United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Ecological Services
P.O. Box 1306, Room 6034
Albuquerque, New Mexico 87103

February 13, 2015

In Reply Refer To:
FWS/R2/ARD-ES/059502
Consultation #02E00000-2015-F-0001

Astor Boozer, Regional Conservationist
U.S. Department of Agriculture
National Resources Conservation Service
1400 Independence Ave SW
Washington, DC 20250

Dear Mr. Boozer:

This represents the U.S. Fish and Wildlife Service (Service) programmatic biological and conference opinion (Opinion) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended. This Opinion analyzes the effects of implementation of the Natural Resources Conservation Services' (NRCS) Working Lands for Wildlife Project for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*) and its critical habitat as well as 84 other federally listed and candidate species on eligible lands in the states of Arizona, California, Colorado, New Mexico, Texas and Utah.

The proposed action consists of the following: (1) conducting habitat restoration and management actions on lands eligible for NRCS' Farm Bill programs for the flycatcher and the other covered species; (2) utilizing habitat evaluation and assessment tools, such as a Wildlife Habitat Evaluation Guide, to ensure that the best available science is applied to these conservation and; (3) implementing conservation practices across the range in concert with eligible landowners by developing conservation plans that incorporate a suite of conservation measures specific to minimize adverse effect and maximize conservation benefits to the covered species.

This Opinion updates and replaces a similar biological opinion completed by the Service in July 2012. As a result of discussions between the NRCS and the Service, the NRCS developed a revised Biological Assessment which fully explains all of the changes and improvements to the proposed action. The Service has accepted and incorporated the changes as stated in the August 2014 Biological Assessment with the following exceptions:

- The Service recently concluded that the Rio Grande cutthroat trout (*Oncorhynchus clarkii virginalis*) was not warranted for protection under the Act, thus the Service did not analyze this species or provide regulatory determinations;

- The Service concludes that the proposed action is not likely to adversely affect the Little Aguja pondweed (*Potamogeton clystocarpus*) and Navajo Sedge (*Carex specuicola*), Nevares Spring naucorid bug (*Ambrysus funebris*), Ash Meadows naucorid (*Ambrysus amargosus*), and Kanab ambersnail (*Oxyloma haydeni kanabense*); and

- The Service concludes that the proposed action is not likely to adversely affect the steelhead trout *Oncorhynchus (=salmo) mykiss*).

This Opinion, the associated NRCS Biological Assessment, and all other supporting technical documents were developed through numerous communications between the Service and NRCS staff. This Opinion is based on the best available scientific and commercial data including electronic mail and telephone correspondence with NRCS officials, Service files, pertinent scientific literature, noted hyperlinks, discussions with recognized species authorities, and other scientific sources. A complete administrative record of this consultation is on file in the Service's Ecological Services Field Office in Tucson, Arizona.

We appreciate the NRCS's efforts to minimize effects to listed species through their conservation measures and practices. We look forward to working with NRCS on this important conservation initiative. For further information; please contact Richard Gooch at (571) 329-2222 or Sarah Rinkevich at (520) 670-6150, ext 237.

Sincerely,

Michelle Shaughnessy

Michelle Shaughnessy
Assistant Regional Director, Ecological Services

Attachment

BIOLOGICAL AND CONFERENCE OPINION

INRODUCTION

This represents the United States Fish and Wildlife Service's (Service or USFWS) programmatic biological opinion regarding the implementation of the Natural Resources Conservation Services' (NRCS) Working Lands for Wildlife Project for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*) and its critical habitat as well as 85 other federally listed and candidate species on eligible lands in the states of Arizona, California, Colorado, New Mexico, Texas and Utah (see Figure 1 below).

This Biological and Conference Opinion (Opinion or Document) has been prepared pursuant to and complies with section 7 of the Endangered Species Act (ESA) of 1973 (the ESA), as amended (16 United States Code [U.S.C.] 1531 et seq.) and 50 Code of Federal Regulations [CFR] §402 of our interagency regulations governing section 7 of the ESA. Section 7(a)(2) of the ESA requires federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out is not likely to jeopardize the continued existence of any federally listed species nor destroy or adversely modify critical habitat. The Service and the federal agency or its designated representative implement section 7 of the ESA by consulting or conferring on any federal action that may affect federally listed or proposed threatened and endangered species and/or designated or proposed critical habitat

In 2012, the Service developed a programmatic consultation for NRCS to implement a similar effort. Modifications were requested by NRCS and in early 2014 they submitted a request to reinitiate consultation and provided a Biological Assessment (BA). The changes, modifications, and improvements are summarized in the NRCS' BA document. The Service worked collaboratively with NRCS to develop the associated BA for the proposed action; its contents, including the technical references provided in the Appendices, are incorporated by reference into this Document. The most significant change is NRCS' expansion of efforts to explicitly design benefits to all of the covered species within the Action Area.

DESCRIPTION OF THE PROPOSED ACTION

BACKGROUND

On March 8, 2012, the Secretaries of Agriculture and Interior jointly announced a collaborative partnership between the NRCS and the USFWS. This partnership, called the Working Lands for Wildlife Project (WLFW), would coordinate with landowners who are eligible to receive Farm Bill technical and financial assistance to achieve the following objectives:

(1) Restore populations of declining wildlife species;
(2) Provide farmers, ranchers, and forest managers with regulatory certainty that conservation investments they make today help sustain their operations over the long term; and
(3) Strengthen and sustain rural economies by restoring and protecting the productive capacity of working lands.

The WLFW identified seven wildlife species across the United States. The southwestern willow flycatcher was one of the seven focal species. More information on the Working Lands for Wildlife Project can be found at: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1047545.pdf.

The NRCS, in the U.S. Department of Agriculture, works with private landowners through conservation planning and assistance designed to benefit the soil, water, air, plants, and animals that result in productive lands and healthy ecosystems. The NRCS's conservation programs help people reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damages caused by floods and other natural disasters. Public benefits include enhanced natural resources that help sustain agricultural productivity and environmental quality while supporting continued economic development, recreation, and scenic beauty. All conservation programs are voluntary and offer technical assistance and may offer financial incentives for implementing conservation systems.

The NRCS is neither a regulatory nor a land management agency, and its role in farm and range management issues is largely advisory at the invitation of individual clients. Technical advice and planning alone do not constitute a federal nexus, as the NRCS has no control over the conservation plan and the client is the decision maker for the conservation plan. However, beginning with the 2002 Farm Bill, clients can now obtain financial assistance directly from NRCS to implement their conservation plan. This establishes a federal nexus for the agency. Most financial assistance programs consist of a term contract between a client and the NRCS where the client agrees to install and maintain a suite of conservation practices to improve natural resource management, and receive a reimbursement of a portion of the cost as an incentive for completing each practice to NRCS standards and specifications. When the term of the contract expires, the federal nexus for NRCS also expires, as this is the end of the action authorized, funded, or carried out by NRCS. However, the contract recipient agrees to maintain the conservation practices for their expected lifespan.

Conservation Planning Process

Local NRCS conservation planners develop conservation plans for clients that address environmental resource concerns on private, non-Federal, or Tribal lands. The NRCS conservationists help individuals and communities to take a comprehensive approach to planning the proper use and protection of natural resources on these lands through a nine-step planning process described in the NRCS "National Planning Procedures Handbook" and described in more detail in Appendix I of the NRCS' 2014 BA.

In addition to NRCS' comprehensive approach to planning using a nine-step planning process described in the National Planning Procedures Handbook, the WLFW planners must use the habitat evaluation tools (including the Wildlife Habitat Evaluation Guide and/or Threats Checklist) approved via this Opinion. These tools will be used to assess the initial habitat conditions and limiting habitat factors, and the restoration potential for a site. Based on the results of these evaluation tools, the WLFW planner works with the participant to develop and evaluate alternatives to address the identified limiting habitat factors (in order of identified priority) on sites determined to have restoration potential. The resulting conservation plan will include at least one core conservation practice and all conservation practices must follow the conservation measures of this Opinion.

WLFW Planners

WLFW planners are resource professionals who work with interested participants to develop and implement WLFW conservation plans. WLFW planners are trained to understand the species' needs and the principles to address any limiting factors or threats by working under ESA section 7 consultations. WLFW planners may be NRCS and USFWS natural resource staff or other partner organization field staff (e.g., State wildlife agency, conservation nonprofit organizations, and resource management consultants). The WLFW planner is a separate certification from the NRCS conservation planner certification. This was nationally directed to ensure a high level of quality across a species range.

Overview of WLFW Plan Requirements

- Developed by a WLFW Planner (Level 1 or 2) and signed by a Level 2 WLFW Planner.
- The habitat evaluation tools (WHEG and/or Threats Checklist) (Appendix V of NRCS' BA) must be completed and incorporated into the planning process for every WLFW conservation plan.
- The WLFW conservation plan must include at least one core conservation practice defined in Table 1 below. A core conservation practice establishes the focus objectives for addressing resource concerns on a client's property.
- The WLFW conservation plan must remove or reduce limiting factors(s) in their order of significance, as indicated by the results of the above mentioned habitat evaluation tools (this is a conservation practice standard criteria of the core practices). The resource limiting factors are fully profiled and explained in Table 4 of NRCS' BA.
- Every practice planned, designed and installed under a WLFW conservation plan or contract must adhere to the conservation measures and conditions identified in this Opinion on the affected job sheet(s). A complete outline of the conservation measures and conditions are provided in Appendices II, III, and IV of NRCS' BA.
- The conservation plan and associated job sheets will clearly detail what is required to "maintain" the covered conservation practices and habitat at a suitable level. Suitable habitat is defined using the WHEG and/or Threats Checklist. It is generally considered the minimum habitat requirements for the species (a WHEG score $\geq$0.5). This is a crucial distinction to make in order for the participant to maintain Endangered Species Act (ESA) predictability after practice implementation. The ESA predictability is further explained in Appendix 1 of this Opinion.
- The WLFW conservation plan becomes the instrument to convey ESA regulatory predictability after the expiration of any NRCS contract(s) for that landowner.
- Emphasis on Resource Management System (RMS) level planning in riparian areas – with progressive planning elements applied to the remainder of the Conservation Plan for each eligible landowner. RMS planning is explained further in the NRCS's BA.

The WLFW – Southwestern Willow Flycatcher Project

The WLFW - Southwestern Willow Flycatcher Project (WLFW-SWFL Project) is a conservation initiative based upon a targeted conservation systems approach to implement specific

conservation practices to manage and enhance the species while ensuring compatibility with the private landowners' expectations for their property. This effort is tiered off the national WLFW partnership mentioned above and continues the previous USFWS section 7 signed in 2012.

NRCS coordinated with the USFWS to determine what actions would avoid or minimize potential long-term adverse effects to the SWFL and the other covered species, and improve potential effectiveness of conservation practices that may result in range-wide benefits. Covered species include other riparian-obligate or aquatic species that may coexist with SWFL on a client's property. NRCS is specifically focusing its program authorities to produce conservation benefits for all of the species listed on Table 1.

This Opinion covers activities conducted in accordance with the NRCS conservation programs and activities focused on conservation of the any/all of the covered species outlined in Table 1 below. The action for the purposes of this Opinion includes the application of certain conservation practices into NRCS conservation plans and implemented by NRCS clients following the conservation planning process and the conservation measures described in this Opinion.

The scope of NRCS actions addressed in this Opinion includes:

1) Implementation and maintenance of all existing conservation practices in existing Conservation Plans previously developed (2012 thru present), provided all applicable conservation measures have been applied,

2) Implementation and maintenance of future conservation plans within the life of this Opinion,

3) Implementation and maintenance of any future Conservation Technical Assistance or Financial Assistance conservation plans provided by NRCS consistent with this Opinion provided all applicable conservation measures have been applied.

The duration of the proposed action is 27 years[1] with a review of the program's outcomes and effects at annual intervals.

The expected conservation benefits from the proposed action are many; outcomes will be measured in the following ways:

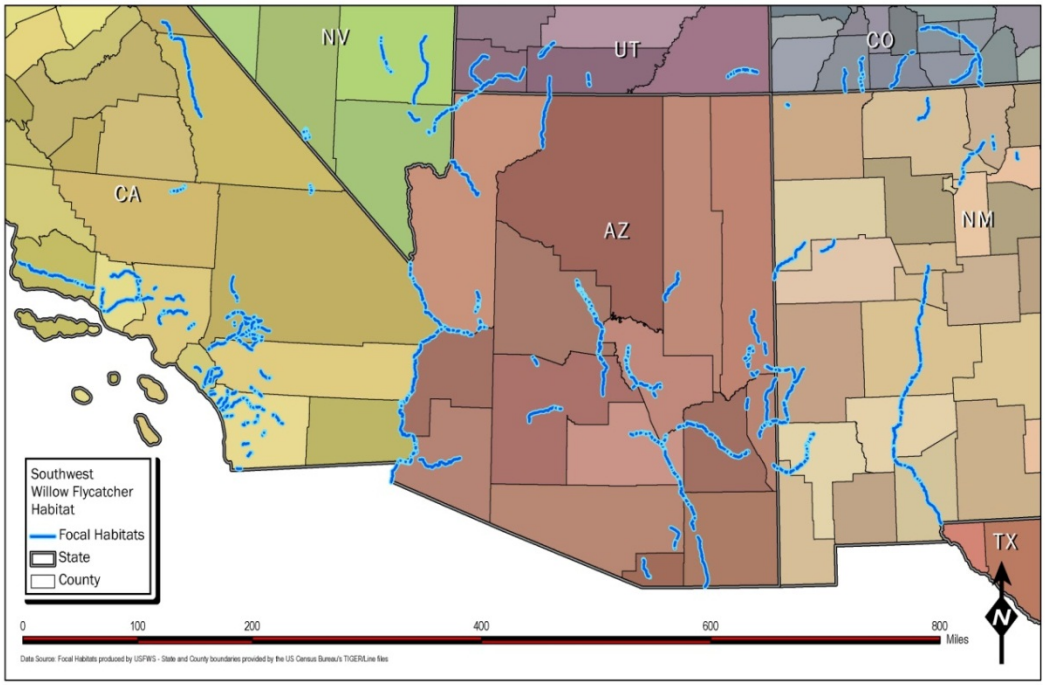
- Habitat being created, managed, and/or enhanced;
- Specific threats to the SWFL and covered species are reduced or managed (such as habitat fragmentation or loss, lack of appropriate forest management, exotic or invasive species establishment or spread);
- Aligning the application of these habitat management and threat reduction systems with on-going conservation efforts at the landscape scale to produce population and species-level benefits.

[1] The original 2012 consultation initiated the 30-years' ESA regulatory predictability. This Opinion continues that original timeline.

ACTION AREA

The Action Area is the range of potential habitat for the SWFL located in Arizona, southern parts of California, Nevada, Utah and Colorado and the western two-thirds of New Mexico. The species is limited to riparian zones with surface water or at least moist soils from May through July. Uplands without riparian association within the range are not included in the action area. The WLFW – SWFL Project focuses NRCS and partner resources on high priority areas – called focal areas - within the Action Area (Figure 1).

Figure 1. Focal Area Map



ELEMENTS OF THE PROPOSED ACTION

The proposed action, the implementation of the WLFW – SWFL Project, involves the following elements: (1) a Landscape and Targeted Focus; (2) use of Selected Conservation Practices; (3) application of the best science to support creating desired habitat conditions; (4) incorporation of jointly developed conservation measures for the selected conservation practice standards ; (5) a science supported, monitoring and assessment element; (6) staff and partnership training and involvement; and (7) provision for participating landowners to return their properties to the original condition after obligations are met. Each element is discussed in further detail below but the reader should also refer to the applicable sections of the BA.

A Landscape and Targeted Focus

The WLFW – SWFL Project is structured to facilitate landscape-level improvements across the species' range while recognizing that threats and opportunities differ among ecological zones, within identified focal areas and other areas suitable for developing SWFL habitat. Close collaboration of many stakeholders, including local, State, and Federal agencies, tribes, and NGOs, will ensure that NRCS activities complement efforts already underway. The WLFW –

SWFL Project provides a multi-tiered framework that allows coordination and implementation on a range-wide scale while ensuring input and control over actions in specific States.

The implementation of the WLFW – SWFL Project is integrated into the daily operations of NRCS' existing Farm Bill authorities. As part of the scope of the consultation, it is therefore important for the reader to understand the NRCS' existing Conservation Planning processes and component elements that NRCS will use to implement this action in context with delivery of the WLFW- SWFL Project.

NRCS worked closely with the USFWS and state wildlife agencies and other partners to produce focal habitat maps for the WLFW – SWFL Project. The maps focus the program on increasing and improving occupied, suitable, and potential breeding habitat, supporting SWFL recovery. Further, the focal area maps provide NRCS' local offices guidance in ranking applications from interested private landowners seeking financial assistance to implement the WLFW – SWFL Project. Proposed restoration within focal areas will receive higher ranking than proposals located outside of the focal area.

With the previous successes and interest from landowners since inception and initial execution beginning in 2012, NRCS is expanding the effort and seeking restoration and enhancement opportunities for all of the covered species in the Action Area.

Selected Conservation Practices

To ensure that the conservation outcomes of the WLFW – SWFL Project are met, NRCS and the USFWS worked together to identify the covered conservation practices (Table 1). Practices implemented consist of:

- The core conservation management practices for the benefit of SWFL and the other covered species. A core conservation practice establishes the focus objectives for addressing resource concerns on a client's property.
- Facilitating conservation practices that make possible the application of the core conservation management practices. Facilitating practices, by themselves, are of limited benefit to SWFL and the other covered species; and
- Practice-specific conservation measures that can minimize or eliminate short-term detrimental effects of the installation/application of conservation practices on SWFL and the other covered species.

The type of practice is important in this context as explained below.

All conservation plans developed under the WLFW – SWFL Project will have one or more of the core practices listed in Table 1. Core practices are critical to addressing the client's targeted resource concern(s) for the proposed action and achieving the desired environmental outcome(s). For each core practice, a wildlife habitat evaluation will be conducted, using the SWFL-focused Wildlife Habitat Evaluation Guide (WHEG) (see Appendix V of NRCS' BA), to identify limiting factors to be addressed in order of their significance and to establish that particular species baseline population or habitat availability on that client's property The identification of the species' limiting factors at the site level is essential to ensure that the goals of a core practice for SWFL are being met under WLFW-SWFL Project.

Implementing WLFW – SWFL Project under the core practices eliminates the possibility of using practices that benefit producers exclusively but not the SWFL and/or the other covered species. For example, the Wetland Wildlife Habitat Management Conservation Practice Standard (644) requires a habitat evaluation to be conducted identifying the limiting factors be addressed in their order of significance. The purpose of the practice is to treat wetland wildlife habitat concerns identified during the conservation planning process to (1) provide shelter, cover, and food in proper amounts, locations and times to sustain the targeted species during all phases of its life cycle, or (2) enable movement. Specific practices will be used by NRCS to address the limiting factors to the species and will be implemented to achieve that objective. The identification of the species' limiting factors at the individual property owner level is essential to informing the use of the Wetland Wildlife Habitat Management practice for the WLFW – SWFL Project. All of the conservation practices, including those which improve irrigation efficiency, and/or upgrade ranch infrastructure (e.g., irrigation) will also be guided by the principle that their application and installation will follow the conservation measures and other requirements of this Opinion and where guided by the WHEG/assessment tool.

This Opinion evaluates the collective effects of implementing all aspects of the WLFW – SWFL Project on the covered species and their supporting habitats. The analysis focuses on identified conservation practice standards required to implement the WLFW –SWFL Project. Use of the conservation practices occurs in concert with the NRCS comprehensive conservation planning framework and creates the circumstances by which potential adverse and/or beneficial effects to the covered species can be assessed. Therefore, the evaluation and conditioning of the identified conservation practice standards is essential to achieve the expected conservation outcomes of the partnership, provide regulatory determinations on effects, and provide NRCS incidental take coverage under the ESA for any adverse effects to any of the covered species that cannot be avoided or eliminated.

The NRCS and the USFWS will use this document as a foundation for continuing collaborative partnership designed to improve the conservation status of the SWFL and other covered species on eligible lands within the reach of NRCS' programs and authorities.

Table 1. List of Conservation Practice Standards

Conservation Practice Standard[2]	Practice Code	Practice Category
Early Successional Habitat Development/ Management	647	Core- Management
Restoration and Management of Declining Habitats	643	Core- Management
Stream Habitat Improvement and Management	395	Core- Management
Upland Wildlife Habitat Management	645	Core- Management
Wetland Wildlife Habitat Management	644	Core- Management

[2] For additional information on the Conservation Practice Standard, please refer to the NRCS' Biological Assessment and the NRCS Field Office Technical Guide (e-FOTG) at the following website: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg/

Conservation Practice Standard[2]	Practice Code	Practice Category
Access Control	472	Facilitating- Management
Animal Trails and Walkways	575	Facilitating- Mechanical
Brush Management	314	Facilitating- Structural
Conservation Cover	327	Facilitating- Planting
Critical Area Planting	342	Facilitating- Planting
Fence	382	Facilitating- Structural
Field Border	386	Facilitating- Structural
Forage Harvest Management	511	Facilitating- Management
Forage & Biomass Planting	512	Facilitating- Planting
Forest Harvest Trails and Landings	655	Facilitating- Mechanical
Forest Stand Improvement	666	Facilitating- Mechanical
Grade Stabilization Structure	410	Facilitating- Mechanical
Herbaceous Weed Control	315	Facilitating- Management
Heavy Use Area Protection	561	Facilitating- Management
Integrated Pest Management	595	Facilitating- Management
Irrigation System – Microirrigation	441	Facilitating- Structural
Irrigation Water Management	449	Facilitating- Management
Livestock Shelter Structure	576	Facilitating- Structural
Mulching	484	Facilitating- Structural
Obstruction Removal	500	Facilitating- Structural
Open Channel	582	Facilitating- Mechanical
Pipeline	516	Facilitating- Structural
Prescribed Grazing	528	Facilitating- Management
Pumping Plant	533	Facilitating- Structural
Riparian Forest Buffer	391	Facilitating- Planting
Riparian Herbaceous Cover	390	Facilitating- Planting
Stream Channel Stabilization	584	Facilitating- Mechanical
Stream Crossing	578	Facilitating- Structural
Streambank & Shoreline Protection	580	Facilitating- Planting
Structure for Water Control	587	Facilitating- Structural
Tree/Shrub Establishment	612	Facilitating- Planting
Tree/Shrub Site Preparation	490	Facilitating- Mechanical
Water Well	642	Facilitating- Structural
Watering Facility	614	Facilitating- Structural
Wetland Enhancement	659	Facilitating- Mechanical
Wetland Restoration	657	Facilitating- Mechanical
Woody Residue Treatment	384	Facilitating- Mechanical

Use of Best Science to Support Creating Desired Habitat Conditions

To support effective application of each of the conservation practices, NRCS and the Service worked collaboratively to develop a Wildlife Habitat Evaluation Guide (WHEG) for the SWFL. The WHEGs are tools that are developed at the NRCS state level, and used by field personnel to assess existing habitat conditions and identify limiting habitat factors in the planning area.

To evaluate the habitat for the Southwestern Willow Flycatcher, the NRCS, developed a range-wide WHEG that will be used by all states to evaluate Southwestern Willow Flycatcher habitat (see Appendix V of the NRCS BA). There are two versions of the SWFL WHEG, one for below

6,000 feet elevation and a WHEG for above 6,000 feet. Each WHEG evaluates existing (benchmark) habitat conditions based on multiple elements such as stream flow, surface water availability and vegetation structure. The score for each element ranges from 0 to 1.0, with 0.5 meeting the bare minimum quality criteria for SWFL habitat. Elements scoring below 0.5 do not meet SWFL habitat criteria indicating a lack of viable habitat and likely the species is not present (i.e. a baseline of zero). The WHEG can also be used to future cast a score for the expected condition of habitat after the implemented conservation practices have reached maturity. In addition to the SWFL WHEG, each state has state specific evaluation tools to evaluate the riparian zone for function and habitat value. This includes, but not limited to, the Stream Visual Assessment Protocol, Ecological Site Descriptions, Riparian based WHEGs and other individual species WHEGS.

After completing the SWFL WHEG, the planner will then work with the client to develop and evaluate alternatives to address the resource concerns from Table 4 of NRCS' BA that do not meet quality criteria for SWFL and/or the other affected species' habitat. A conservation practice may be a structural or vegetative measure, or a management activity used to restore, enhance or protect Southwestern Willow Flycatcher habitat. The suite of practices chosen from Table 1 becomes the Conservation Plan, a record of the client's decisions for the treatment of resource problems.

The agencies will continue to work and improve the use of the existing WHEGs, develop other species-specific WHEGs as needed, and develop a multi-species approach (such as Ecological Site Descriptions), where appropriate, for evaluating and designing the appropriate management strategies for the covered species' habitats over the 27-year life of the Proposed Action.

Incorporation of Jointly Developed Conservation Measures

Conservation Measures consist of additional criteria to the conservation practice standard that reduce or eliminate the short-term adverse effects on species because of practice implementation.

As a component of the WLFW- SWFL Project, the Service and NRCS jointly identified and developed Conservation Measures (Appendix II, III, and IV of the NRCS BA). In most cases, these measures ensure that implementation is not likely to adversely affect any federally listed species or critical habitat.

Inherent to the NRCS conservation planning process is the mitigation of potentially negative impacts that may occur to associated resource concerns during the implementation of any conservation practice on the planning unit. However, it is not always possible to mitigate all negative impacts that may result in "take" of a Federally-listed species. In those cases, negative impacts are primarily of a short-term nature associated with installing conservation practices. Appendix IV of the NRCS BA presents a comprehensive discussion of the potential adverse and beneficial effects of each Conservation Practice on the covered species.

Monitoring and Assessment

The NRCS designs are based on USDA-NRCS Standards and Specifications with an additional operation and maintenance plan for each practice included in the conservation plan provided to the landowner. To certify completion of the practice NRCS will complete a "construction

check" to ensure that the practice was installed according to NRCS standards and specifications. Status reviews are conducted annually throughout the life of the contract to monitor progress on application of facilitating and core management practices and to schedule future technical assistance. The NRCS will also incorporate to the extent possible, monitoring using USGS Willow flycatcher habitat modeling software.
The monitoring consists of five monitoring levels:

a. Practice implementation oversight by NRCS
b. Operation and Maintenance random monitoring by NRCS (5% annual spotchecks)
c. USGS model performed by NRCS
d. Landowner monitoring using photo points and other specified methods
e. Grazing in riparian during growing season

More information on these features is provided in the NRCS' BA.

The NRCS is proposing to utilize in-house staff to monitor large scale habitat changes following the procedures of Hatten, et al, 2010. This work uses 10 years of flycatcher territory data, identified annual extent and distribution of riparian vegetation from Landsat Thematic Mapper images, and extracted floodplain features from a digital elevation model. The authors developed predictive models that quantify and assess the relative quality of flycatcher breeding habitat remotely, and which can be used to evaluate the effectiveness of habitat restoration activities. NRCS will seek training from the USGS for their GIS specialists to apply this model to determine the efficacy of the WLFW-SWFL Project at the landscape scale.

Training
The agencies have agreed to pursue training on implementation of the proposed action and the requirements of this Opinion, a scheduled to be determined during the annual meeting of the partners outlined in the NRCS' BA. Other aspects of this element are more fully explained in the NRCS' BA.

Provision for Landowners to Return Properties to their Original Condition
The NRCS expects that the majority of the contracting with private landowners under the WLFW - SWFL Project will be for less than five years' duration. The NRCS' contractual requirements mandate that participating landowners will continue to maintain the conservation practices that were implemented for the lifespan of that practice. NRCS is requesting that the scope of this document and extent of incidental take coverage for the covered species encompass the expectation that landowners will return their properties to the original condition after all requirements of the NRCS' contracting and landowner commitments are satisfied.

Over the time elapsed during the landowners' contracted actions, an expected conservation outcome will be the creation, restoration, maintenance, and/or enhancement of habitats suitable for the covered species. Including incidental take coverage for these habitats and species' increase in abundance/distribution addresses the concern voiced by both NRCS and potential eligible landowners that, by conducting these identified actions on private lands for federally-protected species, those landowners are accruing additional liability or restrictions on their property after the term of the contract ends with NRCS. Thus, the NRCS is requesting that the evaluation of effects, and associated incidental take coverage provided by the Service, includes

species numbers and/or habitat metrics determined or assumed present at the time the contracting is executed and also those that are anticipated to come into existence at the time the contract expires. The NRCS requests level of incidental take and expected tracking mechanisms are determined for all species covered by these actions.

Establishing Original Conditions
The method used for establishing original conditions will be the SWFL WHEG for all of the covered species and/or other Service-approved methodology. The WHEG will document the extent and distribution of habitat characteristics; describe existing habitat type(s); identify conditions of the habitat(s), and any other information necessary to describe the original conditions. For each eligible landowner, NRCS may invite other conservation partners, including the affected State Wildlife Agency, and/or the Service to provide assistance in establishing the original conditions for each of the covered species. The purpose of determining these original conditions is to ensure that the covered species' status on enrolled lands is no worse after participation in the WLFW-Southwest Willow Flycatcher Project than before enrollment. The most important feature of the original conditions is that it will be determined by the existing ESA responsibilities present within the eligible enrolled lands. A landowner's original conditions can be zero (no current ESA responsibilities as illustrated by no occupied habitat or species present throughout the identified property). Baseline habitat will only be determined for the Southwestern willow flycatcher; baseline for all other listed species must be established on a case by case basis as determined necessary by the NRCS State Biologist.

Maintaining Original Conditions
For landowners that have an existing original condition responsibility above zero, (e.g., the presence of the species/occupied habitat), the landowner must agree to maintain this pre-existing level using the agreed-upon conservation practice standards as conditioned by the conservation measures and as mandated in the NRCS financial assistance contract that are necessary to maintain the original responsibilities for that landowner.

STATUS OF THE SPECIES and ENVIRONMENTAL BASELINE

This section presents the biological and ecological information relevant to formulating the Opinion.

The list of species covered in this consultation is found in Table 2.

Table 2. Covered Species List

Status: E = Endangered; T = Threatened; C = Candidate; EXPN = Experimental, non-essential populations (considered at the same level as proposed species); P = Proposed; CH = Critical Habitat, YES = proposed or designated, NO = no proposed or designated Critical Habitat for that species; DPS = Distinct Population Segment.

Species	Scientific Name	Status	CH	State
BIRDS				
Southwestern willow flycatcher	*Empidonax traillii extimus*	E	YES	AZ, CA, CO, NM, NV, UT
California clapper rail	*Rallus longirostris*	E	NO	CA

Species	Scientific Name	Status	CH	State
	obsoletus			
Least Bell's vireo	*Rallus longirostris obsoletus*	E	YES	CA
Yellow billed cuckoo	*Coccyzus americanus*	T	YES	AZ, CA, CO, NM, NV, UT
Yuma clapper rail	*Rallus longirostris yumanensis*	E	No	AZ, NV, CA
MAMMALS				
Amargosa vole	*Microtus californicus scirpensis*	E	YES	CA
Buena Vista Lake ornate shrew	*Sorex ornatus relictus*	E	P	CA
New Mexico meadow jumping mouse	*Zapus hudsonius luteus*	E	YES	AZ, CO, NM
AMPHIBIANS				
Arroyo toad	*Anaxyrus californicus*	E	YES	CA
California red-legged frog	*Rana aurora draytoni*	T	YES	CA
Chiricahua Leopard Frog	*Rana chiricahuensis*	T	NO	AZ, NM
California tiger salamander	*Ambystoma californiense*	E, T (DPS)	YES	CA
Columbia spotted frog	*Rana luteiventris*	C	NO	CA, NV
Mountain yellow-legged frog	*Rana muscosa*	E	YES	CA
Relict leopard frog	*Lithobates onca*	C	NO	AZ, NV
REPTILES				
Blunt-nosed leopard lizard	*Gambelia silus*	E	NO	CA
Northern Mexican garter snake	*Thamnophis eques megalops*	T	YES	AZ
Narrow headed garter snake	*Thamnophis rufipunctatus*	T	YES	AZ, NM
Mojave desert tortoise	*Gopherus agassizii*	T	NO	AZ, CA, NV, UT
Sonoran desert tortoise	*Gopherus morafkai*	C	NO	AZ
FISH				
Apache trout	*Oncorhynchus apache*	T	NO	AZ
Ash Meadows Amargosa pupfish	*Cyprinodon nevadensis mionectes*	E	YES	NV
Ash Meadows speckled dace	*Rhinichthys osculus nevadensis*	E	YES	NV
Beautiful shiner	*Cyprinella formosa*	E	YES	AZ, NM
Bonytail	*Gila elegans*	E	YES	UT, NV

Species	Scientific Name	Status	CH	State
Chihuahua chub	*Gila nigrescens*	T	NO	AZ, NM
Colorado pikeminnow	*Ptychocheilus lucius*	E	YES	AZ, CO, NM, UT
Colorado pikeminnow	*Ptychocheilus lucius*	EXPN	NO	AZ
Desert pupfish	*Cyprinodon macularius*	E	YES	AZ
Gila chub	*Gila intermedia*	E	YES	AZ
Gila topminnow	*Poeciliopsis occidentalis*	E	NO	AZ
Gila trout	*Oncorhynchus gilae*	T	NO	AZ, NM
Greenback cutthroat trout	*Oncorhynchus clarki stomias*	T	NO	CA, CO
Headwater chub	*Gila nigra*	C	NO	AZ, NM
Hiko White River springfish	*Crenichthys baileyi grandis*	E	YES	NV
Humpback chub	*Gila cypha*	E	YES	AZ, UT
Lahontan cutthroat trout	*Oncorhynchus clarki henshawi*	T	NO	CA, NV
Little Colorado spinedace	*Lepidomeda vittata*	T	YES	AZ
Loach Minnow	*Tiaroga cobitis*	E	YES	AZ
Moapa dace	*Moapa coriacea*	E	NO	NV
Mojave tui chub	*Gila bicolor Mojavensis*	E	NO	CA
Owens pupfish	*Cyprinodon radiosus*	E	NO	CA
Owens tui chub	*Gila bicolor ssp. snyderi*	E	YES	CA
Pahranagat roundtail chub	*Gila robusta jordani*	E	NO	NV
Pecos bluntnose shiner	*Notropis simus pecosensis*	T	YES	NM
Pecos gambusia	*Gambusia nobilis*	E	NO	NM
Razorback sucker	*Xyrauchen texanus*	E	YES	AZ, CO, NV, UT
Rio Grande silvery minnow	*Hybognathus amarus*	E	YES	NM
Rio Grande silvery minnow	*Hybognathus amarus*	EXPN	NO	NM
Roundtail chub	*Gila robusta*	C	NO	AZ
Santa Ana sucker	*Catostomus santaanae*	T	YES	CA
Sonora chub	*Gila ditaenia*	T	YES	AZ
Spikedace	*Meda fulgida*	E	YES	AZ
Tidewater goby	*Eucyclogobius newberryi*	E	YES	CA
Unarmored threespine stickleback	*Gasterosteus aculeatus williamsoni*	E	YES	CA
Virgin River chub	*Gila seminuda*	E	YES	AZ, NV, UT

Species	Scientific Name	Status	CH	State
	(=robusta)			
Warm Springs pupfish	*Cyprinodon nevadensis pectoralis*	E	NO	NV
White River Springfish	*Crenichthys baileyi baileyi*	E	YES	NV
Woundfin	*Plagopterus argentissimus*	E	YES	AZ, NM, UT, NV
Woundfin	*Plagopterus argentissimus*	EXPN	NO	AZ
Yaqui catfish	*Ictalurus pricei*	T	YES	AZ
Yaqui chub	*Gila purpurea*	E	YES	AZ
Yaqui topminnow	*Poeciliopsis occidentalis sonoriensis*	E	NO	AZ, NM
Zuni bluehead sucker	*Catostomus discobolus yarrowi*	T	NO	AZ, NM
PLANTS				
Amargosa nitrewort	*Nitrohphila Mojavensis*	E	YES	CA, NV
Ash Meadows blazingstar	*Mentzelia leucophylla*	T	YES	NV
Ash Meadows gumplant	*Grindelia fraxinopratensis*	T	YES	CA, NV
Ash Meadows ivesia	*Ivesia kingii var. eremica*	T	YES	NV
Ash Meadows milkvetch	*Astragalus phoenix*	T	YES	NV
Ash Meadows sunray	*Enceliopsis nedicaulis* var. *corrugate*	T	YES	NV
Canelo Hills Ladies Tresses	*Spiranthes delitescens*	E	NO	AZ
Chorro Creek bog thistle	*Cirsium fontinale var. obispoense*	E	NO	CA
Dwarf bear-poppy	*Arctomecon humilis*	E	NO	UT
Gambel's watercress	*Rorippa gambellii*	E	NO	CA
Hickman's potentilla	*Potentilla hickmanii*	E	NO	CA
Holmgren milkvetch	*Astragalus holmgreniorum*	E	YES	UT
Huachuca Water Umbel	*Lilaeopsis schaffneriana var. recurva*	E	YES	AZ
La Graiosa thistle	*Cirsium loncholepis*	E	YES	CA
Marsh Sandwort	*Arenaria paludicola*	E	NO	CA
Otay mesa mint	*Pogogyne nudiuscula*	E	NO	CA

Species	Scientific Name	Status	CH	State
Pecos River Sunflower	*Helianthus paradoxus*	T	YES	NM, TX
Salt Marsh bird's-beak	*Cordylanthus maritimus ssp. maritimus*	E	NO	CA
Slender-horned spineflower	*Dodecahema leptoceras*	E	NO	CA
Spring-loving centaury	*Centaurium namophilum*	T	YES	CA, NV
Ute ladies-tresses	*Spiranthes diluvialis*	T	NO	UT, NV
Ventura Marsh milk-vetch	*Astragalus pycnostachyus var. lanosissimus*	E	YES	CA
Willowy monardella	*Monardella viminea*	E	YES	CA

BIRDS

Southwestern Willow Flycatcher
The SWFL was listed as endangered, without critical habitat on February 27, 1995 (60 FR 10695). Critical habitat was designated in 1997 and 2005; a revision to the 2005 rule was published on January 3, 2013 (78 FR 343).

The Southwestern willow flycatcher (*Empidonax traillii extimus*) (SWFL) is a small grayish-green passerine bird (Family Tyrannidae) measuring approximately 5.75 inches. The SWFL is a neo-tropical migrant that breeds in the southwestern United States and migrates to Mexico, Central America, and possibly northern South America. Reasons for decline are attributed to primarily loss, modification, and fragmentation of riparian breeding habitat, loss of wintering habitat, and brood parasitism by the brown-headed cowbird (*Molothrus ater*). A variety of factors cause habitat loss and degradation, including urban, recreational, and agricultural development, water diversion and groundwater pumping, stream and river channelization, dam construction, and un-managed livestock grazing. Fire is an increasing threat to SWFL habitat (Paxton *et al.* 1996), especially in monotypic saltcedar vegetation and where water diversions and/or groundwater pumping desiccates riparian vegetation (Sogge *et al*. 1997). SWFL nests can be parasitized by brown-headed cowbirds, which lay their eggs in the host's nest. Cowbirds can be attracted to SWFL breeding habitats by the presence of livestock and range improvements such as feed and water facilities and corrals; agriculture; urban areas; golf courses; and trash areas. When these attractants are in close proximity to SWFL breeding habitat, especially coupled with habitat fragmentation, cowbird parasitism of SWFL nests may increase (60 FR 10695, Sogge *et al.* 1997, McCarthey *et al.* 1998)).

Rangewide Status
Arizona - The historical range of the SWFL in Arizona included portions of all major watersheds (Swarth 1914, Phillips 1948, Unitt 1987). Contemporary investigations (post-1990) show the SWFLpersists, probably in much reduced numbers, along the Big Sandy, Bill Williams, Colorado, Gila, Hassayampa, Little Colorado, Salt, San Francisco, San Pedro, Santa Cruz, Santa

Maria, Tonto Creek, and Verde River systems (Sferra et al. 1997, Sogge et al. 1997, McKernan and Braden 1999, Paradzick et al. 1999, Tibbitts and Johnson 1999). While numbers have significantly increased in Arizona (145 to 459 territories from 1996 to 2007) (English *et al.* 2006, Durst *et al.* 2008), overall distribution of SWFL throughout the state has not changed much. Currently, population stability in Arizona is largely dependent on the presence of two large populations (Roosevelt Lake and San Pedro/Gila River confluence). Therefore, the result of catastrophic events or losses of significant populations in either size or location, could greatly change the status and survival of the bird. Conversely, expansion into new habitats or discovery of other populations would improve the known stability and status of the SWFL.

California - Historically, the SWFL was common in all lower elevation riparian areas of the southern third of California (Wheelock 1912, Willett 1912 and 1933, Grinnell and Miller 1944), including the Los Angeles basin, the San Bernardino/Riverside area, and San Diego County (Unitt 1987).

Colorado - The historic and current breeding status of the Southwestern Willow Flycatcher in Colorado is unclear (USFWS 1995). Hubbard (1987) believed the subspecies ranged into extreme southwestern Colorado. Browning (1993) was noncommittal, and Unitt (1987) tentatively used the New Mexico-Colorado border as the boundary between *E. t. extimus* and *E. t. adastus*. Several specimens taken in late summer have been identified as *E. t. extimus*, but nesting was not confirmed (Bailey and Niedrach 1965). Breeding willow flycatchers with genetic characteristics of the southwestern subspecies occur at Alamosa National Wildlife Refuge and McIntire Springs, but flycatchers from Beaver and Clear creeks (Andrews and Righter 1992, Owen and Sogge 1997) did not have the Southwestern subspecies genetic characteristics (Paxton 2000). There is much riparian habitat in southwest Colorado that has not yet been surveyed for willow flycatchers; additional populations may be found with increased survey effort.

Nevada - The historical status of the SWFL at its range limit in southern Nevada is unclear; Unitt (1987) reported only three records, all before 1962. Contemporary investigations (post-1990) have verified breeding SWWF on the Virgin River and Muddy River, the Amargosa River drainage at Ash Meadows NWR, Meadow Valley Wash, and the Pahranagat River drainage.

New Mexico - The historic breeding range of the SWFL in New Mexico is considered to have been primarily from the Rio Grande Valley westward, including the Rio Grande, Chama, Zuni, San Francisco, and Carson watersheds (Hubbard 1987); breeding was unconfirmed in the San Juan and Pecos drainages (Hubbard 1987). Contemporary surveys documented that SWFL persist in the Rio Grande, Chama, Zuni, San Francisco, and Carson watersheds and that small breeding populations also occur in the San Juan drainage and along Coyote Creek in the Canadian River drainage, but breeding remains unconfirmed in the Pecos watershed (Williams and Leal 1998). The Carson Valley was identified by Hubbard (1987) as a stronghold for the taxon, and recent surveys have confirmed that area contains one of the largest known SWFL populations (Skaggs 1996, Stoleson and Finch 1999).

Utah - The north-central limit of the SWFL's breeding range is in southern Utah. Historically, the bird occurred in the following river systems: Colorado, Kanab Creek, San Juan (Behle et al. 1958, Behle and Higgins 1959, Behle 1985, Browning 1993), Virgin (Phillips 1948, Wauer and

Carter 1965, Whitmore 1975), and perhaps Paria (BLM, unpubl. data). Behle and Higgins (1959) suggested that extensive habitat likely existed along the Colorado River and its tributaries in Glen Canyon. Contemporary investigations verified probable breeding SWFL along the upper Virgin River, and Panguitch Creek (Langridge and Sogge 1998, Peterson et al. 1998, USFWS unpubl. data), but failed to locate breeders along the San Juan (Johnson and Sogge 1997, Johnson and O'Brien 1998). The subspecific identity (*E. t. extimus* vs. *E. t. adastus*) of willow flycatchers in high elevation/central Utah remains somewhat unresolved (Behle 1985, Unitt 1987, Browning 1993), and requires additional research.

Habitat Use

The SWFL breeds in dense riparian habitats from sea level in California to approximately 8,500 feet in Arizona and Southwestern Colorado. Historical egg/nest collections and species' descriptions throughout its range describe the SWFL's widespread use of willow (*Salix* spp.) for nesting (Phillips 1948, Phillips *et al.* 1964, Hubbard 1987, Unitt 1987, San Diego Natural History Museum 1995). Currently, SWFL primarily use Geyer willow (*Salix geyeriana*), coyote willow (*Salix exigua*), Goodding's willow (*Salix gooddingii*), boxelder (*Acer negundo*), saltcedar (*Tamarix* sp.), Russian olive (*Elaeagnus angustifolio*), and live oak (*Quercus agrifolia*) for nesting. Other plant species less commonly used for nesting include: buttonbush (*Cephalanthus* sp.), black twinberry (*Lonicera involucrata*), cottonwood (*Populus* spp.), white alder (*Alnus rhombifolia*), blackberry (*Rubus ursinus*), and stinging nettle (*Urtica* spp.). Based on the diversity of plant species composition and complexity of habitat structure, four basic habitat types can be described for the SWFL: monotypic willow, monotypic exotic, native broadleaf dominated, and mixed native/exotic (Sogge *et al.* 1997).

The SWFL's habitat is dynamic and can change rapidly; nesting habitat can grow out of suitability; saltcedar habitat can develop from seeds to suitability in about four to five years; heavy runoff can remove/reduce habitat suitability in a day; or river channels, floodplain width, location, and vegetation density may change over time. The SWFL's use of habitat in different successional stages may also be dynamic. For example, over-mature or young habitat not suitable for nest placement can be occupied and used for foraging and shelter by migrating, breeding, dispersing, or non-territorial SWFL (McLeod *et al.* 2005, Cardinal and Paxton 2005). SWFL habitat can quickly change and vary in suitability, location, use, and occupancy over time (Finch and Stoleson 2000).

The SWFL's nesting and foraging habitat includes exotic tamarisk in the central part of the specie's breeding range in Arizona, southern Nevada and Utah, and western New Mexico. In 2001 in Arizona, 323 of the 404 (80 percent) known flycatcher nests (in 346 territories) were built in a tamarisk tree (Smith *et al.* 2002). Tamarisk had been believed by some to be a habitat type of lesser quality for the SWFL, however comparisons of reproductive performance (USFWS 2002), prey populations (Durst 2004) and physiological conditions (Owen and Sogge 2002) of SWFL breeding in native and exotic vegetation has revealed no difference (Sogge *et al.* 2005).

Breeding Ecology

Throughout its range the SWFL arrives on breeding grounds in late April and May. Nesting begins in late May and early June and young fledge from late June through mid-August.

Typically, one brood is raised per year, but birds have been documented raising two broods during one season and re-nesting after a failure. The entire breeding cycle, from egg laying to fledging, is approximately 28 days (USFWS 2002) (see Figure 2).

SWFL nest placement in a shrub or tree is highly variable (1.6 to 60 feet off the ground); most commonly between 6.5 to 23 feet above the ground. Nests are open cup structures, and are typically constructed in the fork of a branch. Nests have been found against the trunk of a shrub or tree (in monotypic saltcedar and mixed native broadleaf/saltcedar habitats) and on limbs as far away from the trunk as 10.8 feet (Spencer et al. 1996). Typical nest placement is in the fork of small-diameter (e.g., 0.4 in), vertical or nearly vertical branches. Nests built in habitat dominated by box elders are placed highest in the tree (to 60 feet) (USFWS 2002).

Figure 2. Southwestern Willow Flycatcher Breeding Chronology.

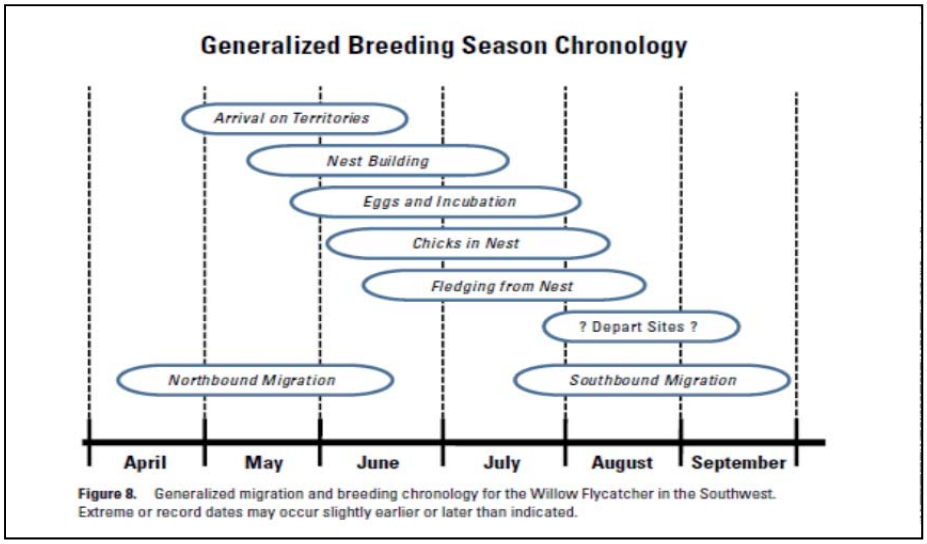


Figure 8. Generalized migration and breeding chronology for the Willow Flycatcher in the Southwest. Extreme or record dates may occur slightly earlier or later than indicated.

The SWFL is an insectivore, foraging in dense shrub and tree vegetation in riparian areas. The bird typically perches on a branch and makes short direct flights, or sallies to capture flying insects. Drost *et al.* (1998) found that the major prey items of the SWFL (in Arizona and Colorado), consisted of true flies (Diptera); ants, bees, and wasps (Hymenoptera); and true bugs (Hemiptera). Other insect prey taxa included leafhoppers (Homoptera: Cicadellidae); dragonflies and damselflies (Odonata); and caterpillars (Lepidoptera larvae). Non-insect prey included spiders (Araneae), sowbugs (Isopoda), and plant material fragments.

SWFL territory size likely fluctuates with population density, habitat quality, and nesting stage. Estimated territory sizes recorded at the Kern River were 0.59 to 3.21 acres for monogamous males and 2.72 to 5.68 acres for polygynous males. Within a 2.22 acre breeding habitat patch on Colorado River, estimated territory sizes were 0.15 to 0.49 acres, and in a 3.71 acre breeding habitat patch on the Verde River, 0.49 to 1.24 acres. Territories are established within a larger patch of appropriate habitat sufficient to contain several nesting SWFL pairs (USFWS 2002).

Critical Habitat
SWFL critical habitat provides the essential biological and physical characteristics to support and maintain self-sustaining populations and metapopulations throughout its range. Based on current knowledge of the life history, biology, and ecology of the subspecies and the requirements of the habitat to sustain the essential life history functions, the USFWS (78 FR 343) determined that the Primary constituent elements (PCEs) of SWFL critical habitat are:

(1) PCE 1: *Riparian vegetation.*
Riparian habitat in a dynamic river or lakeside, natural or manmade successional environment (for nesting, foraging, migration, dispersal, and shelter) that is comprised of trees and shrubs (that can include Goodding's willow, coyote willow, Geyser's willow, arroyo willow, red willow, yewleaf willow, pacific willow, boxelder, tamarisk, Russian olive, buttonbush, cottonwood, stinging nettle, alder, velvet ash, poison hemlock, blackberry, seep willow, oak, rose, sycamore, false indigo, Pacific poison ivy, grape, Virginia creeper, Siberian elm, and walnut) and some combination of:

a. Dense riparian vegetation with thickets of trees and shrubs that can range in height from 2 to 30 meters (about 6 to 98 feet). Lower-stature thickets (2 to 4 meters or 6 to 13 feet tall) are found at higher-elevation riparian forests and tall-stature thickets are found at middle- and lower-elevation riparian forests; and/or

b. Areas of dense riparian foliage at least from the ground level up to approximately 4 meters (13 feet) above ground or dense foliage only at the shrub level, or as a low, dense tree canopy; and/or

c. Sites for nesting that contain a dense (about 50 to 100 percent) tree or shrub (or both) canopy (the amount of cover provided by tree and shrub branches measured from the ground); and/or

d. Dense patches of riparian forests that are interspersed with small opening of open water or marsh or areas with shorter and sparser vegetation that creates a variety of habitat that is not uniformly dense. Patch size may be as small as 0.1 ha (0.25 acre) or as large as 70 ha (175 acres); and

(2) PCE 2: *Insect prey populations.*
A variety of insect prey populations found within or adjacent to riparian floodplains or moist environments, including: flying ants, wasps, and bees (Hymenoptera); dragonflies (Odonata); flies (Diptera); true bugs (Hemiptera); beetles (Coleoptera); butterflies/moths and caterpillars (Lepidoptera); and spittlebugs (Homoptera).

In total, approximately 3,364 stream kilometers (2,090 stream miles) were designated as critical habitat. SWFL critical habitat is located across a wide portion of the subspecies' range and is organized in Management Units that were identified in the Recovery Plan (USWFS 2002). The USFWS designated stream segments in 15 Management Units found in 5 Recovery Units as SWFL critical habitat. Critical habitat maps are available in 78 FR 343 (pages 502 to 534).

The physical and biological features essential to SWFL conservation described above depend upon the dynamic river environment that germinates, develops, maintains, and regenerates the riparian forest and provides food for breeding, non-breeding, dispersing, territorial, and migrating SWFL. Anthropogenic factors such as dams, irrigation ditches, or agricultural field return flow can assist in providing conditions that support SWFL habitat in highly regulated river environments. It is important to recognize that the specific quality of riparian habitat needed for nesting, migration, foraging, and shelter will not remain constant in their suitability or location over time due to succession (*i.e.*, plant germination, growth, and maturation) and the dynamic river environment in which they exist. Suitable breeding habitat may be removed by large flood events or eventually overtime mature out of suitable vegetative structure preferred by the SWFL.

The USFWS designated stream segments as SWFL critical habitat that provide for habitat (breeding, nesting, foraging, and migrating) and allows for the changes in habitat locations or conditions from those that exist presently. The actual riparian habitat in these areas is expected to expand, contract, or change because of flooding, drought, inundation, and changes in floodplains and river channels (USFWS 2002) that result from natural flood regimes and flow management practices and priorities. Stream segments include breeding sites in high connectivity and other essential SWFL habitat components needed to conserve the subspecies. Those other essential components of SWFL habitat (foraging habitat, habitat for nonbreeding birds, migratory habitat, regenerating habitat, streams, elevated groundwater tables, moist soils, flying insects, and other alluvial floodplain habitats, etc.) adjacent to or between sites, along with the dynamic process of riparian vegetation succession and river hydrology, provide current and future habitat for the flycatcher which is dependent upon vegetation succession.

The conservation role critical habitat river segments/units contribute to the SWFL is metapopulation stability, population connectivity, gene flow, and protection against catastrophic loss of populations. Because the SWFL exists in disjunct breeding populations across a wide geographic and elevation range, and is subject to dynamic events, the critical habitat river segments are widespread across the subspecies range. The focus of the critical habitat is therefore a conservation strategy that relies on protecting large SWFL populations as well as small populations with high connectivity. Large populations, centrally located, contribute the most to metapopulation stability, especially if other breeding populations are nearby. Large populations persist longer than small ones, and produce more dispersers capable of emigrating to other populations or colonizing new areas. Smaller populations in high connectivity can provide as much or more stability than a single isolated population with the same number of territories because of the potential to disperse colonizers throughout the network of sites (USFWS 2002).

The approach for defining critical habitat areas supports other key central strategies tied to SWFL conservation identified in the Recovery Plan (USFWS 2002) such as: (1) populations should be distributed close enough to each other to allow for movement; (2) maintaining or augmenting existing populations is a greater priority than establishing new populations; and (3) a population's increase improves the potential to disperse and colonize. Because large populations, as well as small populations with high connectivity, contribute the most to metapopulation stability, we identified these areas to help guide the delineation of areas with features essential to SWFL (i.e., critical habitat). The final rule defines a large population as a

single site or collection of smaller connected sites that support 10 or more territories (USFWS 2002).

California Clapper Rail

California clapper rails (*Rallus longirostris obsoletus*) were designated as federally endangered on October 13, 1970 (35 FR 16047). No critical habitat has been designated for the species. In 2014, the Service approved a multi-species recovery plan that includes this species (USFWS 2014). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Historically, the range may have extended from salt marshes of Humboldt Bay to Morro Bay. San Francisco Bay has been the center of its abundance. The California clapper rail now occurs only within the tidal salt and brackish marshes around San Francisco Bay where it is restricted to less than 10 percent of its former geographic range. Densities reached an all-time historical low of about 500 birds in 1991, then rebounded somewhat, however the most recent survey estimated only 543 birds in the San Francisco Bay Estuary.

California clapper rails occur almost exclusively in tidal salt and brackish marshes with unrestricted daily tidal flows, adequate invertebrate prey food supply, well developed tidal channel networks, and suitable nesting and escape cover as refugia during extreme high tides. Non-native mammalian predators are a significant threat to the species. Lack of extensive blocks of tidal marsh with suitable structure is the ultimate limiting factor for the species' recovery; vulnerability to predation is exacerbated by reduction of clapper rail habitat to narrow and fragmented patches close to urban edge areas that diminish habitat quality. Dikes provide artificial access for terrestrial predators, and displace optimal cover of high marsh vegetation. The rapid invasion of San Francisco Bay by exotic *Spartina alterniflora* (smooth cordgrass) also threatens to cause major long-term structural changes in tidal salt marsh creek beds and banks, slough networks, and marsh plains, and could impair future habitat for California clapper rails. Contaminants, particularly methylmercury, are a significant factor affecting viability of California clapper rail eggs.

Least Bell's Vireo

The least Bell's vireo (*Vireo bellii pusillus*) was federally-listed as endangered on May 2, 1986 (51 FR 16474), and critical habitat was designated in 1994 (59 FR 4845). Critical habitat was designated for the least Bell's vireo on February 2, 1994 (59 FR 4845), but no critical habitat was designated along the Amargosa River. A draft recovery plan for the species was completed in 1998; to date it has not been finalized. There have been five Habitat Conservation Plans and two Safe Harbor Agreements prepared for this species for habitat management on private lands. Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The reasons for listing were loss of habitat, brood parasitism, and lack of adequate protective regulations. Historically, the least Bell's vireo was widespread and abundant, ranging from interior northern California near Red Bluff (Tehama County), south through the Sacramento-San

Joaquin Valleys and the Sierra Nevada foothills, and in the Coast Ranges from Santa Clara County south to approximately San Fernando, Baja California, Mexico. Other populations included Owens Valley, Death Valley, and at scattered oases and canyons throughout the Mojave Desert. By the early 1980s, the least Bell's vireo was extirpated from the Sacramento and San Joaquin Valleys, once the center of its breeding range., The species was restricted to two localities in the Salinas River Valley in Monterey and San Benito Counties, one locality along the Amargosa River (Inyo County), and numerous small populations in southern California south of the Tehachapi Mountains and in northwestern Baja California, Mexico.

The least Bell's Vireo typically breeds in willow riparian forests supporting a dense, shrubby understory of mulefat (*Baccharis salicifolius*) and other mesic species, and occasionally, oak woodland with a willow riparian understory, The most important aspect of least Bell's vireo habitat is the presence of dense cover within 3 to 7 feet of the ground, where nests are typically placed and a dense stratified canopy for foraging. Although least Bell's vireos typically nest in willow-dominated areas, plant species composition does not appear to be as important a determinant of nesting site selection as habitat structure.

Western Yellow-billed Cuckoo

The USFWS listed the western distinct population segment of yellow-billed cuckoo (*Coccyzus americanus*) was listed as threatened on October 3, 2014 (USWFS 2014 or 79 FR 59991). The distinct population segment boundary includes all yellow-billed cuckoos west of the Continental Divide and west of the eastern edge of the Rio Grande drainage, excluding the Pecos River drainage, but including the Sangre de Cristo Mountains. Critical habitat was proposed o August 15, 2014 (79 FR 48547); however, the comment period for the proposal has currently been reopened for public comment (79 FR 67154). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Historically, the yellow-billed cuckoo occupied and bred in riparian zones from western Washington (possibly southwestern British Columbia) to northern Mexico, including Oregon, Washington, southwestern Idaho, California, Nevada, Utah, western Colorado, Arizona, New Mexico, and western Texas. Today, the species is absent from Washington, Oregon, and most of California, is likely extirpated in Nevada, is rare in Idaho and Colorado, and occurs in the balance of its range in riparian habitats that are much reduced from their previous extent and are heavily affected by human use (79 FR 59991).

The yellow-billed cuckoo is associated primarily with cottonwood-willow dominated riparian habitats. Cottonwood-willow is the predominant and preferred habitat, but they also use very tall screwbean-honey mesquite stands as well as a mixture of saltcedar and cottonwood/willows. Vegetation density, distance to water, and the length and width of the habitat area are important characteristics when surveying for yellow-billed cuckoos. The species breeds in large blocks of riparian habitats (particularly woodlands with cottonwoods and willows). Dense understory foliage appears to be an important factor in nest site selection, and cottonwood trees are an important element of foraging habitat.

Quantitative data on the decline of the yellow-billed Cuckoo are lacking, but absence and rarity in Washington, Oregon, Idaho, Colorado, and Nevada, and the three remaining western yellow-billed cuckoo-inhabited states (Arizona, New Mexico, and California) demonstrate a decline in both range and abundance of the distinct population segment. However, New Mexico presently supports a relatively abundant population within its river systems. In 2002, Woodward et al. (2003) found 89 western yellow-billed cuckoos on private, state, and Federal lands in the upper Gila and Mimbres river drainages. Additionally, western yellow-billed cuckoos occur in the Rio Grande river valley from the headwaters of Cochiti Dam to the headwaters of Elephant Butte reservoir.

The proposed PCEs specific to yellow-billed cuckoo proposed critical habitat are the elements of physical or biological features that provide for a species life history processes and are essential to the conservation of the species (79 FR 48548, page 48554).

Yuma Clapper Rail

The Yuma clapper rail (*Rallus longirostris yumanensis*) was listed as an endangered species on March 11 1967 (32 FR 4001). Critical habitat was not designated for this species. Excerpts of the species' distribution and conservation status from the listing document appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The species currently inhabits the mainstem Colorado River in Arizona, California, and Nevada; the Virgin River in Arizona, Nevada, and Utah; the Gila River in Arizona; and the Salton Sea in California. The Yuma clapper rail is the only subspecies of clapper rail found in freshwater marshes.

Historically, cattail/bulrush marshes in the Colorado River Delta were the likely stronghold for the species. The virtual elimination of freshwater flows down the Lower Colorado River (LCR) to the Delta due to diversions from the river for agriculture and municipal uses destroyed that habitat. Existing habitats are primarily either human-made, as are the managed ponds at Salton Sea or the effluent-supported marshes at the Cienega de Santa Clara, or formed behind dams and diversions on the LCR at the time those structures were created. This entire habitat is subject to natural successional processes that reduce habitat value over time without also being subject to natural restorative events generated by a natural hydrograph. The greatest threat to the Yuma clapper rail is that without active management and protection of water sources supporting the habitat, these habitat areas will be permanently lost. Other threats to this species include continuing land use changes in floodplains, human activities, environmental contaminants (particularly increases in selenium levels), and reductions in connectivity between core habitat areas.

MAMMALS

Amargosa Vole

The Amargosa vole (*Microtus californicus scirpensis*) was listed as an endangered species and critical habitat was designated on November 15, 1984 (49 FR 45160). A recovery plan for the species was developed in 1997 (USFWS 1997) it has not been finalized. Excerpts of the species'

distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Reasons for listing included loss of historic habitat, channelization of water sources needed to perpetuate habitats, and pumping of groundwater (USFWS 1997). The current trend in the Amargosa vole population is unknown due to an absence of focused research or monitoring.

The Amargosa vole, also referred to as the Amargosa meadow mouse, is one of 17 named subspecies of the California vole, *Microtus californicus*. The species' range encompasses the Coast Ranges, the Cascade Range, the Sierra Nevada Range (with the exception of high elevations), the Central Valley, the Peninsular Ranges, and the Transverse Ranges, of California. The species also occurs in portions of Baja California. The listed subspecies *scirpensis* occupies bulrush marshes near Tecopa Hot Springs and Shoshone, in southeastern Inyo County, California.

The Amargosa vole is found in moist habitats (meadows, freshwater marshes and pastures) near the Shoshone-Tecopa segment of the Amargosa River. Suitable habitat for the species begins at Shoshone and extends downstream to the northern end of the Amargosa Canyon. Ponds, meadows, and hot spring outflows occurring in proximity but upslope from the Amargosa River, also provide habitat. McClenaghan and Montgomery (1998) found that voles occur primarily in association with stands of bulrush in wet or lightly flooded (e.g., 1-2 inches deep) substrates. They also found that most areas of high vole abundance occurred at the interface of bulrush and saltgrass habitats, or in pure bulrush stands. Murphy and Freas (1989) found that Amargosa vole burrows were exclusively within the interface between bulrush and saltgrass habitats. McClenaghan and Montgomery (1989) found that at one site voles also appeared to be present on wet substrates with a dominance of rush (*Juncus* spp.) and other marsh plants. Associated wetland vegetation is dominated by reeds (*Juncus* spp.), bulrush (*Scirpus olneyi*) and cattails (*Typha* spp.), with southern reed (*Phragmites australis*), arrow weed, iodine weed (*Suada torreyanna*) and quail bush forming the upland overstory plant component. Upland understory plants generally include yerba mansa (*Anemopsis californica*) and saltgrass.

Amargosa vole critical habitat encompasses an area of 4,250 acres in southeastern Inyo County. Critical habitat occurs primarily on lands managed by the Bureau, but there are some critical habitat lands in private ownership around the town of Tecopa and near Tecopa Hot Springs. In addition, there is a portion of critical habitat on state land within the Amargosa Canyon.

Within critical habitat, the PCEs that require special management considerations or protection include marsh vegetation (primarily bulrushes of the genus *Scirpus*), springs, and some open water along the Amargosa River, which provides escape cover and an adequate food supply. Critical habitat includes all extant vole populations and significant areas of potential habitat from north of Tecopa Hot Springs to the northern Amargosa Canyon, south of Tecopa.

Buena Vista Lake Ornate Shrew

The Buena Vista Lake ornate shrew (*Sorex ornatus relictus*) was listed as endangered on March 6, 2002 (67 FR 10101). Critical habitat was designated on July 2, 2013 (78 FR 39835). Excerpts

of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The shrew is one of nine subspecies of ornate shrews known to occur in California. It is a small dull black to grey-brown shrew with a relatively short bicolored tail darker near the tip. Shrews are active during the day and night but rarely seen due to their small size and cryptic behavior. Riparian and wetland vegetation communities with an abundance of leaf litter and dense herbaceous cover are essential habitat for the shrew. The shrews are most common in close proximity to a reliable body of water. Moist soil in areas with an overstory of willows or cottonwoods appears to be favored, but may not be an essential habitat feature. Although other ornate shrew species have been found in drier upland communities, upland habitat is considered very poor and is not considered essential for the shrew.

At the time of listing, threats listed in this section were the loss of habitat due to agricultural and urban development and lack of water sufficient to maintain the riparian areas in which the shrew occupies. Other threats include hybridization with other subspecies, selenium toxicity, exposure to pesticides, and limited gene flow. The primary threat to the shrew's survival and recovery however continues to be habitat loss. The long-term persistence of the shrew depends primarily upon the preservation of riparian and wetland communities in the southern Tulare Basin (south of Tulare Lake bed) and enhancing the size and connectivity between the small and isolated habitats where the shrew is currently found. This can be accomplished by restoring wetlands for migratory waterfowl, developing water recharge facilities, and maintaining and managing flood channels, sloughs, and drainage ditches in the Tulare Basin. These features are some of the few areas in the San Joaquin Valley that possess the water the shrew needs to survive and if riparian and wetland vegetation communities could be established, enhanced, or preserved, the species could begin to colonize and move towards recovery.

New Mexico Meadow Jumping Mouse

The New Mexico meadow jumping mouse (jumping mouse) was listed as an endangered species on June 10, 2014 (79 FR 33119). Critical habitat for this species, proposed on June 20, 2013 (78 FR 37328), has not been finalized to date. Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Historical distribution included riparian wetlands along streams in the Sangre de Cristo and San Juan Mountains from southern Colorado to central New Mexico, including the Jemez and Sacramento Mountains and the Rio Grande Valley from Espanola to Bosque del Apache National Wildlife Refuge, and the White Mountains in eastern Arizona (USFWS 2014).

Based on historical and current data, the distribution and abundance of the jumping mouse has declined significantly rangewide with the majority of local extirpations occurring since the late-1980s and early 1990s. Surveys conducted since 2005 documented locations where the subspecies was historically present, but is now apparently absent or at level too low for detection. Some 70 former locations occupied by the jumping mouse historically are considered no longer occupied. Since 2005, there have been 29 documented populations spread across the

eight sites (2 in Colorado, 15 in New Mexico, and 12 in Arizona. The current records of sites found since 2005 are: three localities in the Sangre de Cristo Mountains along the border of Colorado and New Mexico; seven localities in the Jemez Mountains, four localities in the Sacramento Mountains, and one locality at Bosque del Apache NWR, New Mexico; two localities in the San Juan Mountains, Colorado; and 12 localities in the White Mountains, Arizona. Nearly all of the current populations are isolated and widely separated in patches of suitable habitat that are too small to support resilient populations of jumping mice. In addition, 11 of the 29 populations have been substantially compromised since 2011 (due to water shortages, excessive livestock grazing, or wildfire and post-fire flooding).

The jumping mouse is a riparian-wetland obligate species; it requires dense riparian herbaceous vegetation associated with perennial or intermittent water surface flow. It occurs from elevations ranging from 4,500 feet to 9,600 feet. Habitat requirements are characterized by tall herbaceous vegetation, primarily composed of sedges, rushes, and forbs. Often these are within the understory of streamside willows (*Salix sp*.) or alder (*Alnus sp*.).

The jumping mouse hibernates for 8 to 9 months per year; conversely it is only active for 3 to 4 months during the summer. It may only be active from early June to September in high elevation montane areas (79 FR 33119). Due to this short activity period jumping mice typically raise only one litter per year. Jumping mice feed on insects and seeds from sedges, rushes and grasses, and depend on the availability of seeds to build the fat reserves needed for hibernation. As a result, the availability of seeds prior to hibernation is critical for the mouse's survival through hibernation. Jumping mice nest and hibernate in drier upland grassy areas that are adjacent to riparian habitats. It is important that hibernation sites are above the floodplain elevation to avoid flood-related mortality (see USFWS 2014).

AMPHIBIANS

Arroyo Toad

The arroyo toad (*Anaxyrus californicus*) was listed on endangered on December 16, 1994 (59 FR 64859). Critical habitat was designated on March 7, 2001 (66 FR 13656) and was revised on February 9, 2011 (76 FR 7245). The species has been proposed to be down-listed to threatened on March 27, 2014 (79 FR 17106). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The arroyo toad is a small, dark-spotted toad of the family Bufonidae. At the time the arroyo toad was listed in 1994, it was classified as a subspecies (*B. microscaphus californicus*) of the southwestern toad (*B. microscaphus*) (59 FR 64859). Arroyo toads breed and deposit egg masses in shallow, sandy pools usually bordered by sand and gravel flood terraces.

Historically, arroyo toads occurred from the upper Salinas River system on Fort Hunter Liggett Military Reservation, Monterey County, at the northern end of its range, south through the Santa Ynez, Santa Clara, and Los Angeles River Basins; the coastal drainages of Orange, Riverside, and San Diego Counties; to the Arroyo San Simeon system in Baja California, Mexico (Campbell et al., 1996). The species also now occurs on the desert slopes of the San Gabriel Mountains (in Little Rock Creek in Los Angeles County) and the San Bernardino Mountains (in

the Mojave River and in its tributaries, Little Horsethief Creek and Deep Creek, in San Bernardino County). Extirpated from much of their historic habitat, Arroyo toads now survive primarily in the headwaters of streams as small, isolated populations. .

The breeding habitat of the arroyo toad is restricted to shallow, slow-moving stream habitats, and riparian habitats that are disturbed naturally on a regular basis, primarily by flooding. To provide appropriate arroyo toad habitat, a stream must be large enough for channel scouring processes to occur but not so large that habitat structure is lost after floods. Outside of the breeding season, arroyo toads are essentially terrestrial and known to use a variety of upland habitats including but not limited to: sycamore-cottonwood woodlands, oak woodlands, coastal sage scrub, chaparral, and grassland. Arroyo toads disappeared from approximately 75 percent of their historically occupied habitat in California. They historically occurred in coastal drainages in southern California from San Luis Obispo County to San Diego County and in Baja California, Mexico. In Orange and San Diego Counties, the species occurred from estuaries to the headwaters of many drainages.

The Service identified the physical or biological features essential to the conservation of the arroyo toad by focusing on the PCEs needed to sustain important life history functions of the species (76 FR 7246, pages 7254 to 7255).

California Red-Legged Frog

The California red-legged frog (*Rana draytoni*) was listed on May 23, 1996 as a threatened species (61 FR 25813). Critical habitat was designated on April 13, 2006 (71 FR 19244) and revised on March 17, 2010 (75 FR 12816). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The California red-legged frog is the largest native frog in the western United States and is endemic (native and restricted) to California and Baja California, Mexico, at elevations ranging from sea level to approximately 5,000 feet (1,500 meters). Records of the California red-legged frog are from Riverside County to Mendocino County along the Coast Range; from Calaveras County to Butte County in the Sierra Nevada; and in Baja California, Mexico.

Habitats used by the California red-legged frog typically change in extent and suitability in response to the dynamic nature of floodplain and fluvial processes (i.e., variable natural water flow and sedimentation regimes that create, modify, and eliminate deep pools, backwater areas, ponds, marshes, and other aquatic habitats). Rangewide, and even within local populations, the California red-legged frog uses a variety of areas, including aquatic, riparian, and upland habitats. They may complete their entire life cycle in a particular habitat (e.g., a pond is suitable for all life stages), or they may seek multiple habitat types depending on climatic conditions or distance between and availability of wetland and other suitably moist environments.

The Service identified the physical or biological features essential to the conservation of the California red-legged frog by focusing on the PCEs needed to sustain important life history functions of the species (75 FR 12816, pages 12835 to 12836).

Chiricahua Leopard Frog

The Chiricahua leopard frog (*Lithobates chiricahuensis*) was listed as a threatened species on June 13, 2002 (67 FR 40790). Critical habitat was designated on March 20, 2012 (77 FR 16324). The Chiricahua Leopard Frog Final Recovery Plan (Recovery Plan) was finalized on April 4, 2007 (72 FR 30820). Included in the listing rule was a special rule to exempt operation and maintenance of livestock tanks on non-Federal lands from the section 9 take prohibitions of the ESA. Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The Chiricahua leopard frog is found in central and southeastern Arizona; west-central and southwestern New Mexico; and, in Mexico, northeastern Sonora, the Sierra Madre Occidental of northwestern and west-central Chihuahua, and possibly as far south as northern. The distribution of the species in Mexico is unclear due to limited survey work and the presence of closely related taxa (especially *Lithobates lemosespinali*) in the southern part of the range of the Chiricahua leopard frog

The Chiricahua leopard frog is an inhabitant of montane and river valley cienegas, springs, pools, cattle (stock) tanks, lakes, reservoirs, streams, and rivers. The species requires permanent or semi-permanent pools for breeding and water characterized by low levels of contaminants and moderate pH, and may exhibit periodic die-offs where *Batrachochytrium dendrobatidis* (Bd), a pathogenic chytridiomycete fungus, is present (see further discussion of this in the threats section below and in USFWS 2011). The diet of the Chiricahua leopard frog includes primarily invertebrates such as beetles, true bugs, and flies, but also includes fish and snails.

When critical habitat was proposed, the USFWS determined the physical and biological features (PBFs) for Chiricahua leopard frog. The PBFs include those habitat features required for the physiological, behavioral, and ecological needs of the species. These PBFs were later amended and published on September 21, 2011 (77 FR 16324, page 16343).

California Tiger Salamander

California tiger salamander (*Ambystoma californiense*) was listed as threatened on August 4, 2004 (69 FR 47212) throughout its range, except for the Sonoma County and Santa Barbara County Distinct Population Segments (DPS), where it is listed endangered. There have been numerous critical habitat rules covering different portions of its range published (69 FR 48570, 69 FR 68568, 70 FR 49380, 70 FR 74138 and 76 FR 54346). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Adult males are approximately 8 inches long, females approximately 7 inches long or less. The salamander's small eyes protrude from their heads. California tiger salamanders spend the majority of their lives underground in small mammal burrows. If California tiger salamanders are not able to locate or gain access to underground burrows, they may be prone to predation or desiccation. California ground squirrel (*Spermophilus beecheyi*) and valley pocket gopher (*Thommomys bottae*) burrows are the primary sources of these retreats. The primary cause of the

decline of the Santa Barbara County DPS of California tiger salamanders has been and continues to be the loss, degradation, and fragmentation of habitat as the result of human activities (Service 2000). Most of the known and potential California tiger salamander breeding ponds and surrounding upland habitat in Santa Barbara County occur on private lands.

The Santa Barbara DPS of California tiger salamander is genetically distinct and geographically isolated from the other listed entities within the range of the species. California tiger salamanders spend the majority of their lives underground in small mammal burrows and migrate to pools and ponds for breeding. There are six recognized metapopulations of California tiger salamanders within the range of the Santa Barbara County DPS. These metapopulations each utilize an array of vernal pools and swales, created ponds, and uplands, separated from one another by distance, topography, or anthropogenic barriers. The Santa Barbara County DPS of the California tiger salamander is threatened by habitat loss due to agricultural conversion and development and hybridization with non-native tiger salamanders.

Columbia spotted frog (Great Basin Distinct Population Segment (DPS))

The Great Basin DPS of the Columbia spotted frog (*Rana luteiventris*) is a candidate species (79 FR 72449). This DPS is found in eastern Oregon, southwestern Idaho, and northern drainages of Nevada.

Columbia spotted frogs are closely associated with clear, slow-moving or ponded surface waters, with little shade, and relatively constant water temperatures. Populations reproduce in habitats characterized by springs, floating vegetation, and larger bodies of pooled water (e.g., oxbows, lakes, stock ponds, beaver-created ponds, seeps in wet meadows, backwaters. A deep silt or muck substrate may be required for hibernation and torpor (a state of lowered physiological activity usually occurs during colder months). In colder portions of their range, Columbia spotted frogs will use areas where water does not freeze, such as springheads and undercut streambanks with overhanging vegetation; however, they can overwinter underneath ice-covered ponds.

Mountain Yellow-Legged Frog

The mountain yellow-legged frog (*Rana muscosa)* was listed as an endangered DPS (Southern California DPS) on July 2, 2002, with the remaining population listed as a candidate species by the USFWS (67 FR 44382). Critical habitat for the Southern DPS population of mountain yellow-legged frog was proposed on July 3, 2006 (71 FR 37881). It has not been finalized to date. The Sierra Nevada and Northern DPS of the yellow-legged frog was designated endangered on April 29, 2014 (79 FR 24256). Critical habitat has been proposed but not yet finalized (79 FR 1805). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Based on genetic data, the taxonomy of this species may change in the future. The mountain yellow-legged frog inhabits the high elevation lakes, ponds, and streams in the Sierra Nevada Mountains of California, from near 4,500 feet (1,370 meters) to 12,000 ft (3,650 m). The distribution of the mountain yellow-legged frog is from Butte and Plumas Counties in the north to Tulare and Inyo Counties in the south.

Relict Leopard Frog
The relict leopard frog (*Lithobates onca*) is a candidate species (67 FR 40657). Excerpts of the species' distribution and conservation status from this document appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The relict leopard frog is currently known to occur only in two general areas: near the Overton Arm of Lake Mead, Nevada, and in Black Canyon, Nevada, below Lake Mead. Historical records are reported for both areas, with specimen records dating from 1936 at the Overton Arm area and from 1955 at Black Canyon. Relic leopard frogs have been released in 14 experimental sites in southeastern Nevada and Northwestern Arizona. Eleven of these sites are still extant.

Habitat heterogeneity in the aquatic and terrestrial environment is unknown, but likely important to the relict leopard frog. For other leopard frog species, shallow water with emergent and perimeter vegetation provides foraging and basking habitat, and deep water, root masses, undercut banks, and debris piles provide potential hibernacula and refuge from predators. Historical localities were at springs, streams, and wetlands along major rivers. Extant populations are restricted to perennial desert springs within the Virgin and Colorado River drainages. Currently occupied habitats may reflect available rather than optimal habitat due to destruction, modification, or occupation by nonnative predators of historical habitat.

REPTILES

Northern Mexican Gartersnake and Narrow Headed Gartersnake
The northern Mexican gartersnake (*Thamnophis eques medalops*) and narrow headed gartersnake (*Thamnophis rufipunctatus*) were listed as threatened on July 8, 2014 (79 FR 38677). Critical habitat was proposed but has not been finalized to date (78 FR 41549). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

These gartersnakes are considered a riparian obligates. The narrow-headed gartersnake is widely considered to be one of the most aquatic of the gartersnakes (Drummond and Garcia 1983; Rossman *et al.* 1996). This species is strongly associated with clear, rocky streams (Rosen and Schwalbe 1988, Rossman *et al.* 1996). The northern Mexican gartersnake is considered a "terrestrial-aquatic generalist". It is a riparian obligate (restricted to riparian areas when not dispersing) and occurs chiefly in the following habitat types: source-area wetlands (*e.g.*, cienegas or stock tanks); large-river riparian woodlands and forests; and streamside gallery forests.

The following three reptiles are not riparian-obligate species. They may be encountered on the clients' property during conservation practice construction as project sites are accessed or if portions of the practice are located in appropriate habitats in the adjacent uplands.

Blunt-nose leopard lizard
The blunt-nosed leopard lizard (*Gambelia silus*) was listed as endangered under the Endangered Species Preservation Act (32 FR 4001). It is endemic to the San Joaquin Valley of central California; inhabiting open sparsely vegetated areas of low relief and surrounding foothills (USFWS 2010).

Mojave Desert Tortoise
The Mojave population of the desert tortoise (*Gopherus agassizii*) (all tortoises north and west of the Colorado River in Arizona, Utah, Nevada, and California) was listed as Threatened on April 2, 1990 (55 FR 12178). Critical habitat was designated on February 8, 1994 (59 FR 5820). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Desert tortoises occupy a variety of habitats from flats and slopes dominated by creosote bush scrub at lower elevations to rocky slopes in blackbrush and juniper woodland ecotones at higher elevations. The majority of threats to the desert tortoise or its habitat are associated with human land uses such as recreational off-road use, development, and un-managed livestock grazing. PCEs for the desert tortoise critical habitat were identified as sufficient space to support viable populations within each of the six recovery units and to provide for movement, dispersal, and gene flow; sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species; suitable substrates for burrowing, nesting, and overwintering; burrows, caliche (hard layer of subsoil typically containing calcium carbonate) caves, and other shelter sites; sufficient vegetation for shelter from temperature extremes and predators; and habitat protected from disturbance and human-caused mortality.

Sonoran Desert Tortoise
Sonoran desert tortoise (*Gopherus morafkai*) is considered a candidate species by the USFWS (56 FR 58804). Excerpts of the species' distribution and conservation status from this document appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Sonoran desert tortoises inhabit primarily rocky slopes and bajadas of Mojave and Sonoran desertscrub. In addition to steep, rocky slopes and bajadas, Sonoran desert tortoises may use inter-mountain valleys as part of their home ranges and for dispersal. The majority of threats to the desert tortoise or its habitat are associated with human land uses such as recreational off-road use and development.

FISH SPECIES

There are 40 candidate, proposed or federally-listed fish species potentially affected by the proposed action. The BO will collectively evaluate these species by the following groups:

- Cold-water fish include those species that require clear, cold waters and cannot tolerant of extreme water temperature changes. They require water temperatures of 10 to 18 degrees Celsius (C) (50 to 64 degrees Fahrenheit (F) (Benke 1992).

- Warm-water fisheries support fish able to tolerate water temperatures above 80 degrees F (27 degrees C) (Minckley et al. 2003). Warm-water fishes are generally seen as more tolerant of changes in water chemistry, pulses or sources of fine sediment, and water temperature than cold water fishes.

- Endemic fish species are found in very limited distributions; particular springs or single waterways.

These designations depend upon the most sensitive or particular federal listing designated (threatened or endangered) fish species occupying the water in that particular watershed, stream, spring, or similar waterbody occurring on the clients' property. This Opinion recognizes in specific cases that endemic, cold-water, and/or warm-water fish species may co-exist in the same water body. Conservation measures will be implemented to protect the species with the lowest threshold for take as a result of the conservation practice(s) implementation.

COLD WATER FISH

Apache Trout

Apache trout (*Oncorhynchus apache*), is one of two salmonid species native to Arizona, and was listed as threatened on July 6, 1975 (40 FR 29863). Originally listed as endangered (32 FR 4001), a re-analysis of species status led to its downlisting in 1975 due to successful culturing in captivity and greater knowledge of existing populations. Critical habitat was not designated for this species. Its reclassification to threatened status included a 4(d) rule, allowing the state of Arizona to regulate take of the species and to establish sportfishing opportunities (40 FR 29863). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Historically, Apache trout occupied streams and rivers in the upper White, Black, and Little Colorado River drainages in the White Mountains of east-central Arizona. Currently, 28 pure Apache trout populations exist within historical range in Gila, Apache, and Greenlee Counties of Arizona, on lands of the Fort Apache Indian Reservation (FAIR) and Apache-Sitgreaves National Forest (ASNF). Private lands are not considered an important component of the species' recovery – although opportunities do exist to improve or restore habitat which will contribute to the species' persistence.

Apache trout evolved in streams primarily above 1,800 m (6,000 ft) elevation, within mixed conifer and ponderosa pine forests. Apache trout generally require water temperatures below 25° C (77°F). Adequate stream flow and shading are generally required to prevent lethal temperatures and ample stream flow helps maintain pools that are used frequently during periods of drought and temperature extremes. Apache trout require clean coarse gravel substrates for spawning. Land-use practices such as timber harvest/thinning, prescribed fire, and livestock grazing can affect healthy riparian corridors that promote sufficient habitat conditions to allow for all life functions including spawning, hatching, rearing, foraging, loafing, and over-wintering. Prey of Apache trout consists mostly of invertebrates, which are typically abundant in healthy

streams. Apache trout often use cover in the form of woody debris, pools, rocks and boulders, undercut streambanks, or overhanging vegetation at stream margins.

The most recent Recovery Plan for the Apache Trout was approved in 2009 (USFWS 2009). Priority Recovery action include: 1) surveying and addressing the genetic status (purity) of existing populations and protecting those populations, 2) eliminating non-native trout species and subsequently reintroducing Apache trout in selected streams within historical Apache trout habitat, 3) surveying populations and habitat conditions, and developing and implementing habitat improvement measures, and 4) developing a hatchery broodstock and enhancing sport fisheries for the species. The main objective is to establish and/or maintain 30 self-sustaining discrete populations of pure Apache trout throughout its historic range (USFWS 2009).

Gila Trout

The Gila trout (*Oncorhynchus gilae*) was originally recognized as endangered under the Federal Endangered Species Preservation Act of 1966 (32 FR 4001). Federal designated status of the fish as endangered was continued under the ESA. On July 18, 2006, the USFWS reclassified the Gila trout as threatened (71 FR 40657). No critical habitat has been designated. Excerpts of the species' distribution and conservation status from these listing rules appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

Gila trout are a typical cold-water species requiring well-oxygenated water; coarse sand, gravel, and cobble substrate; stable stream bank conditions; and abundant overhanging banks, pools, and cover for optimal habitat. They are found in moderate to high gradient (from 1% to over 14% gradient) perennial streams above 1,660 m (5,400 ft) to over 2,838 m (9,200 ft) in elevation (McHenry 1986, Propst and Stefferud 1997). The species requires water temperatures below 25°C (77°F), adequate stream flow to maintain survivable conditions, and clean gravel substrates for spawning.

Gila trout are generally insectivorous; however, there is some evidence of piscivory. The most abundant food items in Gila trout stomachs for Main Diamond Creek included adult dipterans, trichopteran larvae, ephermopteran nymphs, and aquatic coleopterans. Food items did not vary significantly for different size classes sampled. The 2003 Recovery Plan notes that the same food items were predominant for other (nonnative) trout species in the Gila River drainage, indicating that there is potential for interspecific competition for food resources.

Currently there are 14 populations of Gila trout in the wild, including four relict populations (Main Diamond, South Diamond, Spruce, and Whiskey Creeks), which are secure, and 10 established replicates. Replication involves moving adults from each successfully reproducing relict population and releasing them into the nearest suitable renovated stream. The total population size in 1998 was estimated to be approximately 37,000 fish and approximately 109.5 km (67.9 mi) of stream were occupied in January 2001, with the addition of the estimated length of the West Fork of the Gila River in Langstroth Canyon where the Whiskey Creek populations was replicated June 2006 (71 FR 40657).

According to the 1987 Federal Register notice, major threats to this species include habitat alterations, competition, hybridization, and predation by non-indigenous fish. The decline in Gila trout populations and available habitat is due to a multitude of factors: 1) habitat degradation, including the impacts of grazing and logging; 2) uncontrolled angling; 3) predation from and competition with nonnative trout, especially piscivory of brown trout; 4) inadequacy of legal protections up to 1967 when Federal listing occurred; and 5) introgressive hybridization with nonnative rainbow trout.

Greenback Cutthroat Trout

The greenback cutthroat trout (*Oncorhynchus clarki stomias*) was originally listed as endangered in 1967 (32 FR 4001). The species was downlisted to threatened status on April 18, 1978. No critical habitat exists for the subspecies. Excerpts of the species' distribution and conservation status from these documents and the original listing rule appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

The original distribution of the subspecies is not precisely known due to its rapid decline in the 1800s. It is assumed that the original distribution included all mountain and foothill habitats of the South Platte and Arkansas River drainage systems, including drainages at lower elevations than it occupies today. The subspecies may have extended as far east as present day Greeley, Colorado, during the mid-1800s. Currently, 145 populations, in 227.7 kilometers of streams and 166.74 hectares of lakes have been documented within greenback historic range on the eastern side of the Continental Divide.

This species inhabits cold water streams and cold water lakes with adequate stream spawning habitat present during spring. Field studies however, have indicated that water temperatures averaging 7.8°C or below in July may have an adverse effect on greenback fry (young fish) survival and recruitment. In general, trout require different habitat types for different life stages: juvenile (protective cover and low velocity flow, as in side channels and small tributaries); spawning (riffles with clean gravels); over-winter (deep water with low velocity flow and protective cover); and adult (juxtaposition of slow water areas for resting and fast water areas for feeding, with protective cover from boulders, logs, overhanging vegetation or undercut banks). Both water quality and quantity are important. Greenbacks, like other cutthroat trout, generally require clear, cold, well-oxygenated water.

Spawning occurs usually from late May to mid-July in higher elevations. Male cutthroat spawn first at age two, and females mature a year later. Females build an egg pit in gravel generally three to eight inches deep and one foot in diameter. A 10-inch female will lay about 800 eggs. Larger fish of about four to seven pounds will lay up to 6,000 eggs. Greenbacks are opportunistic feeders over a wide range of prey organisms, but a large percentage of the diet can be terrestrial insects. Greenbacks also feed on crustaceans such as fresh-water shrimp, aquatic insects, and small fish.

The main reasons cited for the subspecies' decline are hybridization, competition with nonnative salmonids, and overharvest. New threats have arisen, or have become more prevalent, and these include: increased human population growth within the range of the subspecies along with

potential for new water depletions; new introductions of nonnative species; fragmentation and genetic isolation of small populations; the effects of fire and firefighting with chemical retardants; and the effects of global climate change. Additional threats are those whose impacts are limited to specific populations and do not occur at a rangewide level, and these include: the ongoing negative effects of past mining operations on water quality; the impacts of grazing, logging, and road and trail construction and use on riparian habitat and streambanks, causing increased erosion, sediment deposition, and in turn elevated water temperatures and higher turbidity; and the co-occurrence of nonnative salmonids with greenback populations.

Lahontan Cutthroat Trout

The Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*) was listed as endangered in 1970 subsequently reclassified as threatened in 1975 to facilitate management and allow regulated angling. Based on geographical, ecological, behavioral, and genetic factors, the USFWS determined that three vertebrate population segments exist for this species of trout which include: (1) Western Lahontan basin comprised of Truckee, Carson, and Walker river basins; (2) Northwestern Lahontan basin comprised of Quinn River, Black Rock Desert, and Coyote Lake basins and; (3) Humboldt River basin. No designated critical habitat for this species exists.

The Lahontan cutthroat trout is endemic to the physiographic Lahontan basin of northern Nevada, eastern California, and southern Oregon. Lahontan cutthroat trout were once widespread throughout the basins of Pleistocene Lake Lahontan. In 1844, there were 11 lacustrine populations of Lahontan cutthroat trout populations occupying about 334,000 acres of lakes, and 400 to 600 fluvial populations in over 3,600 miles of streams within the major basins of Pleistocene Lake Lahontan.

Lahontan cutthroat trout currently occupy between 155 and 160 streams; 123 to 129 streams within the Lahontan basin and 32 to 34 streams outside the basin, totaling approximately 482 miles of occupied habitat. The subspecies is also found in six lakes and reservoirs, including two small, wild, indigenous populations in Summit and Independence Lakes. Currently, self-sustaining Lahontan cutthroat trout populations occur in 10.7 percent of the historic fluvial and 0.4 percent of the historic lacustrine habitats.

Lahontan cutthroat trout, like other trout species, are found in a wide variety of cold-water habitats including large terminal alkaline lakes (e.g., Pyramid and Walker lakes); oligotrophic alpine lakes (e.g., Lake Tahoe and Independence Lake); slow meandering low-gradient river (e.g., Humboldt River); moderate gradient montane rivers (e.g., Carson, Truckee, Walker, and Marys Rivers); and small headwater tributary stream (e.g., Donner and Prosser Creeks). Generally, Lahontan cutthroat trout occur in cool flowing water with available cover, velocity breaks, well-vegetated and stable stream banks, and relatively silt free, rocky substrate in riffle-run areas. Lahontan cutthroat trout continue to be impacted by degraded and/or limited habitat, displacement and/or hybridization with nonnative trout, and decreased viability.

WARM WATER FISH

Beautiful shiner

The beautiful shiner (*Cyprinella formosa*) was listed as threatened on August 31, 1984 (48 FR 34490). Simultaneously, the Service listed the Yaqui chub (*Gila purpurea*) to be an endangered species, and the Yaqui catfish (*Ictalurus pricei*) to be a threatened species. Critical habitat on San Bernardino National Wildlife Refuge is designated for these three fishes. A special rule is included to allow take of the threatened species for educational, scientific, and conservation purposes in accordance with Arizona State laws and regulations. A final recovery plan for the Yaqui fish and two other species was signed on March 29, 1995. Descriptions of these species and life history accounts are included in the Fishes of the Rio Yaqui Recovery Plan (USFWS 1995), and are included herein by reference.

These species, e.g., the beautiful shiner, Yaqui chub, and Yaqui catfish, have been seriously reduced by habitat modifications including arroyo cutting, water diversion, impoundment construction, development of canal systems for irrigated agriculture, and excessive pumping of underground aquifers. An imminent threat to the remaining populations of Rio Yaqui Fishes is the possible release of exotic fish such as the red shiner and channel catfish, which may result in intense competition and/or genetic swamping. The Rio Yaqui fishes occur in the Rio Yaqui Basin which drains western Sonora and portions of eastern Chihuahua in Mexico, and the extreme southeastern corner of Arizona. The beautiful shiner formerly inhabited small drainages in the closed Guzman Basin, including Rio Mimbres in New Mexico, and the Casa Grandes, Santa Maria, and Del Carmen, just east of the Rio Yaqui.

Bonytail

The bonytail (*Gila elegans*) was listed by the USFWS as endangered on April 23, 1980 (45 FR 2710). Critical habitat for the species was designed on March 21, 1994 (59 FR 13374). Excerpts of the species' distribution and conservation status from the original listing and critical habitat rules appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

The bonytail was once found in many states, including Arizona, California, Colorado, New Mexico, Utah, and Wyoming. This fish species experienced the most abrupt decline of any of the long-lived fishes native to the main-stems of the Colorado River system and, because no young individuals have been found in recent years, has been called functionally extinct. Bonytail were one of the first fish species to reflect the changes that occurred in the Colorado River basin after the construction of Hoover Dam; the fish was extirpated from the lower basin between 1926 and 1950. They may still be found in the Green River of Utah and perhaps in the larger Colorado River water bodies.

Bonytail prefer backwaters with rocky or muddy bottoms and flowing pools, although they have been reported in swiftly moving water. They are mostly restricted to rocky canyons today, but were historically abundant in the wide downstream sections of rivers. The main threats to the species include habitat alterations caused by dams, and predation and competition with nonnative fishes.

The Lower Colorado River Multi-Species Conservation Program (LCRMSCP) is a conservation program aimed at protecting sensitive, threatened, and endangered species of fish, wildlife, and their habitat. The Bonytail is one of many species covered by this program. The overwhelming focus of the LCRMSCP is establishing more natural river flows from dam operations along the LCR to support sustainable native fisheries.

In 2006, the USFWS and Clark County, Nevada entered into a programmatic Safe Harbor Agreement to promote voluntary habitat restoration, maintenance, enhancement, or creation activities to enhance the reintroduction and long-recovery of razorback sucker (*Xyrauchen texanus*) and bonytail (*Gila elegans*) within Clark County, Nevada.

The USFWS designated seven reaches of the Colorado River system as critical habitat for the bonytail. These reaches total 499 km (312 mi) of predominately public lands (only ~27 river miles are privately owned). Critical habitat for the bonytail is designated for portions of the Colorado, Green, and Yampa Rivers in the Upper Basin and the Colorado River in the Lower Basin. Known constituent elements are not quantified in the critical habitat rule, but include water, physical habitat, and biological environment as required for each particular life stage (59 FR 13374). In the USFWS's 1994 critical habitat designation, the USFWS identified water, physical habitat, and the biological environment as the PCEs of critical habitat. This includes a quantity of water of sufficient quality that is delivered to a specific location in accordance with a hydrologic regime that is required for the particular life stage for each species. The physical habitat includes areas of the Colorado River system that are inhabited or potentially habitable for use in spawning and feeding, as a nursery, or serve as corridors between these areas. In addition, oxbows, backwaters, and other areas in the 100-year floodplain, when inundated, provide access to spawning, nursery, feeding, and rearing habitats. Food supply, predation, and competition are important elements of the biological environment.

Colorado Pikeminnow

Colorado pikeminnow (*Ptychocheilus lucius*) was listed as endangered on March 11, 1967 (32 FR 4001). Critical habitat was designed for the species on March 21, 1994 (59 FR 13374). The pikeminnow is also listed as an experimental, non-essential population in the Salt and Verde River drainages and endangered in all other areas where it occurs. Excerpts of the species' distribution and conservation status from these rules appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

The Colorado pikeminnow is endemic to the Colorado River basin, where it was once widespread and abundant in warm-water rivers and tributaries. Wild populations of Colorado pikeminnow are found only in the upper basin of the Colorado River (above Lake Powell). Three wild populations of Colorado pikeminnow are found in about 1,090 miles of riverine habitat in the Green River, upper Colorado River, and San Juan River sub-basins.

The Lower Colorado River Multi-Species Conservation Program (LCRMSCP) is a conservation program aimed at protecting sensitive, threatened, and endangered species of fish, wildlife, and their habitat. The Colorado Pikeminnow is one of many species covered by this program. The overwhelming focus of the LCRMSCP is establishing more natural river flows from dam operations along the LCR to support sustainable native fisheries.

Currently, Colorado pikeminnow is limited mainly to three areas in the upper Colorado River Basin. In these primary areas of occurrence it is common, comparatively speaking, only in the Green-Yampa River system of northwestern Colorado and northeastern Utah. A reproducing population still occurs in the western part of Colorado in the Colorado and Gunnison Rivers. A small population of reproducing Pikeminnow still occurs in the San Juan River of New Mexico. In the lower Colorado River Basin, Pikeminnows have been re-introduced into the Salt and Verde systems as an experimental non-essential population.

The Colorado pikeminnow is a long-distance migrator; moving hundreds of kilometers to and from spawning areas. Adults require pools, deep runs, and eddy habitats maintained by high spring flows. These high spring flows maintain channel and habitat diversity, flush sediments from spawning areas, rejuvenate food production, form gravel and cobble deposits used for spawning, and rejuvenate backwater nursery habitats. Spawning occurs after spring runoff at water temperatures typically between 18 and 23°C. After hatching and emerging from spawning substrate, larvae drift downstream to nursery backwaters that are restructured by high spring flows and maintained by relatively stable base flows. Threats to the species include streamflow regulation, habitat modification, competition with and predation by nonnative fish species, and pesticides and pollutants.
Critical habitat for this fish species is designated in portions of the Colorado, Green, Yampa, White, and San Juan rivers. In the USFWS's 1994 critical habitat designation, the USFWS identified water, physical habitat, and the biological environment as the PCEs of critical habitat. This includes a quantity of water of sufficient quality that is delivered to a specific location in accordance with a hydrologic regime that is required for the particular life stage for each species. The physical habitat includes areas of the Colorado River system that are inhabited or potentially habitable for use in spawning and feeding, as a nursery, or serve as corridors between these areas. In addition, oxbows, backwaters, and other areas in the 100-year floodplain, when inundated, provide access to spawning, nursery, feeding, and rearing habitats. Food supply, predation, and competition are important elements of the biological environment.

Desert Pupfish
The desert pupfish (*Cyprinodon macularius)* was listed as an endangered species, with critical habitat, on April 30, 1986 (51 FR 10842). Designated critical habitat for desert pupfish in Arizona consists of Quitobaquito Spring and a 100-foot riparian buffer zone around the spring (51 FR 10842), located on Organ Pipe Cactus National Monument in western Pima County. Desert pupfish critical habitat is outside the action area and will not be addressed further in this BO. The Desert Pupfish Recovery Plan was finalized in 1993. The goal of the recovery plan is to reclassify the species as threatened, as delisting the species is not considered feasible in the foreseeable future. In order to attain this objective, the following actions are necessary: protection of natural populations, reestablishment of new populations, establishment and maintenance of refuge populations, development of protocols for the exchange of genetic material between stocked pupfish populations, determination of factors affecting population persistence, and information and education to foster recovery efforts.

Thirteen natural populations of desert pupfish persist within the historical range; nine of these are in Mexico. Approximately 20 transplanted populations exist in the wild, though this number

fluctuates widely due to climatic variation and the establishment (or failure) of refugium populations. Many natural and transplanted populations are imperiled by one or more threats. In 2005, desert pupfish were reestablished into three sites within Aravaipa Canyon watershed under a Safe Harbor Agreement with the Arizona Chapter of The Nature Conservancy and a reestablishment project conducted by the Bureau of Land Management's Safford Field Office (AESO/SE 02-21-04-F-0022). The success of these reestablishments is still to be determined. Threats to the species include loss and degradation of habitat through groundwater pumping or diversion, contamination from agricultural return flows, predation and competition from nonnative fish species, populations outside of historical range, population of questionable genetic purity, restricted range, small populations, and environmental contaminants.

Gila Chub

The Gila chub (*Gila intermedia*) was listed as endangered with critical habitat on November 2, 2005 (70 FR 66664). Excerpts of the species' distribution and conservation status from these rules appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

Gila chub feed primarily on aquatic insects and algae. Gila chub commonly inhabit pools in smaller streams, springs, and cienegas and they can survive in small artificial impoundments. Gila chub are highly secretive, preferring quiet, deeper waters, especially pools, or remaining near cover like terrestrial vegetation, boulders, and fallen logs.

Historically, Gila chub have been recorded from rivers, streams, and spring-fed tributaries throughout the Gila River basin in southwestern New Mexico, central and southeastern Arizona, and northern Sonora, Mexico. Today the Gila chub has been restricted to small, isolated populations scattered throughout its historical range.

Threats to Gila chub include predation by and competition with nonnative organisms, including fish in the family Centrarchidae, other fish species, bullfrogs, and crayfish; disease; and habitat alteration, destruction, and fragmentation resulting from water diversions, dredging, recreation, roads, livestock grazing, changes in the natural flow pattern, mining, degraded water quality (including contaminants from mining activities and excessive sedimentation), and groundwater pumping (67 FR 51948). The impacts of nonnative species have been well documented. Dudley and Matter (2000) correlated green sunfish presence with Gila chub decline and found that even small green sunfish readily consume young-of-year Gila chub. Presence of green sunfish was correlated with the absence of young-of-year Gila chub. Riparian and aquatic communities across the southwest have been degraded or destroyed by human activities. Humans have affected southwestern riparian systems over a period of several hundred years. Eighty-five to ninety percent of the Gila chub's habitat has been degraded or destroyed, and much of it is unrecoverable. Only 29 extant populations of Gila chub remain; all but one is small, isolated, and threatened. The current status of the Gila chub is poor and declining.

Gila chub critical habitat includes approximately 333.6 km (207.8 mi) of stream reaches in Arizona and New Mexico, organized into seven river units. The stream segments within each of the seven units are defined longitudinally by upstream and downstream limits (67 FR 51948) and laterally by the area of bankfull width of the particular stream, plus 300 feet on either side of the

stream's edge at bankfull. The 7 units are the Upper Gila River Unit, which includes Turkey Creek in Grant County New Mexico, and Dix, Harden Cienega, Eagle, and East Eagle Creeks in Graham and Greenlee counties, Arizona; the Middle Gila River Area, which includes Mineral Creek, Blue River and Bonita Creek in Gila and Maricopa counties, Arizona; the Babocomari River Area, which includes O'Donnell Canyon, and Turkey Creek/Post Canyon Creek in Cochise County, Arizona; the Lower San Pedro River Area, which includes Bass, Hot Springs, and Redfield canyons in Cochise, Graham, and Pima counties, Arizona; the Lower Santa Cruz River Area, which includes Cienega Creek, Mattie Canyon, Empire Gulch, and Sabino Canyon in Pima County, Arizona; the Upper Verde River Area, which includes Walker Creek, Red Tank Draw, Spring Creek, and Williamson Valley Wash in Yavapai County, Arizona; and the Agua Fria River Area which includes Little Sycamore, Sycamore, Indian, Silver, and Larry creeks and Lousy Canyon in Yavapai County, Arizona.

Each stream segment contains at least one of the PCEs or requires special management consideration. In the final rule, we discussed the biological needs of the species upon which the PCEs are based, listed seven PCEs for the species, and discussed the specific elements in each of the proposed stream segments (70 FR 66664). The seven PCEs are summarized here: (1) perennial pools, eddies, and higher velocity areas in headwaters, springs, and cienegas of smaller tributaries; (2) suitable water quality for spawning, including temperatures ranging from 20 to 26.5°C (68 to 79.7°F); (3) suitable water quality, including low levels of contaminants and sedimentation, for all other aspects of Gila chub life history; (4) adequate food base; (5) sufficient cover for sheltering; (6) a low enough level of nonnative species such that Gila chub are able to survive and reproduce and; (7) streams that maintain a natural flow pattern sufficient to support Gila chub.

The constituent elements of Gila chub critical habitat are generalized descriptions and ranges of selected habitat factors that are critical for the survival and recovery of the species. The appropriate and desirable level of these factors may vary seasonally and is highly influenced by site-specific circumstances. Therefore, assessment of the presence/absence, level, or value of the constituent elements included consideration of the season of concern and the characteristics of the specific location. The constituent elements were not independent of each other and were assessed holistically, as a functioning system, rather than individually. In addition, the constituent elements were assessed in relation to larger habitat factors such as watershed, floodplain, and streambank conditions; stream channel morphology; riparian vegetation; hydrologic patterns; and overall aquatic faunal community structure.

Gila Topminnow

The Gila topminnow (*Cyprinodon macularius)* was listed as endangered on March 11, 1967, without critical habitat (32 FR 4001). Critical habitat has not been designated for Gila Topminnow. Excerpts of the species' distribution and conservation status from this rule appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

Habitat requirements are broad. Topminnow prefer shallow, warm, fairly quiet waters in ponds, cienegas, tanks, pools, springs, small streams and the margins of larger streams. Dense mats of algae and debris along the margins of the habitats are an important component for cover and

foraging. Substrates of organic muds and detritus also provide foraging areas. Species historically also occurred in backwaters of large rivers but is currently isolated to small streams and springs.

The reasons for the decline of this fish include past dewatering of rivers, springs and marshlands, impoundment, channelization, diversion, regulation of flow, land management practices that promote erosion and arroyo formation, and the introduction of predacious and competing non-indigenous fishes. Life history information can be found in the Gila and Yaqui Topminnow Recovery Plan, the draft Gila Topminnow Revised Recovery Plan, and references cited in the plans and in this Biological Opinion.

The status of the species is poor and declining. Gila topminnow has gone from being one of the most common fishes of the Gila River basin to one that exists at no more than 32 localities (12 natural and 20 stocked). Many of these localities are small and highly threatened, and the Gila topminnow has not been found in some recent surveys at these sites. In 2005, Gila topminnow were reestablished into three sites within Aravaipa Canyon watershed under a Safe Harbor Agreement with the Arizona Chapter of The Nature Conservancy (The Nature Conservancy and USFWS 2005) and a reestablishment project conducted by the Bureau of Land Management's Safford Field Office (AESO/SE 02-21-04-F-0022). The success of these reestablishments is still to be determined.

Headwater Chub

The USFWS conducted a status review and published a 12-month petition finding for the headwater chub (*Gila nigra)* on May 3, 2006 (71 FR 26007) that listing was warranted, but precluded by other agency priorities thus this species is considered a candidate species. As of 2013, its status is as a candidate species for listing under the ESA. Excerpts of the species' distribution and conservation status from the petition finding appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

The Headwater chub was first described from Ash Creek and the San Carlos River in east-central Arizona in 1874. The historical distribution of headwater chub in the lower Colorado River basin is poorly documented, due to the paucity of early collections and the widespread anthropogenic (manmade) changes (i.e., habitat alteration and nonnative species introductions to aquatic ecosystems beginning in the mid-19th century. The headwater chub was historically considered common throughout its range.

Headwater chub occur in the middle to upper reaches of moderately-sized streams. Maximum water temperatures of headwater chub habitat varied from 20 to 27 °C, and minimum water temperatures were around 7 °C. Typical adult microhabitat consists of nearshore pools adjacent to swifter riffles and runs over sand and gravel substrate, with young of the year and juvenile headwater chub using smaller pools and areas with undercut banks and low current. Spawning in Fossil Creek occurred in spring and was observed in March in pool-riffle areas with sandy-rocky substrates. Diet of headwater chub include aquatic insects, ostracods (small crustaceans), and plant material.

The data show that the status of headwater chub is poor and declining. It has been extirpated from approximately 50 percent of its historical range; all 16 known populations are experiencing threats and it is no longer considered secure in any part of its historical range. Although 6 of the 16 extant populations are considered "stable" based on abundance and evidence of recruitment, we believe all six of these populations have a high likelihood of becoming extirpated in the foreseeable future, primarily because at least one, and in most cases several, nonnative aquatic species that have been implicated in the decline of headwater chub are present in these streams.

The vast majority of land owned within the range of the Headwater Chub is publically-owned (e.g., USFS or state-owned lands). An estimated 5 percent of the land is owned by private landowners (12.5 river k/7.7 river miles, 113 acres) (USFWS 2013).

Humpback Chub

The humpback chub (*Gila cypha*) was listed as endangered on March 3, 1967 (32 FR 4001) with final critical habitat designated on March 21, 1994 (59 FR 13400). Excerpts of the species' distribution and conservation status from these rules appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The known historic distribution of the humpback chub includes portions of the mainstem Colorado River and four of its tributaries: the Green, Yampa, White, and Little Colorado rivers. However, its original distribution throughout the Colorado River basin is not known with certainty. Before the 1940's there was considerable manmade alteration occurring along the Colorado River, and there is some speculation that prior to this there may have been humpback chub populations in some river reaches of the Lower Colorado River Basin, although no documentation exists. Presently, the humpback chub is found only in the Little Colorado River and adjacent portions of the Colorado River.

The Lower Colorado River Multi-Species Conservation Program (LCRMSCP) is a conservation program aimed at protecting sensitive, threatened, and endangered species of fish, wildlife, and their habitat. The Humpback Chub is one of many species covered by this program. The overwhelming focus of the LCRMSCP is establishing more natural river flows from dam operations along the LCR to support sustainable native fisheries.

Some areas of the Colorado River are turbulent. Consequently, it is believed that the hump causes the humpback chub to be pushed to the bottom where water velocities are lower and where the chub can hold its position without exerting excess energy. Grooves associated with the hump may aid in directing water to the fish's gills. The long snout and beak-like mouth may allow the fish to feed without the mouth becoming filled with rushing water.

Humpback chub habitat preferences are not well understood. The humpback chub have been associated with a variety of habitats ranging from pools with turbulent to little or no current; substrates of silt, sand, boulder, or bedrock; and depth ranging from 1 meter to as deep as 15 meters. The construction and operation of Flaming Gorge, Glen Canyon, and Hoover dams have eliminated, or altered portions of this species habitat blocking migration routes. Competition, predation, and possible hybridization by introduced species have also been a factor in the decline of the humpback chub.

In the USFWS's 1994 critical habitat designation, the USFWS identified water, physical habitat, and the biological environment as the PCEs of critical habitat. This includes a quantity of water of sufficient quality that is delivered to a specific location in accordance with a hydrologic regime that is required for the particular life stage for each species. The physical habitat includes areas of the Colorado River system that are inhabited or potentially habitable for use in spawning and feeding, as a nursery, or serve as corridors between these areas. In addition, oxbows, backwaters, and other areas in the 100-year floodplain, when inundated, provide access to spawning, nursery, feeding, and rearing habitats. Food supply, predation, and competition are important elements of the biological environment.

Little Colorado Spinedace

The Little Colorado spinedace (*Lepidomeda vittata*) was listed as threatened with critical habitat designated on October 16, 1987 (52 FR 25034). Excerpts of the species' distribution and conservation status from these rules appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The spinedace is a small, about 10 cm (4 in.), minnow native to the Little Colorado River (LCR) drainage. This fish occurs in disjunct populations throughout much of the LCR drainage in Apache, Coconino, and Navajo counties. Extensive collections summarized by Miller (1963) indicated that the spinedace had been extirpated from much of the historical range during the period 1939 to 1960. Although few collections were made of the species prior to 1939, the species is believed to have inhabited the northward flowing LCR tributaries of the Mogollon Rim, including the northern slopes of the White Mountains.

Threats include habitat alteration and destruction, predation by and competition with nonnative aquatic organisms, and recreational fishery management. Critical habitat was designated on 47 stream miles: 18 miles of East Clear Creek immediately upstream and 13 miles downstream from Blue Ridge Reservoir in Coconino County; eight miles of Chevelon Creek in Navajo County; and five miles of Nutrioso Creek in Apache County. Critical habitat constituent elements consist of clean, permanent flowing water, with pools and a fine gravel or silt-mud substrate.

Loach Minnow

The Loach minnow (*Tiaroga cobitis*) and the Spikedace (*Meda fulgida*) were listed as endangered with critical habitat on February 23, 2013 (77 FR10810). The following life history, status, and information on threats to the species is summarized below from the USFWS's February 23, 2013 final listing rule (77 FR10810).

Loach minnow are found in small to large perennial streams and use shallow, turbulent riffles with primarily cobble substrate and swift currents and spaces between, and in the lee side of rocks for resting and spawning. It is rare or absent from habitats where fine sediments fill these interstitial spaces.

Loach minnow are now restricted to portions of the following systems: (1) Gila River and its tributaries, the West, Middle, and East Fork Gila River in New Mexico; (2) the San Francisco and Tularosa rivers and their tributaries, Negrito and Whitewater Creeks in New Mexico; (3) the

Blue River and its tributaries, Dry Blue, Campbell Blue, Pace, and Frieborn Creeks in Arizona and New Mexico; (4) Aravaipa Creek and its tributaries, Turkey and Deer Creeks in Arizona; Eagle Creek in Arizona; (5) the North Fork East Fork Black River in Arizona; and (6) possibly the White River and its tributaries, the East and North Fork White River in Arizona. Currently, only small, isolated populations remain, with limited to no opportunities for interchange between populations or expansion of existing areas, making the species more vulnerable to threats including reproductive isolation

We estimate the present range for Loach Minnow to be approximately 15 to 20 percent or less of its historical range, and the status of the species within occupied areas ranges from common to very rare. Data indicate that the population in New Mexico has declined in recent years.

Spikedace and loach minnow face a variety of threats throughout their range in Arizona and New Mexico, including groundwater pumping, surface water diversions, impoundments, dams, channelization, improperly managed livestock grazing, wildfire, agriculture, mining, road building, residential development, and recreation. These activities, alone and in combination, contribute to riparian habitat loss and degradation of aquatic resources in Arizona and New Mexico. Predation by and competition with nonnative species are also identified as threats to the species.

In total, approximately 1,013 kilometers (630 miles) are designated as critical habitat for Spikedace and 983 kilometers (610 miles) are designated as critical habitat for Loach Minnow in Apache, Cochise, Gila, Graham, Greenlee, Pinal, and Yavapai Counties, Arizona, and Catron, Grant, and Hidalgo Counties in New Mexico. Of this area, approximately 853 kilometers (529 miles) are designated for both species, with an additional 162 kilometers (100 miles) for spikedace only and an additional 130 kilometers (81 miles) for loach minnow only.

PCEs of the physical or biological features essential to the conservation of loach minnow consist of six components: (i) Habitat to support all egg, larval, juvenile, and adult loach minnow. This habitat includes perennial flows with a stream depth of generally less than 1 m (3.3 ft), and with slow to swift flow velocities between 0 and 80 cm per second (0.0 and 31.5 in. per second). Appropriate microhabitat types include pools, runs, riffles, and rapids over sand, gravel, cobble, and rubble substrates with low or moderate amounts of fine sediment and substrate embeddedness. Appropriate habitats have a low stream gradient of less than 2.5 percent and are at elevations below 2,500 m (8,202 ft). Water temperatures should be in the general range of 8.0 to 25.0 °C (46.4 to 77 °F). (ii) An abundant aquatic insect food base consisting of mayflies, true flies, black flies, caddis flies, stoneflies, and dragonflies. (iii) Streams with no or no more than low levels of pollutants. (iv) Perennial flows or interrupted stream courses that are periodically dewatered but that serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted. (v) No nonnative aquatic species, or levels of nonnative aquatic species that are sufficiently low to allow persistence of loach minnow. (vi) Streams with a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of transporting sediments.

Razorback Sucker

The razorback sucker (*Xyrauchen texanus)* was listed as an endangered species on October 23, 1991 (56 FR 54957). Critical habitat was designated in 15 river reaches in the historical range of the razorback sucker on March 21, 1994 (59 FR 13374). Excerpts of the species' distribution and conservation status from these rules appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The razorback sucker is a relatively large fish, reaching total length of up to 0.9 meters (3 feet) with a head flattened on top and a stout olive-brown color above to yellowish on the belly. A long, high, sharp-edged hump is found behind the head. It was once abundant in the Colorado River and its major tributaries throughout the Basin, occupying 5,640 km (3,500 mi) of river in the United States and Mexico (USFWS 1993b). Records from the late 1800s and early 1900s indicated the species was abundant in the lower Colorado and Gila River drainages.

The Lower Colorado River Multi-Species Conservation Program (LCRMSCP) is a conservation program aimed at protecting sensitive, threatened, and endangered species of fish, wildlife, and their habitat. The Razorback Sucker is one of many species covered by this program. The overwhelming focus of the LCRMSCP is establishing more natural river flows from dam operations along the LCR to support sustainable native fisheries.

Since 1997, significant new information on recruitment to the wild razorback sucker population in Lake Mead has been developed (Holden et al. 2000) that indicates some degree of successful recruitment is occurring. This degree of recruitment has not been documented elsewhere in the other remaining populations.

Adult razorback suckers use most of the available riverine habitats, although there may be an avoidance of whitewater type habitats. Main-channel habitats tend to be low-velocity ones such as pools, eddies, near-shore runs, and channels associated with sand or gravel. Adjacent to the main channel, backwaters, oxbows, sloughs, and flooded bottomlands are also used by this species. From studies conducted in the upper Colorado River basin, habitat selection by adult razorback suckers changes seasonally. They move into pools and slow eddies from November through April; runs and pools from July through October; runs and backwaters during May; and backwaters, eddies, and flooded gravel pits during June. In early spring, adults move into flooded bottomlands. They use relatively shallow water (ca. 3 feet) during spring and deeper water (5-6 feet) during winter.

Razorback suckers also use reservoir habitat, where the adults may survive for many years. In reservoirs they use all habitat types, but prefer backwaters and the main impoundment. Much of the information on spawning behavior and habitat comes from fishes in reservoirs where observations can readily be made. Spawning takes place in the late winter to early summer depending upon local water temperatures. Various studies have presented a range of water temperatures at which spawning occurs. In general, temperatures between 10° to 20° C are appropriate. They typically spawn over cobble substrates near shore in water 1-3 m (3-10 ft) deep. There is an increased use of higher velocity waters in the spring, although this is countered by the movements into the warmer, shallower backwaters and inundated bottomlands in early

summer. Spawning habitat is most commonly over mixed cobble and gravel bars on or adjacent to riffles.

Range-wide, the status of razorback sucker is exceedingly poor due to lack of significant recruitment, ongoing habitat loss, and continuing pressure from nonnative species. The range-wide trend for the razorback sucker is a continued decrease in wild populations due to a lack of sufficient recruitment and the loss of old adults due to natural mortality. FWS recovery efforts under the Recovery Implementation Program are working towards the goals of replacing the aging population in Lake Mojave, restoring the Lake Havasu population, and increasing the lower river populations.

In 2006, the USFWS and Clark County, Nevada entered into a programmatic Safe Harbor Agreement to promote voluntary habitat restoration, maintenance, enhancement, or creation activities to enhance the reintroduction and long-recovery of razorback sucker (*Xyrauchen texanus*) and bonytail (*Gila elegans*) within Clark County, Nevada.

In the USFWS's 1994 critical habitat designation, the USFWS identified water, physical habitat, and the biological environment as the PCEs of critical habitat. This includes a quantity of water of sufficient quality that is delivered to a specific location in accordance with a hydrologic regime that is required for the particular life stage for each species. The physical habitat includes areas of the Colorado River system that are inhabited or potentially habitable for use in spawning and feeding, as a nursery, or serve as corridors between these areas. In addition, oxbows, backwaters, and other areas in the 100-year floodplain, when inundated, provide access to spawning, nursery, feeding, and rearing habitats. Food supply, predation, and competition are important elements of the biological environment.

The following selection considerations were used by the USFWS to help determine areas necessary for survival and recovery of the razorback suckers: (1) Presence of known or suspected wild spawning populations, although recruitment may be limited or nonexistent; (2). Areas where juvenile razorback suckers have been collected or which could provide suitable nursery habitat (backwaters, flooded bottom lands, or coves); (3) Areas presently occupied or that were historically occupied that are considered necessary for recovery and that have the potential for reestablishment of razorback suckers; (4) Areas and water required to maintain rangewide fish distribution and diversity under a variety of physical, chemical, and biological conditions; and (5) Areas that need special management or protection to insure razorback survival and recovery. Critical habitat includes portions of the Colorado, Duchesne, Green, Gunnison, San Juan, White, and Yampa rivers in the Upper Colorado River Basin, and the Colorado, Gila, Salt, and Verde rivers in the Lower Colorado River Basin. Critical habitat PCEs include water, physical habitat, and the biological environment. The water element refers to 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 element includes 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. Habitat types include bottomland, main and side channels, secondary channels, oxbows, backwaters, and other areas in

the 100-year floodplain, which when inundated may provide habitat or corridors to habitat necessary for the feeding and nursery needs of the razorback sucker. The biological environment element includes living components of the food supply and interspecific interactions. Food supply is a function of nutrient supply, productivity, and availability to each life stage. Negative interactions include predation and competition with introduced nonnative fishes.

Rio Grande Silvery Minnow

The Rio Grande silvery minnow (*Hybognathus amarus*) was listed as federally endangered in 1994 (59 FR 36988) and critical habitat was designated in 2003 (68 FR 8088). Excerpts of the species' distribution and conservation status from these rules appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The Rio Grande silvery minnow uses only a small portion of the available aquatic habitat. In general, the species most often uses silt substrates in areas of low or moderate water velocity (e.g., eddies formed by debris piles, pools, and backwaters). The Rio Grande silvery minnow is rarely found in habitats with high water velocities, such as main channel runs, which are often deep and swift. The species is most commonly found in depths of less than 20 centimeters (7.9 inches [in]) in the summer and 31-40 cm (12.2-15.75 in) in the winter. Few use areas with depths greater than 50 cm (19.7 in).

Throughout much of its historic range, the decline of the Rio Grande silvery minnow is attributed primarily to destruction and modification of its habitat due to dewatering and diversion of water, water impoundment, and modification of the river (channelization). Competition and predation by introduced non-native species, water quality degradation, and other factors also have contributed to its decline.

The Rio Grande silvery minnow historically occupied approximately 3,862 river km (2,400 mi) in New Mexico and Texas. It was found in the Rio Grande from Española, New Mexico, through Texas to the Gulf of Mexico. It was also found in the Pecos River, a major tributary of the Rio Grande, from Santa Rosa, New Mexico, downstream to its confluence with the Rio Grande in Texas.

Currently, the Rio Grande silvery minnow is known to occur only in one reach of the Rio Grande in New Mexico, a 280 km (174 mi) stretch of river that runs from Cochiti Dam to the headwaters of Elephant Butte Reservoir. This includes a small portion of the lower Jemez River, a tributary to the Rio Grande north of Albuquerque. Its current habitat is limited to about seven percent of its former range.

A population of Rio Grande silvery minnow was designated as experimental, nonessential population at the Big Bend Reach of the Rio Grande in Texas on December 8, 2008. The experimental, nonessential population was designated to facilitate reintroductions. Preliminary monitoring is being conducted to determine whether or not that reintroduction has been successful

The species' critical habitat was finalized in February 19, 2003 (68 FR 8088). The silvery minnow critical habitat designation in the Rio Grande extends from Cochiti Dam, Sandoval County, New Mexico (NM) downstream to the utility line crossing the Rio Grande, a permanent identified landmark in Socorro County, NM, a total of approximately 157 mi (252 km), referred to as the ''middle Rio Grande.'' The designation also includes the tributary Jemez River from Jemez Canyon Dam in NM to the upstream boundary of Santa Ana Pueblo, which is not included. The critical habitat designation defines the lateral extent (width) as those areas bounded by existing levees or, in areas without levees, 300 feet (ft) (91.4 meters (m)) of riparian zone adjacent to each side of the bankfull stage of the middle Rio Grande. The Pueblo lands of Santo Domingo, Santa Ana, Sandia, and Isleta within this area are not included. The PCEs for Rio Grande silvery minnow are as follows: (1) A hydrologic regime that provides sufficient flowing water with low to moderate currents capable of forming and maintaining a diversity of aquatic habitats, such as, but not limited to the following: Backwaters (a body of water connected to the main channel, but with no appreciable flow), shallow side channels, pools (that portion of the river that is deep with relatively little velocity compared to the rest of the channel), eddies (a pool with water moving opposite to that in the river channel), and runs (flowing water in the river channel without obstructions) of varying depth and velocity—all of which are necessary for each of the particular silvery minnow life-history stages in appropriate seasons. The silvery minnow requires habitat with sufficient flows from early spring (March) to early summer (June) to trigger spawning, flows in the summer (June) and fall (October) that do not increase prolonged periods of low or no flow, and a relatively constant winter flow (November through February); (2) the presence of low-velocity habitat (including eddies created by debris piles, pools, or backwaters, or other refuge habitat (*e.g.*, connected oxbows or braided channels)) within un-impounded stretches of flowing water of sufficient length (*i.e.*, river miles) that provide a variety of habitats with a wide range of depth and velocities; (3) Substrates of predominantly sand or silt; and (4) Water of sufficient quality to maintain natural, daily, and seasonally variable water temperatures in the approximate range of greater than 1 °C (35 °F) and less than 30 °C (85 °F) and reduce degraded water quality conditions (decreased dissolved oxygen, increased pH, etc.).

Roundtail Chub

The roundtail chub (*Gila robusta*) is currently considered by the USFWS a candidate species (USFWS 2013). The candidate entity is only a portion of the entire species range in the Colorado River Basin below Glen Canyon Dam. Roundtail chub outside of the Lower Colorado River Basin (LCRB) distinct population segment (DPS) are not considered as they are not part of the candidate entity. Excerpts of the species' distribution and conservation status from this document appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The roundtail chub was known from the entire Colorado River Basin including Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming.

Roundtail chub face threats from introduced nonnative fish that prey on them and compete with them for food. Habitat destruction and modification have occurred and continue to occur as

a result of dewatering, impoundment, channelization, and channel changes caused by alteration of riparian vegetation and watershed degradation from mining, grazing, roads, water pollution, urban and suburban development, groundwater pumping, and other human actions.

The Arizona Game and Fish Department's Arizona Statewide Conservation Agreement for Roundtail chub, Headwater chub (*G. nigra*), Flannelmouth sucker (*Catostomus latipinnis*), Little Colorado River sucker (*Catostomus* spp.), Bluehead sucker (*C. discobolus*), and Zuni Bluehead sucker (*C. discobolus yarrowi*) was finalized in 2006. The New Mexico Department of Game and Fish lists the roundtail chub as endangered and in 2006 finalized a recovery plan for the species: Colorado River Basin Chubs (Roundtail chub, Gila chub (*G. intermedia*), and Headwater chub) Recovery Plan. Both the Arizona Agreement and the New Mexico Recovery Plans recommend preservation and enhancement of extant populations and restoration of historical Roundtail chub populations. The recovery and conservation actions prescribed by the Arizona and New Mexico plans, which we predict will reduce and remove threats to this species, will require further discussions and authorizations as they are being implemented. The recently completed Arizona Game and Fish Department Sportfish Stocking Program's Conservation and Mitigation Program contain significant conservation actions for the roundtail chub that will be implemented over the next 10 years (USFWS 2013).

Currently, 13 of the 38 extant populations are considered stable, based on abundance and evidence of recruitment. Two new conservation populations (Gap Creek and Blue River) were initially stocked in 2012, raising the number of introduced stream populations to four.

Sonora Chub

The Sonora chub (*Gila ditaenia*) was listed in the U.S. and Mexico as threatened on April 30, 1986, with critical habitat (51 FR 16042). A recovery plan was finalized in 1992 (USFWS 1992). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Reasons for listing included possible introduction of exotic fishes and their parasites into its habitat, and potential mining activities. The Sonora chub is particularly sensitive to these threats because of its very limited range, and because of the intermittent nature of the streams it occupies.

The Sonora chub is a stream-dwelling member of the minnow family (Cyprinidae) endemic to streams of the Rio de la Concepcion drainage of Sonora, Mexico and Arizona. The Sonora chub is a tenacious, desert-adapted species that exploits small habitats (Hendrickson and Juarez-Romero 1990), and is able to survive under severe environmental conditions. This fish species can achieve total lengths of 20 cm (7.8 in.), but in the U.S. it typically does not exceed 12.8 cm (5.0 in.) in length.

According to the 1992 recovery plan for this species, distribution of Sonora chub in the U.S. is intact and should remain secure, barring major environmental change. The limited distribution of Sonora chub in the U.S. places inordinate importance on the quality of habitat in Sycamore Creek and California Gulch. The Sycamore Creek drainage has been highly modified by human

activities, including grazing, mining, recreation, and the introduction of nonnative taxa. It regularly sustains large floods and severe droughts. A series of environmental perturbations made worse by degraded watershed conditions could cumulatively result in extirpation of the species from the United States.

Sycamore Creek is at the northern edge of the range of the species, is isolated from other populations of Sonora chub, and has marginal habitat. Channel degradation, siltation, and water pollution caused primarily by livestock grazing, roads, and mining have probably affected the habitat of Sonora chub. In the past, cattle regularly gained access to Sycamore Canyon through an intermittently maintained section of fence along the international border (AESO/SE 02-21-98-F-0399), and degraded the riparian vegetation in the lower 4.0 km (2.5 mi) of the stream (Carpenter 1992). In 1981, exploration for uranium occurred along an approximate 12 km (7 mi) stretch of the upper eastern slopes of the Sycamore drainage. According to the 1992 Recovery Plan for the Sonora chub, uranium was found and claims are being maintained; however, no active mining was planned at that time.

Critical habitat was designated at the time of Federal listing to include areas of land and water in the Coronado National Forest, consisting of the following: (1) sycamore Creek, extending downstream from and including Yank Spring (= Hank and Yank Spring), to the International Border; (2) the lower 1.2 miles of Peñasco Creek; and (3) the lower 0.25 mile of an unnamed stream entering Sycamore Creek from the west, about 1.5 miles downstream from Yank Spring.

In addition to the aquatic environment, critical habitat includes a 12 or 8-m (40 or 25-ft) wide strip of riparian area along each side of Sycamore and Peñasco creeks. PCEs were not identified in the 1986 final rule (51 FR 16042). However, habitat characteristics important to this species of chub include clean permanent water with pools and intermediate riffle areas and/or intermittent pools maintained by bedrock or by subsurface flow in areas shaded by canyon walls.

Spikedace

The Spikedace (*Meda fulgida*) and the Loach minnow (*Tiaroga cobitis*) were listed as endangered with critical habitat on February 23, 2013 (77 FR10810). The following life history, status, and information on threats to the species is summarized below from the USFWS's February 23, 2013 final listing rule (77 FR10810).

Spikedace are found in moderate to large perennial streams, where they inhabit shallow riffles (those shallow portions of the stream with rougher, choppy water) with sand, gravel, and rubble substrates. Specific habitat for this species consists of shear zones where rapid flow borders slower flow; areas of sheet flow at the upper ends of midchannel sand or gravel bars; and eddies at downstream riffle edges. Recurrent flooding and a natural flow regime are very important in maintaining the habitat of Spikedace and in helping maintain a competitive edge over invading nonnative aquatic species.

The Spikedace was once common throughout much of the Gila River basin, including the mainstem Gila River upstream of Phoenix, and the Verde, Agua Fria, Salt, San Pedro, and San Francisco subbasins. Habitat destruction and competition and predation by nonnative aquatic species reduced its range and abundance. Spikedace are now restricted to following systems: (1)

portions of the upper Gila River in New Mexico, (2) Aravaipa Creek in Arizona; (3) Eagle Creek in Arizona; and the Verde River in Arizona. Currently, only small, isolated populations remain, with limited to no opportunities for interchange between populations or expansion of existing areas, making the species more vulnerable to threats including reproductive isolation.

The USFWS estimates the present range for Spikedace to be approximately 10 percent or less of its historical range, and the status of the species within occupied areas ranges from common to very rare. Data indicate that the population in New Mexico has declined in recent years.

Spikedace and loach minnow face a variety of threats throughout their range in Arizona and New Mexico, including groundwater pumping, surface water diversions, impoundments, dams, channelization, improperly managed livestock grazing, wildfire, agriculture, mining, road building, residential development, and recreation. These activities, alone and in combination, contribute to riparian habitat loss and degradation of aquatic resources in Arizona and New Mexico. Predation by and competition with nonnative species are also identified as threats to the species.

In total, approximately 1,013 kilometers (630 miles) are designated as critical habitat for Spikedace and 983 kilometers (610 miles) are designated as critical habitat for Loach Minnow in Apache, Cochise, Gila, Graham, Greenlee, Pinal, and Yavapai Counties, Arizona, and Catron, Grant, and Hidalgo Counties in New Mexico. Of this area, approximately 853 kilometers (529 miles) are designated for both species, with an additional 162 kilometers (100 miles) for spikedace only and an additional 130 kilometers (81 miles) for loach minnow only.

The PCEs of the physical or biological features essential to the conservation of spikedace consist of six components: (i) Habitat to support all egg, larval, juvenile, and adult spikedace. This habitat includes perennial flows with a stream depth generally less than 1 m (3.3 ft), and with slow to swift flow velocities between 5 and 80 cm per second (1.9 and 31.5 in. per second). Appropriate stream microhabitat types include glides, runs, riffles, the margins of pools and eddy, and backwater components over sand, gravel, and cobble substrates with low or moderate amounts of fine sediment and substrate embeddedness. Appropriate habitat will have a low gradient of less than approximately 1.0 percent, at elevations below 2,100 m (6,890 ft). Water temperatures should be in the general range of 8.0 to 28.0 °C (46.4 to 82.4 °F).
(ii) An abundant aquatic insect food base consisting of mayflies, true flies, black flies, caddis flies, stoneflies, and dragonflies. (iii) Streams with no or no more than low levels of pollutants. (iv) Perennial flows, or interrupted stream courses that are periodically dewatered but that serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted. (v) No nonnative aquatic species, or levels of nonnative aquatic species that are sufficiently low as to allow persistence of spikedace.
(vi) Streams with a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of transporting sediments.

Tidewater Goby

The tidewater goby (*Eucyclogobius newberryi*) was listed as endangered on February 4, 1994 (59 FR 5494). Critical habitat was designated for the species on February 2, 2013 (78 FR 8746). On

March 13, 2014, the Service proposed to reclassify the species from endangered to threatened (79 FR 14340). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Specific threats to the tidewater goby include habitat destruction and alteration (e.g., coastal development, upstream diversion, channelization of rivers and streams, discharge of agriculture and sewage effluents), introduced predators (e.g., centrarchid fishes), and competition with introduced species.

It is a small fish that inhabits coastal brackish water habitats entirely within California, ranging from Tillas Slough (mouth of the Smith River, Del Norte County) near the Oregon border south to Agua Hedionda Lagoon (northern San Diego County). Tidewater gobies are uniquely adapted to coastal lagoons and the uppermost brackish zone of larger estuaries, rarely invading marine or freshwater habitats. The species is typically found in water less than 1 meter (3.3 feet) deep and salinities of less than 12 parts per thousand. Principal threats to the tidewater goby include loss and modification of habitat, water diversions, predatory and competitive introduced fish species, habitat channelization, and degraded water quality.

In total, approximately 12,156 acres (4,920 hectares) in Del Norte, Humboldt, Mendocino, Sonoma, Marin, San Mateo, Santa Cruz, Monterey, San Luis Obispo, Santa Barbara, Ventura, Los Angeles, Orange, and San Diego Counties, California, fall within the boundaries of the critical habitat designation. Critical habitat includes the following PCEs: (1) Persistent, shallow (in the range of approximately 0.3 to 6.6 ft (0.1 to 2 m)), still-to-slow-moving, lagoons, estuaries, and coastal streams ranging in salinity from 0.5 ppt to about 12 ppt, which provides adequate space for normal behavior and individual and population growth that contain: (a) Substrates (e.g., sand, silt, mud) suitable for the construction of burrows for reproduction; (b) Submerged and emergent aquatic vegetation, such as *Potamogeton pectinatus, Ruppia maritima, Typha latifolia,* and *Scirpus* spp., that provides protection from predators and high flow events; or (c) Presence of a sandbar(s) across the mouth of a lagoon or estuary during the late spring, summer, and fall that closes or partially closes the lagoon or estuary, thereby providing relatively stable water levels and salinity.

Unarmored Threespine Stickleback

The Unarmored Threespine Stickleback (*Gasterosteus aculeatus williamsoni*) was listed as endangered on October 13, 1970 (35 FR 13519). Although critical habitat was originally proposed; on September 17, 2002 the USFWS determined that critical habitat was not needed for the species (67 FR58580). Excerpts of the species' distribution and conservation status from the listing rule appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The species inhabits slow-moving reaches or quiet-water microhabitats in streams and rivers. Favorable habitats are usually shaded by dense and abundant vegetation. In more open reaches, algal mats or barriers (e.g., sand bars, floating vegetation, and low-flow road crossings) may provide refuge for the species. Reproduction occurs in areas with adequate aquatic vegetation and slow-moving water where males can establish and vigorously defend territories. The male

builds a nest of fine plant debris and algal strands and courts all females that enter his territory; a single nest may contain the eggs of several females.

The species is currently restricted to three areas: the upper Santa Clara River and its tributaries in Los Angeles County, San Antonio Creek on Vandenberg Air Force Base in Santa Barbara County, and the Shay Creek vicinity (which includes Shay Pond, Sugarloaf Pond, Juniper Springs, Motorcycle Pond, Shay Creek, Wiebe Pond, and Baldwin Lake), in San Bernardino County. San Felipe Creek in San Diego County is another area that may support the species; however, its current status is unknown.

The ongoing effects of urbanization, eutrophication, stream channelization, addition of water, groundwater removal, and water quality, are the most critical threats to the habitat of the Unarmored Threespine Stickleback; substantial reduction or elimination of these threats is not expected in the near future (USFWS 2009).

Virgin River Chub

Virgin River Chub (*Gila robusta seminude)* was listed as endangered on August 24, 1989 (54 FR 35311). Critical habitat was designated on January 26, 2000 (64 FR 4140). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The Virgin River chub is a subspecies of *Gila robusta* of the Cyprinidae family, and is considered the rarest native fish in the Virgin River. The Virgin River chub is endemic to 134 miles of the Virgin River in southwest Utah, northwest Arizona, and southeast Nevada. Historically, the Virgin River chub is believed to have occurred throughout most of the Virgin River from its original confluence with the main stem Colorado upstream to La Verkin Creek, near the town of Hurricane, Utah.

This species is most common in deeper areas where waters are swift, but not turbulent, and is generally associated with boulders or other cover. It occurs over sand and gravel substrates in water less than 90°F (30°C), and is very tolerant of high salinity and turbidity (Deacon and Holden 1977).

The major limiting factors for the Virgin River chub are modification and loss of habitat and the introduction and establishment of nonnative fish, particularly red shiner *(Cyprinella lutrensis*). Potential threats to the species' survival include further water removal, desalinization, urban growth, sedimentations, pollution, channel alteration, and competition/predation by introduced fishes, especially the red shiner. The threats are magnified by the naturally limited range of this fish and its consequent vulnerability to extensive losses from a single threat.

The species' critical habitat designation includes portions of the Virgin River in Utah, Arizona, and Nevada (64 FR 4140). The USFWS designated 140.1 kilometers (km) (87.5 miles (mi)) of critical habitat for the woundfin (approximately 12.5 percent of its historical range) and the Virgin River chub (65.3 percent of its historical range). The majority of the land to be designated

as critical habitat is under Federal ownership (57.7 percent) or private ownership (39.9 percent). This critical habitat designation includes portions of the mainstem Virgin River and its associated 100-year floodplain. The PCEs of critical habitat determined necessary for the survival and recovery of the Virgin River chub are water, physical habitat, and biological environment (64 FR 4140, pages 4144 to 4145).

Woundfin

The woundfin (*Plagopterus argentissimus*) was listed as endangered on October 13, 1970 (35 FR 16047). The species' critical habitat was designated on January 26, 2000 (64 FR 4140). An experimental, non-essential was designated for the species on July 24, 1985 in the Gila River drainage in Arizona and New Mexico. Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The species continues to be threatened by habitat loss and modification, as well as competition and predation from introduced nonnative fish.

Except for the mainstem of the Virgin River, woundfin are extirpated from most of their historical range. Woundfin presently range from Pah Tempe Springs (also called La Verkin Springs) on the mainstem of the Virgin River and the lower portion of La Verkin Creek in Utah, downstream to Lake Mead. Adult and juvenile woundfin inhabit runs and quiet waters adjacent to riffles with sand and sand/gravel substrates. Adults are generally found inhabits with water depths between 0.15 and 0.43 meters (0.5 and 1.4 feet) with velocities between 0.24 and 0.49 meters per second (m/s) (0.8 and 1.6 ft/s). Juveniles select areas with slower and deeper water, while larvae are found in backwaters and stream margins which are often associated with growths of filamentous algae.

The species' critical habitat includes portions of the Virgin River in Utah, Arizona, and Nevada. The USFWS designated 140.1 kilometers (km) (87.5 miles (mi)) of critical habitat for the woundfin (approximately 12.5 percent of its historical range) and the Virgin River chub (65.3 percent of its historical range). The majority of the land to be designated as critical habitat is under Federal ownership (57.7 percent) or private ownership (39.9 percent). This critical habitat designation includes portions of the mainstem Virgin River and its associated 100-year floodplain. The PCEs of critical habitat determined necessary for the survival and recovery of the woundfin are water, physical habitat, and biological environment (64 FR 4140, pages 4144 to 4145).

Yaqui Catfish and Yaqui Chub

The USFWS listed the Yaqui chub (*Gila purpurea*) to be an endangered species with critical habitat, and the Yaqui catfish (*Ictalurus pricei*) to be a threatened species (also with critical habitat) on August 31, 1984 (48 FR 34490). A special rule for the Yaqui catfish is included to allow take of the threatened species for educational, scientific, and conservation purposes in accordance with Arizona State laws and regulations. A final recovery plan for the Yaqui fish and two other species was signed on March 29, 1995. Descriptions of these species and life history accounts are included in the Fishes of the Rio Yaqui Recovery Plan (USFWS 1995), and are included herein by reference.

Reasons for listing both the Yaqui chub and Yaqui catfish included (1) reduction of available habitat by arroyo cutting, water diversion, impoundment construction, development of canal systems for irrigated agriculture, and (2) excessive pumping of underground aquifers. An imminent threat to the remaining populations of Rio Yaqui Fishes is the possible release of exotic fish such as the red shiner and channel catfish, which may result in intense competition and/or genetic swamping. The Rio Yaqui fishes occur in the Rio Yaqui Basin which drains western Sonora and portions of eastern Chihuahua in Mexico, and the extreme southeastern corner of Arizona. The Yaqui chub also has been recorded from the Rio Sonora and Rio Matape on the Pacific slope of Mexico

Critical habitat for the Yaqui catfish and Yaqui chub includes all aquatic habitats of Santa Bernardino National Wildlife Refuge, Cochise County, Arizona, excluding the Leslie Canyon complex in Arizona. These areas also provide habitat for one of the two existing populations of beautiful shiner. The critical habitat PCEs for the Yaqui catfish and Yaqui chub are: (1) clean, small, permanent streams with riffles, or intermittent creeks with pools and riffles in the Rio Yaqui drainage; (2) permanent streams of medium current with clear pools (Yaqui catfish); (3) permanent water with deep pool and intermediate areas with riffles (Yaqui chub); (4) areas of detritus or heavy overgrown cut banks (Yaqui chub); (5) clean and unpolluted water and; (6) water free of introduced nonnative fish.

Yaqui Topminnow

The Yaqui Topminnow (*Poeciliopsis occidentalis sonoriensis*) was listed as endangered by the USFWS on March 11, 1967 (32 FR 4001). The Sonoran topminnow, *Poeciliopsis occidentalis*, includes two subspecies, the Gila topminnow, *Poeciliopsis o. occidentalis*, and the Yaqui topminnow, *Poeciliopsis o. sonoriensis*. Both subspecies were listed as endangered within the U.S. portion of their range in 1967 with no critical habitat designation. Descriptions of this species and life history accounts are included in the Fishes of the Rio Yaqui Recovery Plan (USFWS 1995), and are included herein by reference.

In the United States, the species currently occurs in the Gila River drainage, Arizona, particularly in the upper Santa Cruz River, Sonoita and Cienega creeks, and the middle Gila River. The species occupies a variety of habitats: springs, cienegas, permanent and interrupted streams, and margins of large rivers. Habitat alteration and destruction, and introduction of predaceous nonnative fish, principally western mosquitofish, *Gambusia affinis*, is the main reason for decline of the Yaqui Topminnow.

Zuni Bluehead Sucker

The Zuni bluehead sucker (*Catostomus discobolus yarrow*) was listed an endangered by the USFWS on July 24, 2014 (79 FR43132). On January 25, 2013, the USFWS has proposed critical habitat for the species (78 FR 5351). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The Zuni bluehead sucker is endemic to the headwaters of the Little Colorado River in east-central Arizona and west-central New Mexico. The Zuni bluehead sucker was once common in the Little Colorado and Zuni River drainages, but its historical range has been reduced by over

90 percent, and its numbers by an unknown amount. The Zuni bluehead sucker is now found in low numbers in Kinlichee Creek area in Arizona, and is restricted to three isolated populations in the upper Rio Nutria drainage in west-central New Mexico.

Zuni bluehead sucker habitat has been described as stream reaches with clean, perennial water flowing over hard substrate, such as bedrock. Silt-laden habitat, such as beaver ponds, represents poor or marginal habitat. Zuni bluehead suckers were collected mainly in pool and pool-run habitats. Such habitat areas were typically shaded, and water velocity was less than 0.1 meter per second (0.3 feet per second). Most specimens were found in water that was 30 to 50 cm (12 to 20 in) deep, where the substrate ranged from cobble and boulders to bedrock. Pools were often edged by emergent aquatic vascular plants and riparian vegetation (mainly willows, *Salix* spp.). As early as 2004, monitoring by New Mexico Department of Game and Fish indicates that pools are variable in size and depth depending on runoff, reducing the amount of available habitat. The largest extent of suitable habitat is found in the Rio Nutria Box Canyon, from the confluence with Tampico Draw downstream to the canyon mouth, and as of 2010, water levels at Tampico Draw above the confluence with Rio Nutria were at the lowest levels since monitoring began, which may be due to drought condition. The Zuni bluehead sucker feeds primarily on algae scraped from rocks, rubble, and gravel substrates. Periphytic and perilithic algae are generally abundant in reaches where Zuni bluehead suckers are common.

The Zuni bluehead sucker faces a variety of threats throughout its range in Arizona and New Mexico, including water withdrawals, logging, livestock grazing, water impoundments, road construction, subdivision development, and long-term drought. In New Mexico, water withdrawals, subdivision development, livestock grazing, road construction, logging, and drought threaten Zuni bluehead suckers and their habitat. In Arizona, water withdrawals, livestock grazing, road construction, and drought have affected the Zuni bluehead sucker. These activities, alone and in combination, contribute to the substantial loss and degradation of habitat in Arizona and New Mexico.

Critical habitat is being proposed for 472 km (293 miles) of riverine and aquatic stream habitat in Apache County, Arizona, and Cibola, McKinley, and San Juan Counties, New Mexico. Within these areas, the PCEs of the physical or biological features essential to the conservation of the Zuni bluehead sucker consist of three components: (i) A riverine system with habitat to support all life stages of Zuni bluehead sucker, which includes: (A) Dynamic flows that allow for periodic changes in channel morphology and adequate river functions, such as channel reshaping and delivery of coarse sediments. (B) Stream courses with perennial flows, or areas that may be periodically dewatered but serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted. (C) Stream microhabitat types including runs, riffles, and pools with substrate ranging from gravel, cobble and bedrock substrates with low or moderate amounts of fine sediment and substrate embeddedness. (D) Streams with depths generally less than 2 m (3.3 ft), and with slow to swift flow velocities less than 35 cm/sec (1.1 ft/sec). (E) Clear, cool water with low turbidity and temperatures in the general range of 9.0 to 28.0 °C (48.2 to 82.4 °F). (F) No harmful levels of pollutants. (G) Adequate riparian shading to reduce water temperatures when ambient temperatures are high and provide protective cover from predators. (ii) An abundant aquatic insect food base consisting of fine particulate organic material, filamentous algae, midge larvae,

caddisfly larvae, mayfly larvae, flatworms, and small terrestrial insects. (iii) Areas devoid of nonnative aquatic species or areas that are maintained to kept nonnative species at a level that allows the Zuni bluehead sucker to continue to survive and reproduce.

ENDEMIC FISH

Ash Meadows Amargosa Pupfish

Ash Meadows Amargosa pupfish (*Cyprinodon nevadensis mionectes*) was listed as endangered on September 2, 1983 (48 FR 40178). This species is addressed in the Ash Meadow Recovery Plan (USFWS 1990). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Imminent land development, groundwater pumping and surface water diversion threatened the integrity this species habitat prompting its emergency listing as endangered (48 FR 40178). Predation and/or competition with non-native mosquito fish (*Gambusia spp.*), crayfish *(Procambarus clarkii*) and bullfrogs (*Rana catesbiana*) are also identified threats to this fish (Williams and Sada 1985, USFWS 1990). It occurs in 10 spring areas within the Ash Meadows NWR (AMNWR), all of which are designated as critical habitat (USFWS 1990). Population estimates of adult pupfish ranged from 143 (April 2010) to 307 (October 2010) (Scoppettone 2013). Habitat may be threatened by groundwater pumping demands in adjacent and regional aquifers.

Ash Meadows Speckled Dace

Ash Meadows speckled dace (*Rhinichthys osculus nevadensis*) was listed as endangered on January 5, 1983 (48 FR 608). This species is addressed in the Ash Meadow Recovery Plan (USFWS 1990). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Imminent land development, groundwater pumping and surface water diversion threatened the integrity this species habitat prompting its emergency listing as endangered. Predation and/or competition with non-native mosquito fish, crayfish and bullfrogs are also identified threats to this fish (Williams and Sada 1985, USFWS 1990). It is found in three springs and their outflows on the AMNWR, all of which as designated critical habitat (48 FR 608). Speckled dace occupy an extraordinary array of habitats, springs and outflows, streams, pools, ponds, even intermittent streams. However, clear, well oxygenated water with abundant cover of woody debris or overhanging banks along with moving water or wave action in the form of wind appear to be essential for continued persistence. Preferable habitats often include shallow rife and sometimes channelized streams with reduced flow (Nevada Department of Wildlife (NDOW 2013).

Chihuahua Chub

The Chihuahua Chub (*Gila nigrescens*) was listed as threatened on October 11, 1983 (48 FR 46052). Excerpts of the species' distribution and conservation status from the listing document appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The decline of the Chihuahua chub is primarily related to loss of habitat due to severe flooding caused by degradation of the watershed and loss of riverbank vegetation; and channeling and leveeing of the river by local landowners to protect their property from future flooding. Critical habitat has not been designated for the species.

The Chihuahua chub historic range included the Mimbres River, Rio Casa Grandes, Rio Piedras Verdes, Arroyo del Aguila, Rio San Miguel, Rio Santa Maria, Rio del Carmen, and Rio Janos and within the Laguna Bustillos Basin in the State of Chihuahua, Mexico. It has declined precipitously throughout its range and was thought to be extinct in the U.S. for over 40 years. It is presently endemic only to the Mimbres River, New Mexico. The Chihuahua chub is presently limited to a two mile stretch of the Mimbres River and two short (100 yards) spring-fed tributaries just north of the town of Mimbres, New Mexico, all privately owned.

Chihuahua chubs inhabit deep pools with undercut banks or over-hanging vegetation which provide both escape cover and suitable foraging. Spawning is believed to take place in quiet pools approximately 3 to 7 feet in depth over matted beds of aquatic vegetation. Assuming that the Chihuahua chub exhibits similar behavior as other *Gila* species, parental care is non-existent. Juveniles tend to inhabit shallower areas with or without cover.

Hiko White River Springfish & White River Springfish

Hiko White River springfish (*Crenichthys baileyi grandis*) and the White River springfish (*Crenichthys baileyi baileyi*) were listed as endangered, with critical habitat, on September 27, 1985 (50 FR 39123). In 1998, the Service issued a multi-species recovery plan which included these two species (USFWS 1998). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Both species are endemic to springs along the White River within Pahranagat Valley, in Lincoln, County, Nevada. The majority of their current range is located on private land in the valley (USFWS 1998). The Hiko White river springfish are currently found in Hiko and Crystal springs and their outflows; both of which are designated as critical habitat (USFWS 2012). Both critical habitat segments are located on private land. An additional refuge population was established Bureau of Land Management-administered land at Blue Link Spring in Mineral County, Nevada because of threats to the Hiko and Crystal springs populations (USFWS 1998). This population is outside of the known historic range of this species.

In 2010, NDOW counted 730 White River springfish and documented fish concentrating near the major spring inflows (NDOW 2010a). In February 2011, 1,400 White River springfish were counted during an NDOW snorkel survey. During June 2012 surveys, NDOW counted 5,462 White River springfish near major spring outflows (NDOW 2012d). Springfish were observed to be abundant throughout the spring outflow above US Highway 93 and rare in the outflow below the highway during all survey visits between September 2011 and June 2012 (NDOW 2012d). Descendants of Hiko White River springfish collected from Crystal Spring (70 individuals) were transplanted into Hiko Spring in 1984 (USFWS 1998), and the population increased and then remained fairly stable until the year 2000. During this period, the estimated population size

reached a high of over 8,000 Hiko White River springfish in 1986 and only occasionally fell below 4,000 fish (NDOW 2011). However, the Hiko Spring population has decreased substantially since 2000, coinciding with the appearance of red swamp crayfish (*Procambarus clarkii*) in the system (NDOW 2011a).

Population estimates for Hiko White River springfish in 2012 included the following: Hiko Spring: 379 springfish (95% confidence interval of 243 to 626); and Crystal Spring: 63 springfish (north pool) (95% confidence interval of 28 to 252); 407 springfish (south pool) (95% confidence interval of 273 to 605). Approximately 4,000 fish were estimated to be in that Blue Link Spring refuge during the latest survey (NDOW 2011).

A programmatic safe harbor agreement for the Pahranagat roundtail chub and the two springfish, in addition to the SWFL within Pahranagat Valley, was completed in 2008 (USFWS 2008). This Agreement recognized the importance of private lands within Pahranagat Valley to these three native fishes and the SWFL. The conservation measures identified to benefit the SWFL that are also expected to benefit the three native fish include: (1) Fencing of other strategies to protect key habitat patches; (2) Modifications to livestock grazing practices; and (3)Control of invasive, non-native plant species. To date, no private landowner has enrolled in the safe harbor agreement (S. Cooper USFWS pers com. November 25, 2013).

The White River springfish is found in thermal pools and outflows created by Ash Springs (commonly referred to as the Pahranagat Creek or Ditch (USFWS 2012). Ash Springs and its outflows are designated critical habitat; all but 0.1 acres are located on private lands. The designated critical habitat for the Hiko White River Springfish is extremely limited; less than 10 acres of both Hiko and Crystal Springs and their associated outflows extending outwards up to 50 feet in Lincoln County, Nevada. Known constituent elements include warmwater springs and their outflows and surrounding land areas that provide vegetation for cover and habitat or insects and other invertebrates on which the species feeds. The White River springfish is found in thermal pools and outflows created by Ash Springs (commonly referred to as the Pahranagat Creek or Ditch (USFWS 2012). Ash Springs and its outflows are designated critical habitat; all but 0.1 acres are located on private lands.

Known constituent elements of critical habitat for both species include warm water springs and their outflows and surrounding land areas that provide vegetation for cover and habitat for insects and other invertebrates on which the species feed (50 FR 39123).

Moapa Dace

Moapa dace (*Moapa coriacea*) was listed as endangered on March 11, 1967 as a result of population declines attributed to competition and predation from non-native species and adverse habitat modification from water diversions and groundwater pumping (32 FR 4001). Critical habitat has not been designated for this species. The Moapa dace is covered in the recovery plan for the Muddy River ecosystem that was prepared in 1996 (USFWS 1996). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The species' occupied range is restricted to the Muddy River drainage (approximately 9.5 kilometers (6 miles) of stream habitat in five thermal headwater spring systems and the main stem of the upper Muddy (= Moapa) River, Clark County, Nevada. The Moapa dace is found in the Muddy River and its tributaries in Clark County, Nevada. The primary landowner for this area is the Southern Nevada Water Authority; other lands are privately-owned or managed by the Moapa National Wildlife Refuge (USFWS 2013). The Moapa dace is surveyed twice annually in 16 reaches in the Muddy River and its tributaries. The most recent survey found 1,226 dace in February 2013; the most found since February 2005 (USFWS 2013).

Mojave Tui Chub

The Mojave tui chub (*Gila bicolor moavensis*) was listed as endangered on October 13, 1970 (35 FR 16048). Critical habitat has not been designated for Mojave Tui Chub. Excerpts of the species' distribution and conservation status from the listing document appears below, with the complete profile and status information from the sources listed here is incorporated by reference in this document

The Mojave tui chub occurred historically in the Mojave River from the joining of the east and west forks at the base of the San Bernardino Mountains to its end at Soda Dry Lake, in San Bernadino County, California. It is the only native fish in this river system.

Of the Mojave tui chub's remaining native range, two of the three habitats at Soda Springs are artificially excavated ponds and the third is a spring. Lake Tuendae, the largest of the three, measures 150m x 40m. The lake level is maintained by water pumped from Zzyzx Well adjacent to the pond. The shallow areas of the lake are filled with aquatic ditch-grass (*Ruppia maritima*). Ditch-grass is important for the Mojave tui chub because it apparently provides a preferred structure for egg attachment during spawning and is a thermal refuge during most of the summer. It is also useful as cover, allowing the fish to elude flying predators.

Three Bats Pond at Soda Springs measures 60m x 70m and is shallower than Lake Tuendae. Water quality characteristics of the pond are more extreme than those in the lake and tui chubs in this pond typically do not grow as large as do those in the lake. Water loss from the pond is mainly via evaporation. Inflow is from at least one and possibly two springs and probably some groundwater seepage. Heavy pumping from the Zzyzx Well probably reduces inflow to the pond. Vegetation in and around the pond is often sparse, but includes all species listed for Lake Tuendae. However, during late summer, *Ruppia* form dense mats throughout much of the pond.

The MC Spring is the third habitat, it includes the smallest population of Mojave tui chubs at Soda Springs. The spring is about 2m deep and 3m in diameter with a central open area of about1.2 m diameter of cattail and bulrush. The only other vegetation occurring in MC Spring is algae.

Mojave tui chub prefer lacustrine habitats, are always associated with deep pools and slough-like areas, and do poorly in fast-flowing streams that are more typical of headwater localities (Hubbs and Miller 1943). Through evaluation and observation of transportation success, the best habitat seems to be a combination of ponds and slow-water slough conditions. Currently, lack of management to Mojave tui chub habitat and population has allowed the vegetation to overgrow which decreases the availability of dissolved oxygen. Habitats filled by dead vegetation, silt, and

debris reduce habitat size and possibly creates pH levels detrimental to the Mojave tui chub. Also, since the three habitats at Soda Springs are isolated, the chubs are vulnerable to genetic inbreeding, decreasing genetic variability.

Owens Pupfish

The Owens pupfish (*Cyprinodon radiosus*) was listed as endangered on March 22, 1967 (32 FR 4001). No critical habitat has been designated for Owen Pupfish. Excerpts of the species' distribution and conservation status from the listing document appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Owens pupfish originally were found in the Owens River (California) and adjacent springs and sloughs from the springs at Fish Slough in Mono County, to as far south as, but not in, Owens Lake, Inyo County, and in the springs around the lake. Presently, three Owens pupfish populations exist in refugium at the Owens Valley Native Fish Sanctuary, BLM Spring in Fish Slough, and Warm Springs. Loss of habitat and predation by largemouth bass, mosquitofish and crayfish still pose a threat to the Owens pupfish. Although the refugia are designed to isolate the pupfish from other exotic species, largemouth bass have at various times been able to invade the Fish Slough refugia, and mosquitofish and crayfish have been illegally introduced at various times at the Warm Springs refugia.

Owens Tui Chub

The Owens Tui chub (*Gila bicolor snyderi*) was listed as endangered in its entire range on August 5, 1985 (50 FR 31597). Critical habitat was also designated at the time of listing. Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The Owens Tui chub is a subspecies of *Gila bicolor,* of the Cyprinidae family, and endemic to the Owens Basin (Miller 1973). Information about the reproduction and development of Owens Tui chub is lacking, and assume that the characteristics and behavior is the same as other *Gila* species. Owens Tui chub spawn from spring through late autumn. Females lay adhesive eggs on vegetation or other available substrates, such as rocks and gravel.

Critical habitat for the Owens tui chub includes the following two areas of Mono County, California: (1) Owens River and 50 feet on each side of the river from Long Valley Dam downstream for a distance of 8 stream miles; and (2) A portion of Hot Creek and outflows, and those areas of land within 50 feet of all sides of the springs, their outflows and the portion of Hot Creek. This area includes about 0.25 miles of stream and springs and about 5 acres of fronting land. Known constituent elements include high quality, cool water with adequate cover in the form of rocks, undercut banks or aquatic vegetation, and a sufficient insect food base.

The historic distribution was throughout the standing waters and low gradient reaches of the Owens River and its larger tributaries extending from the River's headspring to Owens Lake, Mono County, CA. It is thought that due to this species prior extensive distribution that it may

also have been associated with a wider range of habitats. More recently the introduction of predatory species has restricted the Owens Tui Chub to more protective areas.

The Owens Tui chub prefers habitats with low current, muddy bottom, and dense aquatic vegetation providing adequate cover and food supply. Elements of the Owens Tui habitat include high quality, cool water with adequate cover in the form of rocks, undercut banks, or aquatic vegetation, and a sufficient insect food base. A major threat that remains is hybridization with the closely related Lahonton tui chub, *Gila bicolor obesa*. Research is being conducted on the detrimental effects of hybridization and the remaining distribution of the Owens Tui chub.

Pahranagat Roundtail Chub

Pahranagat roundtail chub (*Gila robusta jordani*) was listed as endangered in 1970 (35 FR 13519). Critical habitat was not designated for this species. In 1998, a multi-species recovery plan was approved by the Service that includes the species (USFWS 1998). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Primary threats identified include: non-native species introductions, habitat alteration and disease (USFWS 1998). The Pahranagat roundtail chub is found in the Pahranagat Creek, north of Las Vegas, Nevada. It is currently confined to 3.5 km (2.2 miles) of their historic habitat in Pahranagat Creek, starting at the confluence of Ash and Crystal springs and ending at the concrete-lined Highland Ditch and earthen East Ditch (USFWS 1998). The majority of its current range is located on private land in the valley. A refuge population is located at the NDOW's Key Pittman Wildlife Management Area in a well-fed pond, and a population is maintained at the Dexter National Fish Hatchery in New Mexico. In 2011, approximately 1,000 Pahranagat roundtail chub were taken from Dexter National Fish Hatchery and stocked at the Pahranagat NWR in Cottonwood Spring, after the spring was excavated, in an attempt to establish another refuge population. The introduced population at Cottonwood Spring was unsuccessful, and no chub are currently found there (USFWS 2012). NDOW surveys found 47 roundtail chub in Pahranagat Creek in 2012 (USFWS 2012).

Pecos Bluntnose Shiner

The Pecos bluntnose shiner (*Notropis simus pecosensis*) was listed as threatened with critical habitat on February 20, 1987 (52 FR 5295). Excerpts of the species' distribution and conservation status from the listing rule appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

The Pecos bluntnose shiner is a subspecies of *Notropis simus*, of the Cyprinidae family. Threats to the continued survival and recovery of Pecos bluntnose shiner include restricted flow from reservoirs, water diversions for irrigation, siltation, and pollution from agricultural activities along the river. These habitat modifications have been detrimental to all fish species in the Pecos River, including Pecos bluntnose shiner.

In 1982, Pecos bluntnose shiner was collected most frequently in the main stream channel, over a sandy substrate with low velocity flow, and at depths between 7 inches and 16 inches (17-41cm).

Backwaters, riffles, and pools were also used by younger individuals. Natural springs, such as those in the Santa Rosa and Lake McMillan areas, also serve as habitat for Pecos bluntnose shiner, and are sources of continuous water flow (New Mexico Department of Fame and Fish 1982).

Pecos bluntnose shiner historically occurred in the Rio Grande in New Mexico from El Paso, Texas north to near Abiquiu Reservoir on the Chama River, and in the Pecos River in New Mexico from the upper reaches of Avalon Reservoir north to 1 mile (1.6km) above Santa Rosa. The subspecies, Pecos bluntnose shiner, was historically found in the Pecos River from just north of the town of Santa Rosa, New Mexico, downstream to the town of Carlsbad, New Mexico.

Pecos bluntnose shiner is still extant throughout a large portion of its range, and is now known to occupy the mainstream Pecos River from near the town of Fork Sumner, New Mexico, downstream to the town of Artesia, New Mexico, a distance of 175 miles (282km). However, habitat for the species in this stretch is spotty and often marginal, and the present numbers of Pecos bluntnose shiner are much reduced.

Designated critical habitat for the Pecos Bluntnose Shiner consists of 2 sections of the Pecos River. The first section encompasses about 64 mi. (103 km.) from a point about 10 mi. (16 km.) south of Fort Sumner in De Baca County. The second section consists of about 36 mi. (60 km.) from a point near the town of Hagerman in Chaves County downstream to near the town of Artesia in Eddy County. The areas fronting the Pecos River critical habitat consists of about 101 mi. (163 km.) of land of which approximately 14.5 mi (23.5 km) is federally owned; 8 mi (13 km) is state owned, and the remainder 78.5 mi (126.5 km) is privately owned. Constituent elements include clean, permanent water: a main river channel habitat with sandy substrate: and a low velocity flow.

Pecos Gambusia

The Pecos gambusia (*Gambusia nobilis*) was listed as endangered in the entire range on October 13, 1970 (35 FR 16047). Critical habitat has not been designated for the species. Excerpts of the species' distribution and conservation status from the listing rule appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Pecos gambusia is endemic to the Pecos River basin in southeastern New Mexico and western Texas. The species occurred at least as far south as Fort Stockton, Texas, and as far north as near Fort Sumner, New Mexico. Populations of Pecos gambusia occur near Balmorhea, Texas, in the headwaters of Phantom Lake and in Giffin and East Sandia Springs. Historically, the species inhabited much of the canal system in this area. Populations of Pecos gambusia occur in Leon Creek, Diamond-Y Spring outflow in two discrete segments normally isolated by 2 km of dry streambed. Population numbers are estimated at 26,550-28,650 on Bitter Lake National Wildlife Refuge; 900,000 at Blue Spring; approximately 100,000 in the Balmorhea area and; approximately 1 million in Leon Creek.

Pecos gambusia occurs abundantly in springheads and spring runs. Moderately abundant populations are also known from areas with little spring influence, but with abundant overhead

cover, sedge covered marshes, and gypsum sinkholes. The species has been observed to occur from the surface to depths of three meter. Pecos gambusia are known principally from the lower elevations and more thermally stable localities within its geographic range. All populations occur between 822 m and 1187 m elevation, with Ink Pot, located on the Salt Creek Wilderness Area northeast of Roswell, representing the highest elevation.

The species is facing extinction because of one or both of two major threats: (1) Loss of habitat and (2) the inability to interact successfully with nonnative fish species, especially mosquitofish. The species has become confine to spring-fed areas because it cannot compete with fish species nonnative to its habitat. Loss of habitat has occurred through water withdrawals for irrigation and dam construction. A total of five major dams and at least three lesser dams are on the mainstream Pecos River.

Santa Ana Sucker

The Santa Ana sucker (*Catostomus santaanae*) was listed as threatened on April 12, 2000 (65 FR 19686). The USFWS originally designated critical habitat in 2005 with revisions made on 2010 (75 FR 77962). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

Threats include habitat destruction, natural and human-induced stream-flow, and introduction of nonnative fish. Extant populations exist in the following areas: (1) Santa Ana River Watershed in the Middle Santa Ana River and Tributaries, south La Cadena to Prado Dam; Lower Santa Ana River and Tributaries, Prado Dam to near California and; (2) San Gabriel River Watershed in the San Gabriel River (East, West, and North Forks); San Dimas Wash and; in Big Tujunga Creek.

The streams that the Santa Ana sucker inhabits are generally perennial streams with water ranging in depth from a few inches to several feet and with currents ranging from slight to swift. These streams are naturally subject to periodic, severe flooding and may experience extended periods of low flow as a result of drought conditions that are typical of southern California climate cycles. However, there are also areas within the range of Santa Ana sucker that experience periods of no flow as a result of the past and current hydrological modifications (for example dams, diversions, or recharge basins) of the watershed. Adequate water quantity and quality are important for the persistence of the Santa Ana sucker throughout urbanized areas. Not only is the presence of water vital to the Santa Ana sucker, the volume and flow rate are important in shaping the watershed and facilitating delivery of coarse substrates to occupied areas. Periodic high flow (flood flows) events are essential because they deliver new sources of coarse (gravel and cobble) substrate to currently occupied areas. Additionally, constant flows within the occupied areas are important to the maintenance of the availability of coarse substrate because these constant lower flows are capable of moving sand and silt but leaving the preferred gravel and cobble substrate.

With the final 2010 rule, the USFWS identified approximately 9,331 acres (3,776 hectares) of habitat in the Santa Ana River in San Bernardino, Riverside, and Orange Counties and the San Gabriel River and Big Tujunga Creek in Los Angeles County in southern California as critical

habitat. The PCEs listed for the species' critical habitat include the following: (1) A functioning hydrological system within the historical geographic range of Santa Ana sucker that experiences peaks and ebbs in the water volume (either naturally or regulated) that encompasses areas that provide or contain sources of water and coarse sediment necessary to maintain all life stages of the species, including adults, juveniles, larvae, and eggs, in the riverine environment; (2) Stream channel substrate consisting of a mosaic of loose sand, gravel, cobble, and boulder substrates in a series of riffles, runs, pools, and shallow sandy stream margins necessary to maintain various life stages of the species, including adults, juveniles, larvae, and eggs, in the riverine environment; (3) Water depths greater than 1.2 in (3 cm) and bottom water velocities greater than 0.01 ft per second (0.03 m per second); (4) Clear or only occasionally turbid water; (5) Water temperatures less than 86 °F (30 °C); (6) Instream habitat that includes food sources (such as zooplankton, phytoplankton, and aquatic invertebrates), and associated vegetation such as aquatic emergent vegetation and adjacent riparian vegetation to provide: (a) Shading to reduce water temperature when ambient temperatures are high, (b) shelter during periods of high water velocity, and (c) protective cover from predators; and (7) Areas within perennial stream courses that may be periodically dewatered, but that serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted.

Warm Springs Pupfish

Warm Springs pupfish (*Cyprinodon nevadensis pectoralis*) was listed as endangered on October 13, 1970 (35 FR 13519). No critical habitat has been designated for the species. This species is included in the Ash Meadows Recovery Plan, approved by the Service in 1990 (USFWS 1990). Excerpts of the species' distribution and conservation status from these documents appear below, with the complete profile and status information from the sources listed here is incorporated by reference in this document.

It is found in six locations in Ash Meadows: North and South Indian, North and South Scruggs, Marsh and School springs; all of which are located in an area less than 0.77 square miles (USFWS 1990). A recovery plan for this species was written in 1976, of which the tasks and goals were later incorporated into the Ash Meadow Recovery Plan (USFWS 1990). Groundwater pumping and predation and/or competition with non-native mosquito fish, crayfish, and bullfrogs are identified threats to this fish (USFWS 1990). The Ash Meadow essential habitat boundary includes the known region in which groundwater pumping will most affect spring discharge.

PLANTS

Amargosa niterwort

The Amargosa niterwort (*Nitrophila Mojavensis*) was listed as endangered, with critical habitat, on June 19, 1985 (50 FR 20777). The USFWS has completed a multi-species recovery plan that includes this species in 1990 (USFWS 1990). In 2007, the USFWS completed a five-year review for the Amargosa niterwort (USFWS 2007). Excerpts of the species' distribution and conservation status from these documents and the original listing and critical habitat rule appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

Amargosa niterwort occurs in the Ash Meadows area and Death Valley Junction/Tecopa area in Inyo County, California. The species is a slow growing, long lived perennial, and is best considered a wetland species associated with drainages and seeps that are adapted to extremely alkaline and saline soils devoid of other less tolerant species. At the time of listing, loss of habitat by groundwater pumping and development at Ash Meadows was one of the main listing factors for this species. Amargosa niterwort critical habitat, which includes 1,200 acres, occurs within one contiguous block. PCEs were not identified at the time critical habitat was designated but the final rule suggested that the critical habitat delineation was based on the presence of salt-encrusted alkaline flats.

The known distribution of the Amargosa niterwort is confined to the Amargosa River drainage along the California-Nevada border. The majority of plants within Nevada are contained within the boundary of the Ash Meadows National Wildlife Refuge (AMNWR). It is not known to exist on private lands. A limited number of plants in Nevada also occur on Bureau of Land Management lands immediately west of the boundary of the AMNWR.

Ash Meadows blazing-star

The Ash Meadows blazing-star (*Mentzelia leucophylla*) was listed as threatened, with critical habitat, by the USFWS on May 20, 1985 (50 FR 20777). The USFWS (1990) has completed a multi-species recovery plan that includes this species. Excerpts of the species' distribution and conservation status from these documents and the original listing and critical habitat rule appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

The plant's distribution appears to be strictly limited to the AMNWR (Otis Bay and Stevens Ecological Consulting 2006). This biennial plant is probably the rarest of all plant species endemic to Ash Meadows. Although little is known about its life history or habitat requirements, it is known to occupy alkaline soils in dry washes and on barren bluffs distributed along the eastern edge of Ash Meadows. It is always associated with dry soils apparently uninfluenced by seepage from springs or seeps. It occurs only in Nevada on sandy or saline clay soils along canyon washes and on alkaline mounds. It is often found with the Ash Meadows milk-vetch and the Ash Meadows sunray.

Based on soil mapping conducted 2007-2009, about 77 percent of populations occur on a land type that is saturated to the surface during winter months of normal years (White Horse Associates 2010). From 2007 to 2009, rare plant surveys were conducted on AMNWR. Survey results indicate that there are 12 occurrences at the minimum scale and two occurrences at the maximum scale and 1,513 individuals occur on 13.5 acres (BioWest 2010).

The main threats to the Ash Meadows blazing star include land clearing for road construction, reduction of habitat as a result of groundwater pumping, diversion of springs, trampling by livestock, crushing by OHV activity, and the introduction of invasive non-native species.

Encompassing 1,248 acres in Ash Meadows in Nye County, Nevada, critical habitat includes sandy or saline clay soils along canyon washes and near springs and seeps.

Ash Meadows gumplant

Ash Meadows gumplant (*Grindelia fraxinopratensis*) was listed as threatened on May 20, 1985 (50 FR 20777). The USFWS (1990) has completed a multi-species recovery plan that includes this species. Excerpts of the species' distribution and conservation status from these documents and the original listing and critical habitat rule appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

This species occurs within the AMNWR, and on adjacent BLM and private lands (Cochrane 1981, Knight and Clemmer 1987). The Ash Meadows gumplant exists in the transition zone between riparian areas, which are closely associated with springs, and the arid desert uplands. Its primary habitat is saltgrass meadow along streams and pools, but it occasionally occurs in alkali clay soils in drier areas (Cochrane 1981). The species is not found on rocky, sandy, and arid upland sites (Knight and Clemmer 1987).

The Ash Meadows gumplant is widely distributed across the AMNWR with 23 occurrences at the minimum scale and one occurrence at the maximum scale (BioWest 2010). Survey results indicated 656,890 individuals on 136 acres (BioWest 2010).

The main threats to the Ash Meadows gumplant include land clearing for road construction, reduction of habitat as a result of groundwater pumping, diversion of springs, trampling by livestock, crushing by OHV activity, and the introduction of invasive non-native species.

Simultaneous to listing, the USFWS designated 1,966 acres of critical habitat for the species in the Ash Meadows areas of California and Nevada (50 FR 20777). The designated critical habitat included saltgrass meadows along streams and pools or drier areas with alkali clay soils.

Ash Meadows ivesia

Ash Meadows ivesia (*Ivesia kingii* var. *eremica*) was listed as threatened, with critical habitat, on May 20, 1985 (50 FR 20777). The USFWS (1990) has completed a multi-species recovery plan that includes this species. Excerpts of the species' distribution and conservation status from these documents and the original listing and critical habitat rule appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

Ash Meadows ivesia is a narrow endemic within the Ash Meadows region east of the Amargosa River in California and Nevada. This plant grows in saline seep areas and adjacent uplands on light colored, alkaline limestone soils (Beatley 1977). Approximately 24 percent of its population occurs on soils that are saturated to the surface during winter months of normal years (White Horse Associates 2010).

As of 1987, seven populations were located in AMNWR (Knight and Clemmer 1987). Existing populations were smaller and less numerous than those known historically because of habitat eliminations during agricultural development. Building upon this information BioWest (2010) documented 19 minimum scale occurrences and two maximum scale occurrences on the AMNWR. From 2007 to 2009, rare plant surveys were conducted on AMNWR. Survey results indicated 510,744 individuals on 116 acres (BioWest 2010).

The main threats to the Ash Meadows ivesia include land clearing for road construction, reduction of habitat as a result of groundwater pumping, diversion of springs, trampling by livestock, crushing by OHV activity, and the introduction of invasive non-native species.

Critical habitat designated for the Ash Meadows ivesia consists of 888 acres in Ash Meadows, Nye County, Nevada. These areas include saline seep areas of light colored clay uplands.

Ash Meadows milkvetch

The Ash Meadows milkvetch **(***Astragalus phoenix***)**, was listed as threatened with critical habitat on May 20, 1985 (50 FR 207777). The USFWS (1990) has completed a multi-species recovery plan that includes this species. A five-year review was completed in 2009 (USFWS 2009). Excerpts of the species' distribution and conservation status from these documents and the original listing and critical habitat rule appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

Ash Meadows milkvetch occurs within the AMNWR, and in adjacent BLM and private lands. This plant was initially considered restricted to dry, upland areas outside of the influence of water by the USFWS (1990). Ash Meadows milk-vetch occurs in heavy alkaline soils which are poorly drained (Beatley 1977, Reveal 1978). Pavlik (2006) observed the species growing directly in channels with running and slow moving water during a high precipitation year, suggesting that this species may be more hydric.

In 1977, the species was known from nine occurrences at three sites (Beatley 1977). Reveal (1978) estimated the population to contain 1,000 individuals. In 1998, surveys were targeted on the six general areas identified by Knight and Clemmer (1987) and the total population was estimated to be about 1,800 plants on 847 acres (ac) (343 hectares [ha] (BLM and USFWS 2008).

From 2007 to 2009, rare plant surveys were conducted on AMNWR indicating 12 minimum scale occurrences and two maximum scale occurrences estimating 15,606 individuals on 72.96 acres (BioWest 2010). During 2008, Ash Meadows milkvetch was discovered on a large tract on public land that has since been sold the AMNWR. This tract has not been surveyed (BioWest 2010).

The main threats to the Ash Meadows milkvetch include land clearing for road construction, reduction of habitat as a result of groundwater pumping, diversion of springs, trampling by livestock, crushing by OHV activity, herbivory by rabbits *(Sylvilagus* spp.) and the introduction of invasive non-native species (USFWS 2009).

Critical habitat designated for the Ash Meadows milk-vetch consists of 1,200 acres in Ash Meadows, Nye County, Nevada. These areas include dry, hard, white, barren, saline, clay flats, knolls and slopes.

Ash Meadows sunray

The Ash Meadows sunray (*Enceliopsis nedicaulis* var. *corrugate*) was listed as threatened, with critical habitat, on May 20, 1985 (50 FR 20777). The USFWS (1990) has completed a multi-species recovery plan that includes this species. Excerpts of the species' distribution and conservation status from these documents and the original listing and critical habitat rule appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

It was previously thought this species primarily occurred only in washes on whitish saline soils associated with outcrops of pale, hard limestone, but approximately 14 percent of its population occurs on soils saturated to within 50 cm of surface during winter months (White Horse Associates 2010). This indicates that the plant's dependence on subsurface moisture cannot be ruled out even in areas that are topographically high. From 2007 to 2009, rare plant surveys were conducted on AMNWR. Surveys found 30 minimum occurrences and one maximum occurrence resulting in 79,508 individuals on 216 acres (BioWest 2010).

Although one of the more common species of plants endemic to AMNWR, its populations have been reduced by habitat elimination for agricultural production, land development, and road construction; trampling by resident wild and free roaming horses; and OHV activity. Because 14 percent of its population occurs on soils saturated to the surface by groundwater during winter months, groundwater pumping also may be a threat.

Critical habitat being designated for the Ash Meadows sunray consists of about 1,760 acres in Ash Meadows, Nye County, Nevada. These areas include dry washes or whitish, saline soil associated with outcrops of a pale whitish limestone.

Canelo Hills Ladies Tresses

The USFWS listed the Canelo Hills Ladies Tresses (*Spiranthes delitescens*) as Endangered on January 6, 1997 (62 FR 665). No critical habitat has been designated for the Canelo Hills Ladies Tresses. A summary of the life history requirements and status of the species can be found in Arizona Game and Fish Department (2000) and at http://www.natureserve.org. Excerpts of the species' distribution and conservation status from these documents and the original listing appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

This plant is an orchid and is found in fine-grained, highly organic but well-drained moist soils near springs, seeps, wet meadows (cienegas) and small streams. Four populations of *Spiranthes delitescens* have been found in Arizona ranging over 8 sq. km. Their range includes Cochise County - Babocomari Cienega, Santa Cruz County - along Turkey Creek, at Canelo Hills Cienega along O'Donnell creek, and on a slope below Sheehy Spring. The total amount of occupied habitat is less than 81 hectares (ha) (200 acres (ac)). Four of the populations are on private land less than 37 kilometers (km) (23 miles (mi)) north of the U.S./Mexico border; one additional small site containing four individuals was discovered on public land in 1996 (USFWS 1997). Known locations are at approximately 5,000 feet elevation. Associated plants include sedges, tall grasses, and a few small herbs.

Threats to this orchid are from destruction of its habitat by surface and groundwater development, livestock grazing, improper land management (including erosion off watersheds), spread of invasive non-native plant species, and trampling at habitat sites.

Chorro Creek bog thistle

The Chorro Creek bog thistle (*Cirsium fontinale* var. *obispoense*) was listed as endangered by the USFWS in 1994 (59 FR 64613). No critical habitat has been designated for the Chorro Creek bog thistle. A multi-species recovery plan for this and other species was finalized by the USFWS in 1998 (USFWS 1998). A five year review was published by the USFWS in 2014 (USFWS 2014). Excerpts of the species' distribution and conservation status from these documents and the original listing appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

Chorro Creek bog thistle is restricted to open seep areas in serpentine soil outcrops in San Luis Obispo County, California; thus it has probably never been abundant due to its narrow habitat requirements (59 FR 64613; USFWS 2014). The current range is generally the same as it was when the species was listed. Chorro Creek bog thistle is known from 8 to 10 locations depending on how the sites are defined; most populations are scattered to the south, west, and north of the City of San Luis Obispo and one is 30 miles to the northwest near San Simeon.

At the time of listing, the Chorro Creek bog thistle was threatened by trampling from cattle and water diversions (59 FR 64613). Cattle grazing may either harm or benefit Chorro Creek bog thistle, depending on how the grazing is managed. For instance, cattle may negatively impact bog thistle plants by trampling. However, cattle that move through bog thistle populations may positively affect the species by facilitating the creation of habitat within a bog through hoof-planting seed, creating habitat around hoof prints, dispersing seed, and eliminating competing vegetation (Chipping 1994). Encompassing populations with protective fencing is the most common management tool for protecting Chorro Creek bog thistle and its habitat from the impacts of cattle and inadvertent human trampling.

Chorro Creek bog thistle requires an abundant water supply at the seep habitats which they occupy. Any impact to the hydrological integrity of the water course that would result in degradation of water quality or quantity that support these seep habitats would most likely adversely affect Chorro Creek bog thistles. If there is not a supply of water to the seep habitats, the species will not persist long-term.

Dwarf bear-poppy

The dwarf bear-poppy (*Arctomecon humilis*) was one of the first species in the United States to be listed as endangered on November 13, 1979 (44 FR 64250). No critical habitat has been designated for the Dwarf bear-poppy. A recovery plan was written for the species in 1985 (USFWS 1985). Excerpts of the species' distribution and conservation status from these documents and the original listing appear below, with the complete profile and status information from the sources listed here, including the Natureserve website (www.natureserv.org), are incorporated by reference in this document.

The dwarf bear-poppy is only known to occur in Washington County, Utah, in the vicinity of St. George. Known from 11 traditionally accepted concentrations of plants (but some have only human-made obstacles, some unoccupied habitat, or widely scattered individuals forming the separation between them; there are perhaps 7 or 9 distinct locations) (Natureserve website, 2014).

The dwarf bear-poppy is restricted to "badlands" soil types belonging to several members of one geological formation, the Moenkopi Formation. It typically occurs on rolling hills with sparse vegetation within mixed warm desert shrub communities. Associated species include Mormon tea, Fremont pepperweed, cheesebush, shadscale, and shrubby buckwheat. It occurs on highly erosive, gypsum-rich soils at 2,700 to 3,300 feet in elevation. The USFWS's Recovery Plan identifies off-road vehicle use, mining, and collecting the plants as the most serious threats to the species. Impacts and issues related to conservation needs from grazing and/or agricultural related land uses are not mentioned.

Gambel's watercress

Gambel's watercress (*Rorippa gambellii*) was listed as endangered on August 3, 1993 (58 FR 41378). No critical habitat has been designated for the Gambel's watercress. There have been several taxonomic revisions for this species since that date and *R. gambellii* is currently recognized by the scientific name *Nasturtium gambelii.* Excerpts of the species' distribution and conservation status from these documents and the original listing appear below, with the complete profile and status information from the sources listed here, including the Natureserve website (www.natureserv.org), are incorporated by reference in this document.

Historically, *N. gambelii* occurred in wetland locations in central and southern California (Orange, San Bernardino, Los Angeles, Santa Barbara, and San Luis Obispo Counties). At the time of listing in 1993, we stated in the final listing rule that there were three known *N. gambelii* populations: Black Lake Canyon, Oso Flaco Lake, and Little Oso Flaco Lake, all within San Luis Obispo County. All three populations have had no pure *N. gambelii* plants observed recently; all plants that have been observed are either introgressed with *N. officinale* [*Rorippa nasturtiumaquaticum*] (white or common watercress), or only pure *N. officinale* exist at the site. Pure *N. gambelii* is currently known from one remaining wild population, discovered in 1996, on Vandenberg Air Force Base in Santa Barbara County, California, and one population that was introduced in October 2008 on the Guadalupe-Nipomo Dunes National Wildlife Refuge in San Luis Obispo County, California.

The threats to *N. gambelii* consist of loss and degradation of habitat due to development and urbanization; adverse effects from biostimulation (a state of excessive growth of vegetation caused by the addition of nutrients into an ecological system); sedimentation; inadequacy of existing regulatory mechanisms; nonnative species; stochastic (i.e., random) extirpation/extinction events due to the small size and isolation of the remaining population; and genetic swamping from the closely related, introduced crop species, common watercress.

Hickman's potentilla

Hickman's potentilla (*Potentilla hickmanii*) was listed as endangered on August 12, 1998 (63 FR 43100). No critical habitat has been designated for this species. The USFWS recently completed

a 5-year for the species in 2009 (USFWS 2009). Excerpts of the species' distribution and conservation status from these documents and the original listing appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

Hickman's potentilla is a small perennial herb in the rose family. It is restricted to two general areas, one in San Mateo County and one in Monterey County, California, where it occurs within coastal terrace prairie habitat. In San Mateo County, a population of between 2,000 and 3,000 individuals is scattered over a half square mile (sq. mi) (130 hectares (ha)). In Monterey County, one population comprised of less than 20 plants occurs on less than one quarter of an acre (0.1 ha). In addition to the two native populations, greenhouse-grown plants were outplanted to a site at Point Lobos State Reserve in Monterey County in 2006; whether these plants result in the establishment of a viable population remains to be seen.

The coastal terrace prairie habitat that the species occurs in has been subjected to alteration and destruction due to development, changes in hydrologic regime, and invasion by nonnative species. In addition, the Monterey County population of *Potentilla hickmanii* is subject to grazing by deer, cattle, gophers, snails and slugs, and is experiencing reproductive failure. Cattle grazing may be either beneficial or deleterious to the species, depending on the intensity and duration. Cattle grazing may benefit the species by reducing competition from nonnative species. Too little grazing may allow nonnative species to outcompete *Potentilla hickmanii*, while too much grazing may result in predation or trampling of *Potentilla hickmanii*. We do not have specific information concerning the intensity or the overall impact of grazing that is occurring within this area (USFWS 2009).

Holmgren milk-vetch

Holmgren milk-vetch (*Astragulus holmgreniorum*) was designated as endangered on September 28, 2001 (66 FR 49560). Critical habitat for the species was designated on December 27, 2006 (71 FR 77972). The USFWS adopted a Recovery Plan for the species in 2006 (USFWS 2006). Excerpts of the species' distribution and conservation status from these documents and the original listing and critical habitat rules appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

The species grows on the shallow, sparsely vegetated soils derived primarily from the Virgin limestone member of the Moenkopi Formation. The species is a principal member of a warm-desert shrub vegetative community. The milk-vetch is found in both Washington County, Utah, and Mojave County, Arizona. The Recovery Plan (USFWS 2006) includes current and detailed biological information and a current and detailed five-factor analysis.

Holmgren milk-vetch is known from three major concentration areas. Within these areas there are six populations that are sufficiently discrete to be considered populations for recovery purposes in the USFWS's 2006 Recovery Plan. Except for lands under the management of the Shivwits Band of Paiutes, critical habitat was designated to represent the range and sites of all known populations. The distribution of plants within these populations is not always continuous; however, only a few plants are known to exist outside the boundaries of designated critical habitat.

In total, approximately, 6,289 acres (ac) (2,545 hectares (ha)) fall within the boundaries of the critical habitat in Mojave County, Arizona, and Washington County, Utah. The vast majority of lands, greater than 99 percent, designated as critical habitat are publically-owned.

The USFWS identified the PCEs for Holmgren's milk-vetch: (1) Appropriate geological layers or soils that support individual *Astragalus holmgreniorum* plants. *A. holmgreniorum* is found on the Virgin Limestone member, middle red member, and upper red member of the Moenkopi Formation and the Petrified Forest member of the Chinle Formation. Associated soils are Badland; Badland, very steep; Eroded land-Shalet complex, warm; Hobog-rock land association; Isom cobbly sandy loam; Ruesh very gravelly fine sandy loam; Gypill Hobog complex, 6 to 35 percent slopes; Gypill very cobbly sandy loam, 15 to 40 percent slopes; and Hobog-Grapevine complex, 2 to 35 percent slopes. These soils are generally found at elevations from 2,430 to 3,000 ft (756 to 914 m), support associated native plant species, and have a low presence or lack of Larrea tridentata (creosote bush). (2) Topographic features/relief (mesas, ridge remnants, alluvial fans, and fan terraces, their summits and backslopes, and gently rolling to steep swales) and the drainage areas along formation edges with little to moderate slope (0 to 20 percent). (3) The presence of insect visitors or pollinators, such as *Anthophora captognatha*, *A. damnersi*, *A. porterae*, *Anthophora* spp., *Eucera quadricincta*, *Omia titus,* and two types of *Dialictus* sp.

In the final critical rule, the USFWS identified the following as special management considerations and protections: (a) measures necessary to alleviate the effects of urban development, (b) retaining plants and their habitat on Federal lands, (c) fencing small populations, (d) removing or limiting access routes, (e) ensuring vehicles and pedestrians stay on designated routes, (f) reducing land use practices that disturb the hydrologic regime, (g) minimizing the effects of grazing and recreation use, (h) managing invasive nonnative plant species, (i) evaluating revegetation and restoration with native plant species, (j) developing adequate fire management buffers, and (k) educating fire management staff on the location of the plants. Additionally the USFWS determined that these areas may require special management considerations and protections for ground-nesting and local pollinator communities.

Huachuca Water Umbel

The Huachuca water umbel (*Lilaeopsis schaffneriana* ssp. *recurve*) was listed as endangered on January 7, 1997 (62 FR 665). Critical habitat was designated on July 12, 1999 (64 FR 37441). The USFWS recently completed a 5-year for the species in 2014 (USFWS 2014). Excerpts of the species' distribution and conservation status from these documents and the original listing and critical habitat rules appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

Lilaeopsis has been documented from 21 sites in Santa Cruz and Cochise Counties, Arizona, and in adjacent Sonora, Mexico, west of the continental divide. Six of the 21 sites have been extirpated. The 15 extant sites occur in four major watersheds— San Pedro River, Santa Cruz River, Rio Yaqui, and Rio Sonora. All sites are between 1,148 and 2,133 m (3,500 and 6,500 ft) elevation. *Lilaeopsis* has an opportunistic strategy that ensures its survival in healthy riverine systems, cienegas, and springs. In upper watersheds that generally do not have scouring floods,

Lilaeopsis occurs in microsites where interspecific plant competition is low. In stream and river main channels, *Lilaeopsis* can occur in backwaters, side channels, and nearby springs.

The USFWS has identified wetland degradation and loss as a primary threat to the species. Human activities such as groundwater overdrafts, surface water diversions, impoundments, channelization, improper livestock grazing, chaining, agriculture, mining, sand and gravel operations, road building, non-native species introductions, urbanization, wood cutting, and recreation all contribute to riparian and cienega habitat loss and degradation in southern Arizona. Livestock grazing potentially affects Huachuca water umbel at the ecosystem, community, population, and individual levels. Livestock grazing can affect the umbel through trampling and changes in stream hydrology and loss of stream bank stability; however, existence of the umbel appears to be compatible with well-managed livestock grazing (62 FR 665). Cattle generally do not eat water umbel because the leaves are too close to the ground, but they can trample plants. Huachuca water umbel is capable of rapidly expanding in disturbed sites and could recover quickly from light trampling by extending undisturbed rhizomes. Light trampling also may keep other plant density low, providing favorable Lilaeopsis microsites. Well-managed livestock grazing and Huachuca water umbel are compatible. In overgrazed areas, stream headcutting can threaten cienegas where the umbel occurs. Such headcutting occurs at Black Draw just south of the international boundary and at Los Fresnos, in the San Rafael Valley, Sonora, Mexico.

The USFWS designated a total of 83.2 kilometers (km) (51.7 miles (mi)) of streams or rivers in Cochise and Santa Cruz counties, Arizona as critical habitat (64 FR 37441). This area includes the upper San Pedro River, Garden Canyon on Fort Huachuca, and other areas of the Huachuca Mountains, San Rafael Valley, and Sonoita Creek. Included in this area are both the stream courses proper and including adjacent areas out to the beginning of upland vegetation. Within these areas, the PCEs include, but are not limited to, the habitat components which provide—(1) Sufficient perennial base flows to provide a permanently or nearly permanently wetted substrate for growth and reproduction of *Lilaeopsis;* (2) A stream channel that is relatively stable, but subject to periodic flooding that provides for rejuvenation of the riparian plant community and produces open microsites for *Lilaeopsis* expansion; (3) A riparian plant community that is relatively stable over time and in which nonnative species do not exist or are at a density that has little or no adverse effect on resources available for *Lilaeopsis* growth and reproduction; and (4) In streams and rivers, refugia sites in each watershed and in each reach, including but not limited to springs or backwaters of mainstem rivers, that allow each population to survive catastrophic floods and recolonize larger areas.

La Graciosa thistle

The La Graciosa thistle (*Cirsium loncholepis*) was listed as endangered by the USFWS on March 20, 2000 (65 FR 14888). On November 3, 2009, the USFWS revised critical habitat for the La Graciosa thistle (74 FR 56978). A five year review was published by the USFWS in 2011 (USFWS 2011). Excerpts of the species' distribution and conservation status from these documents and the original listing and critical habitat rules appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

Cirsium loncholepis is largely restricted to back dune and coastal wetlands of southern San Luis Obispo County and northern Santa Barbara County, from the Pismo Dunes lake area and south historically to the Santa Ynez River. The Guadalupe Dune complex, in which the majority of the species occurs, extends inland only up to 3.2 kilometers (km) (2 miles (mi)). *Cirsium loncholepis* is found in wet soils surrounding the dune lakes and in the moist dune swales. The historic distribution of the species included extensive areas in the Orcutt region that have been converted from wetland habitat to agricultural uses or otherwise developed. Large populations, similar to an existing one at the mouth of the Santa Maria River, likely occurred in these areas prior to their conversion.

At the time of listing, there were 17 known locations for *Cirsium loncholepis*. All but one of the populations is on private lands. Trend data in the 1990's indicated at least five known populations are declining, apparently due to the change in habitat as riparian willows and other vegetation invade the areas that previously supported this wet meadow plant.
Ongoing threats to this species include groundwater pumping, oil field development, and competition from nonnative plants. Cattle grazing in the riparian habitat at the mouth of the Santa Maria River may reduce the competition from other species, but the long-term effects of livestock use on the habitat are unknown.

Based on our current knowledge of the life history, biology, and ecology of *Cirsium loncholepis* and the requirements of the habitat to sustain the essential life history functions of the species, the USFWS determined the important PCEs specific to this thistle (74 FR 56978, page 56998).

Marsh Sandwort
Marsh sandwort (*Arenaria paudicoa*) was listed as endangered by the USFWS on August 3, 1993 (58 FR 41378). No critical habitat has been designated for the species. A five year review was published by the USFWS in 2008 (USFWS 2008). Excerpts of the species' distribution and conservation status from these documents and the original listing rule appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

Historically known from swamps and freshwater marshes in four counties in California, as well as Washington State; at the time of listing the species distribution was limited to one extant population at Black Lake Canyon (a state-owned and managed park) in San Luis Obispo County, California. Since listing, two populations have been reestablished in other parts of the range of the species.

The threats to *Arenaria paludicola* are all associated with the alteration and destruction of the coastal freshwater habitats associated with the species (i.e., marsh, riparian, lacustrine). The threats consist of loss and degradation of habitat due to development, urbanization, groundwater pumping, and conversion to agriculture; adverse effects from biostimulation, eutrophication; and sedimentation of water sources; nonnative species; and stochastic (i.e., random) extirpation/extinction events due to the small size and isolation of the one remaining, wild population.

Otay mesa-mint

Otay mesa-mint (*Pogogyne nudiuscula*) was listed as endangered on August 3, 1993 (58 FR 41384). No critical habitat has been designated for the species. A recovery plan for this species and others occupying Vernal Pool habitats was completed by the USFWS in 1998 (USFWS 1998). A five year review was published by the USFWS in 2010 (USFWS 2010). Excerpts of the species' distribution and conservation status from these documents and the original listing rule appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document..

This species exclusively occurs in vernal pools habitats from southwestern Riverside County and San Diego County, California, to northwestern Baja California, Mexico. At the time of Federal listing, *P. nudiuscula* was known to occur at four locations on Otay Mesa. It is currently extant at three locations on Otay Mesa. Historically, *P. nudiuscula* occurred in Mexico at the eastern edge of the City of Tijuana; it is believed to be extirpated from its Mexican locations.

The primary threats at listing were habitat loss and degradation due to urban and agricultural development, grazing, off-road vehicle use, trampling, invasion from weedy nonnative plants, and alteration of the watershed, trash dumping and drought.

Pecos Sunflower

Pecos Sunflower (*Helianthus paradoxus*) was listed as threatened on October 20, 1999 (64 FR 56583). A recovery plan was completed in 2005 (USFWS 2005). Critical habitat for the Pecos Sunflower was designated on April 1, 2008 (73 FR 17762). Excerpts of the species' distribution and conservation status from the recovery plan and the original listing and critical habitat rules appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

Pecos sunflower is a wetland plant that grows on wet, alkaline soils at spring seeps, wet meadows, stream courses and pond margins. It has seven widely spaced populations in west-central and eastern New Mexico and adjacent Trans-Pecos Texas. These populations are all dependent upon wetlands from natural groundwater deposits. Incompatible land uses, habitat degradation and loss, and groundwater withdrawals are historic and current threats to the survival of Pecos sunflower.

Threats to Pecos Sunflower identified by the USFWS include drying of wetlands from groundwater depletion, alteration of wetlands (e.g., wetland fills, draining, impoundment, and development), competition from nonnative plant species, overgrazing by livestock during its flowering season (see next paragraph), impacts from recreational activities, mowing, and highway maintenance.

Livestock will eat this species when other green forage is scarce, and when the buds are developing and abundant. Cattle and horses tend to pull off the flower heads, which can reduce seed production. However, well-managed grazing during non-flowering months may have a beneficial effect on Pecos sunflower populations by decreasing the density and biomass of potentially competing plant species in these habitats. This sunflower germinates earlier than most associated plants and grows vigorously on wet, bare, highly insolated soils. Actions that remove

shading grass cover, such as grazing, appear to enhance growth and reproduction of sunflower plants that are later protected from grazing while they are reproductively maturing. Therefore, properly managed livestock grazing can be compatible with Pecos Sunflower conservation (references summarized in 73 FR 17762).

In the final critical habitat rule, the USFWS identified 1,305 acres (528 hectares) in Chaves, Cibola, and Guadalupe counties, New Mexico, and in Pecos County, Texas, within the boundaries of the final critical habitat designation. About one-half of this area is private lands. The PCEs for Pecos Sunflower are the desert wetland or riparian habitat components that provide: (i) Silty clay or fine sand soils that contain high organic content, are saline or alkaline, are permanently saturated within the root zone (top 50 cm (19.7 in) of the soil profile), and have salinity levels ranging from 10 to 40 parts per thousand; and (ii) A low proportion (less than 10 percent) of woody shrub or canopy cover directly around the plant.

Salt Marsh bird's-beak

Salt Marsh bird's-beak (*Cordylanthus maritimus* ssp. *maritimus*) was listed as endangered on September 28, 1978 (43 FR 44810). Critical habitat has not been designated for the Salt Marsh bird's-beak. A five year review was published by the USFWS in 2009 (USFWS 2009). An updated recovery plan for this species and others inhabiting the Tidal Marsh Ecosystems of Northern and Central California was completed by the USFWS in 2014 (USFWS 2014). Excerpts of the species' distribution and conservation status from these documents and the original listing and critical habitat rules appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

Historically, this species has occurred at sea level in coastal salt marshes from Santa Barbara County, to San Diego, California, to northern Baja California, Mexico. Present distribution is believed to be restricted to the Tijuana River estuary, San Diego County; Point Mugu, Ventura County; and northern Baja California. Filling in of coastal salt marshes has either eliminated or drastically reduced this species in its known habitats.

Slender-horned spineflower

Slender-horned spineflower (*Dodecahema leptoceras*) was listed by the USFWS as endangered on September 28, 1987 (52 FR 36265). Critical habitat has not been designated for the Slender-horned spineflower. A five year review was published by the USFWS in 2010 (USFWS 2010). Excerpts of the species' distribution and conservation status from these documents and the original listing and critical habitat rules appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

The species is usually found in drought prone alluvial benches subject to only rare flood events. At the time *Dodecahema leptoceras* was listed (as *Centrostegia leptoceras*) it was only known to be extant at 5 locations representing 6 element occurrences (EOs). *Dodecahema leptoceras* is endemic to southwestern California, from northern Los Angeles County east to San Bernardino County, and south to southwest Riverside County in the foothills of the Transverse and Peninsular ranges at elevations ranging from 200 to 700 meters (m) (656 to 2,296 feet (ft)). More intensive surveys and resurveys of historical occurrence sites have detected additional extant occurrences since listing for a total of 20 extant occurrences.

At listing, development, mining activities, off road vehicles, proposed flood control measures, and trash dumping were among the threats cited. Occurrences of *Dodecahema leptoceras* are currently threatened by development, mining activities, flood control measures, and trash dumping.

Spring-loving centaury

Spring-loving centaury (*Zeltnera namophilum*) was listed by the USFWS as threatened on May 20, 1985 (50 FR 20777). A multi-species recovery plan for Ash Meadows species was approved by the USFWS in 1990 (USFWS 1990). A five year review was published by the USFWS in 2009 (USFWS 2009). Excerpts of the species' distribution and conservation status from these documents and the original listing and critical habitat rules appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

The spring-loving centaury once occurred outside of Ash Meadows region near Beatty, Nye County, Nevada; near Tecopa in Inyo County, California; and at Furnace Creek in Death Valley National Park. It has not been recently found at these sites and is now considered extirpated outside of the Ash Meadows Region. It is found in riparian areas in Ash Meadows bordering springs and seeps. Remaining populations are smaller and less numerous than those known historically, because of riparian habitat elimination attributed to ground water depletion, water diversion, spring alteration, peat mining in Carson Slough during the early 1960's, and land development for agriculture and municipal facilities.

Simultaneous with listing, the USFWS designated 1,840 acres of critical habitat in Ash Meadows, Nye County, Nevada. Identified PCEs include moist to wet clay areas along banks of streams or in seepage areas.

Threats to its continued existence include ground water depletion causing decreases in spring discharge, road construction through riparian areas, and trampling and overgrazing by wild and free-roaming horses.

Ute ladies'-tresses

When Ute ladies'-tresses (*Spiranthes diluvialis*) was listed as threatened on January 17, 1992 (57 FR 2048), it was known primarily from moist meadows associated with perennial stream terraces, floodplains, and oxbows at elevations between 4300 to 6850 feet (1310 to 2090 meters). No critical habitat has been designated for the species. A Recovery Plan was completed by the USFWS in 1995 (USFWS 1995). Excerpts of the species' distribution and conservation status from these documents and the original listing rule appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

Surveys since 1992 have expanded the number of vegetation and hydrology types occupied by Ute ladies'-tresses to include seasonally flooded river terraces, sub-irrigated or spring-fed abandoned stream channels and valleys, and lakeshores. In addition, 26 populations have been discovered along irrigation canals, berms, levees, irrigated meadows, excavated gravel pits, roadside barrow pits, reservoirs, and other human-modified wetlands. New surveys have also

expanded the elevational range of the species from 720-1830 feet (220-558 meters) in Washington to 7000 feet (2134 meters) in northern Utah. Over one-third of all known Ute ladies'-tresses populations are found on alluvial banks, point bars, floodplains, or ox-bows associated with perennial streams.

In 1992, the USFWS identified habitat loss and modification (through urbanization, water development, and conversion of wetlands to agriculture), over-collection, competition from exotic weeds, and herbicides as the main current and potential threats to the long term survival of Ute ladies'-tresses. Since 1992, other threats have been identified including impacts from recreation; mowing for hay production, (mowing, especially in conjunction with winter grazing, can have positive effects on Ute ladies'-tresses by reducing competing vegetative cover and protective cover for voles); grazing by cattle or horses; hydrology change (modification of wetland habitats through development, flood control, de-watering, and other changes to hydrology); herbivory by native wildlife (particularly voles); reduction in the number and diversity of insect pollinators; drought; absence or rarity of mycorrhizal symbionts; and conflicting management with other rare species.

Ventura Marsh milk-vetch

Ventura marsh milkvetch (*Astragalus pycnostachyus* var. *lanosissimus*) was listed as endangered on May 21, 2001 (66 FR 27901). Critical habitat was designated on May 20, 2004 (69 FR 29081). A five year review was published by the USFWS in 2010 (USFWS 2010). Excerpts of the species' distribution and conservation status from these documents and the original listing and critical habitat rules appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

Little is known of the habitat requirements of this subspecies. At the time of listing, the only known extant population of this taxon occurred in Ventura County, California on less than 0.2 hectare (ha) (0.6 acre (ac)) of degraded dune habitat that was previously used for disposal of petroleum wastes. After rediscovery of the taxon, several attempts have been made to establish populations within the historical range of the taxon, with varying success.

Approximately 420 acres (170 hectares) of land fall within the boundaries of the critical habitat designation. The designated critical habitat is located in Santa Barbara and Ventura Counties, California.

Willowy monardella

Willowy monardella *(Monardella viminea*) was listed as endangered with critical habitat on October 13, 1998 (63 FR 54938). Due to taxonomic revisions to the genera, the USFWS published a final listing and critical habitat rule and accepted the taxonomic revision for *Monardella viminea* on March 6, 2012 (77 FR 13394). A five year review was published by the USFWS in 2012 (USFWS 2012). Excerpts of the species' distribution and conservation status from these documents and the original listing and critical habitat rules appear below, with the complete profile and status information from the sources listed here are incorporated by reference in this document.

The species occurs in coastal sage scrub and riparian scrub in sandy bottoms and on banks of ephemeral washes in canyons where surface water flows for usually less than 48 hours after a rain event. *Monardella viminea* is a geographically narrow endemic species restricted to three watersheds north of Kearny Mesa in San Diego County, California. Within these watersheds, *M. viminea* occurs on land owned by the Department of Defense at Marine Corps Air Station (MCAS) Miramar, the City of San Diego, the County of San Diego, and private parties. When the USFWS listed the species, 20 occurrences were considered to be extant in the United States. Today, the USFWS considers eight occurrences of the listed entity to be extant.

Current threats affecting *M. viminea* and its habitat include: (1) Urbanization and development, (2) altered hydrology, (3) fire and type conversion, (4) disease and predation, (5) nonnative plant species, (6) small population size and restricted range, (7) climate change, and (8) megafire (large, uncontrollable fire events).

Final critical habitat for the species totaled approximately 122 acres (50 hectares) in San Diego County, California.

EFFECTS OF THE ACTION

Regulations implementing the ESA define "effects of the action" as "the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action that will be added to the environmental baseline" (50 CFR Section 402.02). This section details the anticipated effects to covered species by taxon from the proposed action. Further, conclusions are described in this section.

The USFWS and NRCS identified 11 adverse effects that may result from implementation of the conservation practice to the covered species. It is important to note that, in accompanying NRCS BA, NRCS and the USFWS identified specific potential sources of adverse effects from implementation of the proposed action. To address the adverse effects identified, the NRCS and USFWS developed specific conservation measures (Appendices II, III and IV of the NRCS' BA) which are designed to minimize, avoid, or eliminate these adverse effects. This part of the document summarizes and repeats much of the information in the BA.

Adverse effects from the Proposed Action include the following:

- Physical disturbance (e.g. human presence and noise);
- Temporary soil and vegetation disturbance;
- Increased potential of invasive plant introduction;
- Removal of desired riparian vegetation and understory component;
- Increased fire hazard;
- increased potential of accidental mortality of individuals;
- Increased potential of susceptibility to nest parasitism by cowbirds;
- Increased potential for predation;
- Managed livestock grazing in riparian zones may temporarily degrade habitat during the breeding season or result in direct negative effects to the covered species;

- Loss or alteration of suitable water quality and quantity; and
- Increased potential to adversely affect insect prey base.

These adverse effects are discussed by taxon below. The NRCS and USFWS evaluated the effects and summarize below. It is important to note that the evaluation and determination of these common adverse effects duly considered and incorporated the conservation value of the identified conservation measures jointly developed by the partnership.

We describe expected temporary and permanent effects to the PCEs of critical habitat and whether the affected critical habitat will remain functional or retain the current ability to establish (or reestablish) functioning PCEs. In general, it is more likely that temporary effects (stressors) and potential exposures can be found discountable. It is more difficult to conclude that permanent or long term effects (stressors) will not expose individuals over time.

Effects of the Action - Birds

Adverse effects to the southwestern willow flycatcher, California clapper rail, Least Bell's vireo, yellow-billed cuckoo, and Yuma clapper rail may result from implementing conservation practices. The Least Bell's vireo and yellow-billed cuckoo habitat requirements overlap with those of the southwestern willow flycatcher. Yuma clapper rail habitat does not overlap with SWFL habitats. However, clapper rails occupying areas adjacent to SWFL habitat may experience indirect adverse effects from conservation practice implementation.

Physical disturbance (including noise): Conservation practices that involve mechanized equipment use in occupied habitat may adversely affect listed birds. Periodic disturbances may occur as maintenance actions for the conservation practices are needed over their operational life. All of the covered conservation practices either directly or indirectly may produce some additional level of physical disturbance because they involve the presence of humans, livestock, and/or associated equipment, vehicles or machinery.

Physical disturbance would only occur during the breeding and migratory seasons; the birds would not be are not present at other times. Physical disturbance that results in flushing and escape behavior may place individual birds and any nests or nestlings at greater risk to predation and/or exposure to weather. Conservation practice implementation would not likely affect a large enough area to cause adverse effects during migration. If physical disturbance occurs in close proximity to occupied breeding habitat, the female may temporarily or permanently abandon the nest. The net effect of the physical disturbance may be a localized reduction of survival or productivity and/or, avoidance of otherwise suitable habitat. However, these adverse effects are expected to be localized in proximity to the conservation practice. The required conservation measures that address physical disturbance will reduce adverse effects to the species.

Temporary soil and vegetation disturbance and increased potential invasive plant introduction: Temporary soil disturbance and vegetation removal are expected from the implementation of most of the conservation practices. This may result in loss of vegetative cover and increase the potential for invasive plants, such as saltcedar, giant cane (*Arundo donax*) tree-of-heaven (*Ailanthus altissima*) and Russian olive, to establish or spread within the project area.

For purposes of this analysis, the USFWS is combining these two adverse effects into a single discussion of their potential adverse effects.

Soil and vegetation disturbance could result from equipment use such as post-hole diggers, tractors, and other machinery as well as the clearing and preparing sites for desired tree and/or shrub plantings or the cutting and removal of invasive plant species. Conservation practices that may cause this adverse effect may include brush management, herbaceous weed control, forest stand improvement, riparian forest buffer, streambank and shoreline protection, tree and shrub establishment, and tree and shrub site preparation and prescribed burning). Potential adverse effects include temporary habitat degradation and increased habitat fragmentation if the disturbance area is large enough. Most conservation practices only impact small areas in relation to the large habitat patches used by these listed birds.

Non-native plant invasion or spread into what was occupied breeding habitat may significantly impact these listed bird species if the site is no longer suitable for breeding.

Conservation practice installation and maintenance may cause short-term soil and vegetation disturbance but are expected to produce long-term habitat restoration, maintenance and enhancement for these birds if the project sites recover. Conservation measures have been developed and required as practice standards by the NRCS. These conservation measures manage the risk of soil erosion, reduction in vegetative cover and the risk of invasive plant establishment or spread. These conservation measures manage the risk during practice installation and require monitoring and subsequent redress of any created or emerging threat throughout the effective life of the conservation practice. A restoration strategy using native plants appropriate to the ecological site will be used to provide a temporary buffer in the establishment of native vegetation and will further ameliorate these potential adverse effects. Cumulatively, the long-term and landscape benefits of installation and application of the particular conservation practices and their appropriate conservation measures are expected to exceed any temporary adverse effects created from their installation.

Removal of desired riparian vegetation and understory components: This adverse effect is a result of permanent removal of habitat conditions and specific vegetative loss caused by the implementation of the conservation practice. Riparian vegetation, unlike discussed in the above adverse effect, is not expected to recover. Certain facilitating practices such as watering facility, water well, pipeline, grade stabilization structure, and fence construction have the potential to result in the removal and/or loss of habitat for the listed bird species. However, much of this loss may be temporary as vegetation is restored – either deliberately or naturally on the site. Most of the structural practices will produce localized losses which can be minimized using the identified recommended conservation measures. The conservation measures focus on design and planning aspects of the practice so as to avoid large expanses of habitat loss especially from linear practices (e.g., fence lines, water pipelines, etc.).

Permanent removal of native riparian vegetation may also increase a site's susceptibility to invasive plant establishment or spread. See above section for discussion on this adverse effect.

The long-term and cumulative benefits of installation and application of the particular Conservation Practice as conditioned by the conservation measures are expected to exceed the

temporary expected adverse effects created from their installation. Further, the use of the conservation measures will ensure that the species habitat is maintained or improved following application. Cumulatively, the expected species response will be positive as the extent of adverse effects are not expected to occur at the scale necessary to adversely impact population trends or to result in significant additional habitat fragmentation effects.

Increased fire hazard: Although fires are known to have occurred in riparian habitats historically, riparian habitats are not fire-adapted nor are they fire-generated communities. Thus, fires in riparian habitat are typically catastrophic, even with native vegetation. Busch (1995) documented that the current frequency and intensity of fires in riparian habitats is greater than what occurred historically because: (1) a greater accumulation of fuels due to a reduced frequency of scouring floods; and (2) the expansion and dominance in many areas of saltcedar (*Tamarix chinensis*), which is highly flammable. The increased incidence of fire is causing profound alterations in riparian habitats throughout the Southwest. Both saltcedar and arrowweed (*Tessaria sericea*) recover more rapidly from fire and are more tolerant of fire-induced increases in salinity and decreases in soil moisture than are cottonwood and willow (Busch and Smith 1993, Busch 1995).

NRCS conservation practices that remove non-native vegetation and replace with native species will help return the natural riparian ecosystem and thus reduce catastrophic wildfire risk. However, in some cases, the riparian vegetation is depauperate due to management activities (e.g. grazing, recreation). Increased vegetative cover (even though native) may increase fire risk during periods of drought, although not beyond the original natural fire regime present before anthropogenic changes to vegetation occurred.

***Increased potential of accidental mortality to individuals*:** Disturbance to the listed bird species include the possibility of trampling from some of the conservation practices such as installation of fences or pipes and/or maintenance activities. These effects are expected to rarely occur and are not expected to produce significant changes in species distribution and abundance.

Increased potential of susceptibility to cowbird nest parasitism: All three listed birds can be affected by cowbird nest parasitism. Cowbird nest parasitism rates vary among SWFL populations. In New Mexico, parasitism rates vary from 18 percent in the Cliff Gila Valley to 40 percent at other sites (USFWS 2002). Cowbird nest parasitism rates are typically lower in large patches of unfragmented habitat (Robinson et al. 1995). In general, nest parasitism rates and cowbird densities typically decline with increasing densities of low vegetation, as a result of nests in dense vegetation are harder for cowbirds to find (USFWS 2002, Uyehara and Whitfield 2000, Staab and Morrison 1999). Yuma clapper rails are not affected by cowbird nest parasitism.

Determining the level in which a conservation practice may attract cowbirds to an area will be difficult. Cowbirds, in the southwest, frequent riparian areas because that is where their potential hosts are found. In addition, regardless of the conservation practice, unrelated activities on the client's property may already attract cowbirds to the area. Some conservation practices, while not affecting riparian habitat, may still increase parasitism rates by providing an attractant to cowbirds. Conservation measures that establish buffer zones between the project site and listed

bird breeding habitat may be sufficient to reduce or eliminate cowbird parasitism. Several of the conservation practices may temporarily or permanently remove riparian habitat and/or increase habitat edge effects if construction or access to the project e site involves vegetation removal. The USFWS believes that implementation of conservation measures will significantly minimize this adverse effect by establishing non-disturbance dates; minimum buffer distances from nest sites; and limiting the width of clearing of vegetation for access and construction to what is necessary for the conservation practice. Further, any remaining effects will be further managed or effectively mitigated as many of the actions proposed by NRCS are designed to increase riparian habitat or improve their structural component by planting or other direct and indirect enhancements.

Conservation practices that increase riparian vegetation cover and patch size could limit or decrease cowbird parasitism rates from had occurred prior to the conservation practice being implemented. The long-term and cumulative benefits of installation and application of the particular Conservation Practices as conditioned by the conservation measures are expected to exceed the temporary expected adverse effects created from their installation. Further, the use of the conservation measures will ensure that the species habitat is re-established, maintained, or improved following application over the longer term. Cumulatively, the expected species response will be positive as the extent of adverse effects are not expected to occur at the scale necessary to adversely impact population trends or to result in significant additional habitat fragmentation effects.

Increase potential for predation: For many listed species of birds, nest predation is the major cause of nest failure. Known or suspected nest predators include various snakes, predatory birds including corvids, owls, hawks, grackles and cowbirds, and small mammals including raccoons, ringtails, weasels, and rats (McCarthey et al. 1998).

Predation rates may increase in human-altered landscapes. Habitat fragmentation has been correlated with increased nest predation rates in both forested and non-forested habitats (Picman et al. 1993, Askins 1993, Robinson et al. 1995). Whitfield (1990) noted that predation on SWFL nests increased with decreasing distance to habitat edge. The key factor to determine is whether impacts, such as habitat fragmentation, are resulting in substantially higher rates of predation. The NRCS will implement conservation measures to address the potential to increase predation rates as a result of conservation practice implementation. The identified conservation measures may require modifications to the design of fences, management of slash and debris piles, and management of human presence during conservation practice installation and maintenance.

Certain conservation practices may increase the potential for predation on individual birds through the installation of structures or modifying existing habitat conditions. In addition, some practices will temporarily reduce available cover and food sources, making the listed bird species potentially vulnerable to predation. Finally, the presence of humans during practice installation can temporarily create an artificial food source for predators (i.e., trash attracts predators such as foxes, coyotes, crows, ravens, etc.). Cumulatively, the NRCS believes that the conservation measures will effectively reduce the risk of predation at the local and landscape scale to the extent to which it is not expected to have a detectable effect on the population.

Managed livestock grazing in riparian zones may temporarily degrade habitat during the breeding season or result in direct negative effects to the covered species: As with the explanation and discussion throughout this analysis, we recognize the interdependence and interplay between the individual Conservation Practices and how they will produce specific results within the goals and value of the five core conservation practices. By using at least one of the identified core practices, this feature will ensure that implementation of each of the supporting conservation practices will create, maintain, enhance, improve, or otherwise manage the WLFW -SWFL Project and its supporting habitat needs.

Appendix IV of the NRCS' BA more fully explains how a prescribed grazing plan (528[3]) will be designed. An important summary is provided in Appendix 2 of the Opinion. This conservation measure was explicitly developed to guide NRCS planners and eligible landowners to reduce the adverse effects of those structural improvements that support the prescribed grazing plan (528) for livestock operations. Specifically, the conservation practices such as fence, pipeline, and watering facility all have the potential to create their own adverse effects as discussed above and that in certain circumstances these impacts are compounded without thoughtful consideration on their placement and design. The USFWS expects that the conservation practices identified above will be installed with NRCS technical and financial assistance and used to facilitate a prescribed grazing plan. Site-specific management plans will be developed with each landowner; these plans will detail the stocking rates, rotations, timing, and duration of use in each field. All grazing plans will contain a drought contingency that adjusts grazing use commensurate with lower precipitation and plant growth. All required facilitating practices (i.e., fence, well, pipeline, etc.) will be planned and designed to minimize disturbance and, to enhance WLFW-SWFL Project habitat through the installation of a sustainable livestock management program.

Water Quality/Quantity – loss or alteration of suitable hydrology: Degraded water quality may impact these bird species by affecting aquatic insects. All three bird species are insectivorous; they may feed upon aquatic insects.

Water quality is degraded by sediment, nutrients, pesticides, temperature, or a combination of factors resulting in a simplified macro-invertebrate fauna. Fewer organisms have the ability to persist in the degraded water. The reduction in the variety of taxa reduces the diversity of hatches and can create gaps in availability of prey from the aquatic ecosystem.

Adverse impacts to water quantity can exacerbate these water quality impacts. Less water means less aquatic bed to produce macro-invertebrates, increases in water temperature and magnified effects of pesticide or nutrient pollution. There is less water to dilute the effects of the pollutants.

To minimize potential adverse effects on insect prey base and avoid water quality issues, NRCS has proposed the following conservation measure: "Herbicide applications will follow the applicable conservation measures recommended in the USFWS' document titled *Recommended Protection Measures for Pesticide Applications in Region 2 of the USFWS*, which is available on the Arizona Ecological Services webpage."

[3] This is the NRCS numerical code assigned to the Conservation Practice Standard – see Table 1.

Increased potential to adversely affect insect prey base: Direct effects to the insect prey base are the result of spray drift from nearby agricultural fields or from invasive plant control efforts in or near riparian areas. Insecticides that are applied when weather conditions are inappropriate are prone to drift. Wind speed, temperature and barometric pressure all can affect pesticide drift. Indirect effects to the insect prey base come from actions affecting the habitat (see previous paragraphs above for discussion of effects of water quality on macro-invertebrate habitat).

In summary, long-term efforts to improve the health and availability of riparian breeding habitats and to reduce/manage/eliminate the adjacent upland direct and indirect adverse effects, will benefit the covered bird species by increasing nesting success, increasing insect prey abundance, decreasing predation and nest parasitism rates, and by enhancement overall habitat quality. Although short-term adverse effects could occur in association with habitat restoration, enhancement, and management activities carried out on the eligible properties, the long-term effects of these projects result in conservation benefits for the three covered bird species.

EFFECTS OF THE ACTION - MAMMALS

Adverse effects to the Amargosa vole, Buena Vista Lake ornate shrew, and New Mexico meadow jumping mouse may occur as a result of conservation practice implementation. These species may habitat requirements that are similar to those of the SWFL. The Amargosa vole and New Mexico meadow jumping mouse may coexist may also be adjacent to the SWFL habitat since these species require tall grass. The Buena Vista Lake ornate shrew has a high degree of habitat similarity with the SWFL except in areas with low levels of herbaceous understory.

Physical disturbance (including noise): Adverse effects to listed mammals are possible for most of the supporting Conservation Practices that involve the use of mechanized equipment in occupied habitat. Periodic disturbances have the potential to occur, as maintenance actions for the implemented practices may be needed over their operational life. With respect to noise or physical disturbance, normal and routine use of equipment necessary to maintain ranching operations is not considered by the USFWS to be significant source of adverse effect to the species. All conservation practices, either directly or indirectly have the potential to produce some additional level of physical disturbance because they involve the physical presence of humans, livestock, and/or associated equipment, vehicles or machinery. Consequently, these two adverse effects have been combined for purposes of the USFWSs' analysis. Although effects are not quantitatively known, the physical effects from presence and/or associated noise may create some disturbance to mammalian species. However, these effects are expected to be minimal.

Temporary soil and vegetation disturbance (indirect & temporary) and increased potential of introduction of invasive plants: Temporary soil disturbance and vegetation removal are expected from the implementation of most of the conservation practice standards. This disturbance may result in loss of cover and increase the potential for invasive plants, especially woody plants like salt cedar and mesquite. For purposes of this analysis, the USFWS is combining these two conservation issues into a single discussion of their potential adverse effects.

Sources of the disturbance would include use of equipment such as post-hole diggers, tractors, and other machinery as well as practices that involve the planting or manipulation of vegetation (examples such as brush management, shrub control, and prescribed burning). Common potential adverse effects identified by the USFWS include degradation of habitat conditions and the potential for increased habitat fragmentation if the scale of the disturbance is large enough. The USFWS does not anticipate significant impacts to the listed mammal species by colonization of these disturbed sites by invasive plants.

The net effect will be that practice installation and maintenance may result in short-term disturbance to mammalian species but are expected to produce long-term restoration, maintenance and enhancement gains by improving and maintaining habitat conditions for the these species. The use of the conservation measures are expected to minimize the short-term adverse effects of practice installation. Conservation measures have been developed to manage the risk of soil erosion as well as the risk of invasive plants. These measures manage the risk during practice installation and require monitoring and subsequent redress of any created or emerging threat throughout the effective life of the conservation practice standard. A restoration strategy using native plants appropriate to the ecological site will be used to provide a temporary buffer in the establishment of native vegetation will further ameliorate these potential adverse effects. In summary, the long-term and landscape benefits of installation and application of the particular Conservation Practices as conditioned by the conservation measures are expected to exceed any temporary adverse effects created from their installation.

***Removal of desired riparian vegetation and understory components*:** This adverse effect is a result of permanent removal of habitat conditions and specific vegetative loss caused by the installation of the conservation practice standard. Certain facilitating practices such as watering facility, water well, pipeline, grade stabilization structure, and fence construction have the potential to result in the permanent removal and/or loss of habitat for the listed mammal species. Most of the structural practices will produce localized losses which can be minimized using the identified recommended conservation measures. The conservation measures focus on design and planning aspects of the practice so as to avoid large expanses of habitat loss especially from linear practices (e.g., fence lines, water pipelines, etc.).

The long-term and cumulative benefits of installation and application of the particular Conservation Practice as conditioned by the conservation measures are expected to exceed the temporary expected adverse effects created from their installation. Further, the use of the conservation measures will ensure that the species habitat is maintained or improved following application. In summary, the expected species response will be positive as the extent of adverse effects are not expected to occur at the scale necessary to adversely impact these mammalian species or to result in significant additional habitat fragmentation effects.

Increased fire hazard: NRCS conservation practices that remove non-native vegetation and replace with native species will help return the natural riparian ecosystem and thus reduce catastrophic wildlife risk. However, in some cases, the riparian vegetation is depauperate due to management activities (e.g. grazing, recreation). Increased vegetative cover (even though native) may increase fire risk during periods of drought, although not beyond the original natural fire regime present before anthropogenic changes to vegetation occurred.

***Increased potential of accidental mortality to individuals*:** Disturbance to the listed bird species include the possibility of trampling from some of the conservation practices such as installation of fences or pipes and/or maintenance activities. These effects are expected to rarely occur and are not expected to produce significant changes in species distribution and abundance. In the aggregate, the adverse effects of this concern are expected to be localized and temporary, and the use of the conservation measures will further reduce the risks of adverse effects at the scale upon which populations or the species will be negatively impacted.

Managed livestock grazing in riparian zones may temporarily degrade habitat during the breeding season or result in direct negative effects to the covered species: As with the explanation and discussion throughout this analysis, we recognize the interdependence and interplay between the individual Conservation Practices and how they will produce specific results within the goals and value of the 5 core Conservation Practices. By using at least one of the identified core practices, this feature will ensure that implementation of each of the supporting Conservation Practices will create, maintain, enhance, improve, or otherwise manage the Southwestern Willow Flycatcher Project and its supporting habitat needs.

New Mexico meadow jumping is a habitat specialist in that it nests in dry soils, but uses moist, streamside, dense riparian/wetland vegetation up to an elevation of about 8,000 feet. The presence of a functioning livestock exclosure has been reported as the best predictor of jumping mouse occupancy in montane riparian areas. However, no jumping mice are known to exist on private lands thus, impacts to this species from grazing will most likely be minimal. Most areas of high Amargosa vole abundance occurred at the interface of bulrush and saltgrass habitats, or in pure bulrush stands. Impacts from grazing on the Amargosa vole from grazing will also be minimal.

Water Quality/Quantity – loss of alteration of suitable hydrology and increased potential to adversely affect insect prey base: Degraded water quality may impact the mammalian species primarily through impacts to the aquatic food chain. Shrews for example, feed indiscriminately on the available larvae and adults of several species of aquatic and terrestrial insects, some of which are detrimental to agricultural crops. They are also known to consume spiders, centipedes, slugs, snails, and earthworms on a seasonally available basis. To minimize potential adverse effects on insect prey base and avoid water quality issues, NRCS has proposed the following conservation measure: "Herbicide applications will follow the applicable conservation measures recommended in the FWS' document titled *Recommended Protection Measures for Pesticide Applications in Region 2 of the USFWS*, which is available on the Arizona Ecological Services webpage."

In summary, long-term efforts to improve the health and availability of riparian habitats and reduce/manage/eliminate the adjacent upland direct and indirect adverse effects, will benefit the covered species by increasing overall mammalian habitat values. Although short-term adverse effects could occur in association with habitat restoration, enhancement, and management activities to be carried out on the eligible properties, the long-term effects of these projects result in conservation benefits for all of the listed mammalian species.

EFFECTS OF THE ACTION - AMPHIBIANS

Adverse effects to the arroyo toad, California red-legged frog, Chiricahua leopard frog, California tiger salamander, Columbia spotted frog, mountain yellow-legged frog, and relict leopard frog may occur as a result of Conservation Practice Implementation. These species inhabit riparian areas that may also be suitable for breeding SWFL. Therefore, they are discussed together within the Effects of the Proposed Action section.

***Physical disturbance including noise*:** Disturbance to individual amphibians may occur as result of Conservation Practices that involve mechanical equipment use in or adjacent to occupied habitat. Further, future periodic disturbances may occur, as maintenance actions for the implemented practices may be needed over their operational life. Machinery and vehicle noise associated with conservation practice use, over significant duration of time, may interfere with or mask frog breeding calls which can reduce breeding success and eventually frog abundance in affected areas (Bee and Swanson 2007, Parris *et al.* 2009).

***Temporary soil and vegetation disturbance*:** Temporary soil disturbance and vegetation removal are expected from the implementation of most of the conservation practice standards. This disturbance may result in loss of cover and increase the potential for invasive plants, especially woody plants such as saltcedar, Russian olive, giant reed, and tree-of-heaven. For purposes of this analysis, we are combining these two conservation issues into a single discussion of their potential adverse effects. Sources of the disturbance would include use of mechanized equipment as well as practices that plant or manipulate (e.g. brush management, shrub control, and prescribed burning). These actions would adversely affect amphibians if it were to remove vegetative cover needed for hiding or thermal protection. Temporary vegetation removal in occupied habitat may create conditions where amphibians are exposed the predation the potential to create opportunities for colonization of these disturbed sites by invasive plants. Soil disturbing activities in or adjacent to amphibian habitat can result in increased siltation in the stream or wetland. If this siltation occurs during the breeding season, asphyxiation of eggs and small amphibian larvae can result.

Actions that remove emergent and riparian vegetation that eliminates or severely reduces plant cover may cause water temperature increases which can increase non-native bullfrog reproduction and predation on native amphibians. Amphibians that inhabit cold water, such as the red-legged, yellow-legged, spotted frogs, and mountain-populations of Chiricahua leopard frog may avoid bullfrog predation by inhabiting cold water portions of their habitats (Kiesecker and Blaustein 1998). Increased soil erosion in the watershed may accelerate the sediment deposition of pool habitat in occupied streams, ponds, and stock tanks. These deep pools may provide critical refuges during normal low flow periods or periodic drought. If these pools are eliminated or their volumes decreased significantly amphibian fatality may occur.

The degree to which these temporary actions adversely affect amphibians depends upon their duration. Short-term disturbance may only interfere with important life cycle functions for one season. Amphibians, in the absence of other stressors, may persist in the project area until habitat conditions return to the pervious state. Longer-term disturbances may be significant as to cause permanent amphibian population losses despite being temporary.

Removal of desired riparian vegetation and understory components: The adverse effects of permanent removal of riparian vegetation would be the same as described above but would last for a much longer period of time, if not permanently. Adverse effects to amphibians could result in local extirpation if habitat is permanently practice.

Most of the structural practices will produce localized losses which can be minimized by implementing the recommended conservation measures. The conservation measures focus on design and planning aspects of the practice so as to avoid large expanses of habitat loss especially from linear practices (e.g., fence lines, water pipelines, etc.).

Conservation practices such as riparian forest buffer and riparian herbaceous cover would benefit covered amphibian species when they are planted between areas where chemicals (fertilizer, pesticides, *etc*.) are applied and occupied habitats. These practices function as filters to remove impurities from storm or irrigation runoff before they enter streams and other waterbodies.

In summary the Service concludes that the long-term and cumulative benefits of conservation practice use and their associated conservation measures are anticipated to exceed any temporary adverse effects created from their installation if they address the habitat needs of the covered species. Conservation measures will ensure that the covered species habitat is maintained or improved following conservation practice implementation.

***Water Quality/Quantity Alteration*:** Amphibians, at all life stages, are susceptible to poor water quality; in particular from fuel, chemical, or pesticide contamination (Mann *et al.* 2009). Amphibians can absorb toxic substances orally or dermally through their skin when exposed. There are conservation measures that are expected to reduce or eliminate this adverse effect when conservation practices that require chemical use are implemented in covered species habitat.

Temporary stream damming or flow diversion may be necessary when conservation practices involve work within the stream channel (*i.e.* Open Channel, Stream Channel Stabilization, or Streambank and Shoreline Protection). Amphibian eggs, larvae, and potentially adults may suffer fatality when stream channels are drained prior to conservation practice construction and maintenance.

Conservation practices that involve habitat creation that would benefit SWFL (Wetland Restoration, Wetland Enhancement, Riparian Buffer, etc.), as well as covered amphibian species, may reduce stream flow or water availability from one portion of the client's property to another. Covered amphibians maybe adversely affected if existing occupied habitat is drained or receives less water as a result.

Conservation practices that may temporarily contribute excess sediment into covered species habitat was discussed above.

EFFECTS OF THE ACTION - REPTILES

Adverse effects to the blunt-nosed leopard lizard, Northern Mexican gartersnake, narrow-headed gartersnake, Mojave Desert tortoise, and Sonoran desert tortoise may occur from conservation practice implementation. The two gartersnakes inhabit riparian areas that may also be suitable for breeding SWFL. Therefore, they are discussed together within the Effects of the Proposed Action section. The remaining three reptiles are desert-inhabitants. They may be encountered if the conservation practice is implemented adjacent to or within their habitats (fences, pipelines connecting watering faculties, uplands used as part of a prescribed grazing plan, etc.).

***Physical disturbance including noise*:** Disturbance to individual reptiles is possible for most of the supporting Conservation Practices that involve the use of mechanized equipment in occupied habitat. Further, future periodic disturbances have the potential to occur, as maintenance actions for the implemented practices may be needed over their operational life.

Gartersnakes are not likely to be adversely affected by physical disturbance. They are highly mobile and would be expected to move when disturbed.

***Temporary soil and vegetation disturbance*:** Temporary soil disturbance and vegetation removal are expected from the implementation of most of the conservation practice standards. This disturbance may result in loss of cover and increase the potential for invasive plants, especially woody plants such as salt cedar, Russian olive, giant reed, and tree-of-heaven. For purposes of this analysis, we are combining these two conservation issues into a single discussion of their potential adverse effects. Sources of the disturbance would include use of equipment (post-hole diggers, tractors, and other machinery) as well as practices that involve the planting or manipulation of vegetation (examples such as brush management, shrub control, and prescribed burning). These actions are more likely to indirectly affect narrow-headed gartersnakes by affecting their fish prey. Narrow-headed gartersnakes are totally piscivorous; actions that affect fish will indirectly affect the snake. Projects that contribute turbidity into narrow-headed gartersnake-occupied habitats, for prolonged periods of time, will interfere with their foraging. Narrow-headed gartersnakes visually hunt and capture fish while underwater (Hibbitts and Fitzgerald 2005). Northern Mexican gartersnakes, while being considered riparian-obligate snakes, feed on amphibians in addition to fish. They are not as likely to be affected by turbidity while foraging (Queiroz, 2003). Actions that would affect amphibians, directly or indirectly, discussed above under Amphibians would indirectly affect northern Mexican gartersnakes.

All three terrestrial reptiles may be affected during soil and vegetation disturbing activities if they are present in the project area.

Removal of desired riparian vegetation and understory components: The adverse effects of permanent removal of riparian vegetation would be the same as described above but would last for a much longer period of time, if not permanently. Adverse effects to reptiles could result if habitat is permanently removed.

Most of the structural practices will produce localized losses which can be minimized by implementing the recommended conservation measures. The conservation measures focus on

design and planning aspects of the practice so as to avoid large expanses of habitat loss especially from linear practices (e.g., fence lines, water pipelines, etc.).

The long-term and cumulative benefits of conservation practice use and their associated conservation measures are anticipated to exceed any temporary adverse effects created from their installation if they address the habitat needs of the covered species. Conservation measures will ensure that the covered species habitat is maintained or improved following conservation practice implementation.

***Water Quality/Quantity Alteration*:** Amphibians and fish, at all life stages, are susceptible to poor water quality; in particular from fuel, chemical, or pesticide contamination (Mann *et al.* 2009). Actions that adversely affect fish and amphibians would be expected to indirectly adversely affect the two gartersnakes that prey upon them. There are conservation measures that are expected to reduce or eliminate this adverse effect when conservation practices that require chemical use are implemented in covered species habitat.

Conservation practices that may temporarily contribute excess sediment into covered species habitat was discussed above.

EFFECTS OF THE ACTION - FISH

Adverse effects to the fish are possible from some of the Conservation Practices. All covered fish species are mostly likely to overlap with the habitat requirements for the Southwestern Willow Flycatcher. We divided the covered fish species into the following categories: cold water fish; warm water fish; and endemics.

Cold Water Fish

Four cold-water species are analyzed together: Apache Trout (*Oncorhynchus apache),* Gila trout (*O. gilae),* Greenback cutthroat trout (*O. clarki stomiast)* and Lahontan cutthroat trout *(O. clarki henshawi);* hereafter referred to as trout.

Generally, adverse effects from changes in water chemistry, temperature, and/or fine sediment concentrations can be more pronounced on coldwater species. Adverse effects to trout from any of the covered conservation practices implemented under the WLFW-SWFL plan may result when and where facilitating structural, facilitating management, facilitating mechanical, and/or facilitating planting conservation practice in are implemented within the area of potential effect. This area may encompass: (1) the lotic/lentic conditions within the waterbody proper; (2) associated aquatic and riparian habitats immediately adjacent to (2), and /or; (3) the 100-year floodplain.

Specifically, stressors and sources of risk to trout may occur if the conservation practices:

(1) Change or alter stream channel morphology;
(2) Change or alter stream flow;
(3) Introduce excessive sediment levels; or
(4) Remove or negatively impact riparian vegetation/structure.

As discussed below, we believe that the implementation of these conservation practice standards as conditioned by the conservation measures, will, on-balance, result in restoration or enhancement actions that will create long-term beneficial effects for the covered species. Nevertheless, the USFWS must evaluate any aspects of these actions, as some short-term adverse impacts may occur.

Temporary soil and vegetation disturbance (indirect & temporary): Temporary soil disturbance and vegetation removal are expected from the implementation of most of the conservation practice standards. These soil disturbance actions have the potential to produce short term sources of sediments entering the water column and persisting for some point downstream of their source. Conservation measures incorporated into practice standards are expected to limit sediment effects to the short-term period. Sources of the disturbance would include use of equipment (post-hole diggers, tractors, and other machinery) as well as practices that involve the planting or manipulation of vegetation (*i.e.* practices such as Channel Bank Vegetation (322), Riparian Forest Buffer (580), Stream Habitat Improvement (395), etc.). The potential effects of sedimentation are also included as expected adverse effects discussed below.

The conservation practices that could produce these adverse effects (temporary soil disturbance and vegetation) will be implemented by NRCS to conduct habitat management, restoration and enhancement actions designed specifically to produce a functioning aquatic and riparian system. The net effect will be that practice installation and maintenance may result in short-term disturbance but are expected to produce long-term restoration, maintenance and enhancement gains by improving and maintaining habitat conditions. The use of the conservation measures are expected to minimize the short-term adverse effects of practice installation. Conservation measures (and the performance and design standards inherent in each practice standard) have been developed to manage the risk of soil erosion as well as the risk of invasive plants. These measures manage the risk during practice installation and require monitoring and subsequent redress of any created or emerging threat throughout the effective life of the conservation practice standard. A restoration strategy using native plants appropriate to the ecological site will be used to provide a temporary buffer in the establishment of native vegetation will further ameliorate these potential adverse effects. The long-term and landscape benefits of installation and application of the particular Conservation Practices as conditioned by the conservation measures are expected to exceed any temporary adverse effects created from their installation.

We do not expect that permanent features, installed and maintained in accordance with the applicable NRCS practice standards' requirements, will prevent or discourage fish migration through the area, or expose the species to heightened predation risk or other acute or chronic stressors. Furthermore, because of the small amount of the affected habitat and the expected overall net gain of suitable habitat conditions throughout the action area, we conclude that these adverse effects to habitat will not significantly disrupt normal behaviors. In summary, the anticipated effects to riparian and stream habitat resulting from implementation of the WLFW-SWFL Project will result in improvements of available habitat and habitat quality within the action area, but these changes are not expected to measurably affect individuals or populations of cold water fishes, their prey base, or the key functions provided by designated critical habitat.

Removal of desired riparian vegetation and understory components: This adverse effect is a result of permanent removal of habitat conditions and specific vegetative loss caused by the installation of the conservation practice standard or the expectation that, once implemented, permanent degradation of habitat conditions for the SWFL will have resulted. There are conservation practices (*e.g.* watering facility (614), water well (642), pipeline (516), grade stabilization structure (410), fence (382), etc.) covered in this biological opinion that may result in the permanent removal and/or /loss of riparian vegetation along trout-occupied stream courses. Adverse effects of vegetation removal may include:

- Decreased stability causing excessive fine sediments entering the waterbody when streambanks are unprotected by riparian vegetation (Abernathy and Rutherford 2000, Winn and Mostaghimi 2006);
- Decreased terrestrial food base (invertebrates); arboreal invertebrates are an important trout food source during periods of low aquatic insect availability (Edwards and Huryn 1996, Saunders and Fausch 2007); and
- Increased water temperatures resulting from decreased shading (Theurer *et al.* 1985, Rutherford *et al.* 2004).

Most of the structural practices will produce localized losses which can be minimized using the identified recommended conservation measure(s) and existing NRCS design standards and specifications. The conservation measure(s) focus on design and planning aspects of the practice so as to avoid large expanses of riparian habitat removal especially from linear practices that parallel the water course (e.g., fence lines, water pipelines, etc.).

The construction activities may also disrupt normal foraging or mating behaviors (i.e., ability to successfully feed, move, and/or shelter). These construction activities may also temporarily cause the cold water fish to avoid the immediate area, may temporarily impede or discourage free movement, may prevent individuals from exploiting preferred habitats at critical life cycles, and/or expose individuals to predation and/or less favorable habitat conditions.

Water Quality/Quantity – loss of alteration of suitable hydrology: There are conservation practices that involve construction activities in the stream and adjacent riparian area. The USFWS anticipates that these actions may adversely affect water quality thresholds required by trout, their invertebrate prey base, and habitat. These stressors include: temporary effects to water quality such as increased fine sediment and turbidity, lowered dissolved oxygen, and elevated water temperatures. Peer review research on the effects of fine sediments on coldwater fish species in the action area is extremely limited (as summarized in http://azmemory.azlibrary.gov/cdm/ref/collection/statepubs/id/16774). Rine (2001) conducted a laboratory study of this effect on Apache Trout fry and cautioned on the sensitivity of the species where baseline stream loads are close to tolerance ranges. The author concluded that any ambient increase in fine sediments has adverse implication for Apache Trout recruitment over the long term. Sources of sedimentation, even if temporary, have the potential to take a limited number of fry/redds, sub-adults, and adults of the trout species discussed herein. Excessive sediment may smother eggs and/or redds and reduce or eliminate aquatic insect habitat (Meehan 1991, Waters 1995).

We expect that construction related effects from the proposed action may temporarily elevate turbidity and may result in measurable, adverse effects to the species and their habitat. Potential effects will likely be most pronounced closest to the site of the construction activity (ies). These effects are likely to be short-lived as construction activities and associated work will typically be initiated and completed within fourteen (14) days. Further, the USFWS anticipates that the inherent technical design standards and planning processes used by NRCS will effectively manage any "chronic" effects from installation and maintenance of the affected conservation practice standards.

Warm Water Fish

Conservation practices that benefit the SWFL will likely also benefit warm water fish if they also address resource concerns pertaining to aquatic habitats. Further, NRCS has committed to generating benefits to these warm-water fish species explicitly as part of the proposed action. Conservation practices; such as Riparian Forest Buffer (391), Streambank and Shoreline Protection (580), and Stream Habitat Improvement and Management (385); which may involve plantings or management for natural recruitment and establishment of woody riparian plant species would improve water quality and aquatic habitats by reducing streambank erosion and buffering non-point source pollution before it enters warm water fish habitat.

The primary challenges to warm water fish conservation and recovery are competition, predation and/or hybridization from non-native fish, crayfish and bullfrogs, and changes in aquatic and riparian habitat conditions from adjacent land uses. Although some of the aforementioned threats are beyond the scope of NRCS' program authorities, the USFWS anticipates programmatic benefits will accrue as riparian and associated aquatic habitats are created and enhanced and upland and grazing management practices are implemented. Conservation practices that establish, improve, or manage SWFL and its associated floodplain/riparian habitat are unlikely to change the distribution and abundance of non-native species.
For the covered species, the USFWS believes that the primary adverse effects will be created when and where conservation practices are conducted adjacent to or within the existing aquatic and riparian habitats. Notably the following threats have the potential to create stressors and sources of risk to the species where resulting activities:

- Change or alter stream channel morphology;
- Change or alter stream flow;
- Water quality changes from introduced sediments; or
- Result in significant loss of riparian vegetation.

Temporary soil and vegetation disturbance (indirect & temporary) & Water quality/quantity – loss or alteration of suitable hydrology: any conservation practices involve soil disturbance and vegetation removal in or adjacent to aquatic and riparian habitats. These soil disturbance actions have the potential to produce short term pulses of sediments entering the water column and persisting for some point downstream of their source. For this reason for this effects analysis, these two adverse effects are combined together.

To what degree these sediment pulses will have on warm water fish is difficult to ascertain. Many fish species are adversely affected by excessive suspended sediment and sediment

deposition in important habitats (*e.g.* spawning or foraging habitats) (Meehan 1991, Waters 1995). However, warm water fish in arid southwest streams can be expected to have higher suspended and deposited sediment tolerances than cold water fish or fish found in more mesic parts of the country. Native fish are more resilient to flashy, high flood discharge events than are non-native fish in the southwest (Meffe 1984, Meffe and Minckley 1987); they are more adapted to high flow velocities and the high levels of sediment being transported during a flood (Minckley 1973).

The drainage areas that support perennial streams are dominated by ephemeral streams in the southwest (Leopold and Miller 1956, Shaw and Cooper 2008). The large majority of drainages or tributaries of perennial streams are ephemeral; flowing only as a result of localized storm event (Leopold and Miller 1956). These ephemeral streams transport much higher sediment loads than their perennial counterparts (Reid and Larrone 1995). Ephemeral streams do not develop an armored layer of larger substrate on top of finer sediments on the stream bed (Larrone *et al.* 1994, Reid and Larrone 1995). Ephemeral stream beds are generally a homogenous mixture of different substrate sizes that, without armoring, are easily transported downstream during flood events (Larrone *et al.* 1994). This sediment is delivered into perennial streams whenever precipitation magnitude is such that can initiate movement in the ephemeral streams. Sediment is deposited in a fan at the confluence of the ephemeral stream and the perennial stream. The duration of sediment effects from ephemeral stream would depend on the flow magnitude of the perennial stream at the time of deposition. If the perennial stream is flooding at the same time as the ephemeral stream, sediment would be transported through the system accordingly to the flow's ability to move it. If the perennial stream is not flooding (*i.e.* a localized storm only influenced the movement in a few ephemeral streams), the deposited sediment may provide suspended sediment for a longer period of time.

Transported sediment can deposit within important fish habitats if the stream has lost its ability to transport the amount of sediment delivered by it drainage area. This decrease in stream power can result from actions that over-widening of the stream channel or those that deposit excessive sediment into the channel (*i.e.* landslides, fire, agriculture, mining, improper road design, etc.) (Waters 1995). These actions are not included in any conservation practice installation or use.

The conservation practices that could produce excessive sediment have specific conservation measures incorporated as practice standards to limit sediment effects to the short-term period. Sources of the sediment disturbance would include use of equipment (post-hole diggers, tractors, and other machinery) as well as practices that involve the planting or manipulation of vegetation associated with the restoration practice standards (*i.e.* Channel Bank Vegetation (322), Riparian Forest Buffer (580), Stream Habitat Improvement (395), or linear clearing during fence (382) or pipeline (516) construction in the riparian and/or aquatic area. The net effect will be that practice installation and maintenance may result in short-term disturbance but are expected to produce long-term restoration, maintenance and enhancement gains by improving and maintaining habitat conditions for the covered species. The use of the conservation measures are expected to minimize the short-term adverse effects of practice installation. These measures manage the risk during practice installation and require monitoring and subsequent redress of any created or emerging threat throughout the effective life of the conservation practice standard. Cumulatively, the long-term and landscape benefits of installation and application of the

particular conservation practices as conditioned by the conservation measures are expected to exceed any temporary adverse effects created from their installation.

We do not expect that permanent features, installed and maintained in accordance with the applicable NRCS practice standards' requirements, will prevent or discourage fish migration through the area, or expose the species to heightened predation risk or other acute or chronic stressors. Furthermore, because of the small amount of the affected habitat and the expected overall net gain of suitable habitat conditions throughout the action area, we conclude that these adverse effects to habitat will not significantly disrupt normal behaviors. In summary, the anticipated effects to riparian and stream habitat resulting from implementation of the WLFW-SWFL will result in improvements of available habitat and habitat quality within the action area, but these changes are not expected to measurably affect individuals or populations of warm water fishes, their prey base, or the key functions provided by designated critical habitat.

Removal of desired riparian vegetation and understory components: This adverse effect results from the permanent removal of riparian vegetation caused by conservation practice installation. There are conservation practices (*e.g.* pipeline (516), grade stabilization structure (410), fence (382), stream crossing (578), etc.) covered in this biological opinion that may result in the permanent removal and/or loss of riparian vegetation along habitat with the covered species. The severity of the adverse effects to warm water fish would depend upon extent of vegetation removal along the stream banks. Vegetation removal may cause decreased stream bank stability causing excessive fine sediments entering the stream (Winn and Mostaghimi 2006). This is considered a longer term effect than those described above discussing conservation practice installation or use effects to stream banks. The structural conservation practices that will produce localized vegetation losses can be minimized by using the required conservation measure(s). The conservation measure(s) focus on design and planning aspects of the conservation practice so as to avoid large expanses of riparian habitat removal especially from linear practices that parallel the water course (e.g., fence lines, water pipelines, etc.).

Managed livestock grazing in riparian zones may temporarily degrade habitat during the breeding season or result in direct negative effects to the covered species: As with the explanation and discussion throughout this analysis, we recognize the interdependence and interplay between the individual Conservation Practices and how they will produce specific results within the goals and value of the 5 "core" Conservation Practices. By using at least one of the identified core practices, this feature will ensure that implementation of each of the supporting Conservation Practices will create, maintain, enhance, improve, or otherwise manage the SWFL, other covered species, and their supporting habitat needs. We believe that cumulatively, riparian habitat suitable to all of the covered species will be created, restored, or enhanced within the focal areas of the WLWF effort.

As indicated above, the potential exists for incompatible grazing systems to produce adverse effects on warm water fishes. NRCS and the USFWS have worked collaboratively to anticipate the creation of a compatible grazing system for the covered species. Appendix IV of the NRCS' BA more fully explains how a prescribed grazing plan (528) will be designed. An important summary is provided in Appendix 2 of the Opinion. Conservation measures for achieving compatible grazing systems were explicitly developed to guide NRCS planners and eligible

landowners to reduce the adverse effects of those structural improvements on eligible lands that support the creation of a Prescribed Grazing Plan (528) for livestock operations. Specifically, the Conservation Practices such as Fence, Pipeline, and Watering Facility all have the potential to create their own adverse effects as discussed above and that in certain circumstances these impacts are compounded without thoughtful consideration on their placement and design and priority considerations to the limiting factors of the SWFL and the other covered species. Due to the design and administrative controls of the proposed action, we conclude that these events will be rare.

The NRCS expects that the practices identified above will be installed with NRCS technical and financial assistance and used to facilitate a prescribed grazing plan using the RMS planning process identified in NRCS' BA.

Site-specific management plans will be developed with each landowner/producer; these plans will detail the stocking rates, rotations, timing, and duration of use in each field. All grazing plans will contain a drought contingency that adjusts grazing use commensurate with lower precipitation and plant growth. All required facilitating practices (i.e., fence, well, pipeline, etc.) will be planned and designed to minimize disturbance and to enhance SWFL habitat through the installation of a sustainable livestock management program. Further, that where designed and installed, the use of the conservation measures for a prescribed grazing plan (528) will also be followed as outlined in the NRCS' BA. More importantly, the WHEG will assist in the creation of the grazing system and our conclusion is that the habitat vegetation structure and complexity targets identified in the WHEG will be met and sustained at the field level under the prescribed grazing (528) plan, ensuring conservation and recovery of the covered species.

The application the conservation measures outlined Appendices II, III and IV of NRCS' BA are specifically designed to manage and protect the riparian and stream conditions supporting the requirements of warm water fishes. Further, the USFWS expects the measures will effectively eliminate instances where the placement of infrastructure (fences, pumping plants, etc.) will create adverse effects to the covered species.

Summary of Effects on Warm-water Fish

In summary, based on the expected extent and frequency of the conservation practices in the action area, it is reasonable to conclude that a listed warm water fish will be exposed to the practice's short or long term effects. Ground disturbing conservation practices on their own, if properly implemented with the required conservation measures, are unlikely to result in significant adverse effects to warm water fishes (as compared to cold-water fish for example). The long-term and cumulative benefits of conservation practice installation and use is expected to exceed the temporary expected adverse effects created from their installation. We believe that conservation practice-associated suspended sediment or sediment deposition would not exceed levels that warm water fish species cannot tolerate; given their adaptation to high flood flow events and associated high sediment loads. Further, the required conservation measures will ensure that the un-affected habitat is maintained or improved following conservation practice construction and use. The remaining source of adverse effects to warm water fish are therefore direct forms of take due to impact/injury from instream construction actions – including the loss of eggs, young, and/or adults.

Endemic Fish

This category of fishes within the Action Area was created to highlight the importance of site specific planning – both nearby and within these species' discrete habitats and locations. The proposed action as designed and conditioned here will ensure:

(1) That site and population integrity will be sufficiently conserved from the expected temporary changes in vegetation structure;
(2) That both upstream and upslope effects will be effectively minimized using avoidance and exclusion of certain practices as identified in Table 4; and
(3) That opportunities to improve the conservation status of these endemic species will occur by deploying specific habitat conservation, restoration and/or enhancement actions under the Proposed Action independent and separate from SWFL.

For purposes of this analysis, the following twenty (20) species of fish are considered endemics in the action are: Ash Meadows Amargosa pupfish; Ash Meadows speckled dace; Beautiful shiner; Chihuahua chub; Desert pupfish; Hiko White River springfish; Moapa dace; Mojave tui chub; Owens pupfish; Owens tui chub; Pahranagat roundtail chub; Pecos bluntnose shiner; Pecos gambusia; Santa Ana sucker; Tidewater goby; Warm Springs pupfish; White River Springfish; and Yaqui catfish, Yaqui topminnow.

For purposes of considering adverse effects from the proposed action, these species share a variety of characteristics that require an additional review step, at the field or individual plan scale. These are: (1) low or declining population numbers and habitat locations; (2) extremely restricted ranges (e.g., spring sites, small reaches); (3) specific sensitivities to the activities and management actions proposed under this consultation; and/or (4) the habitat needs of these species is not generally compatible with SWFL.

The USFWS' conclusions on sources of adverse effects of these endemic fish follow the framework for the warm-water fishes appearing above. With one notable exception; the USFWS is proposing that, for opportunities to conduct conservation actions for these species, the suite of conservation practices will be limited to those which are compatible (e.g., beneficial or benign) to the affected endemic species. The vast majority of actions that will be limited (excluded) from use are those that involve the creation/enhancement of woody vegetation that enhances SWFL habitat; in-stream work and actions that might result in significant and prolonged alterations in water quality conditions within the species' spring sites or critical habitat; and where control of invasive species involves mechanical control methods.

The USFWS is taking a cautious approach by limiting the conservation practices to those that are determined most beneficial to these endemic species. Should NRCS, through site specific evaluation, believe that a prohibited practice might result in conservation benefits to the endemic species; NRCS can approach the USFWS and engage in further coordination on which practices could support the conservation outcomes for both the SWFL and the affected endemic fish. If, after this additional review step, the USFWS determines that the goals and objectives of the final individual landowner's conservation plan (as modified when appropriate) is consistent with the conservation needs and expected conservation outcomes of this consultation, NRCS can

proceed with including any additional covered practices and make available the regulatory compliance elements of this consultation. The USFWS must approve NRCS' request to add otherwise prohibited conservation practice standards for the affected endemic(s).

Effects of the Action on Plants

The conclusions of this Opinion are based on full implementation of the WLFW-SWFL Project as described in the NRCS BA, and as described in the Description of the Proposed Action section of this document, including any incorporated Conservation Measures.

Physical disturbance; and Adverse Effect and Increased potential of accidental mortality to individuals. Mortality or injury to individual members of the covered plant species is possible for most of the supporting Conservation Practices that involve the use of mechanized equipment in occupied habitat. Further, future periodic disturbances have the potential to occur, as maintenance actions for the implemented practices may be needed over their operational life. Additionally, all of the covered conservation practices, either directly or indirectly have the potential to produce some additional level of physical disturbance because they involve the physical presence of humans, livestock, and/or associated equipment, vehicles or machinery. Consequently, these two adverse effects have been combined for purposes of the overall analysis.

The primary adverse effect of concern is physical disturbance to the listed plants is during the species flowering or seed dispersal periods. The net effect of the physical disturbance may be a localized reduction of survival or productivity, loss of individual plants due to physical crushing, and/or reduction of reproduction frequency.

Disturbance of some members of the covered species, including livestock trampling may occasionally occur from conservation practice standard installation and/or maintenance activities. However, these effects are expected to rarely occur and are not expected to produce significant changes in species distribution and abundance due to the expected benefits from application of the identified conservation measures.

In aggregate, the adverse effects of this concern are expected to be localized and temporary, and the use of the conservation measures will further reduce the risks of adverse effects at the scale upon which populations or the species will be negatively impacted.

Temporary soil and vegetation disturbance (indirect & temporary) and Increased potential of introduction of invasive plants. Temporary soil disturbance and vegetation removal are expected from the implementation of most of the conservation practice standards. This disturbance may result in loss of suitable habitat requirements for seed germination or seedling survival and potential increase in the deleterious effects from invasive plants. For purposes of this analysis, we are combining these two conservation issues into a single discussion of their potential adverse effects.

Sources of the disturbance would include use of equipment (post-hole diggers, tractors, and other machinery) as well as practices that involve the planting or manipulation of vegetation (examples such as prescribed grazing, brush management, shrub control, and prescribed burning). Common

potential adverse effects include degradation of habitat conditions and the potential for increased habitat fragmentation if the scale of the disturbance is large enough and the potential to create opportunities for colonization of these disturbed sites by invasive plants.

The conservation practices could produce these potential sources of adverse effects (temporary soil disturbance and vegetation removal and increased potential of introduction of invasive plants) implemented through NRCS to conduct habitat management, restoration and enhancement actions designed specifically to meet the conservation needs of the Southwest Willow Flycatcher. Consequently, the biological requirements for the listed plant species that require similar conditions within the riparian/wetland habitats (see Table 4) are also expected to be met.

The use of the conservation measures are expected to minimize the short-term adverse effects of practice installation. Conservation measures have been developed to manage the risk of soil erosion as well as the risk of invasive plants. These measures manage the risk during practice installation and require monitoring and subsequent redress of any created or emerging threat throughout the effective life of the conservation practice standard. A restoration strategy using native plants appropriate to the ecological site will be used to provide a temporary buffer in the establishment of native vegetation will further ameliorate these potential adverse effects.

In aggregate, the long-term and landscape benefits of installation and application of the particular Conservation Practices as conditioned by the conservation measures are expected to exceed any temporary adverse effects created from their installation.

Removal of desired riparian vegetation and understory components. This adverse effect is a result of permanent removal of habitat conditions and specific vegetative loss caused by the installation of the conservation practice or the expectation that, once implemented, permanent degradation of habitat conditions for the covered plant species will have resulted. Certain facilitating practices (watering facility, water well, pipeline, grade stabilization structure, fence, etc.) covered in this NRCS' BA and encompassed by this Biological Opinion have the potential to result in the permanent removal/loss of habitat; however the conservation measures are believed to adequately manage this concern.

The primary adverse effect is the permanent loss of the required mico-site conditions which can lead to a reduction in areal extent of suitable habitat and decline in either individual plant or element occurrence (EO) fitness.

Most of the structural practices will produce localized losses which can be minimized using the identified recommended conservation measure(s). The conservation measure(s) focus on design and planning aspects of the practice so as to avoid large expanses of habitat loss especially from linear practices (e.g., fence lines, water pipelines, etc.).

The long-term and cumulative benefits of installation and application of the particular Conservation Practice as conditioned by the conservation measures are expected to exceed the temporary expected adverse effects created from their installation. Further, the use of the conservation measures will ensure that the species habitat is maintained or improved following

application. In aggregate, the expected species response will be positive as the extent of adverse effects are not expected to occur at the scale necessary to adversely impact population trends or to result in significant additional habitat fragmentation effects.

Managed livestock grazing in riparian zones may temporarily degrade habitat during the breeding season or result in direct negative effects to the covered species: As with the explanation and discussion throughout this analysis, we recognize the interdependence and interplay between the individual Conservation Practices and how they will produce specific results within the goals and value of the 5 core Conservation Practices. By using at least one of the identified core practices, this feature will ensure that implementation of each of the supporting Conservation Practices will create, maintain, enhance, improve, or otherwise manage the SWFL, other covered species, and its supporting habitat needs. Appendix IV of the NRCS' BA more fully explains how a prescribed grazing plan (528) will be designed. An important summary is provided in Appendix 2 of the Opinion. This conservation measure was explicitly developed to guide NRCS planners and eligible landowners to reduce the adverse effects of those structural improvements on eligible lands that support the creation of a Prescribed Grazing Plan (528) for livestock operations. Specifically, the Conservation Practices such as Fence, Pipeline, and Watering Facility all have the potential to create their own adverse effects as discussed above and that in certain circumstances these impacts are compounded without thoughtful consideration on their placement and design and priority considerations to the limiting factors of the SWFL. The NRCS expects that the practices identified above will be installed with NRCS technical and financial assistance and used to facilitate a prescribed grazing plan using the RMS planning process explained in NRCS' BA.

Site-specific management plans will be developed with each landowner; these plans will detail the stocking rates, rotations, timing, and duration of use in each field. All grazing plans will contain a drought contingency that adjusts grazing use commensurate with lower precipitation and plant growth. All required facilitating practices (i.e., fence, well, pipeline, etc.) will be planned and designed to minimize disturbance and to enhance SWFL habitat through the installation of a sustainable livestock management program. Further, that where designed and installed, the use of the conservation measures for a prescribed grazing plan (528) will also be followed as outlined in NRCS' BA.

For the vegetative manipulation practices, such as prescribed grazing we do anticipate some level of adverse effect and also some level of beneficial effects – depending upon the timing, duration, intensity, and level of the specific grazing management system deployed for that specific plant species. On balance, however, because the grazing management systems are being specifically designed to facilitate the conservation of the SWFL and its associated riparian habitat structure and function, we do not think that the livestock effects rise to the level of significant impairment of the species' recovery and survival needs across their range.

SUMMARY OF EFFECTS

Although the long-term effects of the WLFW-SWFL Project result in conservation benefits for the covered species, short-term adverse effects could occur in association with habitat restoration, enhancement, and management activities to be carried out on the eligible properties.

Planting native vegetation to enhance habitat and/or restoring the physical and biological functions of the stream and floodplain wetlands may increase human presence, equipment and vehicle use which may include noise disturbances. Associated noise disturbances may adversely affect the behavior of the vertebrates during breeding, nesting or foraging activities. Vegetation disturbances, vegetation removal, or chemical treatment of vegetation may adversely affect availability of nesting habitat, cover from predators, prey, and prey habitat, and adversely affect SWFL and other covered species. Soil disturbances may increase erosion, adversely affect soil stability, increase sediment deposits, and alter channel morphology. Adverse effects from livestock trampling, physical crushing, or limited earth moving actions may result in loss of plants and cryptic species of amphibians and reptiles. In-stream restoration actions may create unsuitable habitat conditions for the aquatic obligates.

Because of these disturbances, there may be decreases in nest initiation or nesting success, or temporary removal of the species from the affected stream reach. Prescribed grazing management may also alter vegetation composition, structure, and nutritive quality and adversely affect availability of nesting habitat, cover from predators, prey habitat for SWFL and other species, and alterations of water distribution. Although some activities, such as vegetation management, prescribed grazing, fencing and exclosure construction, channel width restoration, and in-stream structure installation may cause short-term adverse effects, they will, if conducted in association with the identified conservation measures and other design requirements of the WLFW-SWFL Project, likely result in long-term benefits.

In general, long-term efforts to improve the health and availability of riparian habitats and reduce/manage/eliminate the adjacent upland direct and indirect adverse effects will benefit the SWFL and the other vertebrates by increasing nesting success, increasing insect prey abundance, and decreasing predation and by enhancement overall habitat values.

Implementation of the WLFW-SWFL is intended to ameliorate threats to the SWFL by creating, enhancing, and restoring supporting habitat conditions and addressing incompatible management regimes, and to improve its conservation status. NRCS' interest in addressing limiting factors/conservation challenges to all of the covered species in the Action Area will result in similar benefits to the other species. Although many of the threats facing some of the species – such as introduced game species, impoundments, and dams – are outside of the control of NRCS' program authorities, opportunities will exist to restore, create, or otherwise improve the covered species' habitat and otherwise improve their conservation status over the long-term.

The targeted benefit of WLFW-SWFL is to create strategic improvements to the status of the species on lands receiving NRCS cost share and technical assistance. The proposed action in conjunction with the integrated use of the conservation measures is expected to benefit the covered species by maintaining, enhancing, and restoring populations and their habitats as well as by reducing the threats of direct mortality and developing compatible land management plans. Landowners who are interested in participating in the WLFW-SWFL must agree to contribute to the maintenance of the affected covered species' on their enrolled lands, follow the recommended standards and specifications within the core practices and each of the conservation practice standards used.

Conservation Measures are designed to control limiting factors the run the spectrum from addressing specific issues such as lack of proper nesting habitat for the SWFL, to more systemic threats such as lack of appropriate riparian conditions to promote species' persistence, to ameliorating anthropogenic factors (e.g., education or awareness to avoid applying incompatible management regimes; guidance on identifying compatibility of species persistence with ranching operations, etc.). Conservation Measures also include commitments to reduce direct mortality and conserve the natural landscape attributes required by the species.

The WLFW-SWFL Project is expected to encourage that large expanses of connected private ranchlands will be involved in habitat creation, restoration and/or management to provide a substantial conservation benefit for the species. Because of the targeted and strategic nature of the focal area, progress in meeting the SWFL Recovery Plan's objectives will occur.

Over the individual and cumulative application of the WLFW-SWFL Project as designed, the Service believes that the extent and occurrences of adverse effects will be minimized and off-set by the creation of a sustained management systems (at both the field, farm, and landscape levels) specifically compatible with and supporting the life history and requirements of the SWFL and the other covered species while maintaining a healthy rangeland, grasslands and riparian/wetland plant communities and ecosystems.

The overwhelming conservation benefits of implementation of the proposed action within the selected priority areas, maintenance of existing habitat, and enhancement of marginal habitat will outweigh short-term negative impacts to individual members of each of the covered species. The implementation of the proposed action will result in more of the threats that adversely affect populations being managed, more habitats under the appropriate management prescriptions, and more information being developed and disseminated on the compatibility of sustainable ranching operations on the persistence of these species across the landscape.

The Service finds that effective implementation of conservation practices and associated conservation measures are anticipated to result in a positive population response by the species. Further, the proposed action is expected to limit unfavorable impacts to the species, and to maintain and enhance habitat at both the population and landscape level. In conclusion, the anticipated levels of adverse effects are more than offset by the implementation of conservation practices for the benefit of the covered species as modified by the agreed-upon conservation measures.

CUMULATIVE EFFECTS

Cumulative effects are those effects of future non-Federal (State, local government, or private) activities that are reasonably certain to occur in the project area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

The Action Area is the mix of federal ownership, state managed lands, and private lands. Cumulative effects to the SWFL and other listed species would include, but are not limited to, the following broad types of impacts:

- Ongoing grazing and farming activities that will continue to occur on properties within the action area;
- Changes in land use patterns or practices that could affect critical habitat;
- Encroachment of human development into a species' habitat.

The introduced tamarisk leaf beetle was first detected affecting tamarisk within the range of the southwestern willow flycatcher in 2008 along the Virgin River in St. George, Utah. Initially, this insect was not believed to be able to move into or survive within the southwestern United States in the breeding range of the flycatcher. Along this Virgin River site in 2009, 13 of 15 flycatcher nests failed following vegetation defoliation (Paxton et al. 2010). The beetle has been found in southern Nevada/Utah and northern Arizona/New Mexico within the flycatcher's breeding range. Because tamarisk is a component of about 50 percent of all known flycatcher territories (Durst et al. 2008), continued spread of the beetle has the potential to significantly alter the distribution, abundance, and quality of flycatcher nesting habitat and impact breeding attempts.

Climate change, in combination with drought cycles, is likely to exacerbate existing threats to all these species' habitats in the Southwestern U.S., now and into the foreseeable future. Increased and prolonged drought associated with changing climatic patterns will adversely affect streams and riparian habitat by reducing water availability and altering food availability and predation rates. Drying or warming of streams is of particular concern because native fishes and amphibians and certain wetland dependent plants depend on permanent water of appropriate water quality for survival. Development and maintenance of riparian habitat for riparian-obligate species also will be affected by reduction in baseflows and altered hydrologic regimes.

CONCLUSIONS

This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat in 50 CFR 402.02 because of various court cases surrounding the Service's jeopardy and adverse modification analyses. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat. Critical habitat is defined in section 3 of the Act "as the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical and biological features essential to the conservation of the species and that may require special management considerations or protection; and specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species." We have also relied upon the Consultation Handbook which provides guidance on determining adverse modification of critical habitat and jeopardy pursuant to the following: "Adverse effects on individuals of a species or constituent elements or segments of critical habitat generally do not result in jeopardy or adverse modification determinations unless that loss, when added to the environmental baseline, is likely to result in significant adverse effects throughout the species' range, or appreciably diminish the capability of the critical habitat to satisfy essential requirements of the species" (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998:4-34).

CONCLUSIONS - MAMMALS

After reviewing the status of the Amargosa vole, Buena Vista Lake ornate shrew, and New Mexico meadow jumping mouse, the effects of the proposed project, and the cumulative effects, it is the USFWS's opinion that the actions as proposed, are not likely to jeopardize the continued existence of these species, and are not likely to destroy or adversely modify proposed or designated critical habitat. We base our conclusion on the following:

1. The proposed project will have a net conservation benefit to the cover species of mammalian species by improving and increasing available habitat and contributing to the enhancement and survival of these species, as well as associated beneficial impacts to riparian areas.
2. The proposed project may expand habitat for these species located on enrolled private lands and promote their existence for a minimum of 5 years per individual landowner agreement.
3. The commitment to incorporate conservation measures into project designs should have positive effects to riparian habitat.
4. Although short-term adverse effects could occur in association with habitat restoration, enhancement, and management activities to be carried out on the eligible properties, the long-term effects of these projects result in conservation benefits for all of the listed mammalian species.

CONCLUSIONS - BIRDS

After reviewing the status of the southwestern willow flycatcher, California clapper rail, Least Bell's vireo, yellow-billed cuckoo, and Yuma clapper rail, the effects of the proposed project, and the cumulative effects, it is the USFWS's opinion that the actions as proposed, are not likely to jeopardize the continued existence of these species, and are not likely to destroy or adversely modify proposed or designated critical habitat. We base our conclusion on the following:

1. The proposed project will have a net conservation benefit to the cover species of birds by improving and increasing available habitat and contributing to the enhancement and survival of these species, as well as associated beneficial impacts to riparian areas.
2. Any adverse effects to PCEs of designated or proposed critical habitat are anticipated to be temporary but will improve conditions over the species' current environmental baseline.
3. The proposed project may expand habitat for these species located on enrolled private lands and promote their existence for a minimum of 5 years per individual landowner agreement.
4. Incorporation of the stated conservation measures into individual Conservation Plans minimize adverse effects as explained above and is expected to produce long term beneficial effects on each of the species' habitat requirements and life history needs.
5. The NRCS is proposing to utilize in-house staff to monitor large scale habitat changes following the procedures of Hatten et al (2010).

6. The broad range across the project area for willow flycatcher, least bell's vireo, and yellow-billed cuckoo, ensure that each species would not be jeopardized as a result of this program.
7. The majority of California and Yuma clapper rails habitats do not support vegetation communities that are used by the SWFL. The design of the proposed action ensures no conflicts are created where restoration actions for the other species overlap with these species' requirements.

CONCLUSIONS – EFFECTS ON CRITICAL HABITAT OF BIRDS

SWFL and Least Bell's vireo critical habitats and yellow-billed cuckoo proposed critical habitat provide adequate vegetation for nesting, foraging, migration, dispersal, and shelter, adequate prey base, and conserving dynamic riverine processes (78 FR 343; 59 FR 4845, 79 FR 67154; respectively). Critical habitats will benefit from the WLFW – SWFL Project because it conserves or improves habitat. For example, the Wetland Wildlife Habitat Management Conservation Practice (644) requires a habitat evaluation to be conducted to identify the limiting factors be addressed in their order of significance. The purpose of the practice is to treat wetland wildlife habitat concerns identified during the conservation planning process to provide shelter, cover, and food in proper amounts and locations which will benefit the SWFL, Least Bell's vireo, and yellow-billed cuckoo. Any adverse effects to PCEs of critical habitat and proposed critical habitat are anticipated to be temporary and are not expected to change the conservation value to the species.

CONCLUSIONS - AMPHIBIANS

After reviewing the status of the arroyo toad, California red-legged frog, Chiricahua leopard frog, California tiger salamander, Columbia spotted frog, mountain yellow-legged frog, and relict leopard frog, the effects of the proposed project, and the cumulative effects, it is the USFWS's opinion that the actions as proposed, are not likely to jeopardize the continued existence of these species, and are not likely to destroy or adversely modify proposed or designated critical habitat. We base our conclusion on the following:

1. The long term cumulative outcome of the proposed action is to create, enhance, or restore riparian systems, resulting in more suitable, intact, and functioning aquatic and riparian habitats benefiting these amphibian species throughout their range. These long term benefits more than compensate for the identified short-term temporary adverse effects from the proposed action.
2. The proposed project will have a net conservation benefit to the cover amphibian species by improving and increasing available habitat and contributing to the enhancement and survival of these species, as well as associated beneficial impacts to riparian areas.
3. The proposed project may expand habitat for these species located on enrolled private lands and promote their existence for a minimum of 5 years per individual landowner agreement.
4. Incorporation of the stated conservation measures into individual Conservation Plans minimize adverse effects as explained above and is expected to produce long term beneficial effects on each of the species' habitat requirements and life history needs.

CONCLUSIONS - REPTILES

After reviewing the status of the blunt-nosed leopard lizard, Northern Mexico garter snake, narrow headed garter snake, Mojave Desert tortoise, and Sonoran desert tortoise, the effects of the proposed project, and the cumulative effects, it is the USFWS's opinion that the actions as proposed, are not likely to jeopardize the continued existence of these species, and are not likely to destroy or adversely modify proposed or designated critical habitat. We base our conclusion on the following:

1. The long term cumulative outcome of the proposed action will enhance uplands adjacent to riparian systems, resulting in more suitable, intact, and functioning riparian and upland areas that could be beneficial to reptilian species. These long term benefits more than compensate for the identified short-term temporary adverse effects from the proposed action.
2. The proposed project will have a net conservation benefit to the cover reptilian species by improving and increasing available habitat and contributing to the enhancement and survival of these species, as well as associated beneficial impacts to riparian and upland areas. Although short-term adverse effects could occur in association with habitat restoration, enhancement, and management activities to be carried out on the eligible properties, the long-term effects of these projects result in conservation benefits for all of the listed reptilian species.
3. Incorporation of the stated conservation measures into individual Conservation Plans minimize adverse effects as explained above and is expected to produce long term beneficial effects on each of the species' habitat requirements and life history needs.
4. Exclusively upland species, such as the Mojave Desert tortoise, and Sonoran desert tortoise, will also indirectly benefit from the targeted grazing systems associated with riparian restoration action focusing on the SWFL.

CONCLUSIONS - COLD WATER FISH

The USFWS has reviewed the current status of Apache Trout, Gila trout, Greenback Cutthroat Trout, Lahontan Cutthroat Trout and their status and environmental baseline in the action area, effects of the proposed action, and cumulative effects, and it is our conclusion that the proposed action is not likely to jeopardize the species' continued existence. We reach this non-jeopardy conclusion for the following reasons:

1. As a cold-water fishes, these trout species can be sensitive to changes in water chemistry & temperature, and excessive fine sediment loadings, which may result from implementation of certain practice standards in certain limited circumstances and locations. Incidental take coverage is therefore necessary. However, the USFWS concludes that occurrences of any adverse consequences created by the Proposed Action will be extremely localized, of limited intensity, of minor duration, and are anticipated to occur very infrequently over the life of the Proposed Action.
2. As described in the incidental take statement for the these trout species, the USFWS anticipates that the majority of take will be in temporary changes in habitat conditions

and in the form of harassment of adult fish and events which may result in the mortality of redds, eggs and/or small fry.
3. The short-term extent and duration of incidental take is not expected to significantly change the conservation status of the species (but see #5 below).
4. The USFWS anticipates that application of the avoidance, management, and minimization measures incorporated in the design of the WLFW-SWFL will sufficiently manage the adverse effects as described above.
5. Further, the long term cumulative outcome of the proposed action is to create, enhance, or restore riparian systems – resulting in more suitable, intact, and functioning aquatic and riparian habitats benefiting these trout species throughout their range. These long term benefits more than compensate for the identified short-term temporary adverse effects from the proposed action.
6. If the enrolled properties are returned to original conditions, they are expected to still maintain the extent and quality of riparian and instream habitat which existed prior to enrollment in the WLFW-SWFL project.

CONCLUSIONS - WARM WATER FISH

Beautiful shiner, Bonytail Chub, Colorado Pikeminnow, Gila Chub, Gila Topminnow, Headwater Chub (Candidate Species), Humpback Chub, Little Colorado Spinedace, Loach Minnow, Razorback Sucker, Rio Grande Silvery Minnow, Roundtail Chub, Sonora Chub, Spikedace, Unarmored Threespine Stickleback, Virgin River Chub, Woundfin, Yaqui catfish, Yaqui chub, Yaqui Topminnow, and Zuni Bluehead Sucker.

The USFWS has reviewed the current status of the warm-water fishes, the environmental baselines in the action area, effects of the proposed action, and cumulative effects, and it is our conclusion that the proposed action is not likely to jeopardize their continued existence.

We reach this non-jeopardy conclusion for the following reasons:
1. Warm water fish can tolerate changes in water chemistry & temperature, and temporary habitat changes, which may result from implementation of certain practice standards in certain limited circumstances and locations. However, the USFWS concludes that, in certain circumstances, adverse consequences can be created from the Proposed Action and therefore incidental take coverage is necessary. The USFWS anticipates that incidental take events for warm water fish will be extremely localized, of limited intensity, of minor duration, and are anticipated to occur very infrequently over the life of the Proposed Action.
2. As described in the incidental take statement for each individual species, the USFWS anticipates that the majority of take will be in the form of harassment or harm from short-term temporary changes in riparian habitat and water quality conditions.
3. The short-term extent and duration of incidental take is not expected to significantly change the conservation status of the species (but see #5 below).
4. The USFWS anticipates that application of the avoidance, management, and minimization measures incorporated in the design of the WLFW-SWFL will sufficiently manage the adverse effects as described above.

5. Further, the long term cumulative outcome of the proposed action is to create, enhance, or restore riparian systems which may result in more suitable, intact, and functioning aquatic habitats benefiting warm water fish species throughout the project area. These long term benefits compensate for the identified short-term temporary adverse effects from the proposed action.

CONCLUSIONS – EFFECTS ON CRITICAL HABITAT OF WARMWATER FISH

Beautiful shiner, Bonytail Chub, Colorado Pikeminnow, Gila Chub, Gila Topminnow, Humpback Chub, Little Colorado Spinedace, Loach Minnow, Razorback Sucker, Rio Grande Silvery Minnow, Sonora Chub, Spikedace, Virgin River Chub, Woundfin, Yaqui catfish, Yaqui chub, and Zuni Bluehead Sucker

The USFWS concludes that conservation practices implemented under the proposed action will not destroy or adversely modify the critical habitat for those species it has been designated for. None of the identified PCEs will be adversely modified as a result of the riparian habitat restoration focus of the proposed action. Exotic vegetation removal, shoreline stabilization, and other related infrastructure improvements to enhance riparian functions, restore native vegetation, and to create SWFL habitat are likely the activities that have the potential to affect the species' critical habitat. For the proposed action, the USFWS acknowledges the potential for temporary alterations of the PCEs during practice installation. However, the USFWS concludes that the critical habitat and its elements would remain functional to serve the intended conservation role for the species. Further, the long term cumulative outcome of the proposed action is to create, enhance, or restore riparian systems – resulting in more suitable, intact, and functioning aquatic and riparian habitats supporting the warm water fish throughout the project area. These long term benefits more than compensate for the identified short-term temporary adverse effects from the proposed action.

CONCLUSIONS - ENDEMIC FISH SPECIES

Ash Meadows Amargosa pupfish, Ash Meadows speckled dace, Beautiful shiner, Chihuahua chub, Desert pupfish, Hiko White River springfish, Moapa dace, Mojave tui chub, Owens pupfish, Owens tui chub, Pahranagat roundtail chub, Pecos bluntnose shiner, Pecos gambusia, Santa Ana sucker, Tidewater goby, Warm Springs pupfish, White River Springfish, and Yaqui catfish.

The USFWS has reviewed the current status of the 18 listed endemic fish species discussed in this Opinion, the environmental baseline in the action area, effects of the proposed action, and cumulative effects, and it is our conclusion that the proposed action is not likely to jeopardize their continued existence.

We reach this non-jeopardy conclusion for the following reasons:

1. By applying specific conservation practices conditioned by the conservation measures (and prohibiting some practices as illustrated in Table 4), each project within/adjacent to this species' preferred habitat should be enhanced and managed to generate beneficial conservation outcomes.

2. As a result of the site-specific application of the measures outlined in the Proposed Action and this consultation document, the USFWS anticipates that any adverse effects will be sufficiently managed as a result of application of site-specific avoidance, management, and minimization measures incorporated in the design of the WLFW-SWFL Project and identified herein.
3. As described in the incidental take statements for these species, the USFWS concludes that any incidental take would result from indirect effects associated with riparian restoration actions on adjacent or nearby stream segments, temporarily altering habitat conditions and in the form of harassment of adult fish.

CONCLUSIONS – EFFECTS ON CRITICAL HABITAT OF ENDEMIC FISH

Ash Meadows Amargosa pupfish, Ash Meadows speckled dace, Beautiful shiner, Chihuahua chub, Desert pupfish, Hiko White River springfish, Moapa dace, Mojave tui chub, Owens pupfish, Owens tui chub, Pahranagat roundtail chub, Pecos bluntnose shiner, Pecos gambusia, Santa Ana sucker, Tidewater goby, Warm Springs pupfish, White River Springfish, and Yaqui catfish

Critical habitat, which was designated for some of the endemic fish species, is exclusively limited to federally-owned lands. Effects to critical habitat and their dependent PCEs could therefore only occur indirectly (e.g., from upstream and/or adjacent sources of risk). Exotic vegetation removal, shoreline stabilization, and other related infrastructure improvements to enhance riparian functions, restore native vegetation, and to create SWFL habitat could potentially adversely affect the species' critical habitat. Similarly, actions specifically focused on improving the habitat conditions for the species may occur on adjacent private lands during the life of the Proposed Action. If such a circumstance would occur, the USFWS concludes that the conservation measures would sufficiently manage and significantly reduce adverse effects to designated critical habitat.

For the proposed action, the USFWS acknowledges the potential for temporary alterations of the PCEs during practice installation from these indirect sources. However, the USFWS concludes that the critical habitat and its elements would remain functional to serve the intended conservation role for the species. Therefore, the USFWS concludes that the proposed action will not destroy or adversely modify designated critical habitat for any of the listed endemic fish species.

CONCLUSIONS – PLANTS – NARROW RANGE

Amargosa niterwort, Ash Meadows blazingstar, Ash Meadows gumplant, Ash Meadows milkvetch, Chorro Creek bog thistle, Gambel's watercress, Ash Meadows ivesia, Canelo Hills Ladies Tresses, Hickman's potentilla, Spring-loving centaury, Ash Meadows sunray, La Graiosa thistle, Marsh Sandwort, Otay mesa mint, and Pecos Sunflower

The USFWS has reviewed the current status of the 15 listed plant species that have a narrow or restricted range discussed in this Opinion, the environmental baseline in the action area, effects

of the proposed action, and cumulative effects, and it is our conclusion that the proposed action is not likely to jeopardize their continued existence.

We reach this non-jeopardy conclusion for the following reasons:

1. The above listed plants have are narrow endemics, potentially eligible private lands within this area are extremely limited and an occurrence of this species on private lands eligible for participation in the WLFW-SWFL is extremely unlikely. Most of these species do not occur on private lands.
2. By applying specific conservation practices conditioned by the conservation measures (and prohibiting some practices as illustrated in Table 4), each project within/adjacent to this species' preferred habitat should be enhanced and managed to generate beneficial conservation outcomes.
3. Although livestock management related actions may result in trampling and other adverse effects, the conservation measure required will reduce existing grazing effects and result in increased development of habitat features.
4. As a result of the site-specific application of the measures outlined in the Proposed Action and this consultation document, the USFWS anticipates that any adverse effects will be sufficiently managed as a result of application of site-specific avoidance, management, and minimization measures incorporated in the design of the WLFW-SWFL and identified herein.

CONCLUSIONS – PLANTS – BROAD RANGE

Dwarf bear-poppy, Holmgren milkvetch, Huachuca Water Umbel, Salt Marsh bird's-beak, Slender-horned spineflower, Ute ladies-tresses, Ventura Marsh milk-vetch, and Willowy monardella

The USFWS has reviewed the current status of the 8 listed plant species that have a broader range and more potential to occur within or nearby NRCS WLFW related projects discussed in this Opinion, the environmental baseline in the action area, effects of the proposed action, and cumulative effects, and it is our conclusion that the proposed action is not likely to jeopardize their continued existence.

We reach this non-jeopardy conclusion for the following reasons:

1. By applying specific conservation practices conditioned by the conservation measures (and prohibiting some practices as illustrated in Table 4), each project within/adjacent to this species' preferred habitat should be enhanced and managed to generate beneficial conservation outcomes.
2. As more private lands are enrolled in the WLFW-SWFL, more opportunities will be created to enhance the status of this plant species and its required habitat conditions. As a result; at both the recovery and survival scale of application of the proposed action, the species will not be appreciably diminished and that the action won't preclude the USFWS from maintaining the species survival and recovery needs as they relate to the role of private lands.

3. Riparian and cienega habitat loss and degradation are the primary identified threats to these species and the conservation outcomes of the proposed action are to restore, enhance, and conserve these systems through a specific conservation design. Implementation of the proposed action, in a narrow range of circumstances, may temporarily reduce the area of potential or suitable habitat for these species; may result in temporary ground disturbance activities; and may result in injury to or destruction of individual plants. However, losses of a few individual plants are outweighed by the creation and restoration of more suitable/occupied habitat.
4. As stated above in the status of the species, grazing systems are available which will result in the creation of beneficial effects to the species. We anticipate working with NRCS to ensure compatibility in these situations. Further, the USFWS anticipates that any adverse effects will be sufficiently managed as a result of application of the avoidance, management, and minimization measures incorporated in the design of the WLFW-SWFL Project.
5. In fact, the USFWS believes that the proposed action will provide long-term benefits to these species and their habitat needs from increasing, restoring, and enhancing riparian systems.

CONCLUSIONS - CRITICAL HABITAT DETERMINATION - PLANTS – NARROW RANGE

Amargosa niterwort, Ash Meadows blazingstar, Ash Meadows gumplant, Ash Meadows ivesia, Ash Meadows milkvetch, Ash Meadows sunray, and Spring-loving centaury

Critical habitat, which was designated for the above listed plant species, is exclusively limited to federally-owned lands (e.g., AMNWR or BLM lands). Effects to critical habitat and their dependent PCEs could therefore only occur indirectly (e.g., from upstream and/or adjacent sources of risk). Exotic vegetation removal, shoreline stabilization, and other related infrastructure improvements to enhance riparian functions, restore native vegetation, and to create SWFL habitat could potentially adversely affect the species' critical habitat. If such a circumstance would occur, the USFWS concludes that the conservation measures would sufficiently manage and significantly reduce adverse effects to designated critical habitat.

For the proposed action, the USFWS acknowledges the potential for temporary alterations of the PCEs during practice installation from these indirect sources. However, the USFWS concludes that the critical habitat and its elements would remain functional to serve the intended conservation role for the species. Therefore, the USFWS concludes that the proposed action will not destroy or adversely modify designated critical habitat for any of the listed endemic plant species.

CONCLUSIONS - CRITICAL HABITAT DETERMINATION – PLANTS - BROAD RANGE

Holmgren milkvetch, Huachuca Water Umbel, La Graiosa thistle, Pecos Sunflower, Ventura Marsh milk-vetch, and Ventura Marsh milk-vetch

Critical habitat, which was designated for the above listed plant species includes private lands. Exotic vegetation removal, shoreline stabilization, and other related infrastructure improvements to enhance riparian functions, restore native vegetation, and to create SWFL habitat could potentially adversely affect the species' critical habitat. If such a circumstance would occur, the USFWS concludes that the conservation measures would sufficiently manage and significantly reduce adverse effects to designated critical habitat.

For the proposed action, the USFWS acknowledges the potential for temporary alterations of the PCEs during practice installation from direct and indirect sources. The USFWS anticipates that the specific minimization and conservation measures inherent in the proposed action will adequately manage any adverse effects to critical habitat. In fact, the USFWS concludes that the effect of the proposed action will benefit critical habitat's PCEs and satisfaction of the special management considerations envisioned for each of the species in the critical habitat rule as described above.

The expected conservation outcome of the WLFW-SWFL is to create, restore, and effectively manage riparian systems to the benefit of the SWFL and the other coexistent species, including the above listed plant species. Any conservation plan will employ avoidance, minimization, and/or design features to ensure that the species' PCE and critical habitat are effectively conserved. Therefore, the USFWS concludes that the proposed action will not destroy or adversely modify designated critical habitat for any of the plant species occurring on private lands.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect. Harm is further defined by the USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering. Harass is defined by the USFWS as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which included, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out of an otherwise lawful activity. Under terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by NRCS so that they become binding conditions of any contract issued to parties conducting activities under the auspice of the WLFW-SWFL Project, for the exemption in section 7(o)(2) to apply. The NRCS has a continuing duty to regulate the activity covered by this incidental take statement during the period when financial assistance is being provided. If NRCS: (1) fails to assume and implement the terms and conditions or (2) fails to require contractors or other parties conducting work on behalf of NRCS to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the contract, the protective coverage of section 7(o)(2) may lapse.

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the ESA prohibits the removal and reduction to possession of Federally listed endangered plants or the malicious damage of such plants on areas under Federal jurisdiction, or the destruction of endangered plants on non-Federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law.

Approach to Assessing Incidental Take

In a large-scale program with species that can move easily around their varied habitat, it is very difficult to precisely estimate the number of each of the covered species that are likely to be exposed to impacts from the proposed action. In addition, once a particular individual (or life stage component – such as an egg mass or nest) is exposed, it is difficult to determine the impact. Below we describe the method that Service has used to approach those issues.

We recognize that the resulting estimates in Table 4 are based on many assumptions, including an assumption that each of the covered species are evenly distributed across the habitat in a watershed or known stream reach and that each of the covered species (and its life stage(s)) has an equal probability of being exposed to the various practices. Lastly, we assume the areal extent of any incidental take, based upon the acreage and frequency estimates provided by NRCS in Table 1 of the NRCS' BA, is additive. We know in the majority of cases this will not be the

case, however, as the application of the core management practices is typically applied concurrently on the same geographic area (based upon the result of the NRCS planning framework).

We recognize that these assumptions will likely lead to an overestimate of potential effects to the species rather than an underestimate of effects. However, we know of no more reasonable method for arriving at an estimate. Also, regarding the probability of overestimating the impact - this provides a cautious and reasonable "worst case" analysis for species conservation and recovery purposes. If the likely overestimate is still compatible with survival and recovery, then we can be satisfied that the actual impacts are compatible.

Further, we conclude we can assign risk reduction framework to the proposed action. This information is summarized in Table 3 below. This framework is based upon an evaluation of the (1) geographic extent of the species occurrence within the focal areas; (2) consideration of the frequency and areal extent of the five core management practices (as one or more of these will be used for each of the enrolled landowners); (3) the anticipated conservation value of the conservation measures in risk reduction of an incidental take event occurring and; (4) inferences on the conservation value of the substantial and implicit planning and quantitative information used by NRCS to design and support the implementation of the Conservation Practices (for example, see http://wqic.nal.usda.gov/publications/bibliographies/conservation-effects-assessment-project-ceap-published

Important Considerations Regarding Incidental Take

The extent of incidental take as stated in this Opinion is provided to NRCS. NRCS may convey incidental take to affected eligible landowners within the Action Area and in accordance to the requirements of the Opinion, the NRCS' BA, and the necessary Conservation Planning requirements identified herein. Monitoring of take levels is described in the Monitoring section below and NRCS will ensure that take levels are not exceeded.

However, it is the intent of the USFWS and NRCS that the WLFW-SWFL Project and the associated Opinion will be a living document. Measuring the expected efficacy of the conservation measures, identifying the expected conservation benefits, and monitoring the incidental take levels identified above will be continually assessed and evaluated over time. Modifications and improvements to the design, approach, monitoring, and incidental take authorized may occur over the 27-year life of the WLFW-SWFL Project may occur as a result of incorporating this new information. The annual meetings proposed by NRCS in their BA and as described further in this Opinion will include these forms of discussion of modifications and improvements and address other implementation issues of the proposed action.

To provide an expected incidental take amount, expressed in Table 4, we identified six attributes with explicit consideration and assumptions as described below in Table 3.

Table 3. Framework and Assumptions For Estimating Incidental Take	
Attribute	**Elements, Assumptions, and Potential Direction of Bias**
Geographic Extent of Species' Occurrence in within the Focal Areas	More wide-ranging species have greater chances (and more projects) of incurring an adverse impact. Therefore expected level of incidental take is comparatively higher. Conversely, we limited frequency of incidental take for endemic species and those will narrow habitat requirements as we do not expect many landowners to enroll in the proposed action with these species.
Likelihood of overlap between the species' habitat needs and requirements of those of SWFL.	Higher similarly of habitat requirements and needs equated to higher likelihood of incidental take level. However, species would accrue benefits proportionally higher of long term restoration actions. Conversely, for those species with little/no overlap with SWFL life history needs, we needed to take a very conservative (cautious) approach to limiting incidental take events. We limited frequency of incidental take for endemic species and those will narrow habitat requirements as we do not expect many landowners to enroll in the proposed action with these species.
Expected source(s) of adverse effect from SWFL-WLFW actions.	Direct actions (in-habitat actions) create higher risk to the species; indirect actions (action adjacent to habitat) create (comparatively) less acute/chronic effects. For those actions that create both direct and indirect effects, we provided comparatively more incidental take coverage.
Considerations of inter-related and inter-dependent effects (number of practices, expected duration, frequency, and intensity).	Extent and frequency of risk of incidental take increases with increasing application of conservation practices creating the same adverse effects and considerations of sensitivities of species to that particular source of chronic/acute adverse effect (Table 1 of NRCS' BA and Table 4 below). We accounted for inherent design features and existing performance objectives of the existing conservation practices (for example, see http://wqic.nal.usda.gov/publications/bibliographies/conservation-effects-assessment-project-ceap-published).
Anticipated efficacy of the conservation measures and inherent design features and elements of the Conservation Practice Standards.	For the covered species, the application of the critical time periods, the incorporation of the stated conservation measures for each of the practices, and the inherence design criteria and performance elements of each of the conservation practices significantly reduces the frequency; intensity and duration of the incidental take events. We weighed the more sensitive species' life history requirements and considerations of PCEs of these endemics but took a very conservative approach by establishing a low

	number of allowable incidental take events.
Long term benefits of the proposed action.	Over the life of the proposed action, the long term benefits of creating, enhancing and managing targeting habitat conditions for the species will result in a positive population response and/or more occupied habitat. This net increase in the environment baseline will offset the identified incident take events. While this conclusion did not alter the incidental take level, it was a factor in our regulatory conclusions for violation of both 7(a)(2) and our conclusion for destruction/adverse modification of critical habitat. In all cases, we concluded that the environmental baseline should improve for the species and as a result the conservation status of the covered species will improve over the 27 year life of the Proposed Action.

As the action being analyzed is a wide-ranging multi-faceted program designed to improve riparian habitat and within stream/lotic conditions, with overlapping and interrelated effects, we will focus on the evaluating and estimating the frequency where incidental take for a particular covered species may occur. Incidental take authorization is needed for that combination of unfavorable circumstances and conditions (species occurrence, timing, project placement, and efficient vector(s) of adverse effects) which causes incidental take at the site specific project, despite the application of the conservation measures and other risk management elements of the WLFW-SWFL Project as described herein. Incidental take is not expected to occur for every site specific plan (e.g., for each enrolled landowner) and for every conservation practice implemented. Indeed, the critical timing prohibitions, other conservation measures, and intricate and deliberate protective measures inherent in the NRCS planning and design processes will, cumulatively result in a significant reduction in the frequency, extent, and intensity of any adverse effects discussed previously for these aquatic species.

Although we cannot predict where and when incidental take will occur within the geographic and temporal boundaries of this consultation, we can more comfortably conclude that adverse circumstances will occur, albeit rarely and in a very limited circumstance. The complex and changing riparian and habitat conditions within the action area compound our ability to discern adverse effects directly attributed to the WLFW-SWFL Project and not created by other upstream sources or by natural events (e.g., flood, drought, fire, etc.).

The scope of each type of activity that could be authorized under the proposed restoration program is narrowly prescribed, and is further limited by conservation measures and inherent NRCS design standards tailored to avoid direct and indirect adverse effects of those actions. Administrative controls (e.g., use of the umbrella practices, NRCS planning policies, contracting requirements) are in place to ensure that requirements related to the scope of actions allowed and the mandatory conservation measures operate to limit direct lethal effects to a few instances of death or injury primarily associated with in-water construction work areas, an action necessary to avoid greater environmental harm and achieve restoration objectives.

AMOUNT OR EXTENT OF TAKE ANTICIPATED

The amount or extent of take anticipated is in Table 4 by species over the expected 27-year life of the WLFW-SWFL Project. We articulate the likelihood of overlap of each species with SWFL habitat and direct or indirect adverse impacts.

Table 4. Amount of Incidental Take Expected. The first number in the incidental take column represents nests or egg masses; 2nd number represents number of juveniles; 3rd number is adults.

Common Name	Overlap with SWFL habitat requirements	Adverse effects Potential from WLFW-SW Riparian	Conservation Practices not to use when targeting for this species	Incidental Take
Arroyo toad	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent uplands.	ALL CPs ALLOWED.	2/20/5
California red-legged frog	**Likely**	Indirect. From actions in nearby SWFL riparian habitats or from actions in adjacent uplands or to stockponds.	391, 315, 460, 584, 612, 490	2/40/5
Chiricahua Leopard Frog	**Likely**	Indirect. From actions in nearby SWFL riparian habitats or from actions in adjacent uplands or to stockponds.	391, 315, 460, 584, 612, 490	2/40/5
California tiger salamander**** 4D rule	**Likely**	Indirect. From actions in nearby SWFL riparian habitats or from actions to pools or stockponds.	See 4D Rule; 391, 612, 490.	Follow 4D + 2/5/2
Columbia spotted frog	**Unlikely**	Indirect. From actions in nearby SWFL riparian habitats or from actions to pools or stockponds.	391, 315, 460, 584, 612, 490	2/40/5
Mountain yellow-legged frog	**Likely**	Indirect. From actions in nearby SWFL riparian habitats or from actions in adjacent uplands or to stockponds.	ALL CPs ALLOWED.	2/20/5
Relict leopard frog	**Likely**	Indirect. From actions in nearby SWFL riparian habitats or from actions in adjacent uplands or to stockponds.	391, 315, 460, 584, 612, 490	1/3/1

Common Name	Overlap with SWFL habitat requirements	Adverse effects Potential from WLFW-SW Riparian	Conservation Practices not to use when targeting for this species	Incidental Take
Blunt-nosed leopard lizard	**Unlikely**	Woody vegetation restoration may eliminate habitat	391, 315, 460, 584, 612, 490	1/5/2
Northern Mexican garter snake	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent uplands.	ALL CPs ALLOWED.	1/2/1
Narrow headed garter snake	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent uplands.	ALL CPs ALLOWED.	1/2/1
Mojave desert tortoise	**Unlikely**	Direct- if tortoise present during work. Indirect if block pathway for migration or burrows within banks.	391, 612, 490	1/5/1
Sonoran desert tortoise	**Unlikely**	Direct- if tortoise present during work. Indirect if block pathway for migration or burrows within banks.	391, 612, 490	1/5/1
California clapper rail	**Unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	391, 315,460, 584, 612, 490	1/3/1
Least Bell's vireo	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent uplands.	ALL CPs ALLOWED.	5/5/5
Southwestern willow flycatcher	NA	Direct and Indirect. Potential removal of habitat when use of invasive spp.	ALL CPs ALLOWED.	75/5/5
Yellow billed cuckoo	**Likely**	Direct and Indirect. Potential removal of habitat when use of invasive spp.	ALL CPs ALLOWED.	5/5/5
Yuma clapper rail	**Unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	391, 315 ,460, 584, 612, 490	1/3/1

Common Name	Overlap with SWFL habitat requirements	Adverse effects Potential from WLFW-SW Riparian	Conservation Practices not to use when targeting for this species	Incidental Take
Apache trout	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent uplands.	582-Open Channel	2/10/3
Ash Meadows Amargosa pupfish	**Extremely unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	1/3/2
Ash Meadows speckled dace	**Unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	1/3/2
Beautiful Shiner	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	1/3/2
Bonytail	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/7/3
Chihuahua chub	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/7/3
Colorado pikeminnow	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/10/3
Desert pupfish	**Extremely unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	1/3/2
Gila chub	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/3/2

Common Name	Overlap with SWFL habitat requirements	Adverse effects Potential from WLFW-SW Riparian	Conservation Practices not to use when targeting for this species	Incidental Take
Gila topminnow	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	na/5/2
Gila trout	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent uplands.	582-Open Channel	2/10/3
Greenback cutthroat trout	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent uplands.	582-Open Channel	2/10/3
Headwater chub	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	No take given - candidate species.
Hiko White River springfish	**Extremely unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	1/3/2
Humpback chub	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	1/3/2
Lahontan cutthroat trout	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/10/3
Little Colorado spinedace	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/10/3
Loach Minnow	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/7/3
Moapa dace	**Extremely unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	1/3/2

Common Name	Overlap with SWFL habitat requirements	Adverse effects Potential from WLFW-SW Riparian	Conservation Practices not to use when targeting for this species	Incidental Take
Mojave tui chub	**Unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	2/7/3
Owens pupfish	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/7/3
Owens tui chub	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/7/3
Pahranagat roundtail chub	**Unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	582-Open Channel	1/3/2
Pecos bluntnose shiner	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/7/3
Pecos gambusia	**Extremely unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	1/3/2
Razorback sucker	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/7/3
Rio Grande silvery minnow	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/10/3
Roundtail chub	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	candidate species - no take provided
Santa Ana sucker	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/10/3

Common Name	Overlap with SWFL habitat requirements	Adverse effects Potential from WLFW-SW Riparian	Conservation Practices not to use when targeting for this species	Incidental Take
Sonora chub	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/7/3
Spikedace	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/10/3
Tidewater goby	**Extremely unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	1/3/2
Unarmored threespine stickleback	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/7/3
Virgin River chub	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/7/3
Warm Springs pupfish	**Extremely unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 490	1/3/2
White River Springfish	**Extremely unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	1/3/2
Woundfin	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/7/3
Yaqui catfish	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/7/3
Yaqui chub	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/7/3

Common Name	Overlap with SWFL habitat requirements	Adverse effects Potential from WLFW-SW Riparian	Conservation Practices not to use when targeting for this species	Incidental Take
Yaqui Topminnow	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	1/3/2
Zuni bluehead sucker	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat.	582-Open Channel	2/7/3
Ash Meadows naucorid	**Extremely unlikely**	Indirect. From actions in adjacent SWFL riparian habitats or from actions in adjacent uplands.	391, 315,460, 584, 612, 490	1/3/2
Ash Meadows blazingstar	**Extremely unlikely**	Indirect. From actions in adjacent SWFL riparian habitats or from actions in adjacent uplands.	391, 315,460, 584, 612, 490	None for Plants
Ash Meadows gumplant	**Unlikely**	Indirect. From actions in nearby SWFL riparian habitats or from actions in adjacent uplands.	391, 315,460, 584, 612, 490	None for Plants
Ash Meadows ivesia	**Unlikely**	Indirect. From actions in nearby SWFL riparian habitats or from actions in adjacent uplands.	391, 315,460, 584, 612, 490	None for Plants
Ash Meadows milkvetch	**Unlikely**	Indirect. From actions in nearby SWFL riparian habitats or from actions in adjacent uplands.	391, 315,460, 584, 612, 490	None for Plants
Ash Meadows sunray	**Unlikely**	Indirect. From actions in nearby SWFL riparian habitats or from actions in adjacent uplands.	391, 315,460, 584, 612, 490	None for Plants
Canelo Hills Ladies Tresses	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent uplands.	ALL CPs ALLOWED.	None for Plants
Chorro Creek bog thistle	**Unlikely**	Indirect. From actions in nearby SWFL riparian habitats or from actions in adjacent uplands.	391, 315,460, 584, 612, 490	None for Plants
Dwarf bear-poppy	**Extremely unlikely**	Indirect. From actions in nearby SWFL riparian habitats or from actions in adjacent uplands.	391, 315,460, 584, 612, 490	None for Plants

Common Name	Overlap with SWFL habitat requirements	Adverse effects Potential from WLFW-SW Riparian	Conservation Practices not to use when targeting for this species	Incidental Take
Gambel's watercress	**Extremely unlikely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent uplands.	391, 315,460, 584, 612, 490	None for Plants
Hickman's potentilla	**Extremely unlikely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent uplands.	391, 315,460, 584, 612, 490	None for Plants
Holmgren milkvetch	**Extremely unlikely**	Indirect. From actions in nearby SWFL riparian habitats or from actions in adjacent uplands.	391, 315,460, 584, 612, 490	None for Plants
Huachuca Water Umbel	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent uplands.	ALL CPs ALLOWED.	None for Plants
La Graciosa thistle	**Unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	391, 315,460, 584, 612, 490	None for Plants
Marsh Sandwort	**Extremely unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	None for Plants
Otay mesa mint	**Extremely unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	None for Plants

Common Name	Overlap with SWFL habitat requirements	Adverse effects Potential from WLFW-SW Riparian	Conservation Practices not to use when targeting for this species	Incidental Take
Pecos River Sunflower	**Unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	None for Plants
Salt Marsh bird's-beak	**Extremely unlikely**	Direct. Requirements of this species conflict with creation and management of SWFL habitat.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	None for Plants
Slender-horned spineflower	**Extremely unlikely**	Indirect. From actions in nearby SWFL riparian habitats or from actions in adjacent uplands	391, 315,460, 584, 612, 491	None for Plants
Spring-loving centaury	**Extremely unlikely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent uplands.	391, 315,460, 584, 612, 492	None for Plants
Ute ladies-tresses	**Likely**	Direct. Requirements of this species may conflict with creation and management of SWFL habitat.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	None for Plants
Ventura Marsh milk-vetch	**Unlikely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent uplands.	ALL CPs ALLOWED.	None for Plants

Common Name	Overlap with SWFL habitat requirements	Adverse effects Potential from WLFW-SW Riparian	Conservation Practices not to use when targeting for this species	Incidental Take
Willowy monardella	**Unlikely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent uplands.	391, 315,460, 584, 612, 492	None for Plants
Amargosa vole	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent uplands.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	na/5/3
Buena Vista Lake ornate shrew	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent uplands.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	na/5/3
New Mexico meadow jumping mouse	**Likely**	Direct and indirect due to restoration or management actions in SWFL habitat or possibly from actions in adjacent to its habitat.	582-Open Channel, 574 -Spring Development within habitat, 528-Grazing within Habitat, 391, 315,460, 584, 612, 491	na/7/5

Monitoring Progress of the Action and Incidental Take

The progress of the action and incidental take will be continually monitored and assessed by NRCS and will be reported back to USFWS on a no less than annual basis as fully explained in the NRCS' BA. As NRCS field staff conducts their field review of any WLFW-SWFL Project contract with any of these practices, they will also ask the landowner if they have observed any mortality while implementing the practices as described in the Opinion.

The annual meeting requirement as described in NRCS' BA, will present opportunities to discuss the results of the five monitoring aspects of the Proposed Action (e.g., Practice implementation oversight by NRCS; Operation and Maintenance periodic monitoring; USGS model performed

by NRCS; Landowner monitoring using photo points and other specified methods; and Monitoring of Grazing in riparian pastures during the growing season); discuss any changes in the practices, the conservation measures, or other design features that are necessary to ensure that the expected conservation outcomes are being met, and; assess whether or not the above incidental take levels must be adjusted or modified. Beneficial outcomes will also be measured and assessed for the covered species. This comprehensive monitoring and information sharing will inform any adjustments or changes necessary to insure that this program remains effective and efficient at conserving the covered species.

EFFECT OF THE TAKE

In this biological opinion, the USFWS determines that this level of anticipated take is not likely to result in jeopardy to the covered species or destruction or adverse modification of critical habitat for the reasons stated in the Conclusions section.

Effect of the Take - Return to Original Existing Conditions

At this time, the USFWS believes that level of anticipated take associated with WLFW-SWFL Project, a program intending to improve habitat for the covered species on private lands, is not likely to result in jeopardy to the flycatcher and/or to any of the covered species or destruction or adverse modification of critical habitat. We base this upon the following: (1) the overall effects to species will be generally beneficial, and any adverse effects will be minimal and localized and; (2) return of properties to baseline conditions would only affect improvements in habitat or population numbers over the species' current environmental baseline.

The NRCS and USFWS acknowledge that any take of covered species will be following the implementation of a Conservation Practice as conditioned by the conservation measures and other terms and conditions outlined herein at the time upon which the landowner may exercise her/his rights to return to the original conditions. It is important to note that such taking may or may not ever occur. It also is imperative to emphasize that it is unlikely that the flycatcher would use the habitat involved if not for the voluntary management activities of the participating landowners. These voluntary management activities undertaken through WLFW will likely increase the number, extent, and duration of the species and increase the amount (i.e. acreage and/or connectivity) and quality of habitat. The only habitat that may be lost due to being taken back to baseline conditions is habitat that does not currently exist or is unoccupied at the time a landowner enrollment in the WLFW – SWFL Project.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

All appropriate reasonable and prudent measures have been incorporated into the proposed action as conservation measures for this consultation. These conservation measures generally and specifically require the NRCS to reduce negative effects to the covered species and their habitats. No additional reasonable and prudent measures nor their implementing terms and conditions are necessary to minimize incidental take.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency actions. The USFWS offers the following conservation recommendations:

- Develop an implementation process to ensure local NRCS and affected USFWS offices have the appropriate level of training and understanding of the conservation measures, the use of the monitoring elements as proposed, and other operational components of the proposed action and this Opinion.
- As the science support and monitoring elements of the WLFW-SWFL begin to produce information and data, NRCS will share this information with a wide range and diverse collection of partners (State Fish and Wildlife Agencies, Association of Fish and Wildlife Agencies, Western Association of Fish and Wildlife Agencies, Western Governors Association, and others) to further enhance the conservation outcomes for the targeted species and their supporting aquatic and riparian habitats.
- NRCS is committed to RMS level planning in the riparian area for work associated with SWFL restoration and enhancement actions. The Service encourages NRCS to expand the requirement to apply RMS level planning for all lands and species encompassed within the affected Conservation Plan(s), as this would greatly magnify and enhance the conservation benefits of the proposed action.
- Continue to expand and improve the monitoring element, including the creation of riparian Ecological Site Descriptions (ESD). Use of ESD might prove a more efficient and effective method of managing the needs of the covered species and the supporting hydrological, geological, and morphological characteristics of their habitats and conditions than individual WHEGs. The USFWS offers its assistance in seeking more effective assessment and monitoring tools such as ESDs to document and confirm the expected species and habitat benefits at the ecosystem scale.

REINITIATION NOTICE

This concludes the Biological and Conference Opinion for the potential effects of the proposed action. As provided in 50 CFR § 402.16, reinitiate of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

You may ask the USFWS to confirm the conference opinion as a biological opinion issued through formal consultation if any of the following species are listed and/or critical habitat is

designated (New Mexico meadow jumping mouse, Columbia spotted frog, any population of the mountain yellow-legged frog (not already listed), relict leopard frog, Sonoran desert tortoise, headwater chub, and/or roundtail chub. The request must be in writing. If the USFWS reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, the USFWS will confirm the provisions of this Conference Opinion as the biological opinion on the project and no further section 7 consultation will be necessary.

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Appendix 1 – Letter from USFWS describing conditions for providing 30-year predictability under Working Lands for Wildlife

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington, D.C. 20240

AUG - 3 2012

In Reply Refer To:
FWS/AES/52307

Mr. Dave White
Chief, Natural Resources Conservation Service
1400 Independence Ave., SW, Room 5105-A
Washington, DC 20250

Dear Dave:

Thank you for your letter dated August 2, 2012 about the Working Lands for Wildlife (WLFW) partnership, which is successfully leveraging the capabilities and resources of our two agencies. We greatly appreciate the collaboration between the Natural Resources Conservation Service (NRCS) and U.S. Fish and Wildlife Service (Service) staff, and the leadership that you have shown to strategically target funding for working lands and sensitive species. This effort clearly demonstrates that productive working rural lands are compatible with the needs of wildlife and their habitats, achieving the missions of both NRCS and the Service.

The purpose of this letter is to describe the Service's approach to candidate conservation under the Endangered Species Act (ESA) and predictability for landowners who participate in WLFW. As referenced in your letter, the Service has recently completed conference opinions for three of the four candidate species involved in WLFW, including lesser prairie chicken, the eastern portion of the gopher tortoise's range, and New England cottontail. In addition, the Service had previously completed an effective conference report for the greater sage grouse, the fourth candidate species involved in WLFW. In these documents, the Service analyzed the effects to these species from the implementation of specific conservation practices by landowners who choose to participate in WLFW. These conservation practices and associated conservation measures were developed in partnership by our agencies to benefit the species and their habitats and be fully compatible with working lands.

The Service will be determining in the future whether to list each of these candidate species as threatened or endangered under the ESA. In the event that any of the species are listed, the Service is committed to validating the conference report and opinions as biological opinions for NRCS under section 7 of the ESA, and exempting any incidental take as described in the biological opinions associated with implementing the specified conservation practices. As a result, the predictability for landowners is clear. They will know that the conservation practices will continue to benefit wildlife for as long as they are implemented, and that any ESA issues associated with their implementation have been already addressed in full.

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You also asked how we might encourage landowners to continue to implement these beneficial conservation practices beyond the term of their program contract with NRCS. The Service also recognizes the value of landowners voluntarily choosing to continue implementing the conservation practices after each individual program contract with NRCS under WLFW ends. These contracts can extend from one to fifteen years in length, depending on the species involved and the conservation practices employed. Continuing the implementation of the conservation practices beyond this period would advance the longer-term goals of WLFW and both agencies' missions.

Should any of the candidate species in WLFW be listed in the future, the Service intends to exempt through section 7 any incidental take that is anticipated to occur from the implementation of the conservation practices if a landowner with a WLFW program contract voluntarily chooses to continue implementing the practices after the program contract ends. The Service will review the effects of implementing the specified conservation practices to these species over a 30-year period and exempt any incidental take anticipated to occur from their implementation. Each landowner involved in WLFW will have the sole discretion whether or not to continue implementing the conservation practices at the end of the contract with NRCS. If a landowner chooses, however, to continue implementing the conservation practices defined through our WLFW partnership, they will have predictability and the confidence in knowing that any ESA issues associated with their implementation over a 30-year period will have already been addressed in full. By taking this step, the Service hopes to encourage the long-term implementation of the conservation practices and associated conservation measures.

The Service also notes that two other species included in WLFW are already listed under the ESA, the Southwest willow flycatcher and the bog turtle. For these two species, the Service has completed biological opinions and exempted any incidental take anticipated in the biological opinions to occur from implementation of the conservation practices. In addition, the western portion of the gopher tortoise's range is currently listed (the eastern portion of the range is currently a candidate species as noted above), and the Service has completed a biological opinion and exempted any incidental take anticipated in the biological opinion to occur from implementation of the practices in this portion of the range. Furthermore, the golden-winged warbler is also included in WLFW. This species is neither currently listed under the ESA nor a candidate species for listing. Should the species status change in the future and the potential need for listing be considered, the Service intends to follow the same approach to ESA predictability for NRCS and landowners that has been used for the other species in WLFW.

As WLFW moves forward, we will have the opportunity to gauge the success of the conservation practices over time, and potentially gain information that will allow us to refine them and achieve even better results for landowners, NRCS, and the Service. The Service is committed to this approach of learning and adaptive management in partnership with NRCS and the landowners participating in WLFW. Any refinements to the conservation practices would be developed in full collaboration with NRCS, using information gained from on-the-ground implementation of WLFW.

The Service is also committed to developing more tools for landowners. We are particularly interested in pursuing partnerships using Candidate Conservation Agreements with Assurances with landowners, which can provide long term conservation options and regulatory certainty.

Thank you again for your leadership in working lands conservation. If you have any questions, please contact Gary Frazer, Assistant Director for Endangered Species, at (202) 208-4646.

Sincerely,

DIRECTOR

Appendix 2. Further Information on Implementation of a 528 Grazing Management Plan

This section was explicitly developed to guide NRCS planners and eligible landowners to reduce the adverse effects of those structural improvements on eligible lands that support the creation of a Prescribed Grazing Plan (528) for livestock operations. Specifically, the Conservation Practices such as Fence, Pipeline, and Watering Facility all have the potential to create their own adverse effects as discussed above and that in certain circumstances these impacts are compounded without thoughtful consideration on their placement and design. The NRCS expects that the practices identified above will be installed with NRCS technical assistance and used to facilitate a prescribed grazing plan. Site-specific management plans will be developed with each landowner; these plans will detail the intensity, timing, and duration of use in each field. All grazing plans will contain a drought contingency that adjusts grazing use commensurate with lower precipitation and plant growth. All required facilitating practices (i.e., fence, well, pipeline, etc.) will be planned and designed to minimize disturbance and to enhance SWFL habitat through the installation of a sustainable livestock management program. Motorized vehicles will not be used to herd livestock within listed species habitat. Further, that where designed and installed, the use of the conservation measures for a prescribed grazing plan (528) will also be followed, as repeated below:

Conservation Measures to Be Used for Prescribed Grazing

The timing, duration, intensity and distribution of grazing will be managed to benefit listed species by maintaining or improving the plant communities in each pasture based on the habitat needs of the listed species. NRCS will use inventory and assessment tools such as WHEG, SVAP, and/or ESDs to determine the desired plant community goals (kinds and amounts of vegetation) in riparian habitat. Plant community goals may include plant species attributes such as: composition, production, vegetation and ground cover, seedling establishment, tree density or other attributes.

A site-specific prescribed grazing plan will be developed to achieve the plant community goals. The grazing plan will take into account the physiological needs of the key forage and riparian species. Adjustments to the prescribed grazing plan will be made if it is determined through monitoring that plant community goals are not being achieved.

The prescribed grazing plan will include a forage and animal balance to determine an initial stocking rate. The forage and animal balance is based on key forage plants and maintenance or enhancement of key habitat plant species. Utilization of vegetation by wildlife ungulates (elk, deer, etc.) and other wildlife species will be considered in the forage and animal balance. The forage and animal balance for pastures containing riparian habitat will be adjusted based upon the compositional and spatial patterns of upland and riparian habitat. The forage and animal balance will take into account limited use of riparian habitat due to the specific season of use of the pasture by livestock (ex. spring season - cool weather with adequate cool season forage

species in the uplands to reduce livestock use in riparian habitat). The forage and animal balance will take into account limited use of riparian habitat and forage available in the uplands when livestock distribution is controlled through specific structural practices or management as part of the grazing plan (i.e. water sources located far enough from the riparian habitat to limit livestock riparian use, livestock shelters, supplements, herding etc.).

The duration and timing of livestock use in riparian areas will be set to avoid repeated growing season defoliation in order to provide for adequate rest and recovery periods of key forage and key riparian species.

When developing the prescribed grazing plan the following limitations will apply: Seasons as defined for this document are winter (November through February), spring (Mar - May 14), summer (May 15 -August) and fall (Sept - Oct). Grazing during any particular season does not infer that the entire season will be grazed by livestock. Grazing might only occur during a portion of that season based on the stocking rate developed in the prescribed grazing plan. In any year, grazing will not be allowed to occur during back to back seasons. Grazing during the summer season will occur no more than once in 3 years. Grazing during the winter, spring or fall season will be allowed to occur 2 out of 3 years; however, grazing cannot occur the same spring and fall season in the same year (See example tables below). Variance to the above limitations may be allowed with review by FWS.

Monitoring will be conducted to determine if plant community goals are being achieved and may include plant species attributes such as: composition, production, vegetation and ground cover, seedling establishment, tree density or other attributes based on the vegetation goals established in the prescribed grazing plan. Monitoring methods will be tied to the assessment tools used during the inventory process (i.e. WHEG, SVAP, ESDs, etc.). The degree of livestock use (utilization) will be measured and recorded in the riparian area to ensure planned grazing intensities are not exceeded.

Example without existing desired riparian habitat (most intensive level):

Winter (Nov – Feb)	Spring (Mar – May 14)	Summer (May 15 – Aug)	Fall (Sept – Oct)
Plant	Plant	Defer	Defer
Defer	Defer	Defer	Defer
Defer	Defer	X	
X			X
	X		
X		X	
X			X
	X		
X		X	
X			X

	X		
X		X	
	X		

Three times non-grazed as grazed in above example. (17/52 = 33%). Alternate seasons with no back to back in same place more than 2 years. As compared to existing with most at 50% or more of available seasons grazed.

Example with EXISTING riparian habitat for the species (most intensive level)

Winter (Nov. 1 –Feb 28)	Spring (Mar 1 – May 14)	Summer (May 15 – Aug 31)	Fall (Sept 1 – Oct 31)
		X	
X			X
	X		
X		X	
X			X
	X		
X		X	
X			X
	X		
X		X	
	X		
X			X
X		X	
	X		

Over two times non-grazed as grazed in above example. (22/56 = 40%).