.

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Invasive Species	Landscape	DC 201	Invasive species (both plant and animal) are nonexistent or in low occurrence to avoid negative impacts to ecosystems.
Invasive Species	Mid-Scale	DC 202	Undesirable nonnative species are absent or present only to the extent that they do not adversely affect ecosystem composition, structure, or function, including native species populations or the natural fire regime.
Invasive Species	Mid-Scale	DC 203	Introduction of additional invasive species rarely occurs and is detected at an early stage.
Invasive Species	--	OBJ 16	Annually, contain, control, or eradicate invasive species (e.g., musk thistle, Dalmatian toadflax) on 500 to 3,500 acres.
Invasive Species	--	OBJ 17	Annually, control or eradicate invasive species (e.g., tamarisk, bullfrogs) on at least 2 stream miles.
Invasive Species	--	ST 11	Projects and authorized activities shall be designed to reduce the potential for introduction of new species or spread of existing invasive or undesirable aquatic or terrestrial nonnative populations.
Invasive Species	--	GL 78	Projects and activities should not transfer water between drainages or between unconnected water bodies within the same drainage to avoid spreading disease and aquatic invasive species.
Invasive Species	--	GL 79	Project areas should be monitored to ensure there is no introduction or spread of invasive species.
Invasive Species	--	GL 80	Treatment of invasive species should be designed to effectively control or eliminate them; multiple treatments may be needed.
Invasive Species	--	GL 81	Pesticide use should minimize impacts on nontarget plants and animals.
Landscape Scale Disturbance Events	Landscape	DC 204	The Apache-Sitgreaves NFs landscapes retain the resiliency to survive landscape scale disturbance events.
Landscape Scale Disturbance Events	--	ST 12	Threats to human safety and property shall be promptly addressed following landscape scale disturbance and mitigated through measures such as signing, temporary closures, or treatment.
Landscape Scale Disturbance Events	--	GL 82	Erosion control mitigation features should be implemented to protect significant resource values and infrastructure such as stream channels, roads, structures, threatened and endangered species, and cultural resources.

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Landscape Scale Disturbance Events	--	GL 83	Felling of hazard trees (either dead or alive) should be limited to those which could hit a road, recreation site, building, or other infrastructure to protect places where humans, vehicles, or developments would most likely be present.
Landscape Scale Disturbance Events	--	GL 84	Projects and activities (e.g., revegetation, mulching, lop and scatter) should be designed to stabilize soils and restore nutrient cycling, if needed, and establish movement toward the desired conditions for the affected PNVT(s).
Landscape Scale Disturbance Events	--	GL 85	Where conifer seed sources are lost or poorly distributed, and/or deciduous tree species are not adequately resprouting, artificial regeneration (e.g., planting, seeding) should be used to promote the movement toward desired conditions, provided adequate site conditions exist.
Landscape Scale Disturbance Events	--	GL 86	Management should emphasize long term reestablishment of native deciduous trees, shrubs, and herbaceous vegetation to maintain ecosystem diversity.
Landscape Scale Disturbance Events	--	GL 87	An adequate number and size of snags and logs, appropriate for the affected PNVT, should be retained individually and in clumps to provide benefits for wildlife and coarse woody debris for soil and other resource benefits.
Landscape Scale Disturbance Events	--	GL 88	Projects and activities should include both short and long term provisions for scenic integrity, especially in sensitive foreground areas (high and very high scenic integrity).
Overall Recreation Opportunities	--	DC 205	The Apache-Sitgreaves NFs offer a spectrum of recreation settings and opportunities varying from primitive to rural and dispersed to developed, with an emphasis on the natural appearing character of the forests.
Overall Recreation Opportunities	--	DC 206	Inventoried roadless areas (IRAs) maintain their overall roadless character.
Overall Recreation Opportunities	--	DC 207	Recreation activities occur within the ability of the land to support them and with minimal user conflicts.
Overall Recreation Opportunities	--	DC 208	Recreation enhances the quality of life for local residents (e.g., social interaction, physical activity, connection with nature), provides tourist destinations, and contributes monetarily to local economies.
Overall Recreation Opportunities	--	DC 209	Recreation opportunities provide for a variety of skill levels, needs, and desires in partnership with recreation permit holders, private entities, volunteer groups, community groups, and State, Federal, and tribal governments.

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Overall Recreation Opportunities	--	DC 210	Visitors can easily access information about recreation activities and safe and proper use of the Apache-Sitgreaves NFs.
Overall Recreation Opportunities	--	DC 211	Recreation use does not negatively affect wildlife habitat and populations. Negative interactions between people and wildlife are minimized.
Overall Recreation Opportunities	--	DC 212	The Apache-Sitgreaves NFs are free from vandalism and refuse.
Overall Recreation Opportunities	--	DC 213	Recreation use does not negatively affect the use and character of cultural resources.
Overall Recreation Opportunities	--	DC 214	"Leave No Trace" principles are practiced.
Overall Recreation Opportunities	--	GL 89	Recreation related project-level decisions and implementation activities should be consistent with mapped classes and setting descriptions in the recreation opportunity spectrum (ROS).
Overall Recreation Opportunities	--	GL 90	Developed and dispersed recreation sites and other authorized activities should not be located in places that prevent wildlife or livestock access to available water.
Overall Recreation Opportunities	--	GL 91	Food and other items that attract wildlife should be managed to prevent reliance on humans and to reduce human-wildlife conflicts.
Overall Recreation Opportunities	--	GL 92	Constructed features should be maintained to standard or removed when no longer needed.
Dispersed Recreation	--	DC 215	Dispersed recreation opportunities (e.g., hunting, fishing, hiking, camping) are available and dispersed recreation sites (e.g., campsites, trailheads, vistas, parking areas) occur in a variety of ROS classes throughout the forests.
Dispersed Recreation	--	DC 216	Facilities for dispersed recreation activities are appropriate for the ROS class and scenic integrity objective of the location and are designed to the minimum necessary to protect natural and cultural resources.

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Dispersed Recreation	--	DC 217	Wildlife viewing areas are dispersed throughout the forests and provide opportunities to view waterfowl, migratory birds, elk, and other species.
Dispersed Recreation	--	DC 218	Access, parking, regulations, orientation, and safety information are in place to provide safe and enjoyable dispersed recreation opportunities.
Dispersed Recreation	--	DC 219	Water-based settings are available and the associated recreation opportunities (e.g., canoeing, fishing, waterfowl hunting) do not degrade aquatic resources.
Dispersed Recreation	--	DC 220	Winter nonmotorized areas provide a variety of nonmotorized recreation opportunities in a quiet, natural setting (including groomed and ungroomed ski trails). Noise from motorized use is uncommon in areas away from main road corridors.
Dispersed Recreation	--	DC 221	Winter motorized areas provide a variety of motorized recreation opportunities with a variety of challenges including areas open to cross-country, over-snow motorized use, some with groomed or ungroomed trails.
Dispersed Recreation	--	DC 222	Roads and trails provide a variety of opportunities to view natural landscapes and wildlife.
Dispersed Recreation	--	OBJ 18	Annually, rehabilitate, stabilize, revegetate, or relocate an average of five dispersed campsites to improve recreation opportunities and/or protect the environment.
Dispersed Recreation	--	OBJ 19	Within the planning period, work with the AZGFD, ADOT, and other partners to provide at least 10 new wildlife viewing opportunities.
Dispersed Recreation	--	ST 13	Dispersed campsites shall not be designated in areas with sensitive soils or within 50 feet of streams, wetlands, or riparian areas to prevent vegetation and bank damage, soil compaction, additional sediment, or soil and water contamination.
Dispersed Recreation	--	GL 93	In dispersed areas, the priority for facilities or minor developments should be access and protection of the environment, rather than the comfort or convenience of the visitors.
Dispersed Recreation	--	GL 94	Timing restrictions on recreation uses should be considered to reduce conflicts with wildlife needs or soil moisture conditions.
Dispersed Recreation	--	GL 95	Dispersed campsites should not be located on or adjacent to archaeological sites or sensitive wildlife areas.
Developed Recreation	--	DC 223	Developed recreation sites provide opportunities for people to camp, obtain information, and participate in day-use activities (e.g., picnic areas, fishing piers,

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			scenic overlooks, wildlife viewing sites).
Developed Recreation	--	DC 224	Facilities are maintained, accessible, and complement the forests' natural character. Facilities range from primitive to highly developed, with an emphasis on blending the facilities with the landscape.
Developed Recreation	--	DC 225	Forest vegetation in developed sites is healthy (species, size, and age) and complements recreational activities, scenery, and human safety.
Developed Recreation	--	DC 226	Developed campgrounds are places where structures and human caused vegetation changes may be seen but they do not dominate the view or attract attention (low to moderate scenic integrity). Human activities in the areas visible from campgrounds (foreground to middle ground, 300 feet to 4 miles) should not attract attention or stand out, and the landscapes should appear natural (moderate to high scenic integrity).
Developed Recreation	--	DC 227	Developed campgrounds provide roaded natural or roaded modified recreation opportunities.
Developed Recreation	--	OBJ 20	Within the planning period, reduce the developed recreation deferred maintenance backlog at plan approval by 10 percent.
Developed Recreation	--	OBJ 21	Within the planning period, accessible and wildlife-proof trash facilities should be provided in all developed sites where trash is collected.
Developed Recreation	--	ST 14	Where trash facilities are provided, they shall be bear resistant.
Developed Recreation	--	GL 96	Developed recreation sites should not be constructed unless validated with a capacity analysis.
Motorized Opportunities	--	DC 228	A maintained road and motorized trail system is in place and provides for safety and access for the use (e.g., recreation, minerals, vegetation treatment, fire protection) of the Apache-Sitgreaves NFs.
Motorized Opportunities	--	DC 229	Users have opportunities for motorized access and travel on a system of designated NFS roads, motorized trails, and motorized areas.
Motorized Opportunities	--	DC 230	The transportation system provides a variety of recreation opportunities including varying degrees of difficulty, from OHV trails to paved scenic byways, while limiting resource and/or user conflicts.
Motorized Opportunities	--	DC 231	NFS roads, motorized trails, and motorized areas are easily identified on the ground (e.g., well marked).

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Motorized Opportunities	--	DC 232	The road and trail system is accessible from local communities, State, county, and local public roads and trails.
Motorized Opportunities	--	DC 233	Loop trails exist for motorized trail users.
Motorized Opportunities	--	DC 234	Tread Lightly!® principles are commonly practiced.
Motorized Opportunities	--	DC 235	The location and design of roads and trails does not impede wildlife and fish movement.
Motorized Opportunities	--	OBJ 22	Annually, maintain at least 20 percent of the passenger vehicle and 10 percent of the high-clearance vehicle NFS roads.
Motorized Opportunities	--	OBJ 23	Annually, maintain at least 20 percent of NFS motorized trails.
Motorized Opportunities	--	ST 15	Motorized vehicle travel shall be managed to occur only on the designated system of NFS roads and motorized trails [28] and designated motorized areas [29].
Motorized Opportunities	--	ST 16	Unless specifically authorized, motorized cross-country travel shall be managed to occur only in designated motorized areas.
Motorized Opportunities	--	ST 17	Temporary road construction shall minimize the impacts to resource values and facilitate road rehabilitation. Temporary roads shall be rehabilitated following completion of the activities for which they were constructed.
Motorized Opportunities	--	ST 18	Road maintenance and construction activities shall be designed to reduce sediment (e.g., water bars, sediment traps, grade dips) while first providing for user safety.
Motorized Opportunities	--	GL 97	New motorized trails or additions to existing trails should include destinations and loops to provide for a variety of opportunities.
Motorized Opportunities	--	GL 98	New roads or motorized trails should be located to avoid Mexican spotted owl protected activity centers, northern goshawk post-fledging family areas, and other wildlife areas as identified; seasonal restrictions may be an option.
Motorized Opportunities	--	GL 99	New roads, motorized trails, or designated motorized areas should be located to avoid meadows, wetlands, riparian areas, stream bottoms, sacred sites, and areas with high concentrations of significant archaeological sites. The number of stream crossings should be minimized or mitigated to reduce impacts to aquatic species.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Motorized Opportunities	--	GL 100	As projects occur in riparian or wet meadow areas, unneeded roads or motorized trails should be closed or relocated, drainage restored, and native vegetation reestablished to move these areas toward their desired condition.
Motorized Opportunities	--	GL 101	As projects occur, roads or motorized trails that contribute to negative impacts on cultural resources should be closed or relocated.
Motorized Opportunities	--	GL 102	As projects occur, redundant roads or motorized trails should be removed to reduce degradation of natural resources.
Motorized Opportunities	--	GL 103	Roads and motorized trails removed from the transportation network should be treated in order to avoid future risk to hydrologic function and aquatic habitat.
Motorized Opportunities	--	GL 104	Trail markings (e.g., signs) should be designed to complement the character of the surrounding lands.
Motorized Opportunities	--	GL 105	Roads and motorized trails should be designed and located so as to not impede terrestrial and aquatic species movement and connectivity.
Motorized Opportunities	--	GL 106	As projects occur, existing meadow crossings should be relocated or redesigned, as needed, to maintain or restore hydrologic function using appropriate tools such as French drains and elevated culverts.
Motorized Opportunities	--	GL 107	After management activities occur in areas with high potential for cross-country motorized vehicle use, methods (e.g., barriers, signing) should be used to control unauthorized motorized use.
Nonmotorized Opportunities	--	DC 236	Nonmotorized opportunities are available in a variety of settings that provide differing levels of challenge and seclusion.
Nonmotorized Opportunities	--	DC 237	Blocks of forest land accessible from populated areas are available for nonmotorized opportunities. These areas are free from the sights and sounds of motorized recreation.
Nonmotorized Opportunities	--	DC 238	Opportunities for primitive recreation are available.
Nonmotorized Opportunities	--	DC 239	A maintained and environmentally sound nonmotorized trail network is in place, providing for user safety and access to locations of interest for a variety of uses.
Nonmotorized Opportunities	--	DC 240	Nonmotorized trails are defined and marked.
Nonmotorized	--	DC 241	Destination and loop trails exist for nonmotorized users.

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Opportunities			
Nonmotorized Opportunities	--	OBJ 24	Annually, maintain at least 20 percent of nonmotorized trails.
Nonmotorized Opportunities	--	GL 108	Trail markings (e.g., signs, blazes) should be designed to complement the character of the surrounding lands.
Nonmotorized Opportunities	--	GL 109	New nonmotorized routes should avoid meadows, wetlands, riparian areas, stream bottoms, sacred sites, and areas with high concentrations of significant archaeological sites. The number of stream crossings should be minimized or mitigated to reduce impacts to aquatic habitat.
Nonmotorized Opportunities	--	GL 110	To maintain nonmotorized user opportunities, nonmotorized trails should not be colocated on open motorized routes.
Nonmotorized Opportunities	--	GL 111	New trails and trail relocations should be designed and located so as to not impede terrestrial and aquatic species movement and connectivity.
Nonmotorized Opportunities	--	GL 112	Meadow crossings should be designed or redesigned to maintain or restore hydrologic function using appropriate tools such as French drains and elevated culverts.
Scenic Byways	--	DC 242	Viewsheds along scenic byways provide natural appearing landscapes and enhance recreation tourism that supports local communities.
Scenic Byways	--	DC 243	The intrinsic qualities identified for each scenic byway remain intact.
Scenic Byways	--	DC 244	Scenic byways exhibit natural appearing landscapes where human activities do not stand out in the foreground, up to one-half mile (high scenic integrity).
Scenic Byways	--	DC 245	Scenic byways provide roaded natural recreation opportunities.
Scenic Byways	--	GL 113	Visual impacts from vegetation treatments, recreation uses, range developments, and other structures should blend with the overall landscape character along scenic byways.
Scenic Byways	--	GL 114	Signs, kiosks, and other exhibits should provide interpretive, education, and safety information along scenic byways and in adjacent recreation sites.
National Recreation Trails	--	DC 246	The Blue Ridge NRT provides a nonmotorized trail opportunity where visitors can experience the scenic qualities of the area.
National	--	DC 247	The General George Crook and Eagle NRTs provide nonmotorized trail opportunities where visitors can experience the historic and scenic qualities of

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Recreation Trails			the area.
National Recreation Trails	--	DC 248	The immediate foreground (0 to 200 feet) views from the NRTs vary from natural appearing landscapes where human activities do not stand out (high scenic integrity) to unaltered landscapes where generally only ecological changes occur (very high scenic integrity).
National Recreation Trails	--	OBJ 25	Within 5 years of plan approval, initiate the process for the regional forester to remove the NRT designation from the Escudilla trail in conformance with Forest Service Manual 2353.57 – Management of National Recreation Trails.
National Recreation Trails	--	ST 19	Visual impacts from vegetation treatments, wildland fire, recreation uses, range developments, and other structures will blend with the overall landscape character along national recreation trails.
National Recreation Trails	--	GL 115	Trail markings (e.g., signs, blazes) should be designed to complement the character of the surrounding lands.
National Recreation Trails	--	GL 116	National recreation trails should be managed for nonmotorized or mechanized travel where permitted; however, the General George Crook and Eagle NRTs may have motorized travel where the trail coincides with a designated road or motorized trail.
National Recreation Trails	--	GL 117	New developments which do not support use of, or enhance, a national recreation trail should not be placed within the visual corridor of the trail.
National Recreation Trails	--	GL 118	The General George Crook National Recreation Trail should be managed to preserve evidence of historic roadway and landscape character, including related historic trees, markers, gravesites, and water holes within a 200-foot corridor.
Eligible and Suitable Wild and Scenic Rivers	--	DC 249	Eligible and suitable wild river segments display unaltered landscapes where generally only ecological changes occur (very high scenic integrity) and provide primitive and/or semiprimitive nonmotorized recreation opportunities.
Eligible and Suitable Wild and Scenic Rivers	--	DC 250	Eligible and suitable scenic river segments display landscapes which vary from slightly altered where human activities may be seen but do not attract attention (moderate scenic integrity) to natural appearing where human activities do not stand out (high scenic integrity) and provide semiprimitive nonmotorized, semiprimitive motorized, and/or roaded natural recreation opportunities.
Eligible and Suitable Wild and Scenic Rivers	--	DC 251	Eligible and suitable recreational river segments display landscapes which vary from moderately altered where human activities are evident (low scenic integrity) to slightly altered where human activities may be seen but do not attract attention (moderate scenic integrity) and provide primitive,

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			semiprimitive nonmotorized, semiprimitive motorized, and/or roaded natural recreation opportunities.
Eligible and Suitable Wild and Scenic Rivers	--	ST 20	Each eligible river's free-flowing condition, outstandingly remarkable values, and classification shall be sustained until further study is conducted.
Eligible and Suitable Wild and Scenic Rivers	--	ST 21	Each suitable river's free-flowing condition, outstandingly remarkable values, and classification shall be maintained until congressional action is completed.
Scenic Resources	--	DC 252	The Apache-Sitgreaves NFs appear predominantly natural, and human activities do not dominate the landscape.
Scenic Resources	--	DC 253	The natural and cultural features of the landscapes that provide a "sense of place" are intact.
Scenic Resources	--	DC 254	Landscapes possess vegetation patterns and compositions that are naturally variable in appearance and contribute to scenic values.
Scenic Resources	--	DC 255	Visitors have opportunities to experience important scenic elements including fall colors, rolling grasslands, picturesque vistas, and green riparian corridors.
Scenic Resources	--	DC 256	Lakes (reservoirs) and surrounding lands (¼ mile from the shore) provide landscapes which vary from slightly altered where human activities may be seen but do not attract attention (moderate scenic integrity) to natural appearing where human activities do not stand out (high scenic integrity).
Scenic Resources	--	DC 257	The scenic vistas associated with canyons and other landforms retain their scenic integrity.
Scenic Resources	--	DC 258	The vistas—both from and onto—the Mogollon Rim exhibit landscapes which vary from natural appearing where human activities do not stand out (high scenic integrity) to unaltered where generally only ecological changes occur (very high scenic integrity).
Scenic Resources	--	OBJ 26	Annually, accomplish an average of five projects to enhance scenic resources (e.g., restore grasslands and aspen, remove unnecessary fences, close and rehabilitate unneeded gravel/cinder pits).
Scenic Resources	--	GL 119	Constructed features and landscape alterations should be designed to complement the natural setting.
Scenic Resources	--	GL 120	Projects or activities in primitive and semiprimitive recreation opportunity spectrum (ROS) classes should be designed to maintain a predominately natural

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			appearing environment.
Conservation Education	--	DC 259	The Apache-Sitgreaves NFs provide opportunities for adults and children to explore and learn about ecosystems.
Conservation Education	--	DC 260	Forest visitors have access to information about topics of concern related to the Apache-Sitgreaves NFs (e.g., ecosystem restoration, unmanaged recreation, uncharacteristic wildfire), including appropriate visitor behavior (e.g., follow forest orders, pack out trash, appropriate sanitation, wildfire prevention).
Conservation Education	--	DC 261	Forest visitors have access to information about the features of the Apache-Sitgreaves NFs, its ecosystems, multiple uses, and other management aspects of the forests.
Conservation Education	--	DC 262	Interpretive information (e.g., ecology, wildlife, cultural resources, unique geologic features, Forest Service mission) is available to forest visitors at Apache-Sitgreaves NFs visitor centers, administrative offices, recreation sites, and along major forest roadways.
Lands	--	DC 263	The Apache-Sitgreaves NFs exist in a pattern that promotes efficient management which consists of large contiguous tracts of NFS lands.
Lands	--	DC 264	Residents and visitors are aware of Forest Service regulations and respect common property boundaries.
Lands	--	DC 265	The construction or placement of fences and gates, structures, signs, or other private personal property on NFS land (occupancy trespass) rarely occurs. Disposal of personal property (e.g., dumping) rarely occurs on NFS lands.
Lands	--	OBJ 27	Annually, survey and post on average 2 to 5 miles of unposted NFS boundary.
Lands	--	OBJ 28	Annually, maintain on average 2 to 5 miles of property boundary posting and corner monuments.
Lands	--	OBJ 29	Annually, resolve an average of three existing trespass cases.
Lands	--	GL 121	Access points to NFS land from adjacent non-NFS developments and subdivisions should be limited and provide all residents (not just edge lot owners) common entry points. Individual access points should be discouraged to minimize the development of unauthorized roads or trails.
Lands	--	GL 122	Land exchanges should not result in the creation of isolated NFS parcels surrounded by other ownerships.

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Lands	--	GL 123	Land acquisitions and exchanges should evaluate, and possibly include, associated beneficial encumbrances (e.g., water rights, mineral rights, easements, instream flow).
Cultural Resources	--	DC 266	Significant cultural resources (i.e., archaeological, historic, traditional cultural properties (TCPs), and known American Indian sacred sites) are preserved and protected for their cultural importance and are free from adverse impacts.
Cultural Resources	--	DC 267	Heritage programs, interpretive presentations, brochures, or displays are available to provide opportunities for public use, understanding, and enjoyment of the Apache-Sitgreaves NFs' cultural resources.
Cultural Resources	--	DC 268	Eligible and historically-significant [31] cultural properties are listed on the National Register of Historic Places (NRHP).
Cultural Resources	--	OBJ 30	Every 2 years or according to Southwestern Region Heritage Program standards, National Register sites and priority cultural resources are inspected.
Cultural Resources	--	OBJ 31	During the planning period, nominate at least five eligible cultural resources for inclusion in the NRHP.
Cultural Resources	--	OBJ 32	Annually, provide a Passport in Time (PIT) or other education project to provide opportunities for the public to learn about the Apache-Sitgreaves NFs' past and cultural resources.
Cultural Resources	--	OBJ 33	Annually, complete a minimum of 100 acres of nonproject cultural inventory to expand existing knowledge about the nature, location, and management needs of the forests' cultural resources.
Cultural Resources	--	ST 22	Human remains shall not intentionally be excavated for educational purposes (e.g., research, field schools).
Cultural Resources	--	ST 23	Contracts, permits, or leases that have the potential to affect cultural resources shall include appropriate clauses specifying site protection responsibilities and liabilities for damage.
Cultural Resources	--	GL 124	Activities that have the potential to adversely affect cultural resources should be discouraged in areas with a high concentration of significant archaeological sites or in areas of cultural or religious significance [32] to American Indians.
Cultural Resources	--	GL 125	Avoidance or protection measures should be the preferred method to prevent or minimize adverse effects to cultural resources listed in, nominated to, eligible for, or unevaluated for the NRHP.

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Cultural Resources	--	GL 126	Historic facilities that are eligible for the NRHP should be managed to retain their integrity.
American Indian Rights and Interests	--	DC 269	Members of affiliated tribes have access to gather forest resources and products for traditional cultural purposes32 (e.g., medicinal plants, boughs, basket materials, pollen, plants and minerals for pigments).
American Indian Rights and Interests	--	DC 270	Traditionally used resources are not depleted and are available for future generations.
American Indian Rights and Interests	--	DC 271	Sacred sites and significant TCPs are accessible and free of adverse impacts allowing for culturally affiliated tribes to gather traditional forest products and conduct ceremonies.
American Indian Rights and Interests	--	DC 272	All sacred objects, human remains, funerary objects, and objects of cultural patrimony removed from lands of Apache-Sitgreaves NFs have been repatriated to the appropriate tribe.
American Indian Rights and Interests	--	OBJ 34	Over the planning period, a minimum of five MOUs are renewed or established with tribes associated with the Apache-Sitgreaves NFs.
American Indian Rights and Interests	--	GL 127	Significant TCPs and sacred sites, that are known to be utilized by tribes for traditional use and religious ceremonies, should be managed to preserve the character and use of the site.
American Indian Rights and Interests	--	GL 128	Activities and uses should be administered in a manner that is sensitive to traditional American Indian beliefs and cultural practices.
American Indian Rights and Interests	--	GL 129	Human remains and religious objects recovered from excavations conducted on the forests should be repatriated within 5 years in compliance with the Native American Graves Protection and Repatriation Act of 1990 (Public Law 101-601).
Forest Products	--	DC 273	The Apache-Sitgreaves NFs provide a sustainable supply of forest products (e.g., small roundwood, sawlogs, biomass, firewood, cones, Christmas trees, wildings) to businesses and individuals within the capability of the land.
Forest Products	--	DC 274	The collection of live plants, mushrooms, and other forest products does not impact species persistence onsite.
Forest Products	--	OBJ 35	Annually, prepare and offer up to an average of 122,000 CCF [34] from suitable timberlands resulting from sustainable harvest to provide wood products to

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			businesses and individuals.
Forest Products	--	OBJ 36	Annually, provide up to 94,000 CCF (119,380 cords) [34] of firewood for personal and commercial use.
Forest Products	--	OBJ 37	Annually, provide an average of 5,000 permits for Christmas trees.
Forest Products	--	ST 24	Authorizations to cut, collect, or use forest products for any personal, commercial, or scientific purpose (i.e., permits, contacts, agreements) shall include provisions to ensure the needs of wildlife, which depend upon those forest products, will continue to be met (e.g., fungi and cone collection with respect to overwinter forage needs of squirrels).
Forest Products	--	GL 130	Permits issued for forest products should include stipulations to protect resources.
Livestock Grazing	--	DC 275	Livestock grazing contributes to the social, economic, and cultural diversity and stability of rural communities.
Livestock Grazing	--	DC 276	Livestock grazing and associated activities contribute to healthy, diverse plant communities, satisfactory condition soils, and wildlife habitat.
Livestock Grazing	--	DC 277	Range developments for livestock minimize impacts to wildlife and blend with the natural environment.
Livestock Grazing	--	DC 278	Livestock grazing is in balance with available forage (i.e., grazing and browsing by authorized livestock, wild horses, and wildlife do not exceed available forage production within established use levels).
Livestock Grazing	--	DC 279	Livestock grazing and associated activities do not negatively impact cultural resources.
Livestock Grazing	--	ST 25	New or reconstructed fencing shall allow for wildlife passage, except where specifically intended to exclude wildlife (e.g., elk fencing).
Livestock Grazing	--	ST 26	New livestock watering facilities shall be designed to allow wildlife access and escape.
Livestock Grazing	--	GL 131	During maintenance of existing watering facilities, escape ramps that are ineffective or missing should be replaced.
Livestock Grazing	--	GL 132	Critical areas should be managed to address the inherent or unique site factors, conditions, values, or potential conflicts associated with them.

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Livestock Grazing	--	GL 133	Grazing use on seasonal allotments should be timed to the appropriate plant growth stage and soil moisture.
Livestock Grazing	--	GL 134	New livestock troughs, tanks, and holding facilities should be located out of riparian areas to reduce concentration of livestock in these areas. Existing facilities in riparian areas should be modified, relocated, or removed where their presence is determined to inhibit movement toward desired riparian or aquatic conditions.
Livestock Grazing	--	GL 135	As areas are mechanically treated or burned, or after large disturbances, timing of livestock grazing should be modified as needed, in order to move toward desired conditions and to accomplish the objectives for the treatment.
Livestock Grazing	--	GL 136	Forage, browse, and cover needs of wildlife, authorized livestock, and wild horses should be managed in balance with available forage so that providing for these needs remain at or move toward a healthy, persistent state.
Livestock Grazing	--	GL 137	Efforts (e.g., temporary fencing, increased herding, herding dogs) should be made to prevent transfer of disease from domestic sheep and goats to bighorn sheep wherever bighorn sheep occur. Permit conversions to domestic sheep or goats should not be allowed in areas adjacent to or inhabited by bighorn sheep.
Livestock Grazing	--	GL 138	To minimize potential resource impacts from livestock, salt or nutritional supplements should not be placed within a quarter of a mile of any riparian area or water source. Salt or nutritional supplements should also be located to minimize herbivory impacts to aspen clones.
Livestock Grazing	--	GL 139	To prevent resource damage (e.g., streambanks) and disturbance to federally listed and sensitive wildlife species, trailing of livestock should not occur along riparian areas. Where no alternative route is available, approval may be granted where effective mitigation measures are implemented (e.g., timing of trailing, number of livestock trailed at one time).
Livestock Grazing	--	GL 140	Constructed features should be maintained to standard or removed when no longer needed.
Livestock Grazing	--	GL 141	New range developments should be located to minimize impacts to scenic resources and reduce the potential for vandalism and livestock-vehicle conflicts. Range developments should be designed in consideration of public safety, especially in areas of concentrated recreation use.
Minerals and Geology	--	DC 280	Mineral developments, including pits, mines, equipment, and associated structures, do not dominate the scenic landscape.

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Minerals and Geology	--	DC 281	Mineral materials (e.g., gravel, cinders) are available for road maintenance activities for the Forest Service transportation system, public road system, and ADOT use.
Minerals and Geology	--	DC 282	Mineral materials (e.g., cinders, decorative stone) are available to support resource management needs, personal use, and commercial pursuits.
Minerals and Geology	--	DC 283	Lands where past mineral development or exploration has occurred are returned to stable conditions and vegetated with native species.
Minerals and Geology	--	DC 284	Abandoned mine lands do not endanger people or the environment.
Minerals and Geology	--	DC 285	Naturally occurring geological features (e.g., caves, sinkholes) remain intact to support wildlife habitat, recreation opportunities, and unique vegetation.
Minerals and Geology	--	DC 286	Both caves and abandoned mines are available for roosting bats, reducing the potential for displacement, abandonment of young, and possible mortality.
Minerals and Geology	--	DC 287	Archaeological, geological, and biological features of caves and abandoned mines are not adversely affected by visitors.
Minerals and Geology	--	GL 142	Key cultural sites, research natural areas, and administrative and recreation sites with an investment in facilities should be withdrawn from mineral entry to protect resources and existing infrastructure.
Minerals and Geology	--	GL 143	Mineral material resource sites should be located where economical and the scenic integrity objectives can be met. Adverse visual impacts should be minimized.
Minerals and Geology	--	GL 144	Existing designated mineral material collection areas and community pits should be utilized to the maximum before new areas are developed. Additional mineral material development should balance private and community needs while providing for sustainable administrative use.
Minerals and Geology	--	GL 145	Abandoned mine lands or unneeded mineral material pits should be restored, closed, or rehabilitated to provide for resource protection and public health and safety.
Minerals and Geology	--	GL 146	Streambed and floodplain alteration or removal of material should not occur if it prevents attainment of riparian, channel morphology, or streambank desired conditions.
Minerals and	--	GL 147	To reduce disturbances from human activities and prevent the spread of disease, bat gates should be constructed and installed in cave and mine entrances used

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Geology			as shelter for bats within 3 years of discovery when there are no conflicts with cultural resources.
Minerals and Geology	--	GL 148	Caves and abandoned mines that are used by bats should be managed to prevent disturbance to species and spread of disease (e.g., white-nose syndrome).
Minerals and Geology	--	GL 149	Active mineral operations should be managed to deter public motorized vehicle travel for public safety.
Minerals and Geology	--	GL 150	Oil and geothermal leases should contain the "no surface occupancy" restriction in designated [36] or recommended special areas (e.g., recommended wilderness, primitive area, eligible or suitable wild and scenic rivers corridors, research natural areas, botanical area, and wild horse territory), sacred sites, American Indian TCPs, and properties on the National Register of Historic Places to protect the unique character of these areas.
Minerals and Geology	--	GL 151	Common variety mineral activities should not be permitted in designated or recommended special areas or Chevelon Canyon to protect the unique character of these areas.
Special Uses	--	DC 288	Energy developments and other special uses are not major features on the landscape and should not attract attention (moderate scenic integrity).
Special Uses	--	DC 289	Lands where special use activities have occurred show little evidence of impacts.
Special Uses	--	DC 290	Communications sites display landscapes which vary from moderately altered where human activities are evident (low scenic integrity) to slightly altered where human activities may be seen but do not attract attention (moderate scenic integrity).
Special Uses	--	ST 27	Noxious plants and nonnative invasive species monitoring and control shall be included in contracts, permits, and agreements.
Special Uses	--	ST 28	Special use authorizations for the collection of live species with limited distribution (e.g., some invertebrates, plants) shall include permit provisions to ensure the species persist onsite.
Special Uses	--	ST 29	New communications sites or energy developments shall not be authorized on traditional cultural properties.
Special Uses	--	GL 152	Special use authorizations should include provisions that limit encumbrances of NFS land.
Special Uses	--	GL 153	The number of communications sites, energy developments, and energy

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			corridors should be minimized to limit encumbrances of NFS land.
Special Uses	--	GL 154	New communications permittees and equipment should be located or colocated within designated communications sites as identified in appendix C [of the LMP].
Special Uses	--	GL 155	New communications sites, energy developments, and energy corridors should be located to minimize impacts to scenery, special areas, and species.
Special Uses	--	GL 156	Commercial use of Forest Service administrative communications sites should be discouraged to avoid potential use conflicts or communication interference.
Special Uses	--	GL 157	High power antenna/towers should not be authorized except for the existing antenna/tower located on Porter Mountain. Upon termination of the high power permit, or in the case of inoperability, this communications site should be managed as low power.
Special Uses	--	GL 158	Existing energy corridors should be used to their capacity with compatible upgraded power lines before evaluating new routes.
Special Uses	--	GL 159	Environmental disturbance should be minimized by colocating pipelines, power lines, fiber optic lines, and communications facilities.
Special Uses	--	GL 160	Power pole installation or replacement under special use authorization should include raptor protection devices in open habitat such as large meadows and grasslands. Raptor protection devices should be installed on existing poles where raptors have been killed.
Special Uses	--	GL 161	The use of underground utilities should be favored to avoid potential conflicts with resources (e.g., scenic integrity, wildlife, wildfire, heritage).
Special Uses	--	GL 162	Water use associated with special use authorizations should be in accordance with Arizona State Statutes and should have a decreed water right or a valid claim.
Special Uses	--	GL 163	If structural degradation occurs to recreational residences, (re)construction should be discouraged.
Special Uses	--	GL 164	Target ranges may be appropriate in the General Forest or Community-Forest Intermix Management Areas because of the wide spectrum of recreation opportunities that can be provided in these areas. Other management areas should be avoided.
Special Uses	--	GL 165	Constructed features should be maintained to standard or removed when no longer needed.

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Special Uses	--	GL 166	As applicable, issuance of special use authorizations should incorporate measures to reduce potential impacts to wildlife and avoid rare and unique habitats (e.g., bogs, fens).
Special Uses	--	GL 167	Commercial outfitters and guides should not be authorized to use developed campgrounds so those sites remain available for noncommercial forest visitors.
Special Uses	--	GL 168	Commercial outfitters and guides may be authorized use of range developments when there is no conflict with allotment management.
Special Uses	--	GL 169	Large group and recreation event special uses should not be authorized within wilderness, recommended wilderness, primitive area, wildlife quiet areas, eligible "wild" river corridors, riparian and wetland areas, cultural resource sites, Phelps Cabin Botanical Area, Phelps Cabin Research Natural Area, or recommended research natural areas to protect the unique character of these areas.
Water Uses	--	DC 291	Water developments contribute to fish, wildlife, and riparian habitat as well as scenic and aesthetic values.
Water Uses	--	DC 292	Apache-Sitgreaves NFs water rights are secure and contribute to livestock, recreation, wildlife, and administrative uses.
Water Uses	--	DC 293	Surface water is not diminished by groundwater pumping.
Water Uses	--	DC 294	Dams, diversions, or other water control structures are designed, maintained, and operated to conserve water resources.
Water Uses	--	OBJ 38	Annually, prepare at least one instream flow water rights application until water acquisition needs are complete to sustain riparian areas, fish, wildlife, and water-based recreation.
Water Uses	--	ST 30	Forest Service water rights must be put to beneficial use and that use documented and consistent with ADWR regulations.
Water Uses	--	ST 31	Special uses for water diversions shall maintain fish, wildlife, and aesthetic values and otherwise protect the environment.
Water Uses	--	ST 32	Streams on NFS lands with high aquatic values and at risk from new water diversions shall be preserved and protected with instream flow water rights.
Water Uses	--	ST 33	Groundwater withdrawals shall not measurably diminish surface water flows on NFS lands without an appropriate surface water right.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Water Uses	--	GL 170	Constructed features should be maintained to -- or removed when no longer needed.
Wildland Fire Management	--	DC 295	Human life, property, and natural and cultural resources are protected within and adjacent to NFS lands.
Wildland Fire Management	--	DC 296	Wildland fires burn within the range of frequency and intensity of natural fire regimes. Uncharacteristic high-severity fires rarely occur and do not burn at the landscape scale.
Wildland Fire Management	--	DC 297	Wildland fire maintains and enhances resources and functions in its natural ecological role.
Wildland Fire Management	--	DC 298	For all PNVTs, the composition, cover, structure, and mosaic of vegetative conditions reduce uncharacteristic wildfire hazard to local communities and forest ecosystems.
Wildland Fire Management	--	GL 171	Wildland fire may be used to meet PNVT desired conditions and enable natural fire regimes.
Wildland Fire Management	--	GL 172	Human-induced impacts (e.g., smoke production, suppression actions) to natural processes, resources, or infrastructure attributable to wildland fire activities should be managed towards achieving objectives as identified in the applicable decision document.
Wildland Fire Management	--	GL 173	Resources and infrastructure (e.g., fences, roads, stock tanks) that are lost or damaged by prescribed fire, use of wildland fire, or any suppression activities should be stabilized and rehabilitated.
Wildland Fire Management	--	GL 174	Firelines, helispots, and fire camps should be located to avoid disturbance to critical species and impacts to cultural resources.
Wildland Fire Management	--	GL 175	Aerial retardant drops should avoid threatened, endangered, proposed, or candidate, or identified sensitive species and waterways [37].
General Forest	--	DC 299	Watershed condition rating is at satisfactory.
General Forest	--	DC 300	Landscapes in the General Forest Management Area vary from moderately altered where human activities are evident (low scenic integrity) to natural where generally only ecological changes occur (very high scenic integrity).
General Forest	--	DC 301	Recreation opportunities range from semiprimitive nonmotorized to rural.
Community-	--	DC 302	The Community-Forest Intermix Management Area is composed of smaller groups of trees that are spaced more widely than other forested areas. These

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Forest Intermix			conditions result in fires that burn primarily on the forest floor and rarely spread as crown fire.
Community-Forest Intermix	--	DC 303	There is legal and adequate access to public lands for resource management and recreation.
Community-Forest Intermix	--	DC 304	As a result of forest management, most wildfires are low to mixed severity surface fires resulting in limited loss of structures or ecosystem function.
Community-Forest Intermix	--	DC 305	Residents and visitors are knowledgeable regarding wildfire protection of their homes and property, defensible space, and appropriate uses of the forests.
Community-Forest Intermix	--	DC 306	These areas provide a safer firefighting environment than the general forest.
Community-Forest Intermix	--	DC 307	Native grasses, forbs, shrubs, and litter (i.e., fine fuels) are abundant enough to maintain and support natural fire regimes, protect soils, and support water infiltration.
Community-Forest Intermix	--	DC 308	The composition, density, structure, and mosaic of vegetative conditions reduce uncharacteristic wildfire hazard to local communities and forest ecosystems.
Community-Forest Intermix	--	DC 309	Ponderosa pine and dry mixed conifer forest structure is similar to forestwide conditions or is composed of smaller and more widely spaced tree groups than in the general forest.
Community-Forest Intermix	--	DC 310	Wet mixed conifer and spruce-fir PNVTs are growing in an overall more open condition than the wet mixed conifer PNVT outside of the Community-Forest Intermix Management Area. These conditions result in fires that burn primarily on the forest floor and rarely spread as crown fire.
Community-Forest Intermix	--	DC 311	Where potential occurs, pure deciduous stands (e.g., aspen, Gambel oak) act as natural firebreaks and enhance scenery.
Community-Forest Intermix	--	DC 312	Grasslands have less than 10 percent woody canopy cover.
Community-Forest Intermix	--	DC 313	Piñon-juniper stands have open canopy conditions.
Community-Forest Intermix	--	DC 314	The integrity of riparian areas is maintained.
Community-	--	DC 315	Vandalism and pilfering of cultural resources are uncommon.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Forest Intermix			
Community-Forest Intermix	--	DC 316	Landscapes in the Community-Forest Intermix Management Area vary from moderately altered where human activities are evident (low scenic integrity) to natural appearing where human activities do not stand out (high scenic integrity).
Community-Forest Intermix	--	DC 317	Recreation opportunities range from roaded natural to rural.
Community-Forest Intermix	--	GL 176	Unauthorized infrastructure should be removed.
Community-Forest Intermix	--	GL 177	To reduce fire hazard and spread of insects and disease onto adjacent lands, slash should be treated (e.g., removal, pull back, relocation, burned) as soon as possible.
Community-Forest Intermix	--	GL 178	Where more than 80 percent of the host species or 90 percent of the area is infected with dwarf mistletoe (if regeneration or deferred treatment is not feasible), then thinning from below and/or prescribed fire should be used as needed for fire hazard reduction.
Community-Forest Intermix	--	GL 179	Due to the greater values to be protected (e.g., homes, property), basal areas should be at the lower end of the desired range and openings should occur at the higher end of the desired range (as described in the applicable PNVT desired conditions).
Community-Forest Intermix	--	GL 180	Retention of fire-resistant tree species (e.g., ponderosa pine, Douglas-fir, pure aspen) should be emphasized in the wet mixed conifer and spruce-fir forested PNVTs to reduce fire hazard.
High Use Developed Recreation Area	--	DC 318	Facilities are well maintained and provide for accessibility, user safety, comfort, and convenience, as well as protection of resources.
High Use Developed Recreation Area	--	DC 319	Visitors can expect to see a wide range of human activities and development (including roads, trails, interpretive sites, campgrounds, trailheads, fences, and day-use facilities).
High Use Developed Recreation Area	--	DC 320	The evidence of management activities is common.
High Use Developed	--	DC 321	The surrounding landscape is natural appearing, pastoral, or historic with

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Recreation Area			variations created by the recreational facilities.
High Use Developed Recreation Area	--	DC 322	Trails are well marked and may include features such as loop systems or interpretive information.
High Use Developed Recreation Area	--	DC 323	Recreation opportunities range from semiprimitive motorized to rural.
High Use Developed Recreation Area	--	GL 181	Roads, facilities, and signing should be designed to blend with surroundings.
High Use Developed Recreation Area	--	GL 182	Management should focus on operation and maintenance, safety, aesthetics, and control of noxious weeds and nonnative invasive species.
Energy Corridor	--	DC 324	Energy corridors serve a public benefit by providing for a reliable supply of energy essential to local, regional, and national economies.
Energy Corridor	--	DC 325	Vegetative conditions and land uses within the energy corridor facilitate the operation and maintenance of the associated facilities and infrastructure.
Energy Corridor	--	DC 326	Vegetation consists predominantly of grasses, forbs, shrubs, low-growing trees, and sapling-sized trees.
Energy Corridor	--	ST 34	Obsolete or unused facilities within energy corridors shall be removed and the areas rehabilitated.
Energy Corridor	--	GL 183	Energy corridors should be managed as nonmotorized areas to avoid conflicts with corridor operations and maintenance needs, although operations and maintenance activities may use motorized equipment.
Energy Corridor	--	GL 184	To limit impacts to undisturbed areas, new utilities (e.g., power lines, telephone lines, gas lines) should be colocated within existing corridors whenever technically feasible, within existing rights-of-way (including road rights-of-way), or follow major transportation routes.
Energy Corridor	--	GL 185	Within and adjacent to energy corridors, vegetation should be managed similarly to the Community-Forest Intermix Management Area so that facilities stay operational and reduce the hazards of human-caused damage, damage from wildland fire, and falling trees.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Energy Corridor	--	GL 186	Clearing of vegetation along rights-of-way, facilities, and permitted sites should be limited to that which achieves desired conditions, abates an identified hazard to the facility, or for operational efficiency and weed control.
Energy Corridor	--	GL 187	Trees and shrubs in riparian areas should only be removed when there is an imminent threat to facilities and, in these cases, trees should be left for large coarse woody debris recruitment to the stream and riparian system.
Energy Corridor	--	GL 188	When planning and implementing vegetation treatments (e.g., corridor maintenance), vegetation within riparian zones that provides rooting strength important for bank stability should be encouraged.
Energy Corridor	--	GL 189	As utility facilities are maintained or replaced, relocation of corridors outside of riparian areas should be considered to reduce potential impacts to these ecologically sensitive areas.
Energy Corridor	--	GL 190	Invasive plant species should be aggressively controlled within energy corridors to prevent or minimize spread.
Wild Horse Territory	--	DC 327	Grazing is in balance with available forage (i.e., grazing and browsing by authorized livestock, wild horses, and wildlife do not exceed established use levels).
Wild Horse Territory	--	DC 328	Horse numbers within the territory are aligned with the appropriate management level [2] as described in the "Heber Wild Horse Territory Management Plan."
Wild Horse Territory	--	DC 329	The Wild Horse Territory Management Area contains landscapes that vary from moderately altered where human activities are evident (low scenic integrity) to natural appearing where human activities do not stand out (high scenic integrity).
Wild Horse Territory	--	DC 330	Recreation opportunities range from semiprimitive nonmotorized to roaded natural.
Wild Horse Territory	--	GL 191	When wild horse populations exceed the appropriate management level, horses should be removed in accordance with the "Heber Wild Horse Territory Management Plan" (when completed).
Wildlife Quiet Area	--	DC 331	WQAs provide blocks of core habitat to meet wildlife life stage requirements during the breeding, rearing, and in some cases, the critical wintering period.
Wildlife Quiet Area	--	DC 332	WQAs contribute to preserving natural behaviors and processes that sustain wildlife populations associated with each WQA (see below).

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Wildlife Quiet Area	--	DC 333	WQAs provide for wide ranging predators and big game species, are large enough for a range of species, and provide for population and genetic exchange.
Wildlife Quiet Area	--	DC 334	WQAs lack disturbance from motorized vehicles, resulting in less stress to wildlife.
Wildlife Quiet Area	--	DC 335	WQAs provide undisturbed, nonmotorized hunting opportunities.
Wildlife Quiet Area	--	DC 336	WQAs provide semiprimitive nonmotorized recreation opportunities, including relatively quiet recreation opportunities close to or adjacent to intensively used areas.
Wildlife Quiet Area	--	DC 337	Landscapes in WQAs vary from slightly altered where human activities may be seen but do not attract attention (moderate scenic integrity) to natural appearing where human activities do not stand out (high scenic integrity).
Wildlife Quiet Area	--	DC 338	Willow Springs Horse Trap and Beaver-Turkey Ridge WQAs provide quiet areas for big game amid the intensive recreation uses on the Black Mesa Ranger District.
Wildlife Quiet Area	--	DC 339	Bear Springs and Cottonwood Seep WQAs provide quality travel, hiding, and thermal cover along the Mogollon Rim for a wide variety of species ranging from turkeys to mountain lions. The WQAs provide an abundance of browse species important for deer and elk.
Wildlife Quiet Area	--	DC 340	Woolhouse WQA on the Lakeside Ranger District provides high quality winter range for pronghorn antelope and elk within a busy and heavily used wildland-urban interface.
Wildlife Quiet Area	--	DC 341	The Hulsey Bench WQA on the Alpine Ranger District provides Mexican spotted owl, northern goshawk, elk, deer, turkey, and bear refuge habitat.
Wildlife Quiet Area	--	DC 342	The Open Draw WQA on the Alpine Ranger District provides high quality foraging and young rearing habitat for deer, elk, turkey, and bear.
Wildlife Quiet Area	--	DC 343	Middle Mountain WQA provides refuge for northern goshawk, turkey, deer, elk, and Mexican spotted owl amid extensive dispersed recreation on the Alpine Ranger District.
Wildlife Quiet Area	--	DC 344	Upper Coyote Creek WQA on the Alpine Ranger District provides high quality habitat, especially undisturbed young rearing habitat, for deer, elk, turkey, and bear.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Wildlife Quiet Area	--	DC 345	St. Peters Dome WQA on the Springerville Ranger District provides high quality spruce-fir habitat for dusky grouse, bear, and other high elevation species.
Wildlife Quiet Area	--	GL 192	All WQAs should be managed to preclude snowmobile use to minimize disturbance during the critical winter period.
Wildlife Quiet Area	--	GL 193	WQA boundaries should be signed to identify the areas and educate the public about their purpose.
Wildlife Quiet Area	--	GL 194	Fences surrounding and within WQAs should be inspected and improved to allow wildlife movement within and outside of the areas. Fences should be removed if no longer needed.
Wildlife Quiet Area	--	GL 195	Hiding cover and travelways for wildlife should be maintained to provide for security and connectivity of habitat.
Wildlife Quiet Area	--	GL 196	Restoration treatments should consider the needs of wildlife (e.g., calving/fawning areas, wallows, game crossings) to minimize potential impacts to the species and their habitat.
Natural Landscape	--	DC 346	Succession, fire, insects, disease, floods, and other natural processes and disturbance events primarily shape the composition, structure, and landscape patterns of the vegetation (although management activities may also have a minor influence).
Natural Landscape	--	DC 347	These areas contribute to ecosystem and species diversity and sustainability; serve as habitat for plants and animals; and offer wildlife corridors, reference areas, primitive and semiprimitive nonmotorized recreation opportunities, and places for people seeking natural scenery and solitude.
Natural Landscape	--	DC 348	Inventoried roadless areas (IRAs) maintain their overall roadless character.
Natural Landscape	--	DC 349	Roads and human structures may be present, although uncommon.
Natural Landscape	--	DC 350	Landscapes vary from natural appearing where human activities do not stand out (high scenic integrity) to natural where generally only ecological changes occur (very high scenic integrity), except as described below.
Natural Landscape	--	DC 351	Developed campgrounds, picnic areas, trailheads, and roads passable by passenger cars provide roaded natural recreation opportunities. Landscapes within and immediately adjacent to these features remain scenic. They may be slightly altered where human activities may be seen but do not attract attention (moderate scenic integrity) to natural appearing where human activities do not

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
			stand out (high scenic integrity).
Natural Landscape	--	DC 352	While emphasizing semiprimitive nonmotorized and primitive recreation opportunities, motorized travel may occur on existing roads and motorized trails.
Natural Landscape	--	DC 353	Natural landscapes contribute to preserving natural behaviors and processes that sustain wildlife populations.
Natural Landscape	--	ST 35	New mineral material pits shall not be authorized.
Natural Landscape	--	GL 197	Limited cross-country motorized vehicle use may be authorized for administrative purposes.
Natural Landscape	--	GL 198	Temporary road construction and motorized equipment may be used in order to achieve ecological desired conditions.
Natural Landscape	--	GL 199	Existing roads should be maintained to the minimum standard to meet the objective maintenance level.
Natural Landscape	--	GL 200	Unneeded mineral material pits should be closed, recontoured, and revegetated.
Research Natural Area	--	DC 354	The Phelps Cabin RNA provides opportunities for research, study, observation, monitoring, and educational activities that maintain the natural conditions for which the area was established.
Research Natural Area	--	DC 355	The Phelps Cabin RNA, outside of Mount Baldy Wilderness, exhibits landscapes that vary from natural appearing where human activities do not stand out (high scenic integrity) to natural where generally only ecological changes occur (very high scenic integrity).
Research Natural Area	--	DC 356	Recreation opportunities, although not encouraged, are semiprimitive nonmotorized.
Research Natural Area	--	ST 36	The Phelps Cabin RNA will be surveyed and posted with boundary signs within the planning period.
Research Natural Area	--	ST 37	The Phelps Cabin RNA will be managed for nonmotorized access within the area; exceptions may be made for permitted research use.
Research Natural Area	--	GL 201	Management measures should be used (e.g., fencing) to protect unique features.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Research Natural Area	--	GL 202	To minimize impacts to unique and sensitive plant species, recreational activities (other than use on the designated trail) should not be encouraged.
Research Natural Area	--	GL 203	Research special use authorizations should limit impacts to sensitive resources, unique features, and species within the RNA.
Recommended Research Natural Area	--	DC 357	The recommended RNAs provide opportunities for research, study, observation, monitoring, and educational activities that maintain the natural conditions for which the area was recommended.
Recommended Research Natural Area	--	DC 358	The Three Forks Closure Area (30 acres) of the recommended Three Forks RNA is free from human trampling and other disturbances to protect very sensitive and unique species, such as the Three Forks springsnail, California floater, New Mexico meadow jumping mouse, Chiricahua leopard frog, and loach minnow.
Recommended Research Natural Area	--	DC 359	The recommended Three Forks, Campbell Blue, Corduroy, and Sandrock RNAs, outside of any eligible or suitable wild and scenic river corridor, exhibit unaltered appearing landscapes where human activities do not stand out (high scenic integrity).
Recommended Research Natural Area	--	DC 360	The recommended Thomas Creek RNA exhibits slightly altered landscapes where human activities may be seen but do not attract attention (moderate scenic integrity).
Recommended Research Natural Area	--	DC 361	The recommended Phelps Cabin RNA addition (currently the Phelps Cabin Botanical Area), outside of any eligible or suitable wild and scenic river corridor, exhibit unaltered appearing landscapes where human activities do not stand out (high scenic integrity).
Recommended Research Natural Area	--	DC 362	Natural conditions prevail in the recommended Phelps Cabin RNA addition while providing an opportunity for interpretation, education, and research.
Recommended Research Natural Area	--	DC 363	Unique plant species, including willows, paintbrushes, and gentians, thrive in the recommended Phelps Cabin RNA addition.
Recommended Research Natural Area	--	GL 204	To minimize impacts to unique and sensitive plant and animal species, recreational activities should not be encouraged.
Recommended Research Natural Area	--	GL 205	If necessary, recommended RNAs should be fenced to manage unique features.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Recommended Research Natural Area	--	GL 206	Research special use authorizations should limit impacts to sensitive resources, unique features, and species within recommended RNAs.
Recommended Research Natural Area	--	GL 207	Recommended RNAs should be managed for nonmotorized access within the area to minimize ground disturbances and protect the resources which make these areas unique.
Wilderness and Primitive Area	--	DC 364	Ecological conditions are affected primarily by natural ecological processes, with the appearance of little or no human intervention.
Wilderness and Primitive Area	--	DC 365	Fire functions as a natural ecological process.
Wilderness and Primitive Area	--	DC 366	There is little evidence of human developments and little or no evidence of camping activity, unauthorized trails, trash, or other human impacts on the environment.
Wilderness and Primitive Area	--	DC 367	Visitor use does not affect wilderness characteristics.
Wilderness and Primitive Area	--	DC 368	Wilderness boundaries are posted and visible to visitors.
Wilderness and Primitive Area	--	DC 369	There are unconfined opportunities for exploration, solitude, risk, and challenge. The nonmotorized trail system enhances the wilderness character. Where there is public demand, outfitters and guides provide services to visitors seeking a wilderness experience.
Wilderness and Primitive Area	--	DC 370	Bear Wallow Wilderness provides outstanding opportunities for solitude and isolation. Encounters with small groups or individuals are infrequent.
Wilderness and Primitive Area	--	DC 371	Within Mount Baldy and Escudilla Wilderness areas, trails concentrate use and provide access to popular destinations. Encounters with other users may occur.
Wilderness and Primitive Area	--	DC 372	Wilderness areas maintain natural landscapes where generally only ecological changes occur (very high scenic integrity) and provide primitive and/or semiprimitive nonmotorized recreation opportunities.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Wilderness and Primitive Area	--	DC 373	Wilderness contributes to preserving natural behaviors and processes that sustain wildlife populations.
Wilderness and Primitive Area	--	ST 38	Party size of 12 persons and/or 12 head of stock for hiking and riding groups in Mount Baldy Wilderness shall not be exceeded. A party size of 6 persons for overnight camping shall not be exceeded.
Wilderness and Primitive Area	--	ST 39	Party size of 12 persons and/or 15 head of stock for hiking and riding groups in Escudilla and Bear Wallow Wilderness and the Blue Range Primitive Area shall not be exceeded.
Wilderness and Primitive Area	--	ST 40	Objective(s) and strategies for all wildfires shall be identified.
Wilderness and Primitive Area	--	ST 41	Fire management activities shall be conducted in a manner compatible with the overall wilderness management --s (minimum impact suppression tactics).
Wilderness and Primitive Area	--	ST 42	Human-caused disturbed areas that do not complement wilderness characteristics will be rehabilitated to a natural appearance, using species or other materials native to the area.
Wilderness and Primitive Area	--	GL 208	New trail construction may be considered if the objective is enhancement of the wilderness character (e.g., increase solitude opportunities, restore naturalness).
Wilderness and Primitive Area	--	GL 209	Trail maintenance should be coordinated around anticipated visitor high-use periods to minimize encounters.
Wilderness and Primitive Area	--	GL 210	Trails that have minimal use, detract from the wilderness character, or cannot practically be maintained or reconstructed should be obliterated.
Wilderness and Primitive Area	--	GL 211	Prescribed fire should be considered to reduce the risks and consequences of uncharacteristic wildfire within wilderness or escaping from wilderness by reducing unnatural fuel accumulations, if necessary to meet wilderness fire management objectives. Naturally occurring wildfires should be allowed to perform, as much as possible, their natural ecological role within wilderness.
Wilderness and Primitive Area	--	GL 212	Fire camps, helispots, and other temporary facilities should be located outside the wilderness boundary to protect wilderness character.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Wilderness and Primitive Area	--	GL 213	Firelines and spike camps (i.e., a remote camp usually near a fireline) should not be constructed adjacent to trails or camp areas to protect wilderness values.
Wilderness and Primitive Area	--	GL 214	Grazing of pack stock should not occur except as authorized by the district ranger when adequate forage is available.
Primitive Area	--	DC 374	The Blue Range Primitive Area and presidential recommended additions maintain natural landscapes where generally only ecological changes occur (very high scenic integrity) and provide primitive recreation opportunities, except along the existing road (36 CFR 293.17(a)).
Recommended Wilderness	--	DC 375	Recommended wilderness areas display natural landscapes where generally only ecological changes occur (very high scenic integrity) and provide primitive or semiprimitive nonmotorized recreation opportunities.
Recommended Wilderness	--	DC 376	Recommended wilderness contributes to preserving natural behaviors and processes that sustain wildlife populations.
Recommended Wilderness	--	ST 43	Objective(s) and strategies for all wildfires shall be identified.
Recommended Wilderness	--	ST 44	Fire management activities shall be conducted in a manner compatible with maintaining wilderness characteristics (minimum impact suppression tactics).
Recommended Wilderness	--	ST 45	Human-caused disturbed areas that do not complement wilderness characteristics shall be rehabilitated to a natural appearance, using plant species or other materials native to the area.
Recommended Wilderness	--	GL 215	The wilderness characteristics of each recommended wilderness should remain intact until a congressional decision on wilderness designation is made. Characteristics include naturalness, opportunities for solitude, opportunities for primitive recreation, and identified special features.
Recommended Wilderness	--	GL 216	Only nonmotorized travel may occur in recommended wilderness. However, motorized use associated with grazing allotments may occur and should be limited to that needed to carry out required management practices as authorized.
Recommended Wilderness	--	GL 217	Prescribed fire should be considered to reduce the risks and consequences of uncharacteristic wildfire by reducing unnatural fuel accumulations, if necessary to meet fire management objectives. Naturally occurring fires should be allowed to perform, as much as possible, their natural ecological role.

Plan Section	Scale (where applicable)	Component Number	Desired Condition (DC), Objective (OBJ), Standard (ST), and Guideline (GL) [footnote]
Recommended Wilderness	--	GL 218	Fire camps, helispots, and other temporary facilities should be located outside the recommended wilderness to protect wilderness values.

[FOOTNOTES - as number in the Land Management Plan for the Apache-Sitgreaves National Forests by chapter]

Chapter 2

[2] Degrading factors include, but are not limited to, actions that cause or maintain high departure from historic vegetation conditions, unsatisfactory or impaired soil condition, nonfunctioning riparian areas, impaired species habitat, occurrence of invasive species, and unstable road and trail conditions.

[4] Satisfactory soil condition exists when indicators signify that soil function is being sustained and soil is functioning properly and normally. The ability of soil to maintain resource values and sustain outputs is high.

[5] Species composition and cover amounts and the amount of vegetation and litter needed for soil protection are described by ecological unit in the "Terrestrial Ecosystem Survey for the Apache-Sitgreaves National Forests" (Laing et al., 1987, as amended).

[6] Tolerance soil loss rates are the maximum rates that soil can erode and not reduce long term soil productivity. These were established for each terrestrial ecosystem mapping unit component and are described in the "Terrestrial Ecosystem Survey for the Apache-Sitgreaves National Forests" (Laing et al., 1987, as amended).

[7] The amount of woody material varies by PNVT; see vegetation desired conditions.

[11] Detrimental changes are described in species-specific literature (e.g., recovery plans, listing and critical habitat designations, conservation strategies).

[12] Reference conditions are described in species-specific literature and research.

[15] Based on the site capability as defined by the specific map unit under consideration in the "Terrestrial Ecosystem Survey for the Apache-Sitgreaves National Forests" (Laing et al., 1987 as amended).

[20] The spatial extent of wetlands is delineated in the 2011 RMAP (Regional Riparian Mapping Project) found in the forests' GIS database.

[21] Plant height source material: Vine 1960; Hermann 1970, 1975; Hitchcock and Chase 1971; McDougall 1973; Correll and Correll 1975; Gould 1977; Martin and Hutchins 1980; Benson and Darrow 1981; Hickman 1993; Cronquist et al., 1997; Ruyle and Young 1997; Welsh et al., 1997; Hurd et al., 1998; Barkworth et al., 2003, 2007; Flora of North America 2008; and Springer et al., 2009.

[22] Measured on ungrazed plants as an indicator of vigor.

[24] Fawning may extend through mid-July in the high elevation montane/subalpine grasslands.

[27] Controls do not include State authorized hunting.

[28] The system of NFS roads and motorized trails is identified in the I-WEB database.

[29] In 2012, there are no areas designated for motorized cross-country travel.

[31] Significance as defined by the National Historic Preservation Act and 36 CFR 60.

[32] Sacred sites as defined in E.O. 13007, traditional cultural properties as defined in National Register Bulletin 38, traditional cultural purposes as defined in the 2008 Farm Bill Section 8102, Subtitle B.

[34] CCF = 100 cubic feet

[34] CCF = 1.27 cords

[36] Designated wilderness is withdrawn from leasing and mineral entry.

[37] See the Nationwide Aerial Application of Fire Retardant on National Forest System Land. Final Environmental Impact Statement. USDA Forest Service for species-specific information.

Chapter 3

[2] The Interior Board of Land Appeals (IBLA) has defined the appropriate management level as the “optimum” number of wild horses (or burros) which results in a thriving natural ecological balance and avoids a deterioration of the range. (109 IBLA 119; also reference Dahl vs. Clark, supra at 592). It is usually expressed as a range of numbers. From http://www.blm.gov/nv/st/en/prog/wh_b/ appropriate_management.html