United States Department of the Interior

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

July 24, 2012

In Reply Refer To:
FWS/R2/ARD-ES/052194
Consultation # 02E0000-2012-F-0013

Astor Boozer, Regional Conservationist
National Resources Conservation Service
230 North First Avenue, Suite 509
Phoenix, Arizona 85003-1733

Dear Mr. Boozer:

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). The attached draft programmatic biological opinion provides regulatory assurance regarding the implementation of the Natural Resources Conservation Services' (NRCS) Working Lands for Wildlife Project for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*) on eligible private lands in the states of Arizona, California, Colorado, New Mexico, Texas and Utah. In addition to the Southwestern Willow Flycatcher, 68 other species federally listed as threatened or endangered and/or candidate species have also been evaluated within the biological opinion. The proposed action consists of the following: (1) implement the Working Lands for Wildlife Program which will benefit the Southwestern Willow Flycatcher; (2) complete assessments using a range-wide Southwestern Willow Flycatcher Wildlife Habitat Evaluation Guide (WHEG) and other tools as appropriate and; (3) implement conservation practices across the range of the Southwestern Willow Flycatcher by developing conservation plans that incorporate a suite of conservation practices. The biological opinion provides a return to baseline component at the end of the practice lifespan if the enrolled landowner chooses. In the near future, a Safe Harbor Agreement will be developed for future funding within the Working Lands for Wildlife Program.

The biological assessment and attached biological opinion were developed through numerous communications between the Service and NRCS staff. This biological 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. The consultation history is as follows:

- On March 8, 2012, the Secretaries of Agriculture and Interior jointly announced a collaborative partnership on private lands collectively known as the Working Lands for Wildlife (WLFW) Project and identified seven species across the United States that would share approximately $33 million dollars of NRCS' Wildlife Habitat Incentive Program allocation under the 2008 Farm Bill. The Southwest Willow Flycatcher was one of the selected species for this partnership.
- On May 30-31, 2012, the Service and NRCS met in Phoenix, Arizona, to discuss the biological opinion that would provide regulatory assurances for enrolled landowners for the WLFW initiative.
- From June 1 through July 16, 2012, weekly conference calls were conducted between the Service and NRCS to discuss the consultation.
- On July 16, 2012, the NRCS sent a final version of the biological assessment for the project.
- On July 18, 2012, the Service shared a draft biological opinion with NRCS.

We appreciate the NRCS's efforts to minimize effects to listed species through their conservation measures and practices. For further information, please contact Sarah E. Rinkevich at 520-670-6150, extension 237, or Steve Spangle, Field Supervisor, at 602-242-0210, with Arizona Ecological Services Field Office.

Sincerely,

Michelle Shaughnessy

Michelle Shaughnessy
Assistant Regional Director, Ecological Services

Attachment

cc: Field Supervisor, Arizona Ecological Services Office, Phoenix, Arizona
Field Supervisor, New Mexico Ecological Services Office, Albuquerque, New Mexico
R8, Endangered Species Chief, Sacramento, California
R6, Endangered Species Chief, Denver, Colorado

BIOLOGICAL OPINION

1.0 INTRODUCTION

This represents the United States Fish and Wildlife Service's (Service) programmatic biological opinion regarding the implementation of the Natural Resources Conservation Services' Working Lands for Wildlife Project for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*) and its critical habitat as well as 68 other federally listed and candidate species on eligible private lands in the states of Arizona, California, Colorado, New Mexico, Texas and Utah (see Figure 1 below).

This opinion 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.

2.0 DESCRIPTION OF THE PROPOSED ACTION

The Natural Resources Conservation Service (NRCS) 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 and continuing with the programs of the 2008 Farm Bill, clients can now obtain financial assistance directly from NRCS to implement their conservation plan, establishing 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.

2.1 Conservation Planning Process

Local NRCS conservation planners develop conservation plans for clients that address environmental resource concerns on private, non-Federal, or Tribal lands. 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.

2.2 ACTION DEFINED

This document evaluates the collective effects of implementing all aspects of the Working Lands For Wildlife (WLFW) – Southwestern Willow Flycatcher Project on the covered species identified in Table 1 and their supporting habitats. The analysis focuses on identified conservation practices in which NRCS has chosen to implement the WLFW – Southwestern Willow Flycatcher Project. Table 1 lists those conservation practices evaluated in this biological opinion. Use of the conservation practices occurs in concert with 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 for the WLFW – Southwestern Willow Flycatcher Project 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 Service will use this document as a foundation for continuing collaborative partnership designed to improve the conservation status of the Southwestern Willow Flycatcher and other targeted species on private lands within the reach of NRCS' programs and authorities.

2.2.3 Working Lands for Wildlife – Southwestern Willow Flycatcher Project

On March 8, 2012, the Secretaries of Agriculture and Interior jointly announced a collaborative partnership on private lands eligible to receive Farm Bill technical and financial assistance that is expected 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; (3) Strengthen and sustain rural economies by restoring and protecting the productive capacity of working lands. The partnership is collectively known as the Working Lands for Wildlife (WLFW) Project and identified seven species across the United States that would share approximately $33 million dollars of NRCS' Wildlife Habitat Incentive Program allocation under the 2008 Farm Bill. The Southwest Willow Flycatcher was one of the selected species for this partnership.

The WLFW Project involves a five-step process:

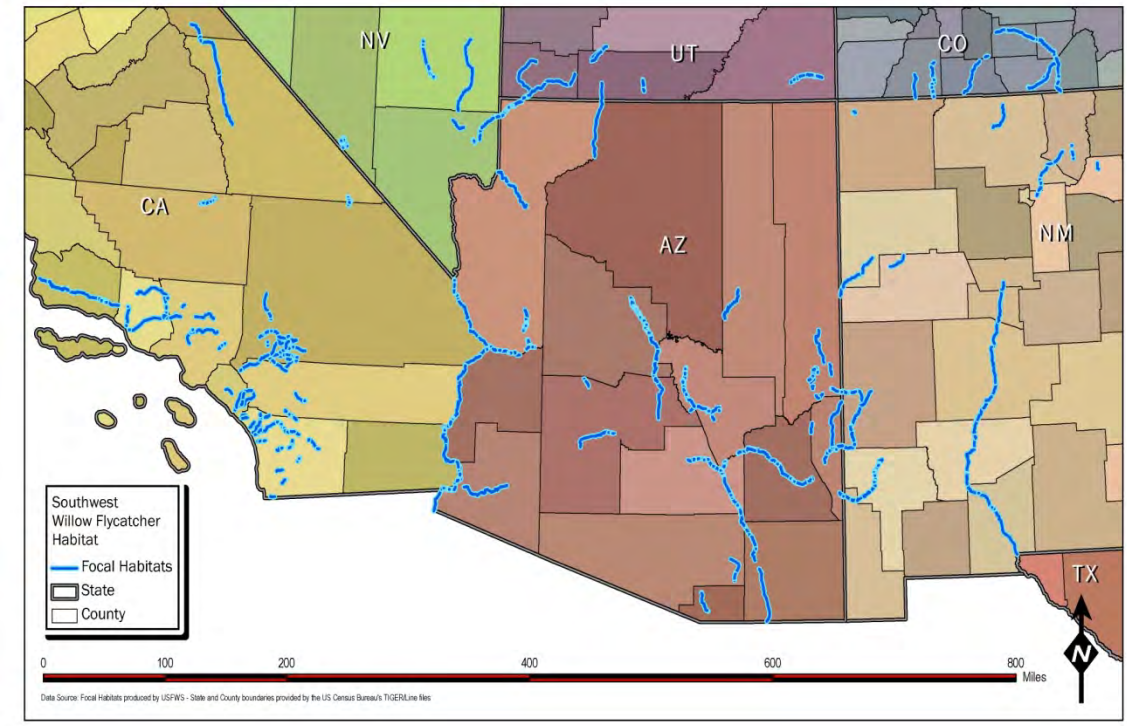
- Joint review and conditioning of NRCS conservation practices capable of benefiting the species and removing threats;
- Identification of priority target areas for habitat restoration and easement programs;
- Design of ranking criteria to deliver project funding where it will do the most good;

- Development of a monitoring program to measure species and habitat outcomes; and
- Put in place innovative mechanisms and approaches that provide improved regulatory predictability to landowners.

The project will target species whose decline can be reversed and will benefit other species with similar habitat needs. More information on the Working Lands for Wildlife Project can be found at: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1047545.pdf.

The WLFW - Southwestern Willow Flycatcher 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. The WLFW – Southwestern Willow Flycatcher Project focuses NRCS and partner resources on high priority areas called focal areas within the Action Area (Figure 1). NRCS sought the Service's assistance in determining what actions will result in minimizing potential long-term adverse effects to the Southwestern Willow Flycatcher and the other covered species, and improve potential effectiveness of conservation practices that may result in range-wide benefits.

Figure 1. Map of focal areas within the range of the Southwestern Willow Flycatcher.



The Action Area is the range of potential habitat for the Southwestern Willow Flycatcher 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 proposed action, the implementation of the WLFW – Southwestern Willow Flycatcher 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 their original condition after obligations are met. Each element is discussed in further detail below.

2.2.4 A Landscape and Targeted Focus

The WLFW – Southwestern Willow Flycatcher Project is structured to facilitate landscape-level improvements across the species' range while recognizing that threats and opportunities differ among ecological zones and within identified focal areas. Close collaboration of many stakeholders, including local, State, and Federal agencies, tribes, and non-government organizations (NGOs), will ensure that NRCS activities complement efforts already underway. The WLFW – Southwestern Willow Flycatcher 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 – Southwestern Willow Flycatcher 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- Southwestern Willow Flycatcher Project. Appendix I contains a description of the NRCS planning process and its interrelationship with this document.

The NRCS worked closely with the Service and state wildlife agencies and other partners to produce focal habitat maps for the Southwestern Willow Flycatcher. The maps focus the program on increasing and improving occupied, suitable, and potential breeding habitat, supporting southwestern willow flycatcher 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 – Southwestern Willow Flycatcher Project.

2.2.5 Selected Conservation Practices

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

- The core conservation management practices for the benefit of Southwestern Willow Flycatcher 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 Southwestern Willow Flycatcher 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 Southwestern Willow Flycatcher and the other covered specie.

All conservation plans developed under the WLFW – Southwestern Willow Flycatcher Project will have one or more of the core practices listed in Table 1. Core practices are critical to addressing the targeted resource concern(s) for the Initiative and achieving the desired environmental outcome(s). For each core practice, a wildlife habitat evaluation will be conducted, using the Southwestern Willow Flycatcher Wildlife Habitat Evaluation Guide (WHEG) (see section 2.2.3 and Appendix V), to identify limiting factors to be addressed in order of their significance. The identification of the species' limiting factors at the owner site level is essential to ensure that the goals of a core practice are being met under the WLFW-Southwestern Willow Flycatcher project.

Implementing WLFW – Southwestern Willow Flycatcher Project under the core practices eliminates the possibility of using practices that benefit producers exclusively but not the Southwest Willow Flycatcher. 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 Southwest Willow Flycatcher 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 – Southwestern Willow Flycatcher Project.

Appendix IV provide details on each of the covered Conservation Practice and includes the definition, purpose(s), associated resource concerns and specific application within the action area. Additionally; the potential adverse and beneficial effects are identified and described for the covered species. The conservation measures necessary to minimize harm and/or produce optimal benefits to the covered species are described.

This document evaluates the collective effects of implementing all aspects of the WLFW – Southwestern Willow Flycatcher Project on the covered species (see Table 2) and their supporting habitats. The analysis focuses on identified conservation practices required to implement the WLFW – Southwest Willow Flycatcher Project. Use of the conservation practices occurs in concert with NRCS comprehensive conservation planning framework, details of which are provided in Appendix I, 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 for the WLFW-Southwestern Willow Flycatcher Project 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 Service will use this document as a foundation for continuing collaborative partnership designed to improve the conservation status of the Southwestern Willow Flycatcher and other targeted species on private lands within the reach of NRCS' programs and authorities.

Table 1. Estimated extent and/or frequency of covered conservation practices (in acres) by State and totals for WLFW-Southwestern Willow Flycatcher Project.

NRCS Code	**Practice Name**	**Practice type**	**Life span (yrs)**	**AZ**	**CA**	**CO**	**NV**	**NM**	**UT**	**Total For Action Area**
647	Early Successional Habitat Development/ Management (acre)	Core- Mgt	1	0				0		**0**
643	Restoration and Management of Declining Habitats (ac.)	Core- Mgt	1				20	500	200	**720**
395	Stream Habitat Improvement and Management (ac.)	Core- Mgt	5	20	15	25		100	200	**360**
645	Upland Wildlife Habitat Management (ac.)	Core- Mgt	1	250	350	300		300	200	**1,400**
644	Wetland Wildlife Habitat Management (acre)	Core- Mgt	1	40	60	90		50		**240**
472	Access Control (ac.)	Facilitating - Management	10	100	125			500		**725**
575	Animal Trails and Walkways (ft.)	Facilitating - Mechanical	10					0		**0**
314	Brush Management (ac.)	Facilitating - Structural	1	20	40		10	250	200	**520**
327	Conservation Cover (ac.)	Facilitating - Planting	5					0		**0**

NRCS Code	Practice Name	Practice type	Life span (yrs)	AZ	CA	CO	NV	NM	UT	Total For Action Area
382	Fence (ft.)	Facilitating - Structural	20	8k	12k	19k	2k	1.5 k	10k	**52,500**
386	Field Border (ac.)	Facilitating - Structural	10					0		**0**
512	Forage & Biomass Planting (ac.)	Facilitating - Planting	5							**0**
511	Forage Harvest Management (ac.)	Facilitating - Management	1					0		**0**
655	Forest Harvest Trails and Landings (sq ft)	Facilitating - Mechanical	5							
666	Forest Stand Improvement (ac.)	Facilitating - Mechanical	10					0		**0**
410	Grade Stabilization Structure (no.)	Facilitating - Mechanical	15	4	4			0	16	**24**
315	Herbaceous Weed Control (ac.)	Facilitating - Management	5							
561	Heavy Use Area Protection (ac.)	Facilitating - Management	10					0		**0**
595	Integrated Pest Management (ac.)	Facilitating - Management	1	30	25			250		**305**
449	Irrigation Water Management (ac.)	Facilitating - Management	1					0		**0**
500	Obstruction Removal (ac.)	Facilitating - Structural	10			3		5		**8**
582	Open Channel (ft.)	Facilitating - Mechanical	15			1.6 k		0	300	**1,900**

NRCS Code	Practice Name	Practice type	Life span (yrs)	AZ	CA	CO	NV	NM	UT	Total For Action Area
516	Pipeline (ft.)	Facilitating - Structural	20	1k	1.2 k			1.5 k		**3,700**
528	Prescribed Grazing (ac.)	Facilitating - Management	1	500	600	300		200	200	**1,800**
391	Riparian Forest Buffer (ac.)	Facilitating - Planting	15	25	30		20	400		**475**
390	Riparian Herbaceous Cover (ac.)	Facilitating - Planting	10					100		**100**
584	Stream Channel Stabilization (ft.)	Facilitating - Mechanical	10	50	60			100		**210**
578	Stream Crossing (no.)	Facilitating - Structural	10	1	1			3		**5**
580	Streambank & Shoreline Protection (ft.)	Facilitating - Planting	20		150	7k	400	0	2,k	**9,550**
587	Structure for Water Control (no.)	Facilitating - Structural	20					1		**1**
612	Tree/Shrub Establishment (ac.)	Facilitating - Planting	15	25	30			50		**105**
490	Tree/Shrub Site Preparation (ac.)	Facilitating - Mechanical	1							
642	Water Well (no.)	Facilitating - Structural	20	1	1			3		**5**
614	Watering Facility (no.)	Facilitating - Structural	20	9	12	3	4	5	2	**35**
659	Wetland Enhancement (acre)	Facilitating - Mechanical	15	10				10		**10**
657	Wetland Restoration (acre)	Facilitating - Mechanical	15					5		**5**
384	Woody Residue treatment	Facilitating - Mechanical								

2.2.6 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 a develop WHEG for the Southwestern Willow Flycatcher. 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. The WHEG's are named in a manner that may use terminology such as "evaluation", "appraisal", "assessment", or "habitat suitability model". They usually take a form similar to Habitat Suitability Index Models (See the Service's Ecological Services Manual, Habitat as a Basis for Environmental Assessment, 1980) and often include variables that are relatively easy for non-biologist staff to collect while in the field

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). There are two versions of the Southwestern Willow Flycatcher WHEGs, one for below 6000 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 Southwestern Willow Flycatcher habitat. Elements scoring below 0.5 do not meet Southwestern Willow Flycatcher 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.

After completing the Southwestern Willow Flycatcher WHEG, the planner will then work with the client to develop and evaluate alternatives to address the resource concerns from Table 4 that do not meet quality criteria for SWFL 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.

2.2.7 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 as a result of practice implementation.

As a component of the WLFW - Southwestern Willow Flycatcher Project, the Service and NRCS jointly identified and developed Conservation Measures (Appendix II and III). 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. Appendix IV is a comprehensive discussion of the potential adverse and beneficial effects of each Conservation Practice on the covered species.

2.2.8 Monitoring

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.

2.2.9 Operation and Maintenance of Prescribed Grazing and Associated Practices

Prescribed grazing will be applied within some areas within planned grazing units. Adjustments will be made as needed to ensure that the goals and objectives of the prescribed grazing strategy are met.

2.2.10 Maintenance

Monitoring data and grazing records will be used to evaluate the efficacy of the prescribed grazing plan in meeting the Southwestern Willow Flycatcher habitat goals, the livestock production goals, and any associated goals such as weed control. This provides for the timely modification of the plan if the goals are not being met.

All facilitating and accelerating practices (e.g. Fence (382), Pest Management (595), Brush Management (314), Forage and Biomass Planting (512), etc.) that are needed to effect adequate grazing and/or browsing distribution as planned by this practice standard will be maintained in good working order and are being operated as intended. The NRCS policy provides quality review of a minimum of 5 percent of contracts for compliance with these requirements.

The NRCS will use the WHEG for the Southwestern Willow Flycatcher to assess annual progress toward habitat goals at the site level. In addition to the site scale evaluations of the effectiveness of implementation of the conservation practices (as conditioned by the conservation measures) to produce the expected conservation outcome, the NRCS is proposing to utilize in-house staff to monitor large scale habitat changes following the procedures of Hatten et al. (2010). The work of Hatten et al. (2010) 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 Southwestern Willow Flycatcher working lands for wildlife program at the landscape scale.

2.2.11 Training

The NRCS and partners will provide training to landowners to monitor changes in plant community structure and habitat quality. Training will include browse utilization measurement, stubble height measurement, and monitoring of upland species so that they can accurately determine when to remove livestock from the riparian area. The NRCS personnel in the project

area will receive training in Conservation Planning, Habitat Evaluation, Southwestern Willow Flycatcher ecology, Prescribed Grazing, and riparian ecology as needed.

2.3 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 - Southwestern Willow Flycatcher 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. Table 1 provides the expected lifespan of each of the covered practices. The NRCS is requesting that the scope of the Service's biological opinion 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.

2.3.1 Establishing Original Conditions

The method used for establishing original conditions will be the Wildlife Habitat Evaluation Guide (WHEG) or other acceptable methodology as identified in 2.2.3 above. 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-Southwestern 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).

2.3.2 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 cost-share agreement and Conservation Plan that are necessary to maintain the original responsibilities for that landowner.

2.3.4 Outcomes Expected

The overall goal of the WLFW- Southwestern Willow Flycatcher Project is to increase Southwest Willow Flycatcher abundance and distribution through habitat improvements and by addressing local and landscape threats. At least one of the identified core management practices will be implemented on all acres contracted through the WLFW – Southwestern Willow Flycatcher Project. The long-term implementation of these core practices is essential to the success of the WLFW – Southwestern Willow Flycatcher Project.

In the short-term, the desired outcome is additional management and enhancement of Southwest Willow Flycatcher habitat on private lands within the Action Area. Over the long-term it is anticipated that the WLFW – Southwestern Willow Flycatcher Project will facilitate the improvement of existing populations, creation of new habitat, reduction of fragmentation of suitable habitat, and reduction or elimination of threats and challenges to recovery, and conservation of not only the Southwestern Willow Flycatcher but other covered species as well. Many associated riparian and aquatic species will benefit from the WLFW – Southwestern Willow Flycatcher Project. The Service will discuss these benefits in more detail in the Biological Opinion.

3.0 Species considered

The list of species covered in this consultation is found in Table 2. Minimization measures are aimed at avoiding direct mortality, harm and harassment to covered species. Critical time periods are those portions of the year that covered species, or specific life stages of a covered species, are most vulnerable to the effects of covered activities. These critical periods typically involve times of the year when breeding, nesting, or the rearing of young occur and when vulnerable life stages, such as egg, larvae, tadpoles, nestlings, and pups may be present in the action area. These life stages are most vulnerable to the potential effects of the covered activities in this consultation. Critical time periods reflect the periods that NRCS will avoid implementation of practices except where otherwise stated are listed in Table 2.

Table 2. Covered Species List and Critical Time Periods. E = Endangered; T = Threatened; C = Candidate; EXPN = Experimental, non-essential populations (considered at the same level as proposed species). No proposed species identified within Southwestern Willow Flycatcher habitat; some species have proposed critical habitat.

Species	Scientific Name	Status	Critical Habitat	State	Critical Time Period
AMPHIBIANS					
Arroyo toad	*Anaxyrus californicus*	E	YES	CA	Mar 1 –Sep 15
California red-legged frog	*Rana aurora draytoni*	T	YES	CA	Nov1- July 15 (but Year-

					round)
Chiricahua Leopard Frog	*Rana chiricahuensis*	T	NO	AZ NM	May 1 to Oct. 31 (above 5,900') July 15 to Feb. 14 (below 5,900')
Columbia spotted frog	*Rana luteiventris*	C	No	CA	Apr 1- Oct 1
Mountain yellow-legged frog	*Rana muscosa*	E	YES	CA	Apr 1- Oct 1
Mountain yellow-legged frog	*Rana muscosa*	C	NO	CA	Apr 1- Oct 1
Relict leopard frog	*Lithobates onca*	C	NO	AZ	Jan 15- July 1
Northern Mexican gartersnake	*Thamnophis eques megalops*	C	NO	AZ	Apr 1- Jun 1 & Jul 1 – Sept 1
BIRDS					
California clapper rail	*Rallus longirostris obsoletus*	E	NO	CA	Mar 15- Sep 15
Least Bell's vireo	*Rallus longirostris obsoletus*	E	YES	CA	Mar 15 – Sep 15
Southwestern willow flycatcher	*Empidonax traillii extimus*	E	Yes	AZ, CA, CO, NM, NV, UT	April 15 to Sept 15
Yellow billed cuckoo	*Coccyzus americanus*	C	NO	AZ, CA, CO, NM, NV, UT	Needs review
Yuma clapper rail	*Rallus longirostris yumanensis*	E	No	AZ, CA	Mar 1 – Jul 1
FISH					
Chihuahua chub	*Gila nigrescens*	T	NO	AZ	Apr 1-Oct 1
Colorado pikeminnow	*Ptychocheilus lucius*	E	YES	AZ CO NM UT	Jun 1-Sep 1
Colorado pikeminnow	*Ptychocheilus lucius*	EXPN	NO	AZ	Jun 1-Sep 1
Desert pupfish	*Cyprinodon*	E	Yes	AZ	Mar 1-Sep 1

	macularius				
Gila chub	*Gila intermedia*	E	YES	AZ	Apr 1 – Sep 1
Gila topminnow	*Poeciliopsis occidentalis*	E	No	AZ	Apr 1 – Sep 1
Gila trout	*Oncorhynchus gilae*	T	No	AZ	April 1- July 1
Greenback cutthroat trout	*Oncorhynchus clarki stomias*	T	NO	CA, CO	April 1- July 1
Headwater chub	*Gila nigra*	C	NO	AZ NM	
Humpback chub	*Gila cypha*	E	Yes	AZ	May 1- Aug 1
Lahontan cutthroat trout	*Oncorhynchus clarki henshawi*	T	NO	CA	
Little Colorado spinedace	*Lepidomeda vittata*	T	Yes	AZ	May1 –July 1
Loach Minnow	*Tiaroga cobitis*	E	Yes	AZ	March 1 – July 1
Mohave tui chub	*Gila bicolor mohavensis*	E	NO	CA	
Owens pupfish	*Cyprinodon radiosus*	E	NO	CA	Feb 1- Sep 1
Owens tui chub	*Gila bicolor ssp. snyderi*	E	YES	CA	Apr 15- Sep 1
Pecos bluntnose shiner	*Notropis simus pecosensis*	T	YES	NM	May 1-Oct 1
Pecos gambusia	*Gambusia nobilis*	E	NO	NM	spawn yr-round
Razorback sucker	*Xyrauchen texanus*	E	Yes	AZ	Feb 1- May 1
Rio Grande cutthroat trout	*Oncorhynchus clarki virginalis*	C	NO	NM	May 15- Jul 15
Rio Grande silvery minnow	*Hybognathus amarus*	E	YES	NM	May1-Sep 1
Rio Grande silvery minnow	*Hybognathus amarus*	EXPN	NO	NM	May1-Sep 1
Roundtail chub	*Gila robusta*	C	NO	AZ	May 1-Sep 1
Santa Ana sucker	*Catostomus santaanae*	T	YES	CA	
Sonora chub	*Gila ditaenia*	T	Yes	AZ	Mar 1- Sep 1
Spikedace	*Meda fulgida*	E	Yes	AZ	April 1and July 1
Tidewater goby	*Eucyclogobius newberryi*	E	Proposed	CA	Year-round
Unarmored threespine	*Gasterosteus aculeatus*	E	Proposed	CA	Feb 1- Oct 1

stickleback	*williamsoni*				
Virgin River chub	*Gila seminuda (=robusta)*	E	Yes	AZ, NV, UT	April 15- Jul 15
Woundfin	*Plagopterus argentissimus*	E	Yes	AZ, NM, UT	Mar 1 – Jun 1
Woundfin	*Plagopterus argentissimus*	EXPN	NO	AZ, NM	Mar 1 – Jun 1
Yaqui catfish	*Ictalurus pricei*	T	YES	AZ	
Yaqui chub	*Gila purpurea*	E	YES	AZ	
Zuni bluehead sucker	*Catostomus discobolus yarrowi*	C	NO	AZ, NM	Mar 1-Sep 1
INVERTEBRATES					
Nevares Spring naucorid bug	*Ambrysus funebris*	C	NO	CA	
PLANTS					
Ash Meadows blazingstar	*Mentzelia leucophylla*	T	YES	CA	
Ash Meadows ivesia	*Ivesia kingii var. eremica*	T	YES	CA	
Ash Meadows milkvetch	*Astragalus phoenix*	T	YES	CA	
Canelo Hills Ladies Tresses	*Spiranthes delitescens*	E	no	AZ	Year round, very difficult to detect
Chorro Creek bog thistle	*Cirsium fontinale var. obispoense*	E	NO	CA	Apr 1 –Oct 1
Gambel's watercress	*Rorippa gambellii*	E	NO	CA	Year-round; very limited numbers
Hickman's potentilla	*Potentilla hickmanii*	E	?	CA	
Huachuca Water Umbel	*Lilaeopsis schaffneriana var. recurva*	E	yes	AZ	None specified
Marsh Sandwort	*Arenaria paludicola*	E	NO	CA	May1 to Sep 1
Otay mesa mint	*Pogogyne nudiuscula*	E	NO	CA	
Salt Marsh bird's-beak	*Cordylanthus maritimus ssp. maritimus*	E	NO	CA	Mar 15 – Jul 15

Ute ladies-tresses	*Spiranthes diluvialis*	T	NO	CA	July 15- Sep 1
Ventura Marsh milk-vetch	*Astragalus pycnostachyus var. lanosissimus*	E	YES	CA	Year-round; only one small population
Willowy monardella	*Monardella viminea*	E	YES	CA	June 1-Sep 1
MAMMALS					
Amargosa vole	*Microtus californicus scirpensis*	E	YES	CA	
Buena Vista Lake ornate shrew	*Sorex ornatus relictus*	E	Proposed	CA	Mar 1 – Jul 1
New Mexico meadow jumping mouse	*Zapus hudsonius luteus*	C	NO	AZ, NM	

3.1 STATUS OF THE SPECIES AND ENVIRONMENTAL BASELINE

This section presents the biological and ecological information relevant to formulating the biological opinion. Because the species' range is wholly contained within the action area, the discussion below includes the Environmental Baseline for the Southwestern Willow Flycatcher.

Southwestern Willow Flycatcher

The Southwestern Willow Flycatcher (*Empidonax traillii extimus*) (flycatcher) is a small grayish-green passerine bird (Family Tyrannidae) measuring approximately 5.75 inches. The flycatcher is considered a neotropical migrant that breeds in the Southwest U.S. and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Stiles and Skutch 1989, Howell and Webb 1995). The flycatcher was listed as endangered, without critical habitat on February 27, 1995 (U.S. Fish and Wildlife Service 1995). Critical habitat was designated in 1997 and 2005; a revision to the 2005 rule was proposed in August 2011 (see below) with a final designation expected to be published in August 2012.

Reasons for Listing

Reasons for decline have been attributed to primarily loss, modification, and fragmentation of riparian breeding habitat, along with a host of other factors including loss of wintering habitat and brood parasitism by the brown-headed cowbird (Sogge *et al.* 1997, McCarthey *et al.* 1998). Habitat loss and degradation are caused by a variety of factors, including urban, recreational, and agricultural development, water diversion and groundwater pumping, channelization, dams, and excessive livestock grazing. Fire is an increasing threat to willow flycatcher habitat (Paxton *et al.* 1996), especially in monotypic saltcedar vegetation (DeLoach 1991) and where water diversions and/or groundwater pumping desiccates riparian vegetation (Sogge *et al.* 1997). Willow flycatcher nests can be parasitized by brown-headed cowbirds (*Molothrus ater*), which lay their eggs in the host's nest. Feeding sites for cowbirds are enhanced by the presence of livestock and range improvements such as waters and corrals; agriculture; urban areas; golf

courses; bird feeders; and trash areas. When these feeding areas are in close proximity to flycatcher breeding habitat, especially coupled with habitat fragmentation, cowbird parasitism of flycatcher nests may increase (Hanna 1928, Mayfield 1977a,b, Tibbitts *et al.* 1994).

Distribution and Abundance

The historical and current breeding range of the Southwestern Willow Flycatcher included southern California, Arizona, New Mexico, western Texas, southern Colorado, southern Utah , southern Nevada, and extreme northwestern Mexico (Sonora and Baja) (Unitt 1987). There are currently 288 known Southwestern Willow Flycatcher breeding sites in California, Nevada, Arizona, Utah, New Mexico, and Colorado (all sites from 1993 to 2007 where a territorial flycatcher has been detected) holding an estimated 1,299 territories (Durst *et al.* 2008). It is difficult to arrive at a grand total of flycatcher territories since not all sites are surveyed annually. At the time of listing in 1995, it was estimated that approximately 900 to 1100 pairs existed range-wide. Numbers have increased since the bird was listed although some habitat remains unsurveyed. After nearly a decade of intense surveys however, the existing numbers are just past the upper end of Unitt's (1987) estimate of 20 years ago (500-1000 pairs). About 50 percent of the 1,299 estimated territories (see Table 3.1) throughout the subspecies range are located in Arizona and New Mexico at four general locations (Cliff/Gila Valley – New Mexico, Roosevelt Lake - Arizona, San Pedro River/Gila River confluence – Arizona, Middle Rio Grande, New Mexico).

Table 3.1. Estimated rangewide population for the Southwestern Willow Flycatcher based on 1993 to 2007 survey data for Arizona, California, Colorado, New Mexico, Nevada, Utah, and Texas[1].

State	Number of sites with WIFL territories 1993-07[2]	Percentage of sites with WIFL territories 1993-07	Number of territories[3]	Percentage of total territories
Arizona	124	43.1 %	459	35.3 %
California	96	33.3 %	172	13.2 %
Colorado	11	3.8 %	66	5.1 %
Nevada	13	4.5 %	76	5.9 %
New Mexico	41	14.2 %	519	40.0 %
Utah	3	1.0 %	7	0.5%
Texas	?	?	?	?

Total	288	100 %	1,299	100 %

[1]Durst *et al.* 2008.
[2]Site boundaries are not defined uniformly throughout the bird's range.
[3] Total territory numbers recorded are based upon the most recent years survey information from that site between 1993 and 2007.

Arizona **-** The historical range of the flycatcher in Arizona included portions of all major watersheds (Swarth 1914, Phillips 1948, Unitt 1987). Contemporary investigations (post-1990) show the flycatcher persists, 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 flycatchers throughout the state has not changed much. Currently, population stability in Arizona is believed to be 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 either in 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 flycatcher.

California **-** Historically, the Southwestern Willow Flycatcher 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 D iego County (Unitt 1984, 1987). River systems where the flycatcher persists include the Colorado, Owens, Kern, Mojave, Santa Ana, Pilgrim Creek, Santa Margarita, San Luis Rey, San Diego, San Mateo C reek, San Timoteo Creek, Santa Clara, Santa Ynez, Sweetwater, San Dieguito, and Temecula Creek (Whitfield 1990, Holmgren and Collins 1995, Kus 1996, Kus and Beck 1998, Whitfield et al. 1998, McKernan and Braden 1999, L. Hays unpubl. data, Griffith and Griffith in press, W. Haas pers. comm., B. Kus pers. comm. and unpubl. data, McKernan unpubl. data).

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 Creek and Clear Creek (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 flycatcher 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 flycatchers on the Virgin River and Muddy River, the Amargosa River drainage at Ash Meadows NWR, Meadow Valley Wash, and the Pahranagat River drainage (McKernan and Braden 1999, Micone and Tomlinson 2000, USFWS unpubl. data).

New Mexico - In New Mexico, the historic breeding range of the flycatcher is considered to have been primarily from the Rio Grande Valley westward, including the Rio Grande, Chama, Zuni, San Francisco, and Carson watersheds (Bailey 1928, Ligon 1961, Hubbard 1987); breeding was unconfirmed in the San Juan and Pecos drainages (Hubbard 1987). Contemporary surveys documented that flycatchers 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 (Cooper 1996, 1997, 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 flycatcher populations (Skaggs 1996, Stoleson and Finch 1999).

Utah - The north-central limit of the flycatcher'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, W auer 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 flycatchers 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

The Southwestern Willow Flycatcher 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 Southwestern Willow Flycatcher'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, Southwesternern willow flycatchers 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 Southwestern Willow Flycatcher: monotypic willow, monotypic exotic, native broadleaf dominated, and mixed native/exotic (Sogge *et al.* 1997).

The flycatcher'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 flycatcher'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 Southwestern Willow Flycatchers (McLeod *et al.* 2005, Cardinal and Paxton 2005). Flycatcher habitat can quickly change and vary in suitability, location, use, and occupancy over time (Finch and Stoleson 2000).

The flycatcher'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 Southwestern Willow Flycatcher, however comparisons of reproductive performance (USFWS 2002), prey populations (Durst 2004) and physiological conditions (Owen and Sogge 2002) of flycatchers breeding in native and exotic vegetation has revealed no difference (Sogge *et al.* 2005).

Breeding Biology

Throughout its range the Southwestern Willow Flycatcher arrives on breeding grounds in late April and May (Sogge and Tibbitts 1992, Sogge et al. 1993, Sogge and Tibbitts 1994, Muiznieks et al. 1994, Maynard 1995, Sferra et al. 1995, 1997). Nesting begins in late May and early June and young fledge from late June through mid-August (Willard 1912, Ligon 1961, Brown 1988a,b, Whitfield 1990, Sogge and Tibbitts 1992, Sogge et al. 1993, Muiznieks et al. 1994, Whitfield 1994, Maynard 1995). Southwestern Willow Flycatchers typically lay three to four eggs per clutch (range = 1 to 5). Eggs are laid at one-day intervals and are incubated by the female for approximately 12 days (Bent 1960, Walkinshaw 1966, McCabe 1991). Young fledge approximately 12 to 13 days after hatching (King 1955, Harrison 1979). Typically one brood is raised per year, but birds have been documented raising two broods during one season and renesting after a failure (Whitfield 1990, Sogge and Tibbitts 1992, Sogge et al. 1993, Sogge and Tibbitts 1994, Muiznieks et al. 1994, Whitfield 1994, Whitfield and Strong 1995). The entire breeding cycle, from egg laying to fledging, is approximately 28 days (see Figure 2).

Southwestern Willow Flycatcher nests are fairly small (3.2 inches tall and 3.2 inches wide) and its placement in a shrub or tree is highly variable (1.6 to 60 feet off the ground). Nests are open cup structures, and are typically placed 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 (USFWS 2002). Occasionally, nests are placed in down-curving branches. Nest height varies considerably, from 1.6 to 60 feet, and may be related to height of nest plant, overall canopy height, and/or the height of the vegetation strata that contain small twigs and live growth (USFWS 2002). Most typically, nests are relatively low, 6.5 to 23 feet above ground (USFWS

2002). 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.

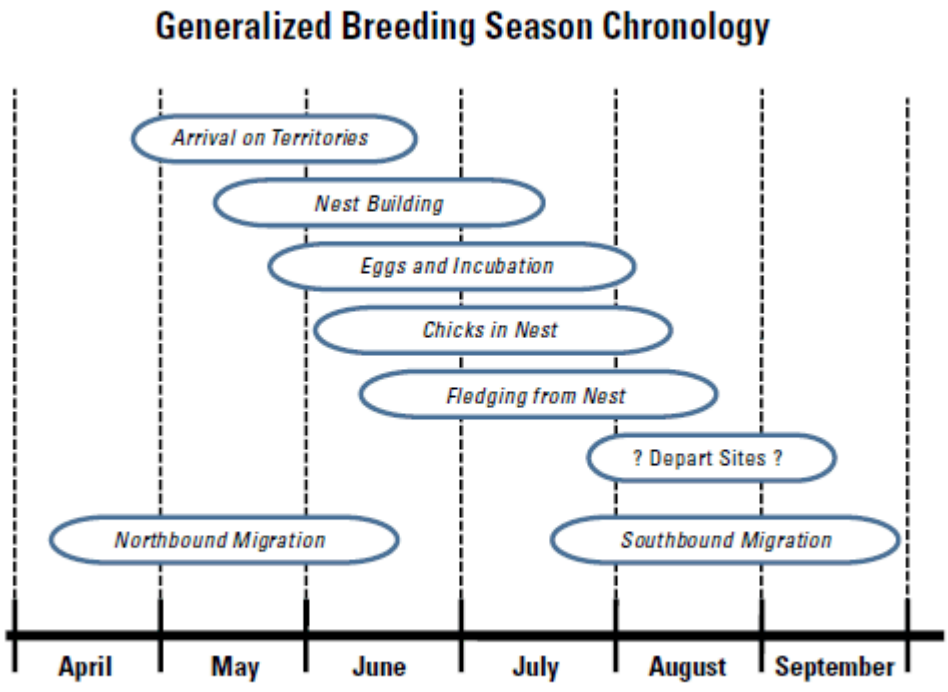


Figure 8. Generalized migration and breeding chronology for the Willow Flycatcher in the Southwest. Extreme or record dates may occur slightly earlier or later than indicated.

The Southwestern Willow Flycatcher is an insectivore, foraging in dense shrub and tree vegetation along rivers, streams, and other wetlands. 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 Southwestern willow flycatcher (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 fragments of plant material.

Brown-headed cowbird parasitism of Southwestern Willow Flycatcher broods has been documented throughout its range (Brown 1988, Whitfield 1990, Muiznieks et al. 1994, Whitfield 1994, Hull and Parker 1995, Maynard 1995, Sferra et al. 1995, Sogge 1995b). Where studied, high rates of cowbird parasitism have coincided with Southwestern Willow Flycatcher population declines (Whitfield 1994, Sogge 1995, Whitfield and Strong 1995) or, at a minimum, resulted in reduced or complete nesting failure at a site for a particular year (Muiznieks et al. 1994, Whitfield 1994, Maynard 1995, Sferra et al. 1995, Sogge 1995, Whitfield and Strong 1995). Cowbird eggs hatch earlier than those of many passerine hosts, thus giving cowbird nestlings a competitive advantage (Bent 1960, McGeen 1972, Mayfield 1977, Brittingham and

Temple 1983). Flycatchers can attempt to renest, but it often results in reduced clutch sizes, delayed fledging, and reduced nest success (Whitfield 1994). Whitfield and Strong (1995) found that flycatcher nestlings fledged after July 20th had a significantly lower return rate and cowbird parasitism was often the cause of delayed fledging.

Territory and Home Range Size

Southwestern Willow Flycatcher 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 (Whitfield and Enos 1996). Within a 2.22 acre patch on Colorado River, estimated territory sizes were 0.15 to 0.49 acres (Sogge 1995), and in a 3.71 acre patch on the Verde River, 0.49 to 1.24 acres (Sogge 1995). Territories are established within a larger patch of appropriate habitat sufficient to contain several nesting pairs of flycatchers.

Cardinal and Paxton (2005) found that the home ranges of telemetered flycatchers at Roosevelt Lake, Arizona, varied from 0.37 to 890 acres. Bird movements just prior to and following nesting were the greatest, while movements while incubating and with nestlings were the most limited. Movements following fledging of young indicated possible pre-migration staging and the targeting of local increases in insect prey populations. Birds were found using a variety of riparian habitat in a variety of conditions (open, young mature, exotic, mixed, etc.) and the distances moved indicate that birds can occupy a larger area and used more different types of habitat than previously believed (Cardinal and Paxton 2005).

Movements

The site and patch fidelity, dispersal, and movement behavior of adult, nestling, breeding, non-breeding, and migratory Southwestern Willow Flycatchers are just beginning to be understood (Kenwood and Paxton 2001, Koronkiewicz and Sogge 2001). From 1997 through 2000, 66 to 78 percent of flycatchers known to have survived from one breeding season to the next returned to the same breeding site; conversely, 22 to 34 percent of returning birds moved to different sites (Luff *et al*. 2000). A large percentage (75%) of known surviving 2000 adults returned in 2001 to their same breeding site (Kenwood and Paxton 2001). Just considering Roosevelt Lake in its entirety, all but three surviving birds (n=28) banded at Roosevelt Lake returned to Roosevelt Lake (Kenwood and Paxton 2001). Although most Southwestern Willow Flycatchers return to former breeding sites, flycatchers can regularly move among sites within and between years (Kenwood and Paxton 2001). Within-drainage movements are more common than between-drainage movements (Kenwood and Paxton 2001). Year-to-year movements of birds have been detected between the San Pedro/Gila river confluence and Roosevelt Lake, the Verde River near Camp Verde and Roosevelt Lake, and the Little Colorado River near Greer and Roosevelt Lake (Kenwood and Paxton 2001). Typical distances moved range from 1.2 to 18 miles. However, long-distance movements of up to 137 miles have been observed on the lower Colorado River and Virgin River (McKernan and Braden 2001). Breeding groups of Southwestern Willow fFycatchers act as a meta-population (Busch et al. 2000).

Critical Habitat Designation

The USFWS published a proposal to revise flycatcher critical habitat on August 15, 2011. Designated Southwestern Willow Flycatcher habitat provide aquatic and terrestrial habitat

containing the essential biological and physical characteristics to support and maintain self-sustaining populations and metapopulations throughout its range. The Southwestern Willow Flycatcher breeds in riparian habitats along rivers, streams, or other wetlands, where relatively dense growths of trees and shrubs are established, near or adjacent to surface water or underlain by saturated soil. Habitat characteristics such as dominant plant species, size and shape of habitat patch, canopy structure, vegetation height, and vegetation density vary widely among sites. As a neotropical migrant (migrating between Central and South America and the United States), migration stopover areas for the Southwestern Willow Flycatcher, even though not used for breeding, are critically important, (i.e. essential) resources affecting productivity and survival.

Based on our 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, we determined that the Southwestern Willow Flycatcher's primary constituent elements are:

(1) Primary Constituent Element 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 Gooddings willow, coyote willow, Geyers 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) Primary Constituent Element 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 being proposed for designation as critical habitat. Critical habitat for the Southwestern Willow Flycatcher is designated across a wide portion of the subspecies' range and is organized in Management Units (as described in the Recovery Plan). We designated stream segments in 15 Management Units found in 5 Recovery Units as critical habitat for the Southwestern Willow Flycatcher. Critical habitat is located in Apache, Cochise, Gila, Graham, Greenlee, Maricopa, Mohave, Pinal, Pima, Santa Cruz, Yavapai, and Yuma counties in Arizona; Imperial, Los Angeles, Kern, Mono, Orange, Riverside, Santa Barbara, San Bernardino, San Diego, and Ventura counties in southern California; Clark, Lincoln, and Nye counties southeastern Nevada; Catron, Cibola, Dona Ana, Grant, Hidalgo, McKinley, Mora, Rio Arriba, Santa Fe, San Juan, Soccoro, Taos, and Valencia counties in New Mexico; Alamosa, Conejos, Costilla, la Plata, and Rio Grande counties in southern Colorado and; Kane, Juan, and Washington counties in Southwestern Utah.

The physical and biological features essential to the conservation of the Southwestern Willow flycatcher described above are results of the dynamic river environment that germinates, develops, maintains, and regenerates the riparian forest and provides food for breeding, non-breeding, dispersing, territorial, and migrating Southwestern willow flycatchers. Anthropogenic factors such as dams, irrigation ditches, or agricultural field return flow can assist in providing conditions that support flycatcher habitat. It is important to recognize that the PCEs are present throughout the river segments selected (PCE 1), but the specific quality of riparian habitat for nesting (PCE 1), migration (PCE 1), foraging (PCE 1 and 2), and shelter (PCE 1) will not remain constant in their condition or location over time due to succession (*i.e.*, plant germination and growth) and the dynamic environment in which they exist.

The USFWS designated stream ''segments'' as critical habitat for the Southwestern Willow Flycatcher that provide for flycatcher habitat (nesting, foraging, migrating, regenerating, etc.) 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 as a result of flooding, drought, inundation, and changes in floodplains and river channels (USFWS 2002) that result from current flow management practices and priorities. Stream segments include breeding sites in high connectivity and other essential flycatcher habitat components needed to conserve the subspecies. Those other essential components of flycatcher habitat (foraging habitat, habitat for nonbreeding flycatchers, 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 flycatcher is metapopulation stability, population connectivity, gene flow, and protection against catastrophic loss of populations. Because the flycatcher exists in disjunct breeding populations across a wide geographic and elevation range, and is subject to dynamic events, the designated critical habitat river segments are widespread across the subspecies range. The focus of the critical habitat

designation is therefore a conservation strategy which relies on protecting large flycatcher populations as well as small populations with high connectivity (USFWS 2002). Large populations, centrally located, contribute the most to metapopulation stability, especially if other breeding populations are nearby (USFWS 2002). Large populations persist longer than small ones, and produce more dispersers capable of emigrating to other populations or colonizing new areas (USFWS 2002). 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 flycatcher 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 (USFWS 2002), we identified these areas to help guide the delineation of areas with features essential to the conservation of the Southwestern Willow Flycatcher (i.e., critical habitat). The rule defines a large population as a single site or collection of smaller connected sites that support 10 or more territories.

Recovery Planning

The Southwestern Willow Flycatcher Recovery Plan was finalized in 2002. The Plan describes the reasons for endangerment, current status of the flycatcher, addresses important recovery actions, includes detailed issue papers on management issues, and provides recovery goals. Recovery is based on reaching numerical and habitat related goals for each specific Management Unit within six Recovery Units (see Figure 3 below) established throughout the subspecies range and establishing long-term conservation plans (USFWS 2002). Recovery actions in the Plan are categorized into nine types: (1) increase and improve occupied, suitable, and potential breeding habitat; (2) increase metapopulation stability; (3) improve demographic parameters; (4) minimize threats to wintering and migration habitat; (5) survey and monitor; (6) conduct research; (7) provide public education and outreach; (8) assure implementation of laws, policies, and agreements that benefit the flycatcher and; (9) track recovery progress. Figure 2 shows the recovery units for the Southwestern willow flycatcher.

According the specie's recovery plan, the Southwestern willow flycatcher may be removed from the list of threatened and endangered species when both of the following criteria have been met: (1) meet and maintain, at a minimum, the population levels and geographic distribution specified under reclassification to threatened Criterion A; increase the total known population to a minimum of 1,950 territories (equating to approximately 3,900 individuals), geographically distributed to allow proper functioning as metapopulation; and (2) provide protection from threats and create/secure sufficient habitat to assure maintenance of these populations and/or habitats over time. The sites containing flycatcher breeding groups, in sufficient number and distribution to warrant downlisting, must be protected into the foreseeable future through development and implementation of conservation management agreements (e.g., public land management planning process for Federal lands, habitat conservation plans (under Section 10 of the ESA), conservation easements, and land acquisition agreements for private lands, and

intergovernmental conservation agreements with Tribes). Prior to delisting, the USFWS must confirm that the agreements have been created and executed in such a way as to achieve their role in flycatcher recovery, and individual agreements for all areas within all Management Units (public, private, and Tribal) that are critical to metapopulation stability (including suitable, unoccupied habitat) must have demonstrated their effectiveness for a period of at least 5 years.

Figure 3. Southwestern Willow Flycatcher Recovery Units.

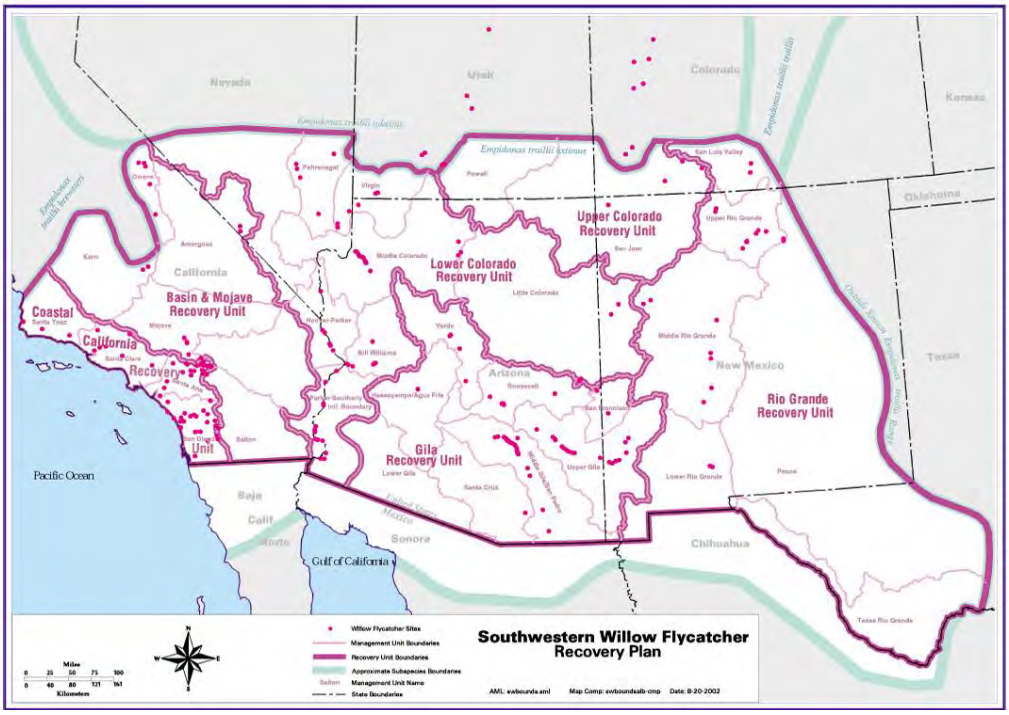


Figure 4. Recovery and Management Units for the southwestern willow flycatcher

3.2 STATUS OF OTHER SPECIES COVERED IN THIS BIOLOGICAL OPINION

AMPHIBIANS

Arroyo Toad

The arroyo toad (*Bufo californicus*) was listed on endangered on December 16, 1994. 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 Federal Register 64859). Arroyo toads breed and deposit egg masses in shallow, sandy pools that are usually bordered by sand and gravel flood terraces.

Historically, arroyo toads occurred from the upper Salinas River system on Fort Hunter Liggett Military Reservation (FHL), 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). Arroyo toads now survive primarily in the headwaters of streams as small, isolated populations, having been extirpated from much of their historic habitat.

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 are 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 have disappeared from approximately 75 percent of the species' historically occupied habitat in California. They were known historically to occur 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. Arroyo toads now survive primarily in the headwaters of coastal streams as small, isolated populations, having been extirpated from much of their historic habitat.

The arroyo toad's critical habitat includes the following primary constituent elements: (1) Rivers or streams with hydrologic regimes that supply water to provide space, food, and cover needed to sustain eggs, tadpoles, metamorphosing juveniles, and adult breeding toads. Breeding pools must persist a minimum of 2 months for the completion of larval development. However, due to the dynamic nature of southern California riparian systems and flood regimes, the location of suitable breeding pools may vary from year to year. Specifically, the conditions necessary to allow for successful reproduction of arroyo toads are: (a) breeding pools that are less than 6 in (15 cm) deep; (b) areas of flowing water with current velocities less than 1.3 ft per second (40 cm per second); and (c) surface water that lasts for a minimum of 2 months during the breeding season (a sufficient wet period in the spring months to allow arroyo toad larvae to hatch, mature, and metamorphose); (2) Riparian and adjacent upland habitats, particularly low-gradient (typically less than 6 percent) stream segments and alluvial streamside terraces with sandy or fine gravel substrates that support the formation of shallow pools and sparsely vegetated sand and gravel bars for breeding and rearing of tadpoles and juveniles; and adjacent valley bottomlands that include areas of loose soil where toads can burrow underground, to provide foraging and living areas for juvenile and adult arroyo toads; (3) a natural flooding regime, or one sufficiently corresponding to natural, that: (a) Is characterized by intermittent or near-perennial flow that contributes to the persistence of shallow pools into at least mid-summer; (b) Maintains areas of open, sparsely vegetated, sandy stream channels and terraces by periodically scouring riparian vegetation; and (c) Also modifies stream channels and terraces and redistributes sand and sediment, such that breeding pools and terrace habitats with scattered vegetation are maintained and; (4) Stream channels and adjacent upland habitats that allow for movement to breeding pools, foraging areas, overwintering sites, upstream and downstream dispersal, and connectivity to areas that contain suitable habitat.

<u>California Red-Legged Frog</u>

The California red-legged frog (*Rana aurora draytoni*) was listed on May 23, 1996 as threatened. The California red-legged frog is 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 known 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.

Critical habitat for the California red-legged frog's includes the following primary constituent elements: (1) *Aquatic Breeding Habitat*: Standing bodies of fresh water (with salinities less than 4.5 ppt), including natural and manmade (e.g., stock) ponds, slow-moving streams or pools within streams, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years; (2) *Aquatic Non-Breeding Habitat*: Freshwater pond and stream habitats, as described above, that may not hold water long enough for the species to complete its aquatic life cycle but which provide for shelter, foraging, predator avoidance, and aquatic dispersal of juvenile and adult California red-legged frogs. Other wetland habitats considered to meet these criteria include, but are not limited to: plunge pools within intermittent creeks, seeps, quiet water refugia within streams during high water flows, and springs of sufficient flow to withstand short-term dry periods; (3) *Upland Habitat:* Upland areas adjacent to or surrounding breeding and non-breeding aquatic and riparian habitat up to a distance of 1 mi (1.6 km) in most cases (i.e., depending on surrounding landscape and dispersal barriers) including various vegetation types such as grassland, woodland, forest, wetland, or riparian areas that provide shelter, forage, and predator avoidance for the California red-legged frog. Upland features are also essential in that they are needed to maintain the hydrologic, geographic, topographic, ecological, and edaphic features that support and surround the aquatic, wetland, or riparian habitat. These upland features contribute to: (1) Filling of aquatic, wetland, or riparian habitats; (2) maintaining suitable periods of pool inundation for larval frogs and their food sources; and (3) providing nonbreeding, feeding, and sheltering habitat for juvenile and adult frogs (e.g., shelter, shade, moisture, cooler temperatures, a prey base, foraging opportunities, and areas for predator avoidance). Upland habitat should include structural features such as boulders, rocks and organic debris (e.g., downed trees, logs), small mammal burrows, or moist leaf litter and; (4) *Dispersal Habitat:* Accessible upland or riparian habitat within and between occupied or previously occupied sites that are located within 1mi (1.6 km) of each other, and that support movement between such sites. Dispersal habitat includes various natural habitats, and altered habitats such as agricultural fields, that do not contain barriers (e.g., heavily traveled roads without bridges or culverts) to dispersal. Dispersal habitat does not include moderate- to high-density urban or industrial developments with large expanses of asphalt or concrete, nor does it include large lakes or

reservoirs over 50 ac (20 ha) in size, or other areas that do not contain those features identified in PCE 1, 2, or 3 as essential to the conservation of the species.

Chiricahua Leopard Frog

The Chiricahua leopard frog (*Lithobates [=Rana] chiricahuensis*) was listed as a threatened species without critical habitat in a Federal Register notice dated June 13, 2002. Included was a special rule to exempt operation and maintenance of livestock tanks on non-Federal lands from the section 9 take prohibitions of the Act. Critical habitat was proposed in 2011 and includes 43 critical habitat units in Arizona and New Mexico. The Chiricahua Leopard Frog Final Recovery Plan (Recovery Plan) was finalized in April 2007.

The range of the Chiricahua leopard frog includes 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 Durango (Platz and Mecham 1984, Degenhardt et al. 1996, Lemos-Espinal and Smith 2007, Rorabaugh 2008) (Figure 1). Reports of the species from the State of Aguascalientes (Diaz and Diaz 1997) are questionable. 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 (see further discussion below).

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 be excluded or 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 U.S. Fish and Wildlife Service 2011). The diet of the Chiricahua leopard frog includes primarily invertebrates such as beetles, true bugs, and flies, but fish and snails are also eaten.

Data suggest the status of the Chiricahua leopard frog is at least stable and probably improving in Arizona, declining in New Mexico, and unknown in Mexico. In pooled data for the U.S., a worst case analysis shows essentially no change in the number of occupied sites from 2002 to 2009 (133 versus 131, respectively); however, as discussed above, this likely underestimates the status of the species in Arizona, overestimates the status of the species in New Mexico, and includes data that are not standardized to be truly comparable. The actual situation is probably that the status of the species is stable in the U.S overall, but the different conditions between Arizona and New Mexico indicate that improvement is occurring only in Arizona at this time, while in New Mexico, frog numbers continue to decline. Continued and new aggressive recovery actions are needed to address threats to the species rangewide, to maintain positive trends in Arizona, to stabilize population losses in New Mexico, and to assist partners in Mexico with their conservation efforts. If on-going recovery actions are interrupted, drought worsens, or other threats intensify, the status of the species across its range could easily deteriorate.

The 2011 proposed critical habitat rule includes 43 critical habitat units across the range of the species in Arizona and New Mexico (U.S. Fish and Wildlife Service 2011a, 2011b). When critical habitat was proposed, the FWS 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 in the Notice of Availability on September 21, 2011.

Based on the above needs and our current knowledge of the life history, biology, and ecology of the species, and the habitat requirements for sustaining the essential life-history functions of the species, we have proposed that the PBFs essential to the conservation of the Chiricahua leopard frog are: (1) Aquatic breeding habitat and immediately adjacent uplands exhibiting the following characteristics: (a) standing bodies of fresh water (with salinities less than 5 parts per thousand, pH greater than or equal to 5.6, and pollutants absent or minimally present), including natural and manmade (e.g., stock) ponds, slow-moving streams or pools within streams, off-channel pools, and other ephemeral or permanent water bodies that typically hold water or rarely dry for more than a month. During periods of drought, or less than average rainfall, these breeding sites may not hold water long enough for individuals to complete metamorphosis, but they would still be considered essential breeding habitat in non-drought years; (b) emergent and or submerged vegetation, root masses, undercut banks, fractured rock substrates, or some combination thereof, but emergent vegetation does not completely cover the surface of water bodies; (c) nonnative predators (e.g., crayfish (*Orconectes virilis*), American bullfrogs (*Lithobates catesbeiana*), nonnative predatory fishes) absent or occurring at levels that do not preclude presence of the Chiricahua leopard frog; (d) absence of chytridiomycosis, or if present, then environmental, physiological, and genetic conditions are such that allow persistence of Chiricahua leopard frogs; (e) upland areas that provide opportunities for foraging and basking that are immediately adjacent to or surrounding breeding aquatic and riparian habitat; and (2) dispersal and non-breeding habitat, consisting of areas with ephemeral (present for only a short time), intermittent, or perennial water that are generally not suitable for breeding, and associated upland or riparian habitat that provides corridors (overland movement or along wetted drainages) for frogs among breeding sites in a metapopulation with the following characteristics: (a) are not more than 1.0 mile (1.6 kilometers) overland, 3.0 miles (4.8 kilometers) along ephemeral or intermittent drainages, 5.0 miles (8.0 kilometers) along perennial drainages, or some combination thereof not to exceed 5.0 miles (8.0 kilometers); (b) in overland and non-wetted corridors, provides some vegetation cover or structural features (e.g., boulders, rocks, organic debris such as downed trees or logs, small mammal burrows, or leaf litter) for shelter, forage, and protection from predators; in wetted corridors, provides some ephemeral, intermittent, or perennial aquatic habitat; (c) are free of barriers that block movement by Chiricahua leopard frogs, including, but not limited to, urban, industrial, or agricultural development; reservoirs that are 50 acres (20 hectares) or more in size and contain predatory nonnative fishes, bullfrogs, or crayfish; highways that do not include frog fencing and culverts; and walls, major dams, or other structures that physically block movement. With the exception of impoundments, livestock tanks, and other constructed waters, critical habitat does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas) and the land on which they are located existing within the legal boundaries.

Columbia Spotted Frog

The Columbia spotted frog is considered a candidate species by the Service. Columbia spotted frogs in Nevada are found in the central (Nye County) and northeastern (Elko and Eureka Counties) parts of the State, usually at elevations between 1,700 and 2,650 meters (5,600 and

8,700 feet), although they have been recorded historically in a broader range including Lander County in central Nevada and Humboldt County in northwest Nevada.

Columbia spotted frogs are found closely associated with clear, slow-moving or ponded surface waters, with little shade, and relatively constant water temperatures. Reproducing populations have been found 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 spring heads and undercut streambanks with overhanging vegetation; however, they can overwinter underneath ice-covered ponds (U.S. Fish and Wildlife Service

Mountain Yellow-Legged Frog

The mountain yellow-legged frog (*Rana muscosa*) is listed as an endangered distinct population segment (Southern California DPS) as of July 2, 2002, with the remaining population listed as a candidate species by the Service. 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. A separate population in southern California is already listed as endangered (67 FR 44382; July 2, 2002).

Critical habitat for the population of mountain yellow-legged frog listed as endangered includes the following primary constituent elements: (1) Water source(s) found between 1,214 to 7,546 feet (370 to 2,300 meter) in elevation that are permanent. Water sources include, but are not limited to, streams, rivers, perennial creeks (or permanent plunge pools within intermittent creeks), pools (*i.e.*, a body of impounded water that is contained above a natural dam) and other forms of aquatic habitat. The water source should maintain a natural flow pattern including periodic natural flooding. Aquatic habitats that are used by mountain yellow-legged frog for breeding purposes must maintain water during the entire tadpole growth phase, which can last for up to 2 years. During periods of drought, or less than average rainfall, these breeding sites may not hold water long enough for individuals to complete metamorphosis, but they would still be considered essential breeding habitat in wetter years. Further, the aquatic includes: (a) bank and pool substrates consisting of varying percentages of soil or silt, sand, gravel cobble, rock, and boulders, (b) open gravel banks and rocks projecting above or just beneath the surface of the water for sunning posts, (c) aquatic refugia, including pools with bank overhangs, downfall logs or branches, and/or rocks to provide cover from predators and, (d) streams or stream reaches between known occupied sites that can function as corridors for movement between aquatic habitats used as breeding and/or foraging sites; (2) Riparian habitat and upland vegetation (*e.g.*, ponderosa pine, montane hardwoodconifer, montane riparian woodlands, and chaparral) extending 262 feet (80 meters) from each side of the centerline of each identified stream and its tributaries, that provides areas for feeding and movement of mountain yellow-legged frog, with a canopy overstory not exceeding 85 percent that allows sunlight to reach the stream and thereby provide basking areas for the species.

Relict Leopard Frog

The relict leopard frog (*Lithobates onca*) is considered a candidate species by the Service. The relict leopard frog is currently known to occur only in 2 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. These 2 areas, encompassing maximum linear extents of only 3.6 and 5.1 km, respectively, comprise a small fraction of the original distribution of the species. Although it is possible that relict leopard frog populations may also occur in other areas, it is unlikely that many other occupied sites exist given the survey efforts made to date.

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 (

Northern Mexican Gartersnake

The northern Mexican gartersnake (*Thamnophis eques medalops*) is considered a candidate species by the Service. The northern Mexican gartersnake may occur with other native gartersnake species and can be difficult for people without herpetological expertise to identify. With a maximum known length of 44 inches (112 centimeters), it ranges in background color from olive to olive-brown to olive-gray with three stripes that run the length of the body. The middle dorsal stripe is yellow and darkens toward the tail. The pale yellow to light-tan lateral stripes distinguish the Mexican gartersnake from other sympatric (co-occurring) gartersnake species because a portion of the lateral stripe is found on the fourth scale row, while it is confined to lower scale rows for other species. Throughout its rangewide distribution, the northern Mexican gartersnake occurs at elevations from 130 to 8,497 feet (40 to 2,590 meters). The northern Mexican gartersnake is considered a riparian obligate (restricted to riparian areas when not engaged in dispersal behavior) and occurs chiefly in the following general habitat types: (1) Source-area wetlands [e.g., cienegas (mid-elevation wetlands with highly organic, reducing (basic, or alkaline) soils), stock tanks (small earthen impoundment), etc.]; (2) large river riparian woodlands and forests; and (3) streamside gallery forests (as defined by well-developed broadleaf deciduous riparian forests with limited, if any, herbaceous ground cover or dense grass).

BIRDS

California Clapper Rail

California clapper rails were designated as federally endangered on October 13, 1970. 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 tidalflows, 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 (*Rallus longirostris yumanesnsis*) was federally listed as endangered on May 2, 1986 (51 *Federal Register* 16474), and critical habitat was designated in 1994 (59 *Federal Register* 4845). The least Bell's vireo was listed due to extensive loss of habitat, brood parasitism, and lack of adequate protective regulations. Critical habitat was designated for the least Bell's vireo on February 2, 1994 (59 Federal Register 4845), but no critical habitat was designated along the Amargosa River. A draft recovery plan for the species was completed in 1998.

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. Populations also were found in Owens Valley, Death Valley, and at scattered oases and canyons throughout the Mojave Desert. By the early 1980s, the least Bell's vireo had been extirpated from the Sacramento and San Joaquin Valleys, once the center of its breeding range, and 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. Oak woodland with a willow riparian understory is also used in some areas. The most important aspect of least Bell's vireo habitat is the presence of dense cover within 3.25 to 6.5 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 Service assigned candidate status to the western continental United States distinct population segment of the yellow-billed cuckoo (*Coccyzus americanus*), i.e., western yellow-billed cuckoo, on July 25, 2001 (66 FR 38611). The candidate status 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.

Historically, the western 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 (67 FR 40657).

The western yellow-billed cuckoo is associated primarily with cottonwood-willow dominated riparian habitats. Cottonwood-willow is the predominant and preferred habitat, but very tall screwbean-honey mesquite stands are also used. In addition, western yellow-billed cuckoos have been found to use 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 western yellow-billed cuckoos. Western yellow-billed cuckoos breed 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 in areas where the species has been studied in California.

Quantitative data on the decline of the western yellow-billed Cuckoo are lacking, but significant range data have been documented for the distinct population segment. In addition to the species' absence and rarity in Washington, Oregon, Idaho, Colorado, and Nevada, 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 can be found in the Rio Grande river valley from the headwaters of Cochiti Dam to the headwaters of Elephant Butte reservoir. The western yellow-billed cuckoo is considered extirpated as a breeding bird in Washington, Oregon, and British Colombia.

Yuma Clapper Rail

The Yuma clapper rail (*Rallus longirostris yumanensis*) was listed as an endangered subspecies on March 11 1967 (32 FR 4001). 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.

FISH

Chihuahua Chub

The Chihuahua Chub (*Gila nigrescens*) was listed as threatened on October 11, 1983 (48 FR 46052). The Chihuahua chub has a slender body with a whitish abdomen, and a brassy green back and side. The dorsal fin is triangular in shape, and the pectoral fin is rounded. During the breeding season an orange-red color develops around the mouth, lower fins, and lower sides of the body. 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.

Little is known about this species diet except that it may feed on surface insects, aquatic invertebrates, and some vegetation. 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.

Colorado Pikeminnow

Colorado pikeminnow (*Ptychocheilus lucius*) was listed as endangered in 1967, and is now given full protection under the ESA of 1973. The pikeminnow is listed as an experimental, non-essential population in the Salt and Verde river drainages and endangered in all other areas

where it occurs. Critical habitat for this fish species is designated in portions of the Colorado, Green, Yampa, White, and San Juan rivers.

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 subbasins.

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

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). 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.

Critical habitat for Gila chub 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 primary constituent elements or requires special management consideration. In the final rule, we discussed the biological needs of the species upon which the primary constituent elements are based, listed seven primary constituent elements for the species, and discussed the specific elements in each of the proposed stream segments (70 FR 66664). The seven primary constituent elements 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). 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 nonindigenous 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 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 Gila topminnow have 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.

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 Act. On July 18, 2006, the FWS reclassified the Gila trout as threatened (71 FR 40657). No critical habitat has been designated.

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 trout.

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.

<u>Headwater Chub</u>

The Service 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. 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 between 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.

Humback Chub

The humback 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). 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.

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. Humpback chub living in habitats with high pollution/pesticide levels

have been found to have spinal deformities, although there is no data showing a direct correlation between the pollution/pesticide levels and the species deformities.

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 Service 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.

Little Colorado Spinedace

The Little Colorado spinedace (*Lepidomeda vittata*) was listed as threatened with critical habitat designated on October 16, 1987 (52 FR 25034). Threats include habitat alteration and destruction, predation by and competition with nonnative aquatic organisms, and recreational fishery management. Forty-four stream miles of critical habitat were designated: 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.

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.

Loach Minnow

The Loach minnow was listed as a threatened species on October 28, 1986 (51 FR 39468). Critical habitat was designated for loach minnow on April 25, 2000 (65 FR 24328), but was subsequently vacated in 2004. Critical habitat was reproposed on December 20, 2005 (71 FR 75546) and on June 6, 2006, we reopened the public comment period on the critical habitat proposal (71 FR 32496). We included the economic analysis, an environmental assessment, and made some modifications to the December 2005 proposal. A final determination is expected in fall 2006.

The Loach minnow is a small, slender, elongate fish with markedly upward-directed eyes (Minckley 1973). The historical range of the loach minnow included the basins of the Verde, Salt, San Pedro, San Francisco, and Gila rivers. Habitat destruction plus competition and predation by nonnative species have reduced the range of the species by about 85 percent. Loach minnow remain in limited portions of the upper Gila, San Francisco, Blue, Black, Tularosa, and White rivers and Aravaipa, Turkey, Deer, Eagle, Campbell Blue, Dry Blue, Pace, Frieborn, Negrito, Whitewater and Coyote creeks in Arizona and New Mexico.

The status of the loach minnow is declining rangewide. As noted in the current proposed rule (70 FR 75546), as amended (71 FR 32496) designating critical habitat, loach minnow are restricted to 642 km (371mi) of streams, and their current range represents approximately 15 percent of their historical range. In occupied areas, loach minnow may be common to very rare. Loach minnow are common only in Aravaipa Creek, the Blue River, and limited portions of the San Francisco, upper Gila, and Tularosa rivers in New Mexico (65 FR 24328). Although it is currently listed as threatened, the FWS has found that a petition to reclassify the species to endangered status is warranted. A reclassification proposal is pending; however, work on it is precluded due to work on other higher priority listing actions (59 FR 35303).

Proposed critical habitat for loach minnow includes: Aravaipa Creek in Pinal and Graham County, East Fork of the Black River with tributaries in Apache County, portions of Eagle Creek in Graham and Greenlee Counties, Blue and San Francisco rivers with tributaries in Greenlee County, Arizona and Catron County, New Mexico, and Upper Gila River in Catron, Grant, and Hidalgo Counties New Mexico (70 FR 75546 and 71 FR 32496). The critical habitat primary constituent elements: (1) permanent, flowing, unpolluted water with living areas for adult loach minnow with slow to swift flow velocities in shallow water with gravel, cobble, and rubble substrates, living areas for juvenile loach minnow with moderate to swift flow velocities in shallow water with sand, gravel, and rubble substrates and, living areas for larval loach minnow with slow to moderate flow velocities in shallow water with sand, gravel, and cobble substrates; (2) spawning areas with slow to swift flow velocities in shallow water where cobble and rubble

and the spaces between them are not filled in by fine dirt or sand; (3) Water with low levels of pollutants, such as copper, arsenic, mercury, cadmium, human and animal waste products, pesticides, suspended sediments, petroleum products, and with dissolved oxygen levels greater than 3 parts per million; (4) substrates of sand, gravel, and cobble with low to moderate amounts of fine sediment and substrate embeddedness; present in the aquatic habitat; a natural, unregulated hydrograph or, if the flows are modified or regulated, then a hydrograph that allows for adequate river functions, such as flows capable of transporting sediments; (5) streams with low gradients; water temperatures in the approximate range of 2° to 29° C (35° to 85° F); pool, riffle, run, and backwater components; abundant aquatic insect food base; (6) habitat devoid of nonnative aquatic species detrimental to loach minnow or habitat in which detrimental nonnative species are at levels that allow the persistence of loach minnow; and (7) areas within perennial interrupted stream courses that are periodically dewatered but serve as connective corridors between occupied habitat and through which species may move when habitat is wetted.

Mohave Tui Chub

The Mohave tui chub (*Gila bicolor moavensis*) was listed as endangered on October 13, 1970 (35 FR 16048). The Mohave 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 Mohave 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 Mohave 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 Mohave 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.

Mohave 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 Mohave 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 Mohave 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). 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 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.

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). 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 fall. Females lay adhesive eggs on vegetation or other available substrates, such as rocks and gravel.

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 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.

Pecos Bluntnose Shiner

The Pecos bluntnose shiner (*Notropis simus pecosensis*) was listed as threatened with critical habitat on February 20, 1987 (52 FR 5295 5303). The Pecos bluntnose shiner is a subspecies of *Notropis simus,* of the Cyprinidae family. Threats to the continued survival and recovery of *Notropis simus pecosensis* 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 *Notropis simus pecosensis*.

Notropis simus 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, *Notropis simus pecosensis*, 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.

Notropis simus pecosensis 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 *Notropis simus pecosensis* are much reduced.

In 1982, *Notropis simus pecosensis* 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 *Notropis simus pecosensis*, and are sources of continuous water flow (New Mexico Department of Fame and Fish 1982).

Pecos Gambusia

The Pecos gambusia (*Gambusia nobilis*) was listed as endangered in the entire range on October 13, 1970 (35 FR 16047 16048). *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 2km 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.

Gambusia nobilis 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 822m and 1187m 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 springfed 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.

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).

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.

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 Mohave, restoring the Lake Havasu population, and increasing the lower river populations.

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 primary constituent elements 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 Cutthroat Trout

The Rio Grande cutthroat trout (*Oncorhynchus clarki virginalis*) is considered a candidate species by the Service. Little is known specifically about the life history of Rio Grande cutthroat trout. As is true of other subspecies of cutthroat trout, it is found in clear cold streams. Unlike some species of cutthroat trout, such as the Bonneville and Yellowstone (*O. c. bouvieri*), Rio Grande cutthroat trout did not originally inhabit large lake systems. However, they have been introduced into coldwater lakes and reservoirs. They spawn as high flows from snowmelt recedes, typically from the middle of May to the middle of June in New Mexico. Spawning is probably keyed to day length, water temperature, elevation, and runoff.

Typical of trout, Rio Grande cutthroat trout require several types of habitat for survival: spawning, nursery or rearing, adult, and refugium. Spawning habitat consists of clean gravel (little or no fine sediment present) that ranges from 6 to 40 millimeters (0.24-1.6 in.). Nursery habitat is usually at the stream margins where water velocity is low and water temperature is slightly warmer. Streams with mean daily temperature in July of less than 7.8 degrees Celsius (46 degrees Fahrenheit) may not have successful recruitment (survival of individuals to sexual maturity and joining the reproductive population) or reproduction in most years. Adult habitat consists of pools with cover and riffles for food production and foraging. The primary form of refugium is deep pools that do not freeze in the winter and do not dry in the summer or during periods of drought. This refugium in the form of large deep pools is also necessary for survival. Lack of large pools may be a limiting factor in headwater streams. Refugium may also be a

downstream reach or a connected adjacent stream that has maintained suitable habitat in spite of adverse conditions.

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). 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 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.

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 primary constituent elements 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 unimpounded 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.).

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). 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. A recovery plan was finalized in 1992 (USFWS 1992).

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. Primary constituent elements 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.

Santa Ana Sucker

The Santa Ana sucker (*Catostomus santaanae*) was listed as threated on April 12, 2000. 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.

The primary constituent elements 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.

Southern California Steelhead

The Southern California steelhead (*Oncorhychus mykiss*) is designated as endangered for all naturally spawned populations in rivers from the Santa Maria River to Malibu Creek in California. All naturally spawned populations are designated as threatened in the following areas: river basins from Redwood Creek in Humboldt County, CA to the Gualala River in Mendocino County, California (inclusive); winter-run populations in the Willamette River and its tributaries; from Willamette Falls to the Calapooia River in the Sacramento and San Joaquin Rivers and their tributaries, excluding San Francisco and San Pablo Bays and their tributaries; in streams from the Russian R. to Aptos Cr., Santa Cruz County, CA (inclusive), and the drainages of San Francisco and San Pablo Bays eastward to the Napa R. (inclusive), Napa County, California, excluding the Sacramento-San Joaquin R. Basin of the Central Valley of California; in streams from the Pajaro River (inclusive) located in Santa Cruz County, CA, to (but not including) the Santa Maria River; in streams in the Snake R. Basin of southeast Washington, northeast Oregon, and Idaho; in streams above and excluding the Wind River in Washington, and the Hood River in Oregon, upstream to, and including, the Yakima R. Excluded are steelhead from the Snake River Basin; in streams and tributaries to the Columbia River between the Cowlitz and Wind Rivers, WA, inclusive, and the Willamette and Hood Rivers, Oegon, inclusive, excluding the Upper Willamette River Basin above Willamette Falls and excluding the Little and Big White Salmon Rivers in Washington; in the Upper Columbia R. Basin upstream from the Yakima R., WA, to the U.S./Canada border, and also including the Wells Hatchery stock; Klamath Mountains Province; and in coastal river basins ranging from the Elk River in Curry County, Oregon, to the Klamath River, inclusive, in Del Norte County, California.

Critical habitat for the Southern California steelhead is designated in the following watersheds: Ruth, Spy Rock, North Fork Eel, Lake Pilsbury, Eden Valley, and Round Valley. The primary constituent elements for this species critical habitat includes the following: (1) Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development; (2) Freshwater rearing sites with: (i) Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; (ii) Water quality and forage supporting juvenile development; and (iii) Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks. (3) Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality

conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival. (4) Estuarine areas free of obstruction and excessive predation with: (i) Water quality, water quantity, and salinity conditions supporting juvenile and adult hysiological transitions between fresh- and saltwater; (ii) Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels; and (iii) Juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.

Spikedace

The spikedace (*Meda fulgida*) was listed as a threatened species on July 1, 1986 (51 FR 23769). Critical habitat was designated on April 25, 2000 (65 FR 24328), but was subsequently vacated in 2004. Critical habitat was reproposed on December 20, 2005 (71 FR 75546) and on June 6, 2006 we reopened the public comment period on the critical habitat proposal (71 FR 32496). We included the economic analysis, an environmental assessment, and made some modifications to the December 2005 proposal. A final determination is expected in fall 2006.

The Spikedace is a small silvery fish whose common name alludes to the well-developed spine in the dorsal fin. Spikedace historically occurred throughout the mid-elevations of the Gila River drainage, but is currently known only from the middle and upper Gila River, and Aravaipa and Eagle creeks. The species also occurs in the upper Verde River, but appears to be declining in numbers. It has not been documented in the Verde River since 1999 despite annual surveys, and additional survey work is needed to determine its current status. Habitat destruction along with competition and predation from introduced nonnative species are the primary causes of the species' decline.

The status of the spikedace is declining rangewide. As noted in the current proposed rule (70 FR 75546), as amended (71 FR 32496), designating critical habitat, spikedace are restricted to 592 km (368 mi) of streams, and their current range represents approximately 10 percent of their historical range. Within occupied areas, it is common to very rare, but is presently common only in Aravaipa Creek and some parts of the upper Gila River in New Mexico (65 FR 24328). Although it is currently listed as threatened, the FWS has found that a petition to reclassify the species to endangered status is warranted. A reclassification proposal is pending; however, work on it is precluded due to work on other higher priority listing actions (59 FR 35303).

Proposed critical habitat for spikedace includes the Verde River in Yavapai County, Lower Gila River, and Aravaipa Creek in Pinal and Graham County, portions of Eagle Creek in Graham and Greenlee Counties, and Upper Gila River in Catron, Grant, and Hidalgo Counties New Mexico (70 FR 75546 and 71 FR 32496). Critical habitat primary constituent elements include: (1) Permanent, flowing, unpolluted water with living areas for adult spikedace with slow to swift flow velocities in shallow water with shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at downstream riffle edges, living areas for juvenile spikedace with slow to moderate flow velocities in shallow water with moderate amounts of instream cover and , living areas for larval spikedace with slow to moderate flow velocities in shallow water with abundant instream cover; (2) low levels of pollutants, such as copper, arsenic, mercury, cadmium, human and animal waste products,

pesticides, suspended sediments, petroleum products, and with dissolved oxygen levels greater than 3 parts per million; (3) substrates of sand, gravel, and cobble with low to moderate amounts of fine sediment and substrate embeddedness; pool, riffle, run, and backwater components present in the aquatic habitat; (4) low gradients; (5) water temperatures in the approximate range of 2° C to 29° C (35° F to 85° F); (6) pool, riffle, run, and backwater components; (7) abundant aquatic insect food base; (8) habitat devoid of nonnative aquatic species detrimental to spikedace or habitat in which detrimental nonnative species are at levels that allow the persistence of spikedace and; (9) areas within perennial interrupted stream courses that are periodically dewatered but serve as connective corridors between occupied habitat and through which species may move when habitat is wetted.

Tidewater Goby

The tidewater goby (*Eucyclogobius newberryi*) was listed as endangered on February 4, 1994. Specific threats 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.

Proposed critical habitat includes the following primary constituent elements: (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. The fish is currently restricted to the Santa Clara River drainage in Los Angeles County and the San Antonio Creek Drainage in Santa Barbara County.

Critical habitat for this species includes the following: Three stream zones of the upper Santa Clara River watershed in northwestern Los Angeles County including a zone near upper Santa Clara River watershed in northwestern Los Angeles County, California, including a zone near Del Valle, one in San Francisquito Canyon, and one in Soledad Canyon: and the lower segment

of San Antonio Creek on the Vandenberg Air Force Military Reservation in Santa Barbara County. California.

Virgin River Chub

Virgin River Chub (*Gila robusta seminude)* was listed as endangered on August 24, 1989 (54 FR 35311). 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.

Diversions have dewatered approximately 35 miles of the chub's natural habitat. With the construction of Hoover Dam and the impoundment of Lake Mead an additional 40 miles of river was inundated, for a nearly total destruction of almost 56 percent of the chub's original habitat. This species presently occurs in only 50 miles of the mainstream Virgin River from Pah Tempe Springs downstream to the Mesquite Diversion. A captive population of Virgin River chub is currently maintained at the Dexter National Fish Hatchery and Technology Center for propagation studies.

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, and other native fish species today are modification and loss of habitat and the introduction and establishment of nonnative fish, particularly red shiner. The building of dams and associated reservoirs, water diversion structures, canals, laterals, aqueducts, and dewatering of streams causes loss or degradation of available habitat. The decline in both species' range and population numbers is due to the physical reduction in available habitats within the various river systems caused by these water projects. This loss of habitat has been exacerbated due to the introduction and establishment of exotic species, further reducing the suitability of remaining habitats for woundfin and Virgin River chubs.

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 primary constituent elements of critical habitat determined necessary for the survival and recovery of the Virgin River chub are water, physical habitat, and biological environment. The desired conditions for each of these elements include the following: (1) Water quality characterized by natural seasonally variable temperature, turbidity, and conductivity;

(2) hydrologic regime characterized by the duration, magnitude, and frequency of flow events capable of forming and maintaining channel and instream habitat necessary for particular life stages at certain times of the year; and (3) flood events inundating the floodplain necessary to provide the organic matter that provides or supports the nutrient and food sources for the listed fishes.

Woundfin

The woundfin (*Plagopterus argentissimus*) was listed as endangered on October 13, 1970 throughout its range in Arizona, Nevada, New Mexico, and Utah. An experimental, non-essential was designated for the species on July 24, 1985 in the Gila River drainage in Arizona and New Mexico. The species continues to be threatened by habitat loss and modification, as well as competition from introduced nonnative fish, and predation.

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 primary constituent elements of critical habitat determined necessary for the survival and recovery of the woundfin are water, physical habitat, and biological environment. The desired conditions for each of these elements are the same as the Virgin River chub.

Yaqui Fish

The Yaqui fish include the Yaqui catfish (*Ictalurus pricei*) and Yaqui chub (*Gila purpurea*), both listed as endangered on August 31, 1984 (49 FR 34490). Critical habitat was designated for these two species at the time of their listing (49 FR 34490). 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.

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 provide habitat for one of the two existing populations of beautiful shiner. The critical habitat primary constituent elements 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.

Zuni Bluehead Sucker

The Zuni bluehead sucker (*Catostomus discobolus yarrow*) is considered a candidate species. 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.

INVERTEBRATES

Nevares Spring Naucorid Bug

The Nevares Spring naucorid bug (*Ambrysus funebris)* was described using specimens that were collected from Nevares Spring in Inyo County, California. *Ambrysus funebris* is recognized as being a valid and current taxonomic entity according to the Integrated Taxonomic Information System. The Nevares Spring naucorid bug is one of three naucorid species that are endemic to the Amargosa River drainage along the Nevada-California border.

Naucorids typically prefer stream riffles that are swift enough to keep sand and silt from accumulating, but not so fast that coarse, gravelly substrates are removed. Laboratory and *in situ* field studies of different naucorid species have confirmed that naucorid habitat preferences are not random, and that water velocity and substrate size play a significant role in determining animal presence or absence. These studies also suggest that naucorids have ecological or physiological constraints that limit their ability to persist in modified stream habitats. Water pumping or diversion activities that modify water velocities or substrate characteristics are therefore likely to affect the distribution and abundance of naucorids because they have a finite ability to use altered streams.

PLANTS

Ash Meadows Blazingstar

Ash Meadows Blazingstar *(Mentzelia leucophylla)* was listed as threatened on May 20, 1985. 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. Flowering continues from June to September with bright yellow flowers arranged in open, broad infloresences (Mozingo and Williams 1980). The blazing star is associated with *Atriplex confertifolia* and another endemic plant species, the Ash Meadows sunray. It is always associated with dry soils apparently uninfluenced by seepage from springs or seeps.

The local distribution of small populations suggests the species is vulnerable to any land disturbance. Past development for agriculture (e.g., roads and crop fields) is believed to have eliminated some populations, and trampling by wild horses and livestock, and disturbance by off-road vehicle travel has disturbed other populations. Critical habitat for the blazing star includes approximately 1,240 acres within Nevada. No primary constituent elements were described except that areas within critical habitat include sandy or saline clay soils along canyon washes and near springs and seeps.

Ash Meadows Ivesia

The Ash Meadows ivesia (*Ivesia eremica*) was listed as threatened on May 20, 1985. This member of the Rosaceae family of plants flowers during the late summer and autumn. It occupies highly alkaline, barren soils that remain moistened by water spreading outward from surface flow discharged by springs. Associated plants include *Atriplex confertifolia* and *Juncus* sp. Small, local populations are scattered throughout Ash Meadows in Nevada. Plants are perennial and occur as solitary clumps not exceeding 1.9 inches high and 9.75 inches in diameter. Little is known about its life history or habitat requirements. Threats to this species have included trampling by wild horses, cattle, and sheep, and spring diversions and ground water pumping resulting in the drying of soils and elimination of its habitat. Critical habitat is designated to include approximately 880 acres.

Ash Meadows Milk-Vetch

Ash Meadows Milk-Vetch (*Astragalus phoenix*) was listed as threatened on May 20, 1985. Nothing is known about the life history and habitat requirements for this member of the pea (Fabaceae) family. It is a perennial species which flowers during mid-spring and grows as mounds on dry, alkaline soil. Old plants are mounded into clumps as large as 5.85 inches high and 19.5 inches in diameter. Associated plant species include the Ash Meadows sunray, *Atrilex confertifolia*, and *Haplopappus acradenius*. Threats to this species are similar to those for the Ash Meadows blazing star. Critical habitat for the milk-vetch includes approximately 1,200 acres scattered throughout Ash Meadows in Nevada. Portions of this critical habitat also include critical habitats of the Ash Meadows sunray and Ash Meadows blazing star.

The Nevares Spring naucorid bug is limited to the Travertine Nevares Springs Complex (Complex) within the boundary of Death Valley National Park (Park). The Travertine Springs area is 2 miles long and 1 mile wide; it includes approximately 20 springbrooks and is located 1.5-2.5 miles east of the Furnace Creek Inn and Ranch resort and the Park headquarters building. Texas Spring is an especially notable spring at the northwestern edge of the Travertine Springs area because it possesses a high-volume discharge. The Nevares Spring area is 0.7 mile long and

0.3 mile wide; it is located 5 miles north of the Travertine Springs area in an area locally referred to as Cow Creek and possesses 14 springbrooks.

Canelo Hills Ladies' Tresses

On January 6, 1997, the Service listed the Canelo Hills ladies' tresses (*Sprianthes delitescens*) as an endangered species; without critical habitat under the Act (62 FR 665). The Canelo Hills ladies' tresses is a member of the orchid family. Flowering occurs in late July to early August, when temperatures range from 60° F (16° C) at night to 100° F (38° C) during the day. During that time, precipitation averages 38-79 cm (15 to 20 in.). Populations of this species are known to exist in only five cienegas in southern Arizona. One population is found in Cochise County and four are found in Santa Cruz County. One population is found at the Arizona Nature Conservancy's Canelo Hills Cienega. Three other populations are found on private land, one in the San Rafael Valley, one on the Babocomari Ranch, and one on private property near or in Turkey Creek. The fourth population is on USFS land in the Canelo Hills.

All populations of Canelo Hills ladies' tresses occur in cienega habitats where scouring floods are very unlikely (Newman 1991). Soils supporting the populations are finely grained, highly organic, and seasonally or perennially saturated. It is found intermixed with tall grasses and sedges at about 5,000 feet in elevation. Springs are the primary water source, but a creek near one locality contributes near-surface groundwater (McClaran and Sundt 1992).

The dominant vegetation associated with *Spiranthes* includes grasses, sedges (*Carex* spp.), rushes (*Juncus* spp.), spike rush (*Eleocharis* spp.), cattails (*Typha* spp.), and horsetails (*Equisetum* spp.)(Cross 1991, Warren et al. 1991). Associated grass species include bluegrass (*Poa pratensis*), Johnson grass (*Sorghum halepense*), and muhlys (*Muhlenbergia aspeifolia* and *M. utilis*) (Fishbein and Gori 1994). The surrounding vegetation is semidesert grassland or oak savannah.

Threats to the Canelo Hills ladies' tresses include groundwater pumping, water diversions, sand and gravel mining, recreation impacts, illegal collection, and invasion of cienega habitats by nonnative plant species, such as Johnson grass and Bermuda grass (*Cynodon dactylon*) (62 FR 665). The orchid was federally listed as an Endangered species in 1997 (62 FR 665). Nonnative Johnson grass is invading one *Spiranthes* site (Fishbein and Gori 1994). This tall grass forms a dense monoculture, displacing less competitive native plants. If Johnson grass continues to spread, the Canelo Hills ladies' tresses population at this site may be lost (Dave Gori 1994). The effect of livestock grazing on the Canelo Hills ladies' tresses is unclear. A *Spiranthes* population growing at a site grazed for more than 100 years was found to be larger and more vigorous than a population growing at a site ungrazed since 1969 (McClaran and Sundt 1992, Newman 1991); however, this may no longer be the case as the management at the grazed site has changed dramatically in recent years. The Canelo Hills ladies' tresses, like many species in the genus, shows an affinity for habitats with sparse herbaceous cover (McClaran and Sundt 1992); which moderate livestock grazing can promote. The species would likely be adversely affected by heavy livestock grazing; however, maintenance of viable populations is probably compatible with well-managed grazing. Mowing of pastures, particularly when the species is flowering, can be very detrimental, may prevent seed set, and could result in mortality of plants. Limited numbers of populations and individuals threatens this taxon with demographic and

environmental extinction as a result of stochastic events that are often exacerbated by habitat disturbance. For instance, restriction of the species to a relatively small area in southeastern Arizona increases the chance that a single environmental catastrophe, such as a severe tropical storm or drought, could eliminate populations or cause extinction.

Chorro Creek Bog Thistle

Chorro Creek Bog thistle (*Cirsium fontinale var. obispoense*) was listed as endangered on December 15, 1994. No critical habitat has been designated for this plant. In 1998, it was known from eight locations between San Simeon and Pismo Beach, where it is restricted to seeps and springs in serpentine-derived soils. The Chorro Creek bog thistle is restricted to seeps and bogs within grassland, and occasionally chaparral, on soils derived from serpentine rock. Threats to Chorro Creek bog thistle include water diversion, development, and excessive trampling by cattle.

Gambel's Watercress and Marsh Sandwort

Gambel's watercress (*Rorippa gambellii*) and marsh sandwort (*Arenaria paludicola*) were both listed as endangered on August 3, 1993. No critical habitat has been designated for these plant species. *A. paludicola* and *R. gambelii* have recently been collected in central or southern Mexico, but little is known of their status. In the United States, *A. paludicola* is found in only two populations, one of fewer than 10 individuals in Black Lake Canyon; the other of more than 85 individuals at Oso Flaco Lake, San Luis Obispo County, California. Three populations of *R. gambelii* are currently known in the United States one with about 500 individuals in Black Lake Canyon near the *A. paludicola* population, one with about 300 individuals at Little Oso Flaco Lake, also in San Luis Obispo County, and a third population of approximately 100 plants on Vandenberg Air Force Base, Santa Barbara County. Both species occur in wetland areas with standing water or saturated acidic soils from sea level to 450 meters (1,480 feet). Both are threatened by encroaching native and alien vegetation associated with lowered water tables, agricultural and residential development, and off-road vehicle use. In addition, the very low numbers of individuals and populations put these species at great risk of extinction due to random naturally occurring events.

Hickman’s Potentilla

Hickman's potentilla (*Potentilla hickmanii*) was listed as endangered on August 12, 1998. No critical habitat has been designated for this species. Hickman's potentilla is a small perennial herb in the rose family and is restricted to two general areas, one in San Mateo County and one in Monterey County, where it occurs within coastal terrace prairie habitat. 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.

Huachuca Water Umbel

On January 6, 1997, the FWS listed the Huachuca water umbel (*Lilaeopsis schaffneriana var. recurva)* as an endangered species under the Act without critical habitat (62 FR 665). Critical habitat was designated on the upper San Pedro River; Garden Canyon on Fort Huachuca; and other areas of the Huachuca Mountains, San Rafael Valley, and Sonoita Creek on July 12, 1999 (64 FR 37441).

The Huachuca water umbel is an herbaceous, semiaquatic perennial plant with slender, erect leaves that grow from creeping rhizomes. The species reproduces sexually through flowering and asexually from rhizomes, the latter probably being the primary reproductive mode. An additional dispersal opportunity occurs as a result of the dislodging of clumps of plants which then may reroot in a different site along aquatic systems.

The Huachuca water umbel has been documented from 27 sites in Santa Cruz, Cochise, and Pima counties, Arizona, and in adjacent Sonora, Mexico, west of the continental divide (Haas and Frye 1997, Saucedo Monarque 1990, Warren et al. 1989, Warren et al. 1991, Warren and Reichenbacher 1991, FWS files). The plant has been extirpated from 6 of the 27 sites. The 21 extant sites occur in four major watersheds - San Pedro River, Santa Cruz River, Río Yaqui, Rio Magalena, and Río Sonora. All sites are 3,500 to 6,500 ft. in elevation. Overgrazing, mining, hay harvesting, timber harvest, fire suppression, and other activities in the nineteenth century led to widespread erosion and channel entrenchment in southeastern Arizona streams and cienegas when above-average precipitation and flooding occurred in the late 1800's and early 1900's (Bryan 1925, Martin 1975, Hastings and Turner 1980, Dobyns 1981, Hendrickson and Minckley 1984, Sheridan 1986, Bahre 1991, Webb and Betancourt 1992, Hereford 1993). Wetland degradation and loss continues today. Human activities such as groundwater overdrafts, surface water diversions, impoundments, channelization, improper livestock grazing, chaining, agriculture, mining, sand and gravel operations, road building, nonnative species introductions, urbanization, wood cutting, and recreation all contribute to riparian and cienega habitat loss and degradation in southern Arizona. The local and regional effects of these activities are expected to increase with the increasing human population.

Critical habitat for Huachuca water umbel includes seven critical habitat units in Sonoita Creek, Santa Cruz River, Scotia Canyon, Sunnyside Canyon, Garden Canyon, the Verde River in Yavapai County, Lower Gila River, the San Pedro River, and Aravaipa Creek in Pinal and Graham County, portions of Eagle Creek in Graham and Greenlee Counties, and Upper Gila River in Catron, Grant, and Hidalgo counties New Mexico (70 FR 75546 and 71 FR 32496). The critical habitat primary constituent elements are: (1) sufficient perennial base flows to provide a permanently or nearly permanently wetted substrate for growth and reproduction of Huachuca water umbel; (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 Huachuca water umbel 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 Huachuca water umbel growth and reproduction and; (4) in streams and rivers, refugial 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

La Graciosa thistle (*Cirsium scariosum* var. *loncholepis*) was listed as endangered on March 20, 2000. Historically, *C. scariosum* var. *loncholepis* was found in coastal wetlands between Arroyo Grande Creek in San Luis Obispo County to the north and the Santa Ynez River in Santa Barbara County to the south. Currently, it is known from four populations that range from the southern Callender Dune Lakes area (San Luis Obispo County) in the north to the Santa Maria River (Santa Barbara County) in the south. Currently, *C. scariosum* var. *loncholepis* is considered to

be extant at eight occurrences that are distributed among four populations: southern Callender Dune Lakes, Oso Flaco, southern Guadalupe Dunes, and Santa Maria River. The eight extant occurrences consist of five occurrences that were identified in the final listing rule in 2000 as well as three new occurrences that have been identified since that time. The extant occurrences range from the southern Callender Dune Lakes in the north to the Santa Maria River in the south.

Otay Mesa Mint

Otay mesa mint *(Pogogyne nudiuscula*) was listed as endangered on August 3, 1993. The plant is an annual herb in the Lamiaceae (mint family) that is restricted to vernal pools on Otay Mesa in southern San Diego County, California. *P.nudiuscula* was listed by the State of California as an endangered species in January 1987 and federally listed as an endangered species in August 1993. 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, alteration of the watershed, trash dumping and drought.

Salt Marsh Bird's Beak

The Salt Marsh bird's beak *(Cordylanthus mollis* ssp. *Mollis)* was designated as endangered in its entire range on November 20, 1997. Persistent populations have been recorded in the tidal marshes of Napa-Sonoma, Point Pinole, Carquinez Staits, Suisun Marsh area, and northern Contra Costa County. These populations are composed of many shifting colonies or subpopulations, with great variability in population size and distribution. Currently 11 populations are believed to be extant.

Salt Marsh bird's beak occurs in high salt and brackish tidal marsh of northern San Pablo Bay and the Suisun Marsh area, and in some diked brackish marshes with limited tidal circulation. It has an affinity for the higher well-drained portions of the marsh and the edges of salt pans. It occurs primarily in portions of the middle to high marsh zones where the dominant vegetation includes gaps and areas of sparse vegetative canopy cover, often in association with *Sarcocornia pacifica* (pickleweed) and *Distichlis spicata* (saltgrass). The plant is negatively associated with dense, tall grass-like vegetation and dense or tall *nonnativebrackish marsh* vegetation (as these dense vegetation types increase in abundance the abundance of *Cordylanthus mollis* ssp. *mollis* decreases). Isolation of populations by dikes and non-tidal marsh management limits its potential dispersal to suitable habitat. It is endangered by low population numbers, severely reduced habitat area, and reduced habitat quality. Invasion by non-native tidal marsh vegetation and hydrologic alterations to tidal sloughs are significant threats to remaining habitat.

Slender-Horned Spineflower

Slender-Horned spineflower (*Dodecahema leptoceras*) was listed as endangered on September 28, 1987. Slender-horned spineflower is a small annual plant in the Polygonaceae (buckwheat family). 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 five locations. 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, offroad 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.

Ute Ladies'-Tresses

Ute ladies'-tresses (*Spiranthes diluvialis*) was listed as threatened on January 17, 1992. The Ute ladies'-tresses is an orchid that occurs in relatively low elevation riparian, spring, and lakeside wetland meadows in three general areas of the interior western United States. This plant is endemic to moist soils in mesic or wet meadows near springs, lakes, or perennial streams. Most of the occurrences are along riparian edges, gravel bars, old oxbows, and moist wet meadows along perennial streams. Ute ladies'-tresses appear to require permanent sub-irrigation, including a close affinity with floodplain areas where the water table is near the surface throughout the growing season and into the late summer or early autumn. The naturally small size and scattered distribution of Ute ladies'-tresses population makes the species particularly vulnerable to the effects of habitat fragmentation and overall decline of suitable habitat.

Ventura Marsh Milk-Vetch

Ventura Marsh Milk-vetch (*Astragalus pycnostachyus* var. *lanosissimus*) was listed as endangered on May 21, 2001. *Astragalus pycnostachyus* var. *lanosissimus* is an herbaceous perennial in the Fabaceae (pea family) that was believed to be extinct until its rediscovery in 1997. At the time of listing, the only known extant population of this taxon occurred in Ventura County, California on less than 0.2 hectare (0.6 acre) 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.

Astragalus pycnostachyus var. *lanosissimus* plants have been introduced in three locations in Ventura County within the historical range: Mandalay State Beach, located at the northwest intersection of Harbor Boulevard and West 5th Street in Oxnard; McGrath State Beach in Oxnard; and Ormond Beach, between Port Hueneme and Point Mugu. Populations have also been established at two locations in Santa Barbara County outside of the known historical range, at the Carpinteria Salt Marsh Reserve and Coal Oil Point Reserve.

The areas designated as critical habitat are: (1) Mandalay, including the site of the extant population at Fifth Street and Harbor Boulevard in the city of Oxnard, Ventura County; (2) McGrath Lake area, McGrath State Beach, California Department of Parks and Recreation (CDPR), Ventura County, and (3) Carpinteria Salt Marsh Reserve run by the University of California, Santa Barbara, (UC Santa Barbara) Santa Barbara County.

Willowy Monardella

Willowy monardella (*Monardella linoides* ssp. *viminea*) was listed as endangered on October 13, 1998. *Monardella linoides* ssp. *viminea* is a perennial herbaceous plant in the mint family (Lamiaceae) with a woody base and aromatic foliage. The waxy, green hairy stems bear conspicuously gland-dotted bracts, linear or lance-shaped leaves, and dense, terminal heads of white to rose-colored flowers. This species primarily inhabits sandy washes and floodplains in coastal sage scrub or riparian scrub vegetation. Of the 11 extant populations, most are

concentrated in the Miramar area of San Diego County, while one disjunct and possibly different subspecies population extends south into Baja California, Mexico.

This narrow endemic plant persists in small isolated occurrences within a 72-square-mile (186 square-kilometer) area between Los Penasquitos Canyon and Mission Gorge in San Diego County and northern Baja California (Epling 1925; 63 FR 54938). When listed in 1998, all but one population (supporting ca. 200 individuals) were found in between Penasquitos Canyon and Mission Gorge in San Diego County, California (63 FR 54938). Willowy monardella has been found from a single population in northern Baja California, Mexico. This taxon occupies the same range that it did at the time of listing.

At the time of listing in 1998, there were approximately 6,000 individuals known from 20 populations within the United States (63 FR 54940). Seven populations were considered extirpated prior to listing of the subspecies in 1998. At the time of listing, 15 of the 20 populations had fewer than 100 plants per population; six of these had fewer than 15 individuals (63 FR 54940). The Marine Corps Air Station Miramar (Miramar) populations had the most plants (1,500 individuals in 1998). At the time of listing, the combined Miramar occurrences supported an estimated 2,000-3,000 plants.

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 has also been approved (USFWS 1997). Reasons for listing included loss of historic habitat, rechannelization 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* (Hall 1981). 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 has been recorded in portions of Baja California. The listed subspecies *scirpensis* occupies bulrush marshes near Tecopa Hot Springs and Shoshone, in southeastern Inyo County, California. Originally described as a distinct species, i.e., *Microtis scirpensis* (Bailey 1900), the scientific name *M. c. scirpensis* was re-assigned by Kellogg (1918).

The Amargosa vole is found in moist habitats (meadows, freshwater marshes and pastures) in the vicinity of the Shoshone-Tecopa segment of the Amargosa River (Murphy and Freas 1989). Suitable habitat for the species begins at Shoshone and extends downstream to the northern end of the Amargosa Canyon (see attached map). 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, and that dry areas away from permanent water appeared to lack the species as did areas of deeper water. 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 (Murphy and Freas 1989). 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 major constituent elements 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. The type locality (where the type specimen was found), near Shoshone, is not within critical habitat (USFWS 1997).

Buena Vista Lake Ornate Shrew

The Buena Vista Lake ornate shrew (*Sorex ornatus relictus*) was listed as endangered on March 6, 2002. 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 are rarely seen due to their small size and cryptic behavior. The shrew differs from its geographically closest subspecies, the Southern California ornate shrew (*S. o. spp.ornatus*); by having darker, grayish black coloration, rather than brown, a slightly smaller body size, and a longer tail.

Habitat essential for the shrew contains riparian and wetland vegetation communities with an abundance of leaf litter and dense herbaceous cover. The shrews were most commonly found 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. Other ornate shrew species have been found in drier upland communities, but upland habitat is considered very poor and is not considered essential for the shrew. Shrews have a high rate of metabolism because of their small size forcing them to constantly be searching for food to maintain their body temperatures, especially in cold conditions. Shrews 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. Food probably is not cached and stored, so the shrew must forage periodically day and night to maintain its high metabolic rate.

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 is found. 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 first and foremost 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

New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) is considered a candidate species. The New Mexico meadow jumping mouse (jumping mouse) is endemic to New Mexico, Arizona, and a small area of southern Colorado. The jumping mouse 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 jumping mouse appears to only utilize two riparian community types: 1) persistent emergent herbaceous wetlands (i.e., beaked sedge and reed canarygrass alliances); and 2) scrub-shrub wetlands (i.e., riparian areas along perennial streams that are composed of willows and alders) (Frey 2005, p. 53). It especially uses microhabitats of patches or stringers of tall dense sedges on moist soil along the edge of permanent water. Home ranges vary between 0.37 and 2.7 acres (0.15 and 1.1 hectares) and may overlap (Smith 1999, p. 4). The jumping mouse is generally nocturnal, but occasionally diurnal. It is active only during the growing season of the grasses and forbs on which it depends. During the growing season, the jumping mouse accumulates fat reserves by consuming seeds. Preparation for hibernation (weight gain, nest building) seems to be triggered by day length. The jumping mouse hibernates about 9 months out of the year, longer than most other mammals

4.0 EFFECTS OF THE ACTION

The effects of the action are the direct and indirect impacts of the proposed federal action on the species and 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 § 402.02). The Service has evaluated the identified conservation practices in the context of how the individual practices have the potential to produce beneficial and adverse effects to the Southwestern Willow Flycatcher Project and other listed species that may be within the action area. The flycatcher was the primary species analyzed because it is the focal species for this project. Based on the nature of the effects from the WLFW – Southwestern Willow Flycatcher Project, the effects are the same to the flycatcher as well as to its critical habitat. Effects to other covered species (i.e., federally listed and candidates) are discussed below.

The NRCS worked with the Service in collaboration to develop specific conservation measures for the 5 core conservation management practices and the 31 facilitating conservation practice standards included in this consultation. The Service believes that, as implemented, the conservation measures will result in ameliorating, minimizing, or eliminating potential adverse effects. However, even with the implementation of the conservation measures, some remaining adverse effects will occur to the covered species as described below. Nevertheless, the Service believes that the conservation measures, in concert with the goals and objectives of the WLFW – Southwestern Willow Flycatcher Project, will cumulatively produce beneficial effects to the flycatcher and covered species.

Planning and execution of NRCS' financial assistance to private landowners within the program guidance of the WLFW – Southwestern Willow Flycatcher Project depends upon the completion of a Conservation Plan for each eligible participant. Consequently, the Service recognizes that each conservation practice will be designed to work synergistically with other conservation practices as a conservation management system to achieve the purposes of the selected core management practice. This linkage between conservation practices produces benefits and minimizes adverse effects to the species. Appendix IV provides a comprehensive narrative of each conservation practice covered in the document, its purpose, the identification of any potential adverse effects and description of expected beneficial effects, and the identification of the appropriate conservation measure(s).

4.1 Summary of Direct and Indirect Effects

In evaluating the direct, indirect and cumulative effects of the proposed action, the Service was able to identify and evaluate 11 common adverse effects common to the flycatcher and possibly to other covered species. Any impacts to other listed species are expected to be indirect effects from implementing conservation measures aimed at enhancing flycatcher habitat. As such, the Service is able to collectively evaluate the effects and summarize them as described below. It is important to note that the Service evaluation and determination of these common adverse effects duly considers and incorporates the conservation value of the identified conservation measures jointly developed by the partnership.

When Conservation Practices are installed or applied to the land, short-term and long-term positive and/or negative effects may occur for listed species. The following potential direct and indirect physical effects to the covered species have been identified:

WATER QUALITY – Many Conservation Practices can affect water quality. The purpose of many Conservation Practices is to improve water quality by improving vegetative cover, reducing runoff and flooding, reducing erosion in uplands and channels, reducing the potential for groundwater contamination, or providing vegetative buffers for streams. The installation or application of some conservation practices may temporarily adversely affect water quality (increased sediment, water temperature, turbidity, loss of shade, increased nutrient levels and/or contaminants).

CHANNEL/ STREAMBANK MODIFICATION – The purpose of many conservation practices is to protect and stabilize stream banks, and reduce stream bank erosion. Conservation Practices

may provide direct structural or vegetative protection to the stream banks. The installation of some practices can temporarily alter or destabilize stream banks and/or stream channels, especially during construction.

WATER SURFACE FLOW ALTERATION – The purpose of many conservation practices is to help maintain or improve surface water flow in streams and springs. Other conservation practices remove or divert surface water flows to provide water for agricultural production and/or to provide water for other resource management objectives. These practices may alter short-term or long-term surface flow magnitude, duration, direction or frequency.

VEGETATION MODIFICATION – The purpose of many conservation practices is to maintain or improve vegetation on the land for a variety of conservation benefits. The installation or application of some conservation practices involves the removal or reduction of unwanted vegetation. Vegetation modification may be permanent or temporary, and may entail complete removal or targeted removal or reduction of undesirable or invasive species.

GROUND DISTURBANCE – The installation or application of many conservation practices will result in temporary soil surface disturbance and/or compaction. The ground disturbance may involve minor surface disturbance such as vehicle tires or livestock movement, or deeper disturbance such as pipeline trenches or pond excavations.

HUMAN DISTURBANCE – The installation or application of most conservation practices will permanently or temporarily increase the presence and/or level of human activities (noise, visual disturbance). Temporary disturbance will occur during installation of structural practices such as pipelines and watering facilities. Long-term increases in human activity will occur where the conservation practice requires regular operation, maintenance, or monitoring.

BARRIER /HAZARD – Some vegetative or structural vegetative practices can create a barrier to movement or hazardous conditions for a species. The practice may establish a desirable physical barrier (Fence using 382 - Fencing to protect exclude and/or management livestock) or an undesirable interference with movement of fish, land animals or birds.

EXOTICS – Many conservation practices are applied to remove or control undesirable non-native plants and animals. The installation or application of some conservation practices also has the potential to introduce undesirable species into the area, or enhance the ability of undesirable species present in the area to increase or spread on the site, or be transported from the site.

4.2 Framework for Assessment of Risk/Benefit of the Physical Effects on the Covered Species

For purposes of this document, the Service provides a qualitative assessment of adverse effects or potential risk(s) to the species and its habitat needs from implementation of conservation practices. A qualitative assessment is used because there is uncertainty in generating specific metrics of adverse effect (such as number of expected mortalities of individuals, or numbers of habitat acres temporarily or permanently lost or temporarily affected) due to the complexity of factors affecting the individual fate of individuals of the covered species. Factors include the

following: (1) a likely inability to effectively measure them; (2) inability to differentiate the source of risk, including predictable but stochastic events such as the effects of drought; (3) sources of risk emerge outside the lands which are not part of the NRCS actions (financial or technical assistance) and; (4) the adverse effect may not be directly attributable to application of a particular conservation practice standard.

The Service has provided a qualitative assessment of benefits to the NRCS' implementation of the proposed action for the same reason described above. Benefits have been identified for each conservation practice and within the context of the core conservation practice as well (Appendix IV).

The Service believes that effective implementation of conservation practices and associated conservation measures can be anticipated to result in a positive population response by the species and achieve the expected conservation outcomes. This positive response is expected as threats are reduced; notably in addressing habitat fragmentation and improvement of habitat conditions across the landscape. This will be measured through the installation of conservation practices within the focal areas and specific resource threats are addressed or removed. At this point in the implementation of the proposed action and our analysis, these benefits, however, cannot be articulated in quantified metrics such as absolute increases in numbers of the covered species or expressed as an expected positive change in population growth. The monitoring component for the proposed action will provide information over time to better refine both the benefits and consequences of the implemented habitat restoration and management actions funded by NRCS.

4.3 Structure and Organization of the Effects Analysis

The effects analysis addresses the nuances of each conservation practice as well as the interplay among conservation practices and the cumulative implementation of the proposed action. Appendix IV provides information about the conservation practices with definition, purposes, resource concerns, adverse and beneficial effects to the covered species and the conservation measures designed to address the potential adverse effects.

The last aspect of the Service's analysis of the conservation practices review synthesizes the anticipated adverse effects resulting from both the application of individual conservation practices and the totality of the proposed action using commonly occurring adverse effects. The analysis further reviews and evaluates the individual and cumulative benefits of the individual conservation practice at both the individual landowner and landscape level scales.

The Service and NRCS identified 12 potential adverse effects that may result from implementation of the conservation practice to the covered species. To address the adverse effects identified, the Service, in cooperation with NRCS, developed specific conservation measures (Table 3, Appendices II and III) which are designed to minimize, avoid, or eliminate these adverse effects.

Table 3. Potential Adverse Effects and Associated Conservation Measures

Potential adverse effects to the species as a result of the conservation practice standard	**Conservation Measure (from Appendix II) recommended to ameliorate, minimize or abate the potential adverse effects**
AE1: Physical Disturbance including noise	1-14, 20, 26, 33, 36, 39, 46
AE2: Temporary soil and vegetation disturbance (indirect & temporary)	1-14, 20, 26, 30-35, 37-40, 43-44
AE3: Increased potential of introduction of invasive plants	7,8,11-15, 18, 20, 23-26, 30-41, 43-45
AE4: Removal of desired riparian vegetation and understory component	2,9-14, 17-21, 23, 23, 30-35, 39, 43-45
AE5: Increased fire hazard	18, 22, 39, 44
AE6: Increased potential of accidental mortality of individuals	1-11,13,14, 17-20, 22, 24-27, 33, 34, 36, 40, 42, 45
AE7: Increased potential of susceptibility to parasitism e.g. cowbirds	30-35, 38
AE8: Increased potential for predation	30-35, 38
AE9: Practice implementation in isolation without 528 for flycatcher may reduce riparian habitat	30-38
AE10: Water quality/quantity – loss or alteration of suitable hydrology	5-8,11-16, 18, 19, 27, 28, 37, 43
AE11: Increased potential to adversely affect insect prey base	4-20, 24-26, 39, 43, 45

4.3.1 Adverse Effect: (1) Physical disturbance (including noise) and Adverse Effect (6) Increased potential of accidental mortality to individuals

Adverse effects to flycatcher sand covered species is 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 Service to be significant source of adverse effect to the species. All of the covered conservation practice standards, 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 Services' analysis. Although effects are not quantitatively known, the literature suggests that some form of physical effects from

presence and/or associated noise will create a disturbance response to individual flycatchers and possibly other listed species covered in this biological opinion.

The primary adverse effect of concern to the Service is physical disturbance during the Southwestern Willow Flycatcher's breeding and nesting season (considered April 15 thru September 15). The flycatcher's response ("flushing"/escape behavior) may place individual birds at greater risk to predation when they leave cover. If the equipment and actions occur close to occupied nests, the female may abandon the nest for some indeterminate period or permanently. The net effect of the physical disturbance including sustained sources of noise may be a localized reduction of survival or productivity, avoidance of otherwise suitable habitat, and/or reduction of breeding frequency.

Disturbance of flycatchers and some members of the covered species, including trampling may occasionally occur from conservation practice standard installation and/or maintenance activities. These effects are expected to rarely occur and are not expected to produce significant changes in species distribution and abundance. Cumulatively, 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.

4.3.2 Adverse Effect: (2) Temporary soil and vegetation disturbance (indirect & temporary) and (3) 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 Service is 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). Common potential adverse effects identified by the Service 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.

Temporary adverse effects on individuals can include increased levels of stress hormones, increased recesses during incubation (i.e., may increase detection by predators and predation risk), or disturbance/flushing of young broods. If these risks are realized, individual fitness is reduced and may have population level effects if disturbance is over a broad enough spatial or temporal scale.

The conservation practices analyzed by the Service that could produce these potential sources of adverse effects (temporary soil disturbance and vegetation removal and increased potential of introduction of invasive plants) will be implemented by NRCS to conduct habitat management, restoration and enhancement actions designed specifically to meet the conservation needs of the

Southwestern Willow Flycatcher. 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. 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. 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.

4.3.3 Adverse Effect: (4) 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 Southwest Willow Flycatcher will have resulted. Certain facilitating practices (watering facility, water well, pipeline, grade stabilization structure, fence, etc.) covered in this biological opinion have the potential to result in the permanent removal/loss of habitat for the flycatcher and possibly other listed species.

The primary adverse effect is the permanent loss of forage and nest habitat which can lead to a reduction of available habitat and subsequent decline in breeding pair fitness, and if the areal extent is large, then localized Southwestern Willow Flycatcher populations. 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. 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.

4.3.4 Adverse Effect: (5) 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. 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).

4.3.5 Adverse Effect: (7) Increased potential of susceptibility to nest-parasitism (e.g., cowbirds)

The Southwestern Willow Flycatcher is one of several declining species that apparently have been impacted by Brown-headed Cowbird nest parasitism (USFWS 2002, Rothstein and Robinson 1994, Holmes 1993). Among Southwestern Willow Flycatcher populations, cowbird impact varies widely. In New Mexico, reported rates vary from 18% in the Cliff Gila Valley to 40% at other sites (USFWS 2002). Cowbird parasitism rates are typically lower in large patches of unfragmented habitat (Robinson et al. 1995). In general, parasitism rates and cowbird densities typically decline with increasing densities of low vegetation, probably because nests in dense vegetation are harder for cowbirds to find (USFWS 2002, Uyehara and Whitfield 2000, Staab and Morrison 1999, Larison et al. 1998). In one New Mexico study, cowbirds only parasitized nests in narrow habitat patches with large edge components and snags that provided perches for cowbirds (Smith and Johnson 2007).

Several of the covered Conservation Practices have the potential to temporarily or permanently remove riparian habitat and/or increase edge effects especially if the construction or required access to the active site may involve some habitat removal. The Service believes that implementation of conservation measures will significantly minimize this adverse effect by establishing non-disturbance dates; minimum buffer distances from nest sites; and minimizing the width of clearing of vegetation for access and construction. 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.

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.

4.3.6 Adverse Effect: (8) Increase potential for predation

For many flycatcher populations, nest predation is the major cause of nest failure (Finch et al. 2000). Most monitored populations experience high rates of nest predation ranging from 14 to

60% (Spencer et al. 1996, Whitfield and Strong 1995, Sferra et al. 1997, Sogge et al. 1997). 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).

Rates of predation may increase in human-altered landscapes. In the lower Colorado River valley, Rosenberg et al. (1991) noted increases in great-tailed grackles, a common nest predator. Increases in the extent of habitat fragmentation have been correlated with increased rates of nest predation in both forested and non-forested habitats (Picman et al. 1993, Askins 1993, Robinson et al. 1995). Whitfield (1990) noted that predation on flycatcher nests increased with decreasing distance to edge. Most small bird species in North America experience moderate rates of nest predation (30 to 60%) and the southwestern willow flycatcher, presumably, has adapted to similar rates. 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 for predation to the species as direct or indirect consequence of implementation of the proposed action. 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 SWFL and other covered species 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.

4.3.7 Adverse Effect: (9) Practice implementation in isolation without 528 for Southwestern Willow Flycatcher may reduce riparian habitat.

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.

Prescribed Grazing - According to Appendix IV, prescribed grazing (528) during the spring and summer months will occur no more than once in 3 years. Livestock grazing can adversely affect watersheds that support the aquatic and riparian habitats in which listed fishes, amphibians, plants, and the flycatcher occur. Herbivory and soil and plant trampling can alter vegetation composition, increase erosion and sedimentation into streams, and increase flood events. Grazing can also promote invasion by non-native plant species, which compete with native species and alter fire regimes. Livestock trample and destroy cryptobiotic crusts, which help stabilize soils and provide soil nutrients. Effects in the watersheds translate downstream into

alterations of riparian and stream structure and function, thus reducing the quantity and quality of habitat for listed aquatic and riparian species.

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 Prescribe 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 Service expects that the 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 Southwestern Willow Flycatcher Project 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 include the following:

In Southwestern Willow Flycatcher Project Habitat:

1. The timing, duration, intensity, and distribution of grazing will be managed to improve habitat conditions from those established in the environmental baseline.
2. Grazing will be scheduled to occur outside of the flycatcher breeding season as well as outside of the covered species' critical periods per Table 2 except where noted in specific rotations during the riparian growing season.
3. Motorized vehicles will not be used to herd livestock within listed species habitat.

In riparian, wetland or near aquatic areas:

~~4. .~~

4.~~5.~~ The timing, intensity, duration, and frequency of livestock grazing will be controlled to maintain or improve the plant communities to achieve 60% or higher similarity index for the desired plant community based on the ecological sites being managed. The desired kinds and amounts of vegetation will be based on the ecological sites being managed and the current plant communities that will be managed. Monitoring will be done to determine if plant community goals are being achieved. Monitoring may include species composition, production, vegetation and ground cover, seedling establishment, utilization, tree density or other attributes based on the vegetation goals established in the prescribed grazing plan. The Prescribed Grazing plan will also ensure adequate post-grazing vegetative heights and bank vegetation cover to minimize erosion and sediment losses from runoff, and to control stream bank erosion that would cause degradation of the riparian area. Stocking rates will be light to minimize nest disturbance. Fall and winter grazing after the willow flycatcher has left will be done no more than 2 out of 3 years. Grazing during the spring and summer will occur no more than once in 3 years.

~~6.~~5. Provide off-site water supply for livestock and wildlife to maintain or improve streamside vegetation.

In uplands or pastures with ephemeral water only:
6. Pastures with ephemeral water will be grazed when surface water is not present.

By following the conservation measures, the Service believes the potential additive effects will be effectively minimized and more than offset by the creation and maintenance of beneficial effect to the covered species habitat and other requirements.

4.3.8 Adverse Effect: (10) Water Quality/Quantity – loss of alteration of suitable hydrology

Degraded water quality impacts SWFL primarily through impacts to the aquatic food chain. Aquatic marco-invertebrates provide supplemental carbon to the terrestrial system when they emerge in great numbers to reproduce. A diverse fauna of macro-invertebrates supplies a sustained dietary supplement by producing hatches throughout the spring, summer, and into the fall.

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.

Water quantity can also effect the amount and quality of riparian habitat. The southwestern willow flycatcher population depends on breeding habitat in the southwestern United States with particular characteristics (Marshall, 1995). The birds prefer riparian forests with a dense understory of shrub-like vegetation where they typically construct their nests, with a more open canopy of larger trees, all situated near still or slow-moving open water. Commonly, the dense understory consists of willow (*Salix* sp.), seep-willow *(Baccharis sp.),* arrowweed (*Pluchea* sp.), tamarisk (*Tamarix* sp.), or Russian olive (*Eleagnus* sp.). The scattered overstory often consists of cottonwood (*Populus* sp.). Flycatchers are most abundant in these habitats when they are located adjacent to slack water. These riparian habitats were once much more common and spatially continuous, but human intervention in the southwestern river systems has now produced a geography of willow flycatcher habitat that is widely scattered, with small linear patches separated by dryland conditions.

Loss of hydrology suitable for sustaining this habitat can be a result of damming which alters the river hydrograph by managing flows to meet agricultural demands and to protect properties in the floodplain. This often changes the hydrologic peak, reducing flooding and sediment deposition required for riparian plant establishment and habitat renewal. Irrigation withdrawals result in low flows during the summer. This can cause plant stress to native riparian plants and alter the makeup of the riparian flora. Down cutting of the stream channel can act as a drain to the floodplain and result in a flora of upland and facultative plants not suitable for SWFL habitat. Bank stabilization can result in sealing of preferential flow paths adversely impacting oxbows and back swamp habitats.

4.3.9 Adverse Effect: (11) 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. 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 section 4.3.8 Water quality above for discussion of effects of water quality on macro-invertebrate habitat).

Cattle grazing can have unintended effects on insect populations. Cattle are often equipped with ear tags containing insecticides. These tags are intended to keep flies and ticks off of livestock but can impact non-target species.

4.4 General Beneficial Effects of WLFW Implementation

Implementation of the WLFW – Southwestern Willow Flycatcher Project involves conservation measures and management practices that ultimately work towards securing compatibility of the working private lands and the covered species. Financial agreements with individual landowners also will provide incentives for private lands conservation of federally threatened and endangered species. Each landowner agreement is expected to provide some measure of conservation benefit to the covered species via implementation of the conservation actions and practices described in the "Description of Proposed Action" section and as conditioned by the agreed-upon conservation measures. The objective of the WHEG is to evaluate habitat conditions that provide for the life requisites of the flycatcher under consideration and to inform alternative formulation and effects analysis.

For as long as management activities are carried out, or the habitat they create persists, enrolled lands will benefit the covered species by improving (and possibly providing) feeding, breeding, covering, and/or foraging habitat. For some eligible lands, the full measure of the conservation benefit may be achieved early, while for others it may take years to fully express for the covered species. In addition, the habitat maintained through commitments created by the WLFW – Southwestern Willow Flycatcher Project will not necessarily cease to exist upon expiration or termination of the individual contract and even after the lifespan of the particular conservation practice standard is honored by that affected landowner. The magnitude of conservation benefit will likely vary site by site; some conservation benefits may be relatively minimal, where others could be a considerable benefit to the flycatcher. However, overall, because the project is geographically targeting those important areas for flycatcher recovery and the riparian habitat it relies upon, implementing these practices will in their entirety, improve overall riparian flycatcher habitat conditions. Overall, the activities that may occur within critical habitat for the Southwestern Willow Flycatcher are not likely to result in significant adverse effects to any primary constituent elements, except on a short-term basis, and they are anticipated to result in a long-term improvement of any affected constituent element.

A qualitative evaluation of similar incentive programs such as the Service's Safe Harbor Program reveals that, in the vast majority of cases, landowners will maintain their commitment in the program. For example, in tracking landowner participation in the Service's Red-cockaded

woodpecker Safe Harbor program in nine southeastern states since 1995, only about one percent of landowners desired to return their properties to their original baseline conditions by seeking termination of their Safe Harbor Agreement (Service, unpublished data).

4.5 Effects to Other Listed Species

The management practices proposed by NRCS through the WLFW – Southwestern Willow Flycatcher Project may benefit other listed and candidate species covered above. The management practices that are beneficial to the flycatcher should also benefit all riparian and aquatic species. In addition, improving management of upland vegetation and rivers or streams on non-Federal lands should have beneficial effects on through reduced sedimentation and improved hydrological function. Critical habitat units within the action area are described in the Status of the Species and Environmental Baseline above. Non-Federal parcels of critical habitat located within the action area could be affected by activities implementing but will most likely benefit from NRCS's conservation practices. The only activity that would directly impact a stream reach designated as critical habitat would be grazing and vegetation removal, and clearing riparian vegetation for a pipeline or fence. These effects are short-term and should be more than compensated for by the long-term beneficial effects of improved flycatcher habitats.

4.6 Return to Existing Conditions

The return to baseline condition could result in a long-term loss of any improvements to primary constituent elements of Southwestern Willow Flycatcher critical habitat that have resulted from Agreement-related activities. This should only affect improvements to primary constituent elements related to enrolled landowner participation and not degrade the condition of primary constituent elements of southwestern willow flycatcher critical habitat existing at the time of enrollment. Overall, the activities that may occur within critical habitat designated or proposed for other listed species are not likely to result in significant adverse effects to any primary constituent elements, except on a short-term basis, and they are anticipated to result in a long-term improvement of any affected constituent element.

4.7 CUMULATIVE EFFECTS

Cumulative effects include the impacts of future State, local, or private actions that are reasonably certain to occur in the action area considered in this document. 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.

Cumulative effects to the flycatcher 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). As of 2012, 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.

4.7 SUMMARY OF EFFECTS

Although the long-term effects of these projects 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 Southwestern Willow Flycatcher Project and other 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 Southwestern Willow Flycatcher Project and other covered species. Soil disturbances may increase erosion, adversely affect soil stability, increase sediment deposits, and alter channel morphology.

Because of these disturbances, there may be decreases in nest initiation or nesting success. 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 impacts, they will, if conducted in association with the identified conservation measures and other design requirements of the WLFW-Southwestern Willow Flycatcher 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 Southwestern Willow Flycatcher Project by increasing nesting success, increasing insect prey abundance, and decreasing predation and by enhancement overall habitat values.

Implementation of the proposed action under the WLFW – Southwestern Willow Flycatcher is intended to reduce the threats to the species and to improve its conservation status. The targeted benefit of WLFW is to create strategic improvements to the status of the species on private working lands receiving NRCS financial and technical assistance. The proposed action in conjunction with the integrated use of the conservation measures is expected to benefit the

Southwestern Willow Flycatcher Project by maintaining, enhancing, and restoring populations and their habitats as well as by reducing the threats of direct mortality. Landowners who are interested in participating in the WLFW – Southwestern Willow Flycatcher Project must agree to install and maintain the covered conservation practices as conditioned by the conservation measures and as designed using one of the identified core management practices. This will individually and cumulatively produce benefits to the species in the form of increased habitat quantity and quality and the reduction and/or management of threats (indirect and direct) acting on the individual and population scales during the term of the individual contracts (between 3 and 15 years).

Conservation Measures are designed to maintain and enhance habitat and decrease fragmentation that is the greatest threat to Southwestern Willow Flycatcher Project. 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 the species. The implementation of the proposed action will result in more of the threats that adversely affect populations being managed – either through avoidance or minimization measures. Beneficial actions to the covered species are expected to accrue, as most of the covered conservation practices installed are focused on habitat restoration, maintenance and/or enhancement actions.

Cumulatively, the NRCS and Service find that effective implementation of conservation practices and associated conservation measures are anticipated to result in a positive population response by the species, and that the short term localized adverse impacts are more than offset by the implementation of conservation practices for the benefit of SWFL and the other covered species as modified by the agreed-upon conservation measures.

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).

After reviewing the status of the southwestern willow flycatcher and other listed species (see Table 2), the effects of the proposed project, and the cumulative effects, it is the Service's biological 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 flycatcher and other species by improving and increasing available habitat and contributing to the enhancement and survival of the species, as well as associated beneficial impacts to riparian habitat for the other species listed in Table 2.
2. Any adverse effects to primary constituent elements of designated or proposed critical habitat are anticipated to be temporary or to improve conditions over the species' current environmental baseline.
3. The proposed project may expand habitat for flycatchers located on enrolled private lands and promote their existence for a minimum of 5 years per individual landowner agreement. Similar associated beneficial effects are expected for the other listed species.
4. If the enrolled properties are returned to baseline conditions, they will maintain the baseline flycatcher habitat.
5. Management activities designed for flycatcher habitat enhancement will also provide associated beneficial impacts to riparian habitat for other listed species by enhancing native riparian vegetation.
6. The commitment to incorporate conservation measures into project designs should have positive effects to riparian habitat.
7. The NRCS is proposing to utilize in-house staff to monitor large scale habitat changes following the procedures of Hatten et al (2010).

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act 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 Service 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 Service 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 Act 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-Southwest Willow Flycatcher 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 Act 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.

Amount or Extent of Take Anticipated

Southwestern Willow Flycatcher

The goal of the program is to use innovative approaches to improve the distribution, abundance, and/or quality of flycatcher habitat on the enrolled properties during the life of the private land owners' agreements. Incidental take of flycatchers is expected to occur as a result of a variety of activities including prescribed grazing and vegetation manipulation (e.g., nonnative plant removal). Incidental take is anticipated to occur in the form of harm and harassment of flycatchers and possibly other species due to prescribed grazing and/or vegetation manipulation. If the action brings cattle into nesting sites during the breeding season, then mortality to eggs and nestlings from collision with nesting habitat and mortality to nestling and eggs from increasing parasitism levels could occur.

Incidental take is also anticipated to occur from harm and harassment to flycatchers if the enrolled landowner decides to return the property to baseline conditions. The number of flycatchers taken as a result of a landowner taking their land back to baseline is difficult to estimate because of the uncertainty of the number of landowners who participate in the program and the amount of habitat that is created.

Incidental take above baseline conditions would be in the form of harm and/or harassment. The amount or extent of incidental take to the original baseline conditions would not include any flycatchers associated with habitat conditions existing at the beginning of the landowners' enrollment in the WLFW – Southwestern Willow Flycatcher Project. The Service estimates that based upon the expected amount of enrolled acres, over the next 5 years that approximately 3,000 acres of habitat could be improved. As a conservation estimate, the Service estimates that 25% of the 3,000 acres (which equate to 750 acres) could contain nesting flycatchers within 5 years. Using 750 acres of nesting flycatcher habitat, the amount or extent of incidental take equate to 75 flycatcher nesting territories. However, it is unlikely that all of the areas enrolled and actions implemented will result in the development of nesting flycatcher habitat. The amount of incidental take of this amount could conceptually occur but this is an extremely unlikely scenario based upon historical experience with the Service's Safe Harbor program.

Other Covered Species

The precise number of covered species subject to incidental take cannot be enumerated because baseline conditions have not been established. In addition, the amount of incidental take of other listed species cannot be quantified because of the uncertainty that underlie predictions of the precise number of species that will increase above the baseline in response to voluntary management to benefit these species.

Effect of the Take

At this time, the Service does believe that level of anticipated take associated with WLFW-Southwestern Willow Flycatcher 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 Service 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 – Southwestern Willow Flycatcher program.

REASONABLE AND PURDENT MEASURES

The Service believes that the following reasonable and prudent measures and their implementing terms and conditions are necessary and appropriate for NRCS to minimize impacts of incidental take of flycatchers and other listed species identified in Table 2. In order to be exempt from the prohibitions of Section 9 of the ESA, the NRCS must ensure that implementation of the agreements complies with the following terms and conditions which implements the Reasonable and Prudent Measure above. An enrolled landowner will be allowed to make any other lawful use of his/her property, even if such use results in the incidental take of the covered species provided all of the following are met.

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of Southwestern Willow Flycatchers and other federally listed species:

1. Conserve flycatchers and other listed species that may occupy the given property.
2. Conserve flycatcher nesting territories if prescribed grazing and vegetation manipulation occurs in occupied flycatcher habitat.

3. Conserve flycatcher nesting territories if vegetation manipulation (e.g., nonnative removal) occurs in occupied flycatcher habitat.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the ESA, the enrolled landowners must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following terms and conditions will implement reasonable and prudent measure 1:

1. Identified conservation measures associated with Conservation Practices will be implemented during the life of the agreements to minimize impacts to flycatchers and other listed species. Land use and conservation practices will be evaluated by NRCS on a project by project basis in order to reduce any potential for conflict.

2. Identified conservation measures associated with Conservation Practices will be implemented during the life of the agreements to minimize impacts to critical habitat for flycatchers as well and other proposed and/or designated critical habitat associated with the other listed species.

3. On at least a quarterly basis, NRCS will provide a report of enrolled landowners by State and County, indicating the original conditions on the enrolled lands for each of the covered species, as applicable.

4. Enrollee must be in total compliance with the NRCS contract, including maintaining previously identified existing original conditions as specified in the WHEG and associated Conservation Plan.

5. Covered species may not be shot, captured, or otherwise directly taken (as defined by the ESA).

6. Take is incidental to otherwise lawful activities.

7. Incidental take meets Term and Condition 1-3 above and it does not occur during species-specific sensitive periods as outlined in Table 2; except as noted for prescribed grazing plans.

8. Baseline conditions will be established through the WHEG although surveys are the preferable method. Other methods such as on the ground evaluation using aerial photos may supplement the WHEG. The NRCS will work with the Service if the enrolled landowner requests surveys be conducted for flycatchers or other listed species.

9. Surveys for listed species will need to be conducted prior to the landowner returning to baseline conditions.

10. The landowner will provide NRCS and the Service with at least 30 days written notice, in order to allow the NRCS and the Service and/or their respective agents the opportunity to translocate the affected covered species to a suitable recipient site.

The following terms and conditions were based on recommendations within Appendix G of the Southwestern Willow Flycatcher Recovery Plan (U.S. Fish and Wildlife Service 2001) and will implement reasonable and prudent measure 2:

1. Identify the most important riparian areas for the recovery of the southwestern willow flycatcher and riparian and aquatic organisms in general.

2. Establish separate pastures for critical flycatcher habitat that will allow specific control of timing, intensity, duration and frequency of grazing to meet the habitat recovery needs identified in the conservation plan.

3. Establish specific habitat improvements needed in areas that will be grazed. Where possible, exclude livestock from sites where exclusion would result in the greatest flycatcher habitat improvement with minimal economic loss.

4. Establish livestock use numbers based on below normal precipitation years, not the average or wettest years. Use annual monitoring to adjust livestock levels to meet the specified habitat goals in the conservation plan.

5. Where possible, establish and monitor grazing exclosures in the land under contract to help evaluate monitoring data to compare the effects of climate versus management efforts. These will provide land management agencies and researchers with a much-needed series of sites against which to compare the condition of grazed watersheds (see #7 below).

6. Institute and/or improve record-keeping and documentation of grazing practices, retroactively where possible, so that the ecological effectiveness of various grazing practices can be more scientifically evaluated (see #7 below).

7. Work with state universities, private colleges, and research institutions to facilitate research that better defines the ecological and hydrological effects and sustainability of livestock grazing in southwestern ecosystems, particularly southwestern riparian ecosystems.

The following terms and conditions will implement reasonable and prudent measure 3:

1. Vegetation manipulation such as salt cedar removal or other vegetation manipulation that will occur in occupied flycatcher habitat will be conducted outside of flycatcher breeding season.

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 Service offers the following conservation recommendations:

- Meet with the Service on at least an annual basis to evaluate the progress, successes, and challenges of the implementation of the WLFW – Southwestern Willow Flycatcher Project.

- Develop an implementation process to ensure local NRCS and affected Service 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 identified in this document.

- As the science support and monitoring elements of the WLFW – Southwestern Willow Flycatcher Project 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, and others) to further enhance the conservation outcomes of the WLFW – Southwestern Willow Flycatcher Project, This must be aggregated information not specific to any operation as per privacy protection requirements in the farm bill.

- In order to continue the certainty component of the document and extend the Services' Safe Harbor assurances as provided under Section 10 of the ESA, the Service requests that NRCS provide assistance and full support in the Service's effort to develop and execute a programmatic Safe Harbor Agreement for enrolled WLFW landowners throughout the range of the covered species in the next 3 years.

REINITIATION NOTICE

As provided in 50 CFR §402.16, reinitiation 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 agency 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.

LITERATURE CITED

Askins, R. A. 1993. Population trends in grassland, shrubland, and forest birds in eastern North America. Pp. 1-34. In: Current Ornithology, vol. 11 (D. Powers, Ed.). New York, Plenum Press.

Bailey, F.M. 1928. Birds of New Mexico. New Mexico Department of Game and Fish.

Busch, D. E. 1995. Effects of fire on southwestern riparian plant community structure. Southwestern Naturalist 40: 259-267.

Busch, D. E., and S. D. Smith. 1993. Effects of fire on water and salinity relations of riparian woody taxa. Oecologia 94: 186-194.

Cooper, C.A. 1996. Summary of 1995 Surveys for Willow Flycatchers in New Mexico. New Mexico Department of Game and Fish. Santa Fe, New Mexico. Contract #96-516.51.

Cooper, C.A. 1997. Statewide summary of 1996 surveys for willow flycatchers in New Mexico. New Mexico Department of Game and Fish Report. Contract # 96-516.81.

Durst, S.L., T.C. Theimer, E.H. Paxton, and M.K. Sogge. 2008. Age, habitat, and yearly variation in the diet of a generalist insectivore, the southwestern willow flycatcher. The Condor 110(3):514-525.

Finch, Deborah M.; Stoleson, Scott H., eds. 2000. Status, ecology, and conservation of the Southwestern Willow Flycatcher. Gen. Tech. Rep. RMRS-GTR-60. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 131 p.

Hatten, James R.; Paxton, Eben H.; and Mark K. Sogge. 2010. Modeling the dynamic habitat and breeding population of Southwestern Willow Flycatcher. Ecological Modelling 221 (2010) 1674–1686. Accessed June 11, 2101 at http://sbsc.wr.usgs.gov/cprs/research/projects/swwf/Reports/hatten%20et%20al.%202010%20flycatcher%20modeling%20-%20Ecological%20Modelling%20-%20Page%201%20only.pdf

Holmes, B. 1993. An avian arch-villain gets off easy. Science 262:1514-1515.

Howell, Steve N.G. and S. W ebb. 1995. A guide to the birds of Mexico and northern Central America. Oxford University Press. 851 pp.

Hubbard, J.P. 1987. The status of the willow flycatcher in New Mexico. Endangered Species Program, New Mexico Department of Game and Fish, Santa Fe, New Mexico. 29 pp.

Larison, B., S. A. Laymon, P. L. Williams, and T. B. Smith. 1998. Song Sparrows vs. cowbird brood parasites: impacts of forest structure and nest-site selection. Condor 100:93-101.

Ligon, J.S. 1961. New Mexico Birds and where to find them. The University of New Mexico Press, Albuquerque, New Mexico.

McKernan, R.L. and G. Braden. 1999. Status, distribution, and habitat affinities of the southwestern willow flycatcher along the lower Colorado River: Year 3 - 1998. Report to U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, and U.S. Bureau of Land Management. San Bernardino County Museum. 71 pp.

McCarthey,T. D., C. E. Paradzick, J. W. Rourke, M. W. Sumner, and R. F. Davidson. 1998. Draft Arizona Partners In Flight southwestern willow flycatcher 1997 survey and nest monitoring report. Arizona Game and Fish Department, Phoenix, AZ. 79 p.

Moore, D., and D. Ahlers. 2006. 2006 Southwestern Willow Flycatcher study results. Bureau of Reclamation, Denver, Colorado.

Morrison, L. S. Hall, S. K. Robinson, S. I. Rothstein, D. C. Hahn, and T. D. Rich. 1999. Research and management of the Brown-headed Cowbird in western landscapes. Studies in Avian Biology 18.

Netter, M.R., E.H. Paxton, and M.K. Sogge. 1998. Banding and movements of the southwestern willow flycatcher at Roosevelt Lake and San Pedro River/Gila River confluence, Arizona - 1998. USGS Forest and Rangeland Ecosystem Science Center, Colorado Plateau Field Station, Flagstaff, Arizona. Funded by the U.S. Bureau of Reclamation, Phoenix, Interagency Agreement #98-AA-32-0010. 48 pp.

Paradzick, C.E., R.F. Davidson, J.W. Rourke, M.W. Sumner, and T.D. McCarthey. 1999. Southwestern Willow Flycatcher 1998 Survey and Nest Monitoring Report. Technical Report 141. Arizona Game and Fish Department Phoenix, Arizona.

Phillips, A.R. 1948. Geographic variation in Empidonax traillii. The Auk 65:507-514.

Picman, J., M. L. Milks, and M. Leptich. 1993. Patterns of predation on passerine nests in marshes: effects of water depth and distance from edge. Auk 110: 89-94.

Robinson, S. K., F. R. Thompson III, T. M. Donovan, D. R. Whitehead, and J. Faaborg. 1995. Regional forest fragmentation and the nesting success of migratory birds. Science 267:1987-1990.

Rosenberg, K. V., R. D. Ohmart, W. C. Hunter, and B. W. Anderson. 1991. Birds of the Lower Colorado River Valley. University of Arizona Press, Tucson. 416 p.

Rothstein, S. I., and S. K. Robinson. 1994. Conservation and coevolutionary implications of brood parasitism by cowbirds. Trends Ecol. Evol. 9:162-164.

Sferra, S. J., T. E. Corman, C. E. Paradzick, J. W. Rourke, J. A. Spencer, and M. W. Sumner. 1997. Arizona Partners In Flight southwestern willow flycatcher survey: 1993-1996 summary report. Arizona Game and Fish Department. Phoenix, Arizona. Nongame and Endangered Wildlife Program Technical Report 113.

Sferra, S.J., T.E. Corman, C.E. Paradzick, J.W. Rourke, J.A. Spencer, and M .W. Sumner. 1997. Arizona Partners In Flight southwestern willow flycatcher survey: 1993-1996 summary report. Nongame and Endangered Wildlife Program Technical Report 113. Arizona Game and Fish Department, Phoenix, Arizona.

Skaggs, R.W. 1996. Population size, breeding biology, and habitat of Willow Flycatchers in the Cliff-Gila Valley, New Mexico - 1995. New Mexico Department of Game and Fish report. Contract #95-516-91.

Stiles, F.G. and A.F. Skutch. 1989. A guide to the birds of Costa Rica. Cornell University Press, New York.

Stoleson, S.H. and D.M. Finch. 1999. Reproductive success of southwestern willow flycatchers in the Cliff-Gila Valley, New Mexico. Report to Phelps-Dodge Corporation. USDA Forest Service, Rocky Mountain Research Station, Albuquerque, New Mexico. 25 pp.

Stoleson, S. H., and D. M. Finch. 2003. Microhabitat use by breeding Southwestern Willow Flycatchers on the Gila River, New Mexico. Studies in Avian Biology 26:91-95.

Swarth, H.S. 1914. A distributional list of the birds of Arizona. Museum of Vertebrate Zoology, University of California. Cooper Ornithological Club, Pacific Coast Avifauna No. 10. Hollywood, California. 133 pp.

Smith, J., and K. Johnson. 2004. Southwestern Willow Flycatcher nesting success, cowbird parasitism, and habitat characteristics at the Pueblo of Isleta, New Mexico, 2003 report. Natural Heritage New Mexico, Publication No. 03-GTR-255.

Smith, J., and K. Johnson. 2005. Southwestern Willow Flycatcher nesting success, cowbird parasitism, and habitat characteristics at the Pueblo of Isleta, New Mexico. Natural Heritage New Mexico, Museum of Southwestern Biology, Albuquerque, New Mexico. Natural Heritage Publication No. 05-GTR-283.

Smith, J., and K. Johnson. 2007. Water requirements for Southwestern Willow Flycatcher habitat and nesting at the Pueblo of Isleta, 2006-2007 draft report. Natural Heritage New Mexico, Museum of Southwestern Biology, Albuquerque, New Mexico.

Smith, T. L. Cook, S. I. Rothstein, S. K. Robinson, and S. G. Sealy, eds. Ecology and management of cowbirds and their hosts. University of Texas Press, Austin, Texas.

Sogge, M. K., T. J. Tibbitts, and J. R. Petterson. 1997. Status and breeding ecology of the Southwestern Willow Flycatcher in the Grand Canyon. Western Birds 28: 142-157.

Spencer, J.A., S.J. Sferra, T.E. Corman, J.W. Rourke, and M.W.Sumner. 1996. Arizona Partners In Flight 1995 southwestern willow flycatcher survey. Technical Report 97, March 1996. Arizona Game and Fish Department, Phoenix, Arizona. 69 p.

Staab, C. A., and M. L. Morrison. 1999. Managing riparian vegetation to control cowbirds. Pages 18-22 in M. L.

Tibbitts, T.J. and M.J. Johnson. 1999. Southwestern willow flycatcher inventory and monitoring along the Colorado River in Grand Canyon National Park. 1998 Summary Report. USGS Biological Resources Division, Colorado Plateau Field Station, Northern Arizona University, Flagstaff. 17 pp.

Unitt, P. 1987. Empidonax traillii extimus: An endangered subspecies. Western Birds 18:137-162.

U.S. Fish and Wildlife Service. 1995. Final rule determining endangered status for the southwestern willow flycatcher (*Empidonax traillii extimus*). Federal Register 60:10694 (February 27, 1995).

U.S. Fish and Wildlife Service and National Marine Fisheries Service. 1998. Consultation handbook: procedures for conducting consultation and conference activities under section 7 of the Endangered Species Act.

U.S. Fish and Wildlife Service. 2002. Southwestern Willow Flycatcher recovery plan. Albuquerque, NM, i-ix + 210 pp., Appendices A-O.

U.S. Fish and Wildlife Service. 2011. Endangered and threatened wildlife and plants; revised critical habitat for the Southwestern willow flycatcher: proposed rule. Federal Register 76(157): 50542.

Uyehara, J. C., and M. J. Whitfield. 2000. Association of cowbird parasitism and vegetative cover in territories of Southwestern Willow Flycatchers. Pages 204-209 in J. N. M.

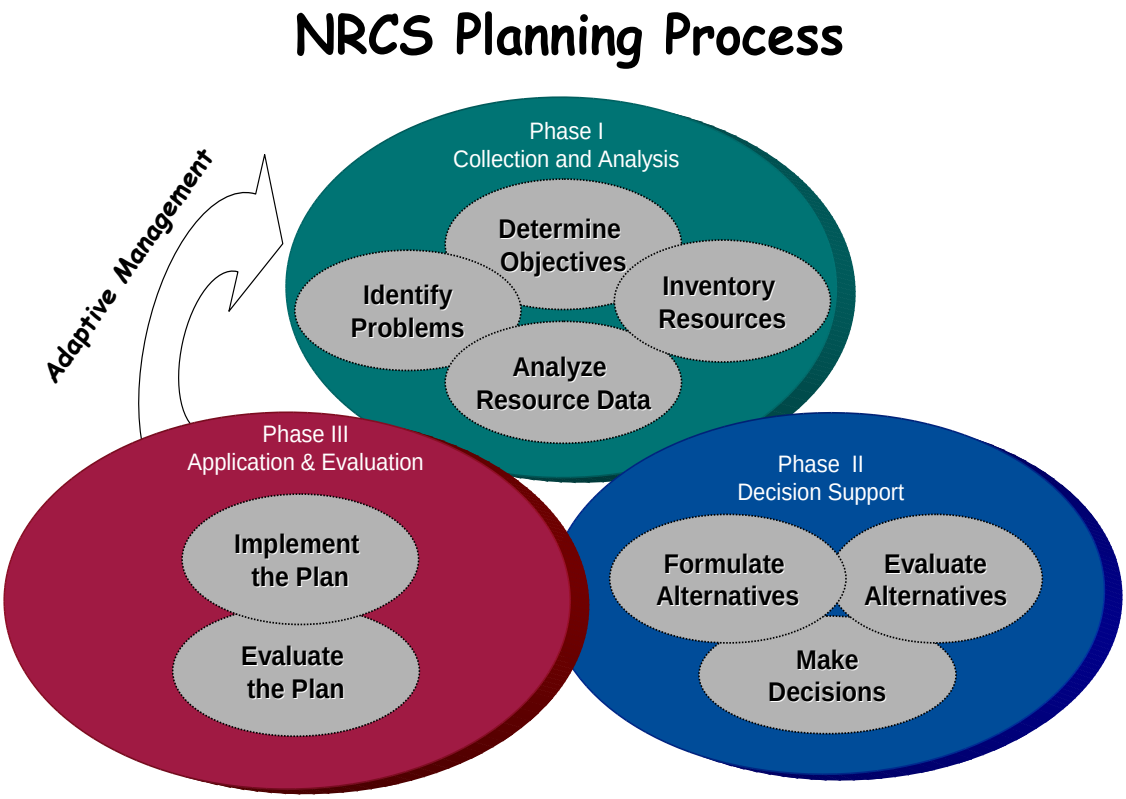
Whitfield, M.J. 1990. Willow flycatcher reproductive response to brown-headed cowbird parasitism. Masters Thesis, California State University, Chico.

Whitfield, M. J., and C. M. Strong. 1995. Bird and Mammal Conservation Program Report, 95-4: A Brown-headed Cowbird control program and monitoring for the Southwestern Willow Flycatcher, South Fork Kern River, California. Sacramento, California Department of Fish and Game.

Williams, S.O. and D.A. Leal. 1998. Summary of Willow Flycatcher surveys in New Mexico during 1993-1998. Summary report by New Mexico Department of Game and Fish, Santa Fe, NM.

APPENDIX I. NRCS CONSERVATION PLANNING PROCESS

The planning process is initiated when a client requests NRCS assistance to address one or more resource concerns, usually on their private property and/or leased lands. Beginning with the initial site visit, the NRCS planner and client will complete the following nine steps in developing and implementing a conservation plan for the property. These iterative steps are a process that blends the objectives of the land owner, NRCS, and environmental laws:



Step 4 - Analyze Resource Data: Analyze the resource information gathered in planning Step 3 to clearly define the natural resource conditions, along with economic and social issues related to the resources. This includes problems and opportunities.

Phase II - Decision Support

Step 5 - Formulate Alternatives: Formulate alternatives that will achieve the client's objectives, solve natural resource problems, and take advantage of opportunities to improve or protect resource conditions.

Step 6 - Evaluate Alternatives: Evaluate the alternatives to determine their effects in addressing the client's objectives and the natural resource problems and opportunities. Evaluate the projected effects on social, economic, and ecological concerns. Special attention must be given to those ecological values protected by law or Executive Order.

Step 7 - Make Decisions: The client selects the alternative(s) and works with the planner to schedule conservation system and practice implementation. The planner prepares the necessary documentation.

Phase III - Application and Evaluation

Step 8 - Implement the Plan: The client implements the selected alternative(s). The planner provides encouragement to the client for continued implementation.

Step 9 - Evaluate the Plan: Evaluate the effectiveness of the plan as it is implemented and make adjustments as needed. A financial assistance contract can be modified through this process.

QUALITY CRITERIA, CONSERVATION SYSTEMS AND PRACTICES

In Steps 5 and 6, the planner strives to help the client balance natural resource issues with economic and social needs through the development of a Resource Management System (RMS). An RMS is a combination of Conservation Practices that treat all Resource Concerns to a condition that meets or exceeds Quality Criteria for sustainable land use. Quality Criteria establishes the desired condition for a Resource Concern. An evaluation method (indicator) is chosen to evaluate each Resource Concern, and a target value (Quality Criteria) is established based on the evaluation method. Quality criteria for RMS's (see National Planning Procedures Handbook (NPPH), Subpart D, Section 600.43) are located in the Field Office Technical Guide (FOTG), Section III- http://efotg.nrcs.usda.gov/treemenuFS.aspx.

A Conservation System is the implementation of a variety of conservation practices that together address multiple resource concerns. A Conservation Practice is a discrete set of technology used to address a resource problem. A conservation practice may be a structural or vegetative measure, or a management activity used to protect or reduce the degradation of soil, water, air, plant or animal resources. Some practices are stand-alone in that they can be implemented to meet a desired condition and not be associated with other practices, such as Prescribed Grazing (NRCS code 328). If the client has the ability to manage livestock in a matter to meet quality criteria, they can simply implement Prescribed Grazing through managing

duration and numbers of livestock grazing on a given area. Other practices, such as Fence (NRCS code 382) are facilitating practices, in that they cannot stand alone to treat resource problems; rather they are installed to facilitate other conservation practices. A fence by itself does not do anything for conservation; when installed to facilitate Prescribe Grazing, it facilitates the manager's ability to manipulate livestock to achieve the goals of Prescribed Grazing.

The NRCS planner works with the client to develop and evaluate alternatives that would allow the user to manage the land to meet or exceed quality criteria for each resource concern. The client chooses the alternative consisting of a suite of Conservation Practices best suited to their needs and ability to implement. The suite of practices chosen becomes their Conservation Plan, a record of the client's decisions for the treatment of resource problems. Therefore, it is the client's plan and not the NRCS' plan. The Conservation Plan identifies the conservation practices and a planned schedule for installing or applying the practices. The client can then apply for financial assistance to implement all or a portion of the conservation plan through NRCS, other agencies or through their own funding initiative.

As part of this conservation planning effort, individual environmental reviews called Environmental Evaluations (EE) are completed which inform the conservation planning effort and assist the Agency's compliance with NRCS regulations that implement NEPA. The EE is a concurrent part of the planning process in which the potential long-term and short-term impacts of an action on people, their physical surroundings, and the natural environment are, evaluated and alternative actions explored. The EEs and conservation plans are developed to assist the client in making decisions and implementing the conservation practices identified in the conservation plan. A Conservation plan is a record of the client's decision to implement of one or more conservation practices which prescribe the actions necessary to address the identified resource concerns in need of treatment.

Structural conservation practices may have some short term (the construction or implementation phase) negative effects on certain listed species if they are in the action area, such as soil disturbance that can be mitigated through incorporation of conservation measures. The long-term (after construction through the life-span of the practice) effects are positive or beneficial for nearly all conservation practices. However, some practices can have longer-term effects to specific species, such as when the construction of a fire break done in a certain way may create a barrier to movement to sand skinks or other reptilian species. In some cases, long term effects may have "no effect" after the short-term effects have been mitigated for or disappeared.

The NRCS works with land users to plan and implement Resource Management Systems that will maintain or improve the condition and health of the soil, water, air, plant and animal resources for long term sustainability of a quality environment. The NRCS helps the land user understand the potential of the land, determine the current health and condition, and identify existing and potential resource problems.

A resource concern is an element of the natural resources that may be sensitive to change by natural forces or human activity. Resource concerns are nationally established soil, water, air, plant and animal resource elements used by NRCS to evaluate the health of the natural resources. The NRCS conducts an inventory of the planning area to determine the current

condition of the resource concerns as the basis for developing the conservation plan. The NRCS resource concerns are nationally established indicators that are used to evaluate the health of the natural resources. For this effort, the NRCS identified fifteen resource concerns that affect the quality and quantity of SWFL habitat (**Table 4**). A resource problem is identified when a resource concern does not meet Quality Criteria. The client determines which resource problems they are ready, willing and able to treat using Conservation Practices to reach Quality Criteria.

Table 4. Resource Concerns in SWFL Habitat

#	RESOURCE CONCERN	RESOURCE CONCERN DESCRIPTION
1	SOIL EROSION - Sheet, rill, & wind erosion	Detachment and transportation of soil particles caused by rainfall runoff/splash, irrigation runoff or wind that degrades soil quality
2	SOIL EROSION – Concentrated flow erosion	Untreated classic gullies may enlarge progressively by head cutting and/or lateral widening. Ephemeral gullies occur in the same flow area and are obscured by tillage. This includes concentrated flow erosion caused by runoff from rainfall, snowmelt or irrigation water.
3	SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels	Sediment from banks or shorelines threatens to degrade water quality and limit use for intended purposes
4	INSUFFICIENT WATER – Inefficient moisture management	Natural precipitation is not optimally managed to support desired land use goals or ecological processes
5	INSUFFICIENT WATER – Inefficient use of irrigation water	Irrigation water is not stored, delivered, scheduled and/or applied efficiently. Aquifer or surface water withdrawals threaten sustained availability of ground or surface water. Available irrigation water supplies have been reduced due to aquifer depletion, competition, regulation and/or drought.
6	WATER QUALITY DEGRADATION – Excess pathogens and chemicals from manure, bio-solids or compost applications	Pathogens, pharmaceuticals and other chemicals are applied as amendments and transported to receiving waters in quantities that degrade water quality and limit use for intended purposes. This resource concern also includes the off-site transport of leachate and runoff from silage, compost, or other organic materials.

#	RESOURCE CONCERN	RESOURCE CONCERN DESCRIPTION
7	WATER QUALITY DEGRADATION – Excessive sediment in surface waters	Off-site transport of sediment from sheet, rill, gully, and wind erosion into surface water that threatens to degrade surface water quality and limit use for intended purposes
8	WATER QUALITY DEGRADATION – Elevated water temperature	Surface water temperatures exceed State/Federal standards and/or limit use for intended purposes.
9	DEGRADED PLANT CONDITION – Undesirable plant productivity and health	Plant productivity, vigor and/or quality negatively impacts other resources or does not meet yield potential due to improper fertility, management or plants not adapted to site. This could include addressing pollinators and beneficial insects.
10	DEGRADED PLANT CONDITION – Inadequate structure and composition	Plant communities have insufficient composition and structure to achieve ecological functions and management objectives. This includes degradation of wetland habitat, targeted ecosystems, or unique plant communities.
11	DEGRADED PLANT CONDITION – Excessive plant pest pressure	Excessive pest damage to plants including that from undesired plants, diseases, animals, soil borne pathogens, and nematodes. As an example, this concern addresses invasive plant, animal and insect species
12	DEGRADED PLANT CONDITION– Wildfire hazard, excessive biomass accumulation	The kinds and amounts of fuel loadings - plant biomass - create wildfire hazards that pose risks to human safety, structures, plants, animals, and air resources.
13	INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation	Quantity, quality or connectivity of food, cover, space, shelter and/or water is inadequate to meet requirements of identified fish, wildlife or invertebrate species.
14	LIVESTOCK PRODUCTION LIMITATION – Inadequate feed and forage	Feed and forage quality or quantity is inadequate for nutritional needs and production goals of the kinds and classes of livestock.
15	LIVESTOCK PRODUCTION LIMITATION – Inadequate livestock water	Quantity, quality and/or distribution of drinking water are insufficient to maintain health or production goals for the kinds and classes of livestock.

Conservation Practice Standards

The NRCS standard for each conservation practice establishes criteria for applying conservation technology on the land and sets the minimum acceptable level for application of the technology. Each conservation practice has a practice standard that guides the site-specific design. The NRCS issues conservation practice standards in its National Handbook of Conservation Practices (NHCP), periodically revising them and developing new standards. Before revised or new conservation practice standards are added to the NHCP, they are advertised in the Federal Register for review and comment by the general public. All standards currently under Federal Register review are located at ftp://ftp-c.sc.egov.usda.gov/NHQ/practice-standards/federal-register.

Each state determines which National conservation practice standards are applicable in their state. States add the technical detail needed to effectively use the standards at the Field Office level, and issue them as state conservation practice standards. State conservation practice standards may be found in Section IV of the FOTG at: http://efotg.nrcs.usda.gov/treemenuFS.aspx. At a minimum, each state will review and revise each standard every 5 years.

Conservation Practice Standards include the Name, Code, and Unit of Measure for the practice. They also include a Definition of the practice, list the Purpose(s), describe the Conditions where the practice applies (as well as where the practice may not apply), identify the minimum Quality Criteria for successfully achieving a single purpose or for multiple purposes, discuss special Considerations, which may be important to the successful operation of the practice after it has been applied, provide guidance for the development of Plans and Specifications used to install the practice, and provide instructions for developing the Operation and Maintenance guidance that will be used after practice installation. Conservation measures required through this programmatic consultation for each standard listed in Appendix 1 will be added to the practice design provided to the client.

Potential Resource Effects of Implementing a Conservation Practice

The potential effects of conservation practices were evaluated in several ways. The NRCS planning process has long been based on the ability of any given conservation practice to effectively address a resource concern. This tool evaluates the ability of a conservation practice to address resource concerns and to meet quality criteria.

The NRCS, in collaboration with the Service, reviewed the Conservation Practices covered in the consultation (Table 1). We then listed the resource effects that can be expected from implementation of any given conservation practice through a conservation system and evaluated the impacts on all the covered species with particular emphasis placed on the SWFL. Since the purpose of a resource management system is to improve natural resource conditions, conservation practices will normally have long term beneficial effects on listed species. Practice standards establish the minimum acceptable level of quality that is required to plan, design, install, operate, and maintain conservation practices.

APPENDIX II. CONSERVATION MEASURES FOR ALL CONSERVATION PRACTICES IN THE 100 YEAR FLOODPLAIN

Planning:

1. Flag or otherwise protect individuals of a listed plant species in construction areas.
2. If removing vegetation or habitat structural materials, a pre-construction survey will be completed to ensure that materials to be removed are not used as primary cover for a listed species. Cover or nest materials will remain with a 250' undisturbed buffer.
3. Conduct a pre-installation, pedestrian survey for wildlife that may be trapped within a temporarily fenced construction area. Trapped wildlife will be allowed to escape prior to construction.

Timing:

4. Install outside covered species' critical periods (**Table 2**), Referenced in practice standard as Field Office Technical Guide, Section II, Technical note except where otherwise stated (e.g. Prescribed Grazing).
5. Install practices when any ephemeral streambed within the action area is dry; or at times when hydrologic, migration or reproduction conditions ensure that covered species are not present.
6. Minimize upland soil compaction during practice construction by selecting the location and timing of the practice to minimize compaction (i.e. avoid periods when soil is wet, especially high clay soils).

Location:

7. Use existing stream crossings for equipment access during practice installation.
8. Use existing roads, limit cross-country travel or initiation of new roads.
9. Locate practice a minimum of 250 feet from any known listed species active nest or burrow as applicable, whether or not bulldozers, trenching machines, or similar equipment is used.
10. Alignments for any planned construction will be routed to avoid specific areas known to be occupied by the covered species and known habitat features of the covered species such as nests.

Vegetation:

11. Minimize soil and vegetation disturbance during practice installation; avoid total removal of vegetation to allow regrowth by only removing targeted species and leaving the native herbaceous layer as undisturbed as possible.
12. Plant or seed native species adapted to local conditions on disturbed ground to reduce opportunities of invasive weed establishment.
13. Where clearing of vegetation is determined to be necessary during planned construction or maintenance, the corridor cleared, otherwise prepared, or maintained will not exceed 25 Feet in width.

Equipment:

14. Minimize or eliminate stream bank disturbance during practice construction.
15. Clean equipment used in practice implementation (vehicles, farm equipment, and tools) before entering and leaving project site to prevent the spread of non-native plant/animals or disease.
16. Immediately clean grease, oil, or other contaminant spills and remove from the site.

APPENDIX III. Conservation Measures Applied to Selected Conservation Practices (see Appendix IV)

17. This practice will not be used in cases where habitat currently meets all minimum occupation requirements of SWFl **and** greater than 50% of nesting canopy cover consists of tamarisk.
18. Conservation plans using Brush Management will be designed to develop SWFL habitat of improved quality or that provides equivalent habitat and decreases the potential of wild fire due to tamarisk.
19. Tamarisk in a nesting patch shall not be treated if a biologist designated by state biologist determines that implementation of Brush Management will decrease SWFL viability in the patch for the following nesting season.
20. Treated sites may be deferred from grazing for a period of time determined to be necessary to restore SWFL habitat based on pre and post site treatment conditions.
21. This practice is not to be used for land use change.
22. Slash treatment will occur outside of the 100-year floodplain when it is not in seed.
23. If soil is disturbed, use site specific reclamation using SWFL WHEG, Stream Visual Assessment Protocol-2 and/or riparian Ecological Site Desription with consideration of SWFL habitat needs.
24. Use Win_PST to determine pesticide mitigation requirements.
25. Herbicide applications will follow the applicable conservation measures recommended in the FWS document “Recommended Protection Measures For Pesticide Applications in Region 2 of the U.S. Fish and Wildlife Service” available on the Arizona Ecological Services webpage.
26. Where clearing of vegetation is determined to be necessary during planned construction or maintenance, the corridor cleared, otherwise prepared, or maintained will not exceed 5 Feet in width in SWFL occupied habitat. Outside of SWFL occupied habitat, the path or corridor where the practice is implement may be up to 25 feet wide.
27. Provide wildlife safe ingress/egress in trenches (ladder or dirt plugs to allow escape) during construction.
28. Implementation of grazing management plans, to the extent practicable, will meet habitat conditions for riparian habitat as recommended by WHEG
29. Frequency – Grazing will occur at a rate conducive to creating or maintaining desired habitat structure for nesting SWFL.
30. Duration – Grazing periods will be designed to establish or maintain desired habitat conditions as recommended by WHEG

31. Timing – Grazing will be scheduled to avoid potential disturbance to SWFL and occupied SWFL habitat during breeding season – from April 15 to Sept 15, except when following prescribed grazing protocol during growing season as stated
32. Intensity – the amount of forage removed (or left) during any particular grazing cycle will be in keeping with the life cycle requirements of the SWFL.
33. 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. The timing, intensity, duration, and frequency of livestock grazing will be controlled to maintain or improve the plant communities to achieve 60% or higher similarity index for the desired plant community based on the ecological sites being managed. The desired kinds and amounts of vegetation will be based on the ecological sites being managed and the current plant communities that will be managed. Monitoring will be done to determine if plant community goals are being achieved. Monitoring may include species composition, production, vegetation and ground cover, seedling establishment, utilization, tree density or other attributes based on the vegetation goals established in the prescribed grazing plan. The Prescribed Grazing plan will also ensure adequate post-grazing vegetative heights and bank vegetation cover to minimize erosion and sediment losses from runoff, and to control stream bank erosion that would cause degradation of the riparian area. Stocking rates will be light to minimize nest disturbance. Fall and winter grazing after the willow flycatcher has left will be done no more than 2 out of 3 years. Grazing during the spring and summer will occur no more than once in 3 years. Provide off-site water supply for livestock and wildlife to maintain or improve streamside vegetation
34. Motorized vehicles will not be used to herd livestock within listed species habitat.
35. Provide off-site water supply for livestock and wildlife to maintain or improve streamside vegetation.
36. Time practice implementation to reduce spread of non-native plants by implementing the practice during the dormant season (e.g. avoid ground disturbance in riparian areas in the summer to reduce salt cedar spread).
37. Leave adequate vegetation buffer and/or install best management practices along down slope edge of project area to prevent disturbed ground sediment runoff from entering aquatic habitats. These can include straw baffles, silt fence, hay bales, etc.
38. Design stream crossings to prevent water flow blockage during low flow periods or debris blockage during high flow periods.
39. Screen inlets and outlets to prevent non-native fish and amphibians from spreading into other habitats.
40. Re-establish native riparian vegetation on disturbed sites to maintain or improve bank stability.
41. Plan for this practice shall be designed to develop SWFL habitat of improved quality or that provides equivalent habitat and decreases potential of wild fire due to tamarisk.
42. Defer use of this practice from April 15 to Sept 15

APPENDIX IV. CONSERVATION PRACTICES

CORE PRACTICES

CONSERVATION PRACTICE: EARLY SUCCESSIONAL HABITAT DEVELOPMENT/MANAGEMENT (647)

Definition – Manage plant succession to develop and maintain early successional habitat to benefit desired wildlife and/or natural communities.

Purpose – To provide habitat for species requiring early successional habitat for all or part of their life cycle.

Resource Concern –

RC 13: Inadequate Habitat for Fish and Wildlife

Application –

Potential Beneficial Effect(s) to SWFL –

Potential Adverse Effect(s) to SWFL –
should be none if correctly applied

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: RESTORATION & MANAGEMENT OF RARE & DECLINING HABITATS (643)

Definition – Restoring, conserving, and managing unique or diminishing native terrestrial and aquatic ecosystems.

Purpose – To return aquatic or terrestrial ecosystems to their original or usable and functioning condition and to improve biodiversity by providing and maintaining habitat for fish and wildlife species associated with the ecosystem.

Resource Concern –

RC 10: Degraded Plant Condition – Inadequate structure and composition
RC 13: Inadequate Habitat for Fish and Wildlife

Application – This practice will be a core practice in which a system of supporting practices will be applied to restore and manage the covered species with particular emphasis on the Southwest Willow Flycatcher. This Practice may be utilized in those areas or states where Southwest Willow Flycatcher has been identified to occur in an identified rare or declining habitat(s).

Potential Beneficial Effect(s) to SWFL – This is one of several practices that can be used for the restoration of riparian habitat providing the basic needs of food, cover, and water for the SWFL.

Potential Adverse Effect(s) to SWFL –

should be none if correctly applied

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: STREAM HABITAT IMPROVEMENT & MANAGEMENT (395)

Definition – Maintain, improve or restore physical, chemical and biological functions of a stream, and its associated riparian zone, necessary for meeting the life history requirements of desired aquatic species.

Purpose –

- Provide suitable habitat for desired fish and other aquatic species.
- Provide stream channel and associated riparian conditions that maintain stream corridor ecological processes and hydrological connections of diverse stream habitat types important to aquatic species.

Resource Concern –

RC 13: Inadequate Habitat for Fish and Wildlife

Application – This practice is used to supply need habitat elements identified in the stream visual assessment or other habitat model. Typical application might call for the establishment of trees to reduce thermal pollution or place large boulders to create scour pools.

Potential Beneficial Effect(s) to SWFL – Improving in stream habitat will provide the proper diversity of substrates for the production of benthic invertebrates that provide critical food resources for aquatic and terrestrial species, including SWFL, during hatches.

Potential Adverse Effect(s) to SWFL – should be none if correctly applied

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: UPLAND WILDLIFE HABITAT MANAGEMENT (645)

Definition – Provide and manage upland habitats and connectivity within the landscape for wildlife.

Purpose – Treating upland wildlife habitat concerns identified during the conservation planning process that enable movement, or provide shelter, cover, and food in proper amounts, locations and times to sustain wild animals that inhabit uplands during a portion of their life cycle.

Resource Concern –

RC 13: Inadequate Habitat for Fish and Wildlife

Application – This practice is used to supply needed habitat elements identified in the Upland WHEG or other habitat model. Typical application might call for the establishment of plants to provide food and/or cover, manipulation of plants to improve quality or manage timing of producer activities to enable life stage events of wildlife.

Potential Beneficial Effect(s) to SWFL – Upland habitat is managed for the benefit of species identified. Needs are assessed using an appropriate Wildlife Habitat Evaluation Guide (WHEG), in this case the SWFL guide, and the limiting factors are addressed through appropriate conservation practices.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE3: Increased potential of introduction of invasive plants

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: WETLAND WILDLIFE HABITAT MANAGEMENT (644)

Definition – Retaining, developing or managing wetland habitat for wetland wildlife.

Purpose – To maintain, develop, or improve wetland habitat for waterfowl, shorebirds, fur-bearers, or other wetland dependent or associated flora and fauna.

Resource Concern –

RC 04: Insufficient Water
RC 13: Inadequate Habitat for Fish and Wildlife

Application – This practice is used to supply needed habitat elements identified in the Wetland WHEG or other habitat model. Typical application might call for the establishment of plants to provide food and/or cover, manipulation of plants to improve quality or manage timing of producer activities to enable life stage events of wildlife.

Potential Beneficial Effect(s) to SWFL – Wetland habitat is managed for the benefit of species identified. Needs are assessed using an appropriate Wildlife Habitat Evaluation Guide (WHEG), in this case the SWFL guide, and the limiting factors are addressed through appropriate conservation practices.Potential Adverse Effect(s) to SWFL: should be none if correctly applied

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE3: Increased potential of introduction of invasive plants

Additional Conservation Measures – NONE

SUPPORTING PRACTICES

CONSERVATION PRACTICE: ACCESS CONTROL (472)

Definition – The temporary or permanent exclusion of animals, people, vehicles, and/or equipment from an area.

Purpose –- Achieve and maintain desired resource conditions by monitoring and managing the intensity of use by animals, people, vehicles, and/or equipment in coordination with the application schedule of practices, measures and activities specified in the conservation plan.

Resource Concern –

RC 03: Soil Erosion – Excessive Bank Erosion
RC 07: Water Quality Degradation – Excessive sediment in surface waters
RC 10: Degraded Plant Condition – Inadequate structure and composition
RC 13: Inadequate Habitat for Fish and Wildlife

Application – Typical Application: A four wire fence is installed using three barbed wires and a smooth bottom wire. If ORVs are to be excluded a ½ inch cable is used to replace one of the middle wires. Five acres of access control is accomplished with the installation of approximately 2,500 feet of fence. Access is controlled for the duration needed to achieve resource goals such as 3 – 5 years for the establishment of woody vegetation.

Potential Beneficial Effect to SWFL – Controlled access of people (especially vehicles) and livestock will reduce ground disturbance, allow plants to recover for food, cover, and reduce human presence disturbance to species.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE3: Increased potential of introduction of invasive plants
AE5: Increased fire hazard

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: ANIMAL TRAILS AND WALKWAYS (575)

Definition – Established lanes or travel ways that facilitate animal movement.

Purpose –

- Provide or improve access to forage, water, working/handling facilities, and/or shelter,
- Improve grazing efficiency and distribution, and/or
- Protect ecologically sensitive, erosive and/or potentially erosive sites.

Resource Concern –

RC 02: Soil Erosion – Concentrated flow erosion.
RC 03: Soil Erosion – Excessive Bank Erosion
RC 07: Water Quality Degradation – Excessive sediment in surface waters

Application – Installation of a stable path to move livestock through easily damaged areas such as down steep embankments.

Potential Beneficial Effect(s) to SWFL – Preserve the integrity of the stream channel and reduces sedimentation preserving macro-invertebrate production for SWFL forage resources.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise

AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: BRUSH MANAGEMENT (314)

Definition – To provide habitat for species requiring early successional habitat for all or part of their life cycle.

Purpose –

- Create the desired plant community consistent with the ecological site.
- Restore or release desired vegetative cover to protect soils, control erosion, reduce sediment, improve water quality or enhance stream flow.
- Maintain, modify, or enhance fish and wildlife habitat.
- Improve forage accessibility, quality and quantity for livestock and wildlife.
- Manage fuel loads to achieve desired conditions.

Resource Concern –

RC 10: Degraded Plant Condition – Inadequate structure and composition
RC 13: Inadequate Habitat for Fish and Wildlife

Application – Typical installation involves the removal of individual invasive shrubs such as salt cedar with a chain saw. The stump is then painted with an appropriate herbicide to prevent sprouting. Treatment area is from one to five acres with 20 – 40 trees per acre removed.

Potential Beneficial Effect(s) to SWFL – Restore native plant community and diversity including diversity of associated invertebrates.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants
AE4: Removal of desired riparian vegetation and understory component
AE5: Increased fire hazard
AE6: Increased potential of accidental mortality of individuals
AE11: Increased potential to adversely affect insect prey base

Additional Conservation Measures –

Planning:

17. This practice will not be used in cases where habitat currently meets all minimum occupation requirements of SWFl and greater than 50% of nesting canopy cover consists of tamarisk.
18. Conservation plans using Brush Management will be designed to develop SWFL habitat of improved quality or that provides equivalent habitat and decreases the potential of wild fire due to tamarisk.

19. Tamarisk in a nesting patch shall not be treated if a biologist designated by state biologist determines that implementation of Brush Management will decrease SWFL viability in the patch for the following nesting season.
20. Treated sites may be deferred from grazing for a period of time determined to be necessary to restore SWFL habitat based on pre and post site treatment conditions.
21. This practice is not to be used for land use change.

Location:

22. Slash treatment will occur outside of the 100-year floodplain when not in seed.

Vegetation:

23. If soil is disturbed, use site specific reclamation using SWFL WHEG, Stream Visual Assessment Protocol-2 and/or riparian Ecological Site Desription with consideration of SWFL habitat needs.

CONSERVATION PRACTICE: CONSERVATION COVER (327)

Definition – Establishing and maintaining permanent vegetative cover

Purpose –

- Reduce soil erosion and sedimentation.
- Improve water quality.
- Improve air quality
- Enhance wildlife habitat and pollinator habitat.
- Improve soil quality
- Manage plant pests

Resource Concern –

RC 01: Soil Erosion – Sheet, rill, and wind erosion
RC 07: Water Quality Degradation – Excessive sediment in surface waters
RC 08: Water Quality – Elevated water temperature
RC 14: Livestock Production Limitation – Inadequate feed and forage

Application –Typically the planting of grasses and legumes with the primary purpose of reducing erosion and protecting water quality. Can be drill or broadcast seeded in rough terrain

Potential Beneficial Effect(s) to SWFL – Improved water quality will improve macroinvertebrate production. Provide an alternative source of livestock forage that could reduce grazing pressure in flycatcher habitat.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: FENCE (382)

Definition – A constructed barrier to animals or people

Purpose – This practice facilitates the accomplishment of conservation objectives by providing a means to control movement of animals and people, including vehicles.

Resource Concern –

RC 03: Soil Erosion – Excessive Bank Erosion
RC 06: Water Quality Degradation – excess pathogens and chemicals from manure
RC 10: Degraded Plant Condition – Inadequate structure and composition
RC 13: Inadequate Habitat for Fish and Wildlife

Application – Typically installed parallel to the riparian area on the terrace for the control of livestock. In some instances fences are constructed across the riparian area to break it into multiple pastures to facilitate prescribed grazing.

Potential Beneficial Effect(s) to SWFL – In conjunction with use exclusion or prescribed grazing this practice will improve nesting and foraging habitat. Exclusion or proper timing of grazing will reduce bank erosion and enhance the sustainability of the habitat.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants
AE4: Removal of desired riparian vegetation and understory component
AE5: Increased fire hazard
AE7: Increased potential of susceptibility to parasitism e.g. cowbirds
AE8: Increased potential for predation
AE9: Practice implementation in isolation without 528 for SWWF may reduce riparian habitat

Additional Conservation Measures –

Vegetation:

26. Where clearing of vegetation is determined to be necessary during planned construction or maintenance, the corridor cleared, otherwise prepared, or maintained will not exceed 5 Feet in width in SWFL occupied habitat. Outside of SWFL occupied habitat, the path or corridor where the practice is implemented may be up to 25 feet wide.

CONSERVATION PRACTICE: FIELD BORDER (386)

Definition – A strip of permanent vegetation established at the edge or around the perimeter of a field.

Purpose – This practice may be applied to accomplish one or more of the following:

- Reduce erosion from wind and water
- Protect soil and water quality

- Manage pest populations
- Provide wildlife food and cover and pollinator habitat
- Increase carbon storage
- Improve air quality

Resource Concern –

RC 01: Soil Erosion – Sheet, rill, and wind erosion
RC 13: Inadequate Habitat for Fish and Wildlife

Application – A line of dense tall vegetation at the edge of an agricultural field used to prevent/reduce the drift of chemicals.

Potential Beneficial Effect(s) to SWFL – Field borders can help preserve the SWFL forage base by reducing chemical drift from cropland. Field borders also reduce sedimentation thereby supporting water quality.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: FORAGE HARVEST MANAGEMENT (511)

Definition – The timely cutting and removal of forages from the field as hay, green-chop or ensilage

Purpose –

- Optimize yield and quality of forage at the desired levels
- Promote vigorous plant re-growth
- Manage for the desired species composition
- Use forage plant biomass as a soil nutrient uptake tool
- Control insects, diseases and weeds
- Maintain and/or improve wildlife habitat

Resource Concern –

RC 13: Inadequate Habitat for Fish and Wildlife
RC 14: Livestock Production Limitation – Inadequate feed and forage

Application – The management of haying or grazing of tame pastures for sustained yield.

Potential Beneficial Effect(s) to SWFL – Managing forage harvest can provide an alternative to riparian grazing during key life cycle periods for SWFL. Alternative forage resources can allow recovery and restoration of riparian habitat.

Potential Adverse Effect(s) to SWFL – NONE

CONSERVATION PRACTICE: FORAGE & BIOMASS PLANTINGS (512)

Definition – Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay, or biomass production.

Purpose –

- Improve or maintain livestock nutrition and/or health.
- Provide or increase forage supply during periods of low forage production.
- Reduce soil erosion.
- Improve soil and water quality.
- Produce feedstock for biofuel or energy production

Resource Concern –

RC 13: Inadequate Habitat for Fish and Wildlife
RC 14: Livestock Production Limitation – Inadequate feed and forage

Application – Planting of grasses and legumes for haying, grazing or biomass production. Not done in the riparian area.

Potential Beneficial Effect(s) to SWFL – Managing forage harvest can provide an alternative to riparian grazing during key life cycle periods for SWFL. Alternative forage resources can allow recovery and restoration of riparian habitat.

Potential Adverse Effect(s) to SWFL – NONE

CONSERVATION PRACTICE: FOREST HARVEST TRAILS AND LANDINGS (655)

Definition – A temporary or infrequently used route, path or cleared area.

Purpose –

- Provide routes for temporary or infrequent travel by people or equipment for management activities.
- Provide periodic access for removal and collection of forest products.

Resource Concern –

RC 10: Degraded Plant Condition – Inadequate Structure and composition

Application – installed prior to a scheduled harvest to provide a location to assemble and transport harvested logs.

Potential Beneficial Effect(s) to SWFL – The conservation objective is to minimize onsite and offsite damage to the other natural resources.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE4: Removal of desired riparian vegetation and understory component
AE7: Increased potential of susceptibility to parasitism e.g. cowbirds
AE8: Increased potential for predation

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: FOREST STAND IMPROVEMENT (666)

Definition – The manipulation of species composition, stand structure and stocking by cutting or killing selected trees and understory vegetation.

Purpose –

- Increase the quantity and quality of forest products by manipulating stand density and structure.
- Timely harvest of forest products
- Development of renewable energy systems.
- Initiate forest stand regeneration.
- Reduce wildfire hazard.
- Improve forest health reducing the potential of damage from pests and moisture stress.
- Restore natural plant communities.
- Achieve or maintain a desired native understory plant community for special forest products, grazing, and browsing.
- Improve aesthetic and recreation, values.
- Improve wildlife habitat.
- Alter water yield.
- Increase carbon storage in selected trees.

Resource Concern –

RC 10: Degraded Plant Condition – Inadequate Structure and composition
RC 13: Inadequate Habitat for Fish and Wildlife

Application – This conservation practice will be used for the removal of exotic tree species where removal will not degrade nesting SWFL habitat.

Potential Beneficial Effect(s) to SWFL – Used for the removal of exotic tree species where removal will not degrade nesting habitat. Provide diversity of habitat structure to improve foraging opportunities.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE4: Removal of desired riparian vegetation and understory component
AE5: Increased fire hazard
AE7: Increased potential of susceptibility to parasitism e.g. cowbirds
AE8: Increased potential for predation

Additional Conservation Measures –

Planning

17. This practice will not be used in cases where habitat currently meets all minimum occupation requirements of SWFl and greater than 50% of nesting canopy cover consists of tamarisk.

19. Tamarisk in a nesting patch shall not be treated if a biologist designated by state biologist determines that it will decrease SWFL viability in the patch for the following nesting season.
20. Treated sites may be deferred from grazing for a period of time determined to be necessary to restore SWFL habitat based on pre and post site treatment conditions.
21. This practice shall not to be used for land use change.
41. Plan for this practice shall be designed to develop SWFL habitat of improved quality or that provides equivalent habitat and decreases potential of wild fire due to tamarisk.

Timing

42. Defer use of this practice from April 15 to Sept 15

Location

22. Slash treatment must occur outside of the 100-year floodplain when not in seed.

Vegetation

23. If soil is disturbed, use site specific reclamation using SWFL WHEG, Stream Visual Assessment Protocol-2 and/or riparian Ecological Site Desription with consideration of SWFL habitat needs.

CONSERVATION PRACTICE: GRADE STABILIZATION (410)

Definition – A structure used to control the grade and head cutting in natural or artificial channels.

Resource Concern –

RC 03: Soil Erosion – Excessive Bank Erosion
RC 10: Degraded Plant Condition – Inadequate Structure and composition

Application – Grade stabilization is used to arrest head cutting or other channel degradation which can cause the local water table to drop essentially draining the riparian area and changing the plant community. Typically rock of sufficient size is installed to arrest a head cut from further advancement. See Zeedyk and Clothier, *"Let the Water Do the Work: Induced Meandering, an Evolving Method for Restoring Incised Channels".*

Potential Beneficial Effect(s) to SWFL – Grade stabilization is used to arrest head cutting or other channel degradation which can cause the local water table to drop essentially draining the riparian area and changing the plant community. By preventing these action SWFL habitat is maintained.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE4: Removal of desired riparian vegetation and understory component

AE6: Increased potential of accidental mortality of individuals
AE7: Increased potential of susceptibility to parasitism e.g. cowbirds
AE8: Increased potential for predation
AE9: Practice implementation in isolation without 528 for SWWF may reduce riparian habitat
AE10: Water quality/quantity – loss or alteration of suitable hydrology

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: HERBACEOUS WEED CONTROL (315)

Definition – The removal or control of herbaceous weeds including invasive, noxious and prohibited plants

Purpose –

- Enhance accessibility, quantity, and quality of forage and/or browse.
- Restore or release native or create desired plant communities and wildlife habitats consistent with the ecological site.
- Protect soils and control erosion
- Reduce fine-fuels fire hazard and improve air quality

Resource Concern –

RC 10: Degraded Plant Condition – Inadequate structure and composition
RC 11: Degraded Plant Condition – Excessive plant pest pressure
RC 13: Inadequate Habitat for Fish and Wildlife

Application – Typical application: The spot application of selective herbicide to control noxious or invasive weeds. Also applied mechanically using hand tools on limited infestations.

Potential Beneficial Effect(s) to SWFL –

- Facilitate establishment of woody vegetation and understory.
- Long-term benefit to invertebrate diversity and quantity for SWFL foraging.
- Reduction of fire hazards.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants
AE11: Increased potential to adversely affect insect prey base

Additional Conservation Measures –

Planning:

24. Use Win_PST to determine pesticide mitigation requirements.
25. Herbicide applications will follow the applicable conservation measures recommended in the FWS document “Recommended Protection Measures For

Pesticide Applications in Region 2 of the U.S. Fish and Wildlife Service" available on the Arizona Ecological Services webpage.

CONSERVATION PRACTICE: HEAVY USE AREA PROTECTION (561)

Definition – The stabilization of areas frequently and intensively used by people, animals or vehicles by establishing vegetative cover, surfacing with suitable materials, and/or installing needed structures.

Purpose –

- To provide a stable, non-eroding surface for areas frequently used by animals, people or vehicles
- To protect and improve water quality

Resource Concern –

RC 03: Soil Erosion – Excessive Bank Erosion
RC 07: Water Quality Degradation – Excessive sediment in surface waters

Application – Typically protecting an area of heavy use such as around a water facility from erosion by hardening. Installation of a concrete apron around a stock tank is an example of heavy use area protection.

Potential Beneficial Effect(s) to SWFL – Preserve the integrity of the stream channel and reduces sedimentation preserving macro-invertebrate production for SWFL forage resources.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: INTEGRATED PEST MANAGEMENT (595)

Definition – A site-specific combination of pest prevention, pest avoidance, pest monitoring, and pest suppression strategies.

Purpose –

- Prevent or mitigate off-site pesticide risks to water quality from leaching, solution runoff and adsorbed runoff losses.
- Prevent or mitigate off-site pesticide risks to soil, water, air, plants, animals and humans from drift and volatilization losses.
- Prevent or mitigate on-site pesticide risks to pollinators and other beneficial species through direct contact.
- Prevent or mitigate cultural, mechanical and biological pest suppression risks to soil, water, air, plants, animals and humans.

Resource Concern –

RC 10: Degraded Plant Condition – Inadequate structure and composition

RC 11: Degraded Plant Condition – Excessive plant pest pressure
RC 13: Inadequate Habitat for Fish and Wildlife

Application – This practice will be used to control crop pests on existing croplands. Also, this practice will be used in combination with herbaceous weed control (315) to protect the integrity of the riparian plant community and conserve/management habitat and species diversity and structure.

Potential Beneficial Effect(s) to SWFL – When used to control crop pests this practice can reduce impacts on SWFL prey items. When used in combination with 315 herbaceous weed control it can protect the integrity of the riparian plant community, preserving habitat and species diversity and structure.

Potential Adverse Effect(s) to SWFL –

AE6: Increased potential of accidental mortality of individuals
AE11: Increased potential to adversely effect insect prey base

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: IRRIGATION WATER MANAGEMENT (449)

Definition – The process of determining and controlling the volume, frequency and application rate of irrigation water in a planned, efficient manner.

Resource Concern –

RC 05: Insufficient Water – Inefficient use of irrigation water.

Application – The management of the timing and amount of application of irrigation water to meet the crop needs and conserve water.

Potential Beneficial Effect(s) to SWFL – As part of a water management system this practice can potentially improve in stream flows. It supplies a stable, relatively stable point of diversion reduces entries and disturbance to the stream channel and disturbance to SWFL.

Potential Adverse Effect(s) to SWFL – AE3, AE4

AE3: Increased potential of introduction of invasive plants
AE4: Removal of desired riparian vegetation and understory component

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: OBSTRUCTION REMOVAL (500) (NOT IN FY12)

Definition – Removal and disposal of buildings, structures, other works of improvement, vegetation, debris or other materials.

Resource Concern –

RC 13: Inadequate Habitat for Fish and Wildlife

Application – Used to remove levees, fences or other manmade or man caused obstructions from the floodplain or habitat area. Typically, the removal of an old levy or other anthropogenic obstruction from the floodplain to increase function.

Potential Beneficial Effect(s) to SWFL – Used to remove levees, fences or other manmade or man caused obstructions from the floodplain or habitat area. Can aid in restoration of a more natural hydrologic regeme.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants
AE4: Removal of desired riparian vegetation and understory component
AE5: Increased fire hazard
AE10: Water quality/quantity – loss or alteration of suitable hydrology

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: OPEN CHANNEL (582)

Definition – Constructing or improving a channel either natural or artificial, in which water flows with a free surface.

Purpose – To provide discharge capacity required for flood prevention, drainage, other authorized water management purposes, or any combination of these purposes.

Resource Concern –

RC 07: Water Quality Degradation – Excessive sediment in surface waters
RC 08: Water Quality Degradation – Elevated water temperature
RC 09: Degraded Plant Condition – Undesirable plant productivity and health
RC 10: Degraded Plant Condition – Inadequate structure and composition
RC 13: Inadequate Habitat for Fish and Wildlife

Application – This conservation practice standard will be applied in situations where the stream channel is so degraded that it needs to be reconstructed to reconnect the channel and its floodplain and restore the riparian area and its associated SWFL habitat. The reconstruction of a stable analog of the natural channel. Only used when the current channel is so degraded and incised that other methods will not work in the foreseeable future. Extremely expensive and rarely used.

Potential Beneficial Effect(s) to SWFL – Open channel is applied in situations where the stream channel is so degraded that it needs to be reconstructed to reconnect the channel and it's floodplain and restore the riparian area and it's associated SWFL habitat.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants
AE4: Removal of desired riparian vegetation and understory component
AE5: Increased fire hazard
AE6: Increased potential of accidental mortality of individuals
AE7: Increased potential of susceptibility to parasitism e.g. cowbirds
AE8: Increased potential for predation
AE9: Practice implementation in isolation without 528 for SWWF may reduce riparian habitat
AE10: Water quality/quantity – loss or alteration of suitable hydrology
AE11: Increased potential to adversely effect insect prey base

Additional Conservation Measures –

Timing:

36. Time practice implementation to reduce spread of non-native plants by implementing the practice during the dormant season (e.g. avoid ground disturbance in riparian areas in the summer to reduce salt cedar spread).

Location:

38. Design stream crossings to prevent water flow blockage during low flow periods or debris blockage during high flow periods.
39. Screen inlets and outlets to prevent non-native fish and amphibians from spreading into other habitats.

Vegetation:

26. Where clearing of a vegetation strip is determined to be necessary during planned construction or maintenance, the strip will not exceed 5 Feet in width in SWFL occupied habitat. Outside of SWFL occupied habitat, the strip may be up to 25 feet wide.
37. Leave adequate vegetation buffer and/or install best management practices along down slope edge of project area to prevent disturbed ground sediment runoff from entering aquatic habitats. These can include straw baffles, silt fence, hay bales, etc.
40. Re-establish native riparian vegetation on disturbed sites to maintain or improve bank stability.

CONSERVATION PRACTICE: PIPELINE (516)

Definition – A pipeline and appurtenances installed to convey water for livestock or wildlife.

Purpose – This practice may be applied as part of a resource management system to achieve one or more of the following purposes:

- Convey water to points of use for livestock or wildlife.
- Reduce energy use.

- Develop renewable energy systems

Resource Concern –

RC 03: Soil Erosion – Excessive Bank Erosion
RC 06: Water Quality Degradation – excess pathogens and chemicals from manure
RC 13: Inadequate Habitat for Fish and Wildlife
RC 15: Livestock Production Limitation – Inadequate Livestock Water

Application – A small diameter (generally less than 2 inches in diameter) pipeline that connects a water source such as a well to a watering facility. Buried beneath the depth of freeze construction involves the ripping of a trench with the imeadiate installation of the pipeline and refilling of the trench.

Potential Beneficial Effect(s) to SWFL – In combination with 614, Watering Facility, this practice provides livestock water out of the riparian area. This benefits SWFL by protecting the overall integrity of the habitat by reducing bank erosion. It improves water quality and associated macroinvertebrate production. Improved water quality improves livestock production making ranching and it's associated open space more viable. It facilitates livestock management which can improve or maintain SWFL habitat.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants
AE4: Removal of desired riparian vegetation and understory component
AE6: Increased potential of accidental mortality of individuals
AE7: Increased potential of susceptibility to parasitism e.g. cowbirds
AE8: Increased potential for predation
AE9: Practice implementation in isolation without 528 for SWWF may reduce riparian habitat
AE10: Water quality/quantity – loss or alteration of suitable hydrology

Additional Conservation Measures –

27. Provide wildlife safe ingress/egress in trenches (ladder or dirt plugs to allow escape) during construction.

CONSERVATION PRACTICE: PRESCRIBED GRAZING (528)

Definition – Managing the harvest of vegetation with grazing and/or browsing animals. **Purpose –** This practice may be applied as a part of conservation management system to achieve one or more of the following:

- Improve or maintain desired species composition and vigor of plant communities.
- Improve or maintain quantity and quality of forage for grazing and browsing animals' health and productivity.
- Improve or maintain surface and/or subsurface water quality and quantity.
- Improve or maintain riparian and watershed function.

- Reduce accelerated soil erosion, and maintain or improve soil condition.
- Improve or maintain the quantity and quality of food and/or cover available for wildlife.
- Manage fine fuel loads to achieve desired conditions.

Resource Concern –

RC 03: Soil Erosion – Excessive Bank Erosion
RC 06: Water Quality Degradation – excess pathogens and chemicals from manure
RC 14: Inadequate Habitat for Fish and Wildlife
RC 25: Livestock Production Limitation – Inadequate Livestock Water

Application – Managing the number of livestock, the duration of use, and the timing of use in order to achieve resource goals. Such goals include annual animal production goals, plant community goals, and wildlife habitat. Repeated grazing during the same season each year (such as winter grazing only in riparian areas) is generally detrimental to some part of the plant community, woody species in this example. The Wildlife Habitat Evaluation Guide (WHEG) will provide the basis for planning Prescribed Grazing. For example where the WHEG indicates insufficient nesting cover the 528 plan will be designed to favor woody plants (see the first bullet in "Purpose"). The timing, intensity, duration, and frequency of livestock grazing will be controlled to maintain or improve the plant communities in accordance to goals developed from the habitat evaluation. The desired kinds and amounts of vegetation will be based on the ecological sites being managed and the current plant communities that will be managed. Monitoring will be done to determine if plant community goals are being achieved. Monitoring may include species composition, production, vegetation and ground cover, seedling establishment, utilization, tree density or other attributes based on the vegetation goals established in the prescribed grazing plan. The Prescribed Grazing plan will also ensure adequate bank vegetation cover to minimize erosion and sediment losses from runoff, and to control stream bank erosion that would cause degradation of the riparian area. Stocking rates will be light to minimize nest disturbance. Fall and winter grazing after the willow flycatcher has left will be done no more 2 of 3 years. Grazing during the spring and summer will occur no more than once in 3 years.

Off site watering facilities will be a requirement for grazing in SWFL habitat.

Potential Beneficial Effect(s) to SWFL – Controlling the timing of livestock use can avoid resource damage to soils, streams, plant communities preserving the integrity of the swfl habitat. Timing of grazing can be used for specific benefits such as weed control or increasing the coefficient of roughness to collect more sediment and build banks. Controlling livestock numbers reduces the incidence of density dependent events such as nest disturbance. Controlling the timing and duration of livestock grazing allows for the accomplishment of specific plant community goals such as benefiting the woody community. Prescribed grazing contributes to the sustainability of livestock production and hence the sustainability of the associated open space.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants
AE4: Removal of desired riparian vegetation and understory component
AE5: Increased fire hazard

AE6: Increased potential of accidental mortality of individuals
AE7: Increased potential of susceptibility to parasitism e.g. cowbirds
AE8: Increased potential for predation
AE9: Practice implementation in isolation without 528 for SWWF may reduce riparian habitat
AE10: Water quality/quantity – loss or alteration of suitable hydrology
AE11: Increased potential to adversely affect insect prey base

Additional Conservation Measures –

28. Implementation of grazing management plans, to the extent practicable, will meet habitat conditions for riparian habitat as recommended by WHEG
29. Frequency – Grazing will occur at a rate which is conducive to creating or maintaining desired habitat structure for nesting SWFL.
30. Duration – Grazing periods will be designed to establish or maintain desired habitat conditions as recommended by WHEG
31. Timing – Grazing will be scheduled to avoid potential disturbance to SWFL and occupied SWFL habitat during breeding season – from April 15 to Sept 15, except when following prescribed grazing protocol during growing season as stated ABOVE.
32. Intensity – the amount of forage removed (or left) during any particular grazing cycle will be in keeping with the life cycle requirements of the SWFL.
33. 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. The timing, intensity, duration, and frequency of livestock grazing will be controlled to maintain or improve the plant communities to achieve 60% or higher similarity index for the desired plant community based on the ecological sites being managed. The desired kinds and amounts of vegetation will be based on the ecological sites being managed and the current plant communities that will be managed. Monitoring will be done to determine if plant community goals are being achieved. Monitoring may include species composition, production, vegetation and ground cover, seedling establishment, utilization, tree density or other attributes based on the vegetation goals established in the prescribed grazing plan. The Prescribed Grazing plan will also ensure adequate post-grazing vegetative heights and bank vegetation cover to minimize erosion and sediment losses from runoff, and to control stream bank erosion that would cause degradation of the riparian area. Stocking rates will be light to minimize nest disturbance. Fall and winter grazing after the willow flycatcher has left will be done no more than 2 out of 3 years. Grazing during the spring and summer will occur no more than once in 3 years.
34. Motorized vehicles will not be used to herd livestock within listed species habitat.
35. Provide off-site water supply for livestock and wildlife to maintain or improve streamside vegetation.

CONSERVATION PRACTICE: RIPARIAN FOREST BUFFER (391)

Definition – An area predominantly trees and/or shrubs located adjacent to and up-gradient from watercourses or water bodies.

Purpose –

- Create shade to lower or maintain water temperatures to improve habitat for aquatic organisms.
- Create or improve riparian habitat and provide a source of detritus and large woody debris.
- Reduce excess amounts of sediment, organic material, nutrients and pesticides in surface runoff and reduce excess nutrients and other chemicals in shallow ground water flow.
- Reduce pesticide drift entering the water body.
- Restore riparian plant communities.
- Increase carbon storage in plant biomass and soils.

Resource Concern –

RC 03: Soil Erosion – Excessive Bank Erosion
RC 07: Water Quality Degradation – Excessive sediment in surface waters
RC 10: Degraded Plant Condition – Inadequate structure and composition
RC 13: Inadequate Habitat for Fish and Wildlife

Application – Typically, a buffer of woody plants of sufficient width to address the resource concern such as wildlife habitat or water quality.

Potential Beneficial Effect(s) to SWFL – Improves nesting and foraging habitat. Protect the stream system from degradation.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants
AE4: Removal of desired riparian vegetation and understory component
AE5: Increased fire hazard
AE6: Increased potential of accidental mortality of individuals

Additional Conservation Measures – **NONE**

CONSERVATION PRACTICE: RIPARIAN HERBACEOUS COVER (390)

Definition- Grasses, sedges, rushes, ferns, legumes, and forbs tolerant of intermittent flooding or saturated soils, established or managed as the dominant vegetation in the transitional zone between upland and aquatic habitats.

Purpose-

- Provide or improve food and cover for fish, wildlife and livestock,
- Improve and maintain water quality.
- Establish and maintain habitat corridors.
- Increase water storage on floodplains.
- Reduce erosion and improve stability to stream banks and shorelines.
- Increase net carbon storage in the biomass and soil.
- Enhance pollen, nectar, and nesting habitat for pollinators.

- Restore, improve or maintain the desired plant communities.
- Dissipate stream energy and trap sediment.
- Enhance stream bank protection as part of stream bank soil bioengineering practices.

Resource Concern –

RC 03: Soil Erosion – Excessive Bank Erosion
RC 07: Water Quality Degradation – Excessive sediment in surface waters
RC 10: Degraded Plant Condition – Inadequate structure and composition
RC 13: Inadequate Habitat for Fish and Wildlife

Application – Typical Practice Application**:** In areas where the herbaceous seedbank is depleted or where natural regeneration leaves the soil exposed to erosion for too long a period herbaceous cover will be installed. Sedge plugs are installed in a 3'x3' grid in areas with adequate contact to the water table. Generally 5 acres or less.

Potential Beneficial Effect(s) to SWFL – Improve foraging habitat. Maintain sustainability of the riparian system. Protect water quality and associated macroinvertebrate production.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants

Additional Conservation Measures – **NONE**

CONSERVATION PRACTICE: STREAM CHANNEL STABILIZATION (584)

Definition – Measure(s) used to stabilize the bed or bottom of a channel.

Purpose – This practice may be applied as part of a conservation management system to support one or more of the following:

- Maintain or alter channel bed elevation or gradient
- Modify sediment transport or deposition
- Manage surface water and groundwater levels in floodplains, riparian areas, and wetlands.

Resource Concern –

RC 09: Degraded Plant Condition – Undesirable plant productivity and health
RC 10: Degraded Plant Condition – Inadequate structure and composition
RC 13: Inadequate Habitat for Fish and Wildlife

Application – Typically rock of sufficient size is installed to arrest a head cut from further advancement. Used to prevent/arrest channel down cutting which can reduce the stream's access to the flood plain and act as a drain to the riparian area eventually altering the plant community to more upland plants.

Potential Beneficial Effect(s) to SWFL – Channel Stabilization is used to arrest head-cutting and incising of the channel. An incised channel functions as a drain robbing the riparian area of the free water that allow the production and structure found there. Vertically stabilizing the

channel preserves the channel integrity the near surface water table and hence the riparian habitat.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE4: Removal of desired riparian vegetation and understory component
AE6: Increased potential of accidental mortality of individuals
AE7: Increased potential of susceptibility to parasitism e.g. cowbirds
AE8: Increased potential for predation
AE9: Practice implementation in isolation without 528 for SWWF may reduce riparian habitat
AE10: Water quality/quantity – loss or alteration of suitable hydrology

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: STREAM CROSSING (578)

Definition – A stabilized area or structure constructed across a stream to provide a travel way for people, livestock, equipment, or vehicles.

Resource Concern:

RC 03: Soil Erosion – Excessive bank erosion
RC 06: Water Quality Degradation – Excess pathogens and chemicals from manure
RC 07: Water Quality Degradation – Excessive sediment in surface waters

Application –Stream crossings are typically installed at the crossover. The crossover is the midpoint in the relatively straight part of the stream between two meanders where the thalwag (deepest part of the current) crosses from one side of the stream to the other. This is the most stable part of the channel. The approaches to the crossing are hardened with rock to prevent erosion. The crossing itself is hardened if the channel bed is sand or finer material.

Potential Beneficial Effect(s) to SWFL – By providing a stable point for crossings needed for management or recreation impacts to riparian areas and associated habitats are avoided or minimized.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants
AE4: Removal of desired riparian vegetation and understory component
AE6: Increased potential of accidental mortality of individuals
AE7: Increased potential of susceptibility to parasitism e.g. cowbirds
AE8: Increased potential for predation

AE10: Water quality/quantity – loss or alteration of suitable hydrology
AE11: Increased potential to adversely effect insect prey base

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: STREAMBANK AND SHORELINE PROTECTION (580)

Definition – Treatment(s) used to stabilize and protect banks of streams or constructed channels, and shorelines of lakes, reservoirs, or estuaries.

Purpose –

- To prevent the loss of land or damage to land uses, or facilities adjacent to the banks of streams or constructed channels, shoreline of lakes, reservoirs, or estuaries including the protection of known historical, archeological, and traditional cultural properties.
- To maintain the flow capacity of streams or channels.
- Reduce the offsite or downstream effects of sediment resulting from bank erosion.
- To improve or enhance the stream corridor for fish and wildlife habitat, aesthetics, recreation.

Resource Concern –

RC 03: Soil Erosion – Excessive Bank Erosion
RC 07: Water Quality Degradation – Excessive sediment in surface waters

Application – Typically the use of plant materials to protect the streambank or shoreline from excessive erosion. This practice standard will be used to arrest head-cutting and incising of the channel. An incised channel functions as a drain robbing the riparian area of the free water that allow the production and structure found there. Vertically stabilizing the channel preserves the channel integrity the near surface water table and hence the riparian habitat.

Potential Beneficial Effect(s) to SWFL – Preserve the integrity of the stream channel or shoreline and reduce sedimentation preserving macro-invertebrate production for SWFL forage resources.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants
AE4: Removal of desired riparian vegetation and understory component
AE5: Increased fire hazard
AE6: Increased potential of accidental mortality of individuals
AE7: Increased potential of susceptibility to parasitism e.g. cowbirds
AE8: Increased potential for predation
AE9: Practice implementation in isolation without 528 for SWWF may reduce riparian habitat
AE10: Water quality/quantity – loss or alteration of suitable hydrology

Additional Conservation Measures –

Timing:

36. Time practice implementation to reduce spread of non-native plants by implementing the practice during the dormant season (e.g. avoid ground disturbance in riparian areas in the summer to reduce salt cedar spread).

Vegetation:

26. Where clearing of a vegetation strip is determined to be necessary during planned construction or maintenance, the strip will not exceed 5 Feet in width in SWFL occupied habitat. Outside of SWFL occupied habitat, the strip may be up to 25 feet wide.
37. Leave adequate vegetation buffer and/or install best management practices along down slope edge of project area to prevent disturbed ground sediment runoff from entering aquatic habitats. These can include straw baffles, silt fence, hay bales, etc.

CONSERVATION PRACTICE: STRUCTURE FOR WATER CONTROL (587)

Definition – A structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation or measures water.

Purpose –The practice may be applied as a management component of a water management system to control the stage, discharge, distribution, delivery or direction of water flow.

Resource Concern –

RC 05: Insufficient Water – Inefficient use of irrigation water

Application – Typically a gate valve or similar structure to regulate the movement of water from a stream to a ditch or from a stream to a reconnected oxbow for example.

Potential Beneficial Effect(s) to SWFL: As part of a water management system this practice can potentially improve in stream flows. It supplies a stable, relatively stable point of diversion reduces entries and disturbance to the stream channel and disturbance to SWFL.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants
AE10: Water quality/quantity – loss or alteration of suitable hydrology

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: TREE / SHRUB ESTABLISHMENT (612)

Definition – Establishing woody plants by planting seedlings or cuttings, direct seeding, or natural regeneration.

Purpose – Establish woody plants for:

- forest products such as timber, pulpwood, etc.
- wildlife habitat
- long-term erosion control and improvement of water quality
- treating waste
- storing carbon in biomass
- reduce energy use
- develop renewable energy systems
- improving or restoring natural diversity
- enhancing aesthetics.

Resource Concern –

RC 03: Soil Erosion – Excessive Bank Erosion
RC 07: Water Quality Degradation – Excessive sediment in surface waters
RC 10: Degraded Plant Condition – Inadequate structure and composition
RC 13: Inadequate Habitat for Fish and Wildlife

Application – Typically in conjunction with 490 Tree and Shrub Site Preparation rooted stock is planted into the capillary fringe of the water table. Cuttings are planted into the dry season water table. Trees and shrubs are planted in clumps to mimic natural regeneration.

Potential Beneficial Effect(s) to SWFL – Improves nesting and foraging habitat. Protect the stream system from degradation.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: TREE SHRUB SITE PREPARATION (490)

Definition – Treatment of areas to improve site conditions for establishing trees and/or shrubs.

Purpose –

- Encourage natural regeneration of desirable woody plants.
- Permit artificial establishment of woody plants.

Resource Concern –
RC 10: Degraded Plant Condition – Inadequate structure and composition
RC 13: Inadequate Habitat for Fish and Wildlife

Application – Where herbaceous competition is a detriment to tree or shrub establishment a 2'x2' area is scalped of vegetation and a 2'x2' weed barrier is installed prior to planting. Generally applied on 0.5 acres.

Potential Beneficial Effect(s) to SWFL – In combination with 612, Tree and Shrub Establishment, this practice can restore nesting and foraging habitats.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants
AE4: Removal of desired riparian vegetation and understory component

Additional Conservation Measures – **NONE**

CONSERVATION PRACTICE: WATER WELL (642)

Definition – A hole drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply.

Resource Concern –

RC 03; Soil Erosion – Excessive Bank Erosion
RC 06: Water Quality Degradation – excess pathogens and chemicals from manure
RC 13: Inadequate Habitat for Fish and Wildlife
RC 15: Livestock Production Limitation – Inadequate Livestock Water

Application – Well is established outside the riparian area on a terrace. Drill depth is normally 50-100 feet. Casing is installed in the well and flows are typically from 1 – 10 gallons per minute.

Potential Beneficial Effect(s) to SWFL – In combination with 516, livestock pipeline and 614, Watering Facility, this practice provides livestock water out of the riparian area. This benefits SWFL by protecting the overall integrity of the habitat by reducing bank erosion. It improves water quality and associated macro-invertebrate production. Improved water quality improves livestock production making ranching and it's associated open space more viable. It facilitates livestock management which can improve or maintain SWFL habitat.

Potential Adverse Effect(s) to SWFL –

RC 15: Livestock Production Limitation – Inadequate Livestock Water

Additional Conservation Measures –

17. This practice will not be used in cases where habitat currently meets all minimum occupation requirements of SWFl **and** greater than 50% of nesting canopy cover consists of tamarisk.

39. Screen inlets and outlets to prevent non-native fish and amphibians from spreading into other habitats.

41. Defer use of this practice from April 15 to Sept 15

CONSERVATION PRACTICE: WATERING FACILITY (614)

Definition – A permanent or portable device to provide an adequate amount and quality of drinking water for livestock and or wildlife.

Purpose – To provide access to drinking water for livestock and/or wildlife in order to:

- Meet daily water requirements
- Improve animal distribution

Resource Concern –

RC 03: Soil Erosion – Excessive Bank Erosion
RC 06: Water Quality Degradation – excess pathogens and chemicals from manure
RC 13: Inadequate Habitat for Fish and Wildlife
RC 15: Livestock Production Limitation – Inadequate Livestock Water

Application – This practice is typically used to support a prescribed grazing management plan (518) and used in combination with livestock pipeline (516) to direct and manage livestock away from riparian areas.

Potential Beneficial Effect(s) to SWFL – In combination with 516, livestock pipeline, this practice provides livestock water out of the riparian area. This benefits SWFL by protecting the overall integrity of the habitat by reducing bank erosion. It improves water quality and associated macro-invertebrate production. Improved water quality improves livestock production making ranching and it's associated open space more viable. It facilitates livestock management which can improve or maintain SWFL habitat.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants
AE7: Increased potential of susceptibility to parasitism e.g. cowbirds
AE9: Practice implementation in isolation without 528 for SWWF may reduce riparian habitat
AE10: Water quality/quantity – loss or alteration of suitable hydrology

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: WETLAND ENHANCEMENT (659)

Definition – The augmentation of wetland functions beyond the original natural conditions on a former, degraded, or naturally functioning wetland site; sometimes at the expense of other functions.

Purpose – To increase the capacity of specific wetland functions (such as habitat for targeted species, and recreational and educational opportunities) by enhancing:

- Hydric soil functions (changing soil hydrodynamic and/or bio-geochemical properties).
- Hydrology (dominant water source, hydroperiod, and hydrodynamics).

- Vegetation (including the removal of undesired species, and/or seeding or planting of desired species).
- Enhancing plant and animal habitats.

Resource Concern –

RC 04: Insufficient Water
RC 13: Inadequate Habitat for Fish and Wildlife

Application – This practice involves an increase in a specific wetland function to achieve the desire objective. Increasing the hydro-period is a typical wetland enhancement increasing the habitat value for some species.

Potential Beneficial Effect(s) to SWFL – Wetland restoration can improve both nesting and foraging habitat for SWFL. Floodplain wetlands store water for recharge of streams during low flow sustaining both SWFL habitat and that of benthic macro-invertebrate food resources for SWFL.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants
AE4: Removal of desired riparian vegetation and understory component
AE10: Water quality/quantity – loss or alteration of suitable hydrology

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: WETLAND RESTORATION (657)

Definition – The return of a wetland and its functions to a close approximation of its original condition as it existed prior to disturbance on a former or degraded wetland site

Purpose – To restore wetland function, value, habitat, diversity, and capacity to a close approximation of the pre-disturbance conditions by restoring:

- Conditions conducive to hydric soil maintenance.
- Wetland hydrology (dominant water source, hydroperiod, and hydrodynamics).
- Native hydrophytic vegetation (including the removal of undesired species, and/or seeding or planting of desired species).
- Original fish and wildlife habitats.

Resource Concern –

RC 04: Insufficient Water
RC 13: Inadequate Habitat for Fish and Wildlife

Application – Wetland restoration occurs in areas that were wetlands (hydric soils) or in degraded wetlands where functions are restored. Removing excess sediment, establishing

native hydrophytic plants, creating micro-topography are actions that might be undertaken to restore a wetland.

Potential Beneficial Effect(s) to SWFL – Wetland restoration can improve both nesting and foraging habitat for SWFL. Floodplain wetlands store water for recharge of streams during low flow sustaining both SWFL habitat and that of benthic macro-invertebrate food resources for SWFL.

Potential Adverse Effect(s) to SWFL –

AE1: Physical Disturbance including noise
AE2: Temporary soil and vegetation disturbance (indirect & temporary)
AE3: Increased potential of introduction of invasive plants
AE4: Removal of desired riparian vegetation and understory component
AE9: Practice implementation in isolation without 528 for SWWF may reduce riparian habitat

Additional Conservation Measures – NONE

CONSERVATION PRACTICE: WOODY RESIDUE TREATMENT (384)

Definition – The treatment of residual woody material that is created due to management activities or natural disturbances.

Resource Concern –

RC 12: Degraded Plant Condition – Wildfire Hazard, excessive biomass accumulation

Application – This practice involves the use or disposal of woody residue from 314 Brush Management or 666 Forest Stand Improvement. Typical application might be to distribute the mulch from brush management in a manner that protects the soil and allows plant establishment.

Potential Beneficial Effect(s) to SWFL – Helps to maintain the fire return interval within the natural range of variation.

Potential Adverse Effect(s) to SWFL –

AE5: Increased fire hazard

Additional Conservation Measures –

Location

22. Slash treatment must occur outside of the 100-year floodplain when not in seed.

APPENDIX V. RANGE-WIDE WILDLIFE HABITAT EVALUATION GUIDES (WHEG) for the SOUTHWESTERN WILLOW FLYCATCHER

1. SWFL WHEG for applications above 6,000 ft elevation

NRCS **Wildlife Habitat Evaluation Guide – July 2012**

Southwestern Willow Flycatcher **ABOVE 6000' ELEVATION**

Owner/Operator:		District:	
County:		Field	
Assisted By:		Acres:	
Location:		Date:	
Farm & Tract		Contract	

Southwestern willow flycatchers are neotropical migrants found nesting in dense mosaics of riparian vegetation (usually where surface water is present or soil is saturated). Nests at high elevation (>6000 feet) sites are usually found in dense stands of medium-sized shrubby willows, and in some instances with an overstory of cottonwood. High elevation locations are known to occur in south-central Colorado, eastern Arizona, and some portions of western and northern New Mexico.

			VALUE	
1. Floodplain Conectivity		**Value**	**Before**	**After**
a.	Regular flooding every 1.5 - 2 years. Flood plain wetlands (oxbows, backwater wetlands) are still hydrologically connected to the river. High flows in the river channel result in surface water saturation of these floodplain features.	1.0		
b.	Overbank flooding occurs every 3 - 5 years. Channel is slightly incised. Flood plain wetlands (oxbows, backwater wetlands) are still hydrologically connected to the river. High flows in the river channel result in surface water saturation of these floodplain features.	0.7		
c.	Flooding every 6 - 10 years. Only the deepest floodplain wetlands are wetted when river levels rise.	0.3		
d.	No flooding. The channel is deeply incised or confined by structures such as levees. Floodplain wetland are no longer hydrologically connected to the river.	0.0		

			VALUE	
2. Woody riparian plants* and species composition		**Value**	**Before**	**After**
a.	Woody Riparian vegetation composed of > 90% native species (i.e, typically woody species such as willow) and <10% exotic vegetation (most likely Russian olive).	1.0		
b.	Woody riparian vegetation dominated by >50% native vegetation (i.e. typically woody species such as willow) with a smaller component of exotic vegetation (most likely Russian olive).	0.7		
c.	Woody riparian vegetation dominated >50% exotic vegetation (most likely Russian olive) with a smaller component of native riparian species (i.e. woody species such as willow).	0.5		
d.	Woody riparian vegetation composed of >90% exotic vegetation (most likely Russian olive).	0.3		
e.	Little to no woody riparian vegetation flycatchers use for nesting.	0.0		

			VALUE	
3. Vegetation configuration		**Value**	**Before**	**After**
a.	Multiple patches** of dense riparian vegetation, minimum of 10 feet wide, most greater than 0.25 acre in size, totaling over 10 acres in the aggregate.	1.0		
b.	Multiple patches of dense riparian vegetation, minimum of 10 feet wide, most greater than 0.25 acre in size, totaling 4.5 to 10 acres in the aggregate.	0.8		
c	A single or multiple patches of riparian vegetation, minimum 10 feet wide, 2.5 to 4.5 acres in size.	0.6		
d.	A single or multiple patches of riparian vegetation, minimum 10 feet wide, 0.25 to 2.5 acres in size.	0.5		
e.	A single, narrow strip of riparian vegetation or collection of any small patch that does not extend from or connect to a larger patch that is less 10 feet wide and 0.25 acres in size.	0.0		

			VALUE	
4. Canopy height of woody riparian vegetation		**Value**	**Before**	**After**
a.	Native woody riparian vegetation dominated with canopy heights ranging from 10 to 23 feet tall, with mostly a single vegetative layer, no distinct overstory or understory. Typically, a dense branch and twig structure occurs in the lower 10 feet, with high live foliage density from the ground to the canopy.	1.0		
b.	Tree overstory is >50% dead standing trees, with new tree regeneration, within or adjacent to nesting patches.	0.5		
c.	Limited or no tree density within or adjacent to habitat patches.	0.0		

			VALUE	
5. Dense herbaceous understory within nesting patches		**Value**	**Before**	**After**
a.	Native understory (grass, forb, sedge) > .6m (2 ft) tall through July.	1.0		
b.	Mixed native/non-native understory > .6m (2 ft) tall through July.	0.7		
c.	Native or mixed understory .3m (1 ft) - .6m (2 ft) tall through July.	0.5		
d.	Understory dominated by invasives or is < .3m (1 ft) tall through July	0.3		
e.	Little to no understory of grasses, forbs, or sedges.	0.0		

			VALUE	
6.	**Site Disturbance**	**Value**	**Before**	**After**
a.	No human disturbance occurs in the planning unit	1.0		
b.	SWFL Habitat quality factors are maintained with minimal disturbance from human activities, such as livestock grazing, fire wood harvest, and other land management; no vehicular recreational activities in the planning unit: all disturbance activities occurs outside the breeding season: all grazing will be consistent with NRCS grazing plans specific to SWFL management.	0.7		
c.	SWFL habitat quality factors are maintained with noticeable, but non - persistent impacts to habitat quality from human activities, such as livestock grazing, fire wood harvest, and other land management; no vehicular recreational activities in the planning unit: grazing will follow NRCS approved grazing plan specific to SWFL management.	0.5		
d.	SWFL habitat quality factors are maintained with noticeable, but persistent impacts to habitat quality from human activities, such as livestock grazing, fire wood harvest, and other land management; no vehicular recreational activities in the planning unit:	0.3		
d.	Significant decline in SWFL habitat quality factors due to human activities, such as livestock grazing, fire wood harvest, and other land management; no vehicular recreational activities in the planning unit:	0.0		

			VALUE	
7.	**Insecticide/Pesticide Use**	**Value**	**Before**	**After**
a.	No insecticide/pesticide use.	1.0		
b.	Insecticides applied according to IPM plan; field border or other buffer present to reduce drift	0.7		
c.	Insecticide applied according to IPM plan	0.5		
d.	Insecticides applied only at night	0.3		
e.	Prophylactic application of insecticides without scouting	0.0		

			VALUE	
8.	**Water use (under the control of land manager)**	**Value**	**Before**	**After**
a.	No river diversion or groundwater pumping.	1.0		
b.	Limited river diversion or groundwater pumping that does not reduce the water available for riparian habitat regeneration, growth, maintenance, distribution, or abundance.	0.5		
c.	River diversion or groundwater pumping that reduces the water available for riparian habitat regeneration, growth, maintenance, distribution, or abundance.	0.2		

HSI Value is the lowest value for the above 11 factors. To improve the HSI, the lowest value in the before condition must be increased by implementing changes that will increase the value in the after condition. To meet quality criteria, the overall HSI must be at 0.5 or higher in the after condition.

	Before	After
Overall HSI ----------	**0.0**	**0.0**

2. SWFL WHEG for applications below 6,000 ft elevation

NRCS	Wildlife Habitat Evaluation Guide – Southwestern Willow Flycatcher	July 2012 BELOW 6000' ELEVATION

Owner/Operator:		District:	
County:		Field	
Assisted By:		Acres:	
Location:		Date:	
Farm & Tract		Contract	

Southwestern willow flycatchers are Neotropical migrants found nesting in dense mosaics of riparian vegetation (usually where surface water is present or soil is saturated). Nests are usually found in dense stands of medium-sized trees or shrubs such as willow or tamarisk, often with an overstory of cottonwood.

			VALUE	
1. River Flow		**Value**	**Before**	**After**
a.	Unregulated section of stream with full complement of flood flows that allows regular recycling of riparian habitat.	1.0		
b.	Regulated portion of stream but retains some periodic flooding (appropriate frequency, magnitude, duration, and timing) that allows recycling of riparian habitat (i.e. middle Gila River or lower Verde River).	0.7		
c.	Regulated conservation space of lake bottoms where the surface water expands and contracts exposing flat broad areas allowing riparian vegetation to grow with periodic rising and lowering of lake that allows recycling of habitat.	0.5		
d.	Regulated portion of river that does not flood or rarely has flood flows of magnitude to extend water across the floodplain, fill aquifers, and recycle/develop and/or maintain dense riparian habitat (lower Colo River).	0.0		

			VALUE	
2. Surface flow		**Value**	**Before**	**After**
a.	Perennial surface flow with elevated groundwater.	1.0		
b.	Intermittent or emphemeal streams that provide surface water during the breeding season	0.7		
c.	Mostly perennial surface flow, with some intermittent sections or short durations of intermittent flow and elevated groundwater maintains moist soils	0.5		
d.	Intermittent or perennial surface flows during the breeding season with elevated groundwater largely maintained by other sources of water such as nearby tributary flow, wastewater, and/or agricultural return flow.	0.1		
e.	Little to no surface flow or rare occurrence of surface flow without moist soils and elevated groundwater.	0.0		

			VALUE	
3. Floodplain		**Value**	**Before**	**After**
a.	Relatively broad floodplain with flat gradient with river connected to the floodp	1.0		
b.	Relatively broad floodplain with flat gradient and the river connected to much of the floodplain or one-half of the riverside that allows development of abundant riparian vegetation.	0.7		
c.	Relatively narrow floodplain that does not allow expansive growth of riparian vegetation because the river occurs within a canyon, channel downcutting, or as a result of manmade actions such as levees or channelization.	0.0		

			VALUE	
4. Woody Riparian plants* and species composition		**Value**	**Before**	**After**
a.	Woody riparian vegetation composed of > 90% native species (i.e, typically woody species such as willow, cottonwood) and <10% exotic vegetation (most likely tamarisk, and possibly Russian olive).	1.0		
b.	Woody riparian vegetation dominated by >50% native vegetation (i.e. typically woody species such as willow, cottonwood) with a smaller component of exotic vegetation (most likely tamarisk, and possibly Russian olive).	0.7		
c.	Woody riparian vegetation dominated >50% exotic vegetation (most likely tamarisk, and possibly Russian olive) with a smaller component of native riparian species (i.e. typically woody species such as willow, cottonwood).	0.5		
d.	Woody riparian vegetation composed of >90% exotic vegetation (mostly likely tamarisk, and possibly Russian olive).	0.3		
e.	Little to no woody riparian vegetation flycatchers use for nesting, abundant wetland veg like cattails or arundo do not comprise flycatcher habitat.	0.0		

			VALUE	
5. Vegetation configuration		**Value**	**Before**	**After**
a.	Multiple patches** of riparian vegetation greater than 33 feet wide, ranging from each about 20 to 60 acres in size, totaling hundreds of acres in the	1.0		
b.	Multiple patches of riparian vegetation greater than 33 feet wide, ranging from 4.5 to 20 acres in size.	0.8		
c	A single patch of riparian vegetation greater than 33 feet wide and 20 acres in size.	0.7		
d.	A single patch of riparian vegetation greater than 33 feet wide and 4.5 acres in size.	0.5		
e.	A single patch of riparian vegetation greater than 33 feet wide and 2.5 acres in size.	0.3		
f.	A single, narrow strip of riparian vegetation that does not extend from or connect to a larger patch that is less than 33 feet wide and 2.5 acres.	0.0		

			VALUE	
6. Canopy height of riparian vegetation		**Value**	**Before**	**After**
a.	Mature multi-storied native riparian vegetation (>90% native species) sites with canopy heights ranging from approximately 35 to 65 feet tall, with mosaics of densely vegetated understories of shorter willows (greater than 15 feet tall, that are difficult to walk through).	1.0		
b.	Young stands of regenerating native riparian vegetation (>90 % native species) approximately 3 to 5 years of age with similar heights of vegetation approximately 15 feet in height (that are difficult to walk through).	0.9		
c.	Mature multi-storied native-dominated riparian vegetation (>50% native species and <50% exotic vegetation) sites with canopy heights ranging from approximately 35 to 65 feet tall, with mosaics of densely vegetated understories of shorter willow and tamarisk plants (greater than 15 feet tall, that are difficult to walk through).	0.8		
d.	Young stands of regenerating native-dominated riparian vegetation (>50 % native species and <50% exotic vegetation) approximately 3 to 5 years of age with similar heights of willow and tamarisk vegetation approximately a minimum of 15 feet in height (that are difficult to walk through).	0.7		

e.	Mature exotic-dominated riparian vegetation (>50% exotic vegetation and <50% native vegetation) that may have interspersed mature native trees, but tamarisk and willow canopies ranging from about 25 to 40 feet (that can be difficult to walk through).	0.6		
f.	Young stands of regenerating exotic-dominated riparian vegetation (>50 % native species and <50% exotic vegetation) approximately 3 to 5 years of age with similar heights of tamarisk and willow vegetation all approximately a minimum of 6.5 15 feet in height (that are difficult to walk through).	0.5		
g.	Mature exotic riparian vegetation (most likely tamarisk) (>90% exotic vegetation) with canopies ranging from about 25 to 40 feet (that can be difficult to walk through).	0.4		
h.	Young stands of regenerating exotic vegetation (most likely tamarisk) (>90% exotic vegetation) approximately 3 to 5 years of age with similar heights of tamarisk all approximately a minimum of 15 feet in height (that are difficult to walk through).	0.3		
j.	Stands of sparse isolated exotic vegetation (most likely tamarisk).	0.1		

			VALUE	
7. Dense herbaceous understory within nesting patches		**Value**	**Before**	**After**
a.	Native understory (grass, forb, sedge) > .6m (2 ft) tall through July.	1.0		
b.	Mixed native/non-native understory > .6m (2 ft) tall through July.	0.7		
c.	Native or mixed understory .3m (1 ft) - .6m (2 ft) tall through July.	0.5		
d.	Understory dominated by invasives or is < .3m (1 ft) tall through July	0.3		
e.	Little to no understory of grasses, forbs, or sedges.	0.0		

			VALUE	
8. Site Disturbance		**Value**	**Before**	**After**
a.	No human disturbance occurs in the planning unit	1.0		
b.	SWFL Habitat quality factors are maintained with minimal disturbance from human activities, such as livestock grazing, fire wood harvest, and other land management; no vehicular recreational activities in the planning unit: all disturbance activities occurs outside the breeding season: all grazing will be consistent with NRCS grazing plans specific to SWFL management.	0.7		
c.	SWFL habitat quality factors are maintained with noticeable, but non - persistent impacts to habitat quality from human activities, such as livestock grazing, fire wood harvest, and other land management; no vehicular recreational activities in the planning unit: grazing will follow NRCS approved grazing plan specific to SWFL management.	0.5		
d.	SWFL habitat quality factors are maintained with noticeable, but persistent impacts to habitat quality from human activities, such as livestock grazing, fire wood harvest, and other land management; no vehicular recreational activities in the planning unit:	0.3		
d.	Significant decline in SWFL habitat quality factors due to human activities, such as livestock grazing, fire wood harvest, and other land management; no vehicular recreational activities in the planning unit:	0.1		

			VALUE	
9. Insecticide/Pesticide Use		**Value**	**Before**	**After**
a.	No insecticide/pesticide use.	1.0		
b.	Insecticides applied according to IPM plan; field border or other buffer present to reduce drift	0.7		
c.	Insecticide applied according to IPM plan	0.5		
d.	Insecticides applied only at night	0.3		
e.	Prophylactic application of insecticides without scouting	0.0		
10. Water use (under the control of land manager)		**Value**	**Before**	**After**
a.	No river diversion or groundwater pumping.	1.0		
b.	Limited river diversion or groundwater pumping that does not reduce the water available for riparian habitat regeneration, growth, maintenance, distribution, or abundance.	0.5		
c.	River diversion or groundwater pumping that reduces the water available for riparian habitat regeneration, growth, maintenance, distribution, or abundance.	0.2		
HSI Value is the lowest value for the above 9 factors. To improve the HSI, the lowest value in the before condition must be increased by implementing changes that will increase the value in the after condition. To meet quality criteria, the overall HSI must be at 0.5 or higher in the after condition.				
			Before	**After**
	Overall HSI ----------		**0.0**	**0.0**