United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

September 10, 2004

Honorable Leonard Armijo, Governor
Pueblo of Santa Ana
2 Dove Road
Santa Ana Pueblo, New Mexico 87004

Dear Governor Armijo:

I am writing you concerning the attached clarification to the final U.S. Fish and Wildlife Service's (Service) biological opinion on the Safe Harbor Agreement and associated 10(a)(1)(A) Enhancement of Survival Permit (TE-035920-0) for the Pueblo of Santa Ana, located in Sandoval County, New Mexico. These clarifications stem from inconsistencies between the biological opinion, the findings document, and the associated 10(a)(1)(A) Enhancement of Survival Permit. In the biological opinion and findings documents, we mistakenly included language that was unclear. The enclosed memorandum identifies changes to these documents. We regret the confusion this may have caused.

We appreciate your continued coordination and support for the recovery of the Rio Grande silvery minnow, the southwestern willow flycatcher, and the bald eagle and your concern for our natural resources. In future communications regarding this consultation, please refer to consultation #2-22-04-F-369. If you have any comments or questions about this opinion, please contact me at the letterhead address or at (505) 761-4706.

Sincerely,

for Joy E. Nicholopoulos
State Supervisor

Enclosure

cc:
Native American Liaison, External Affairs, Region 2, Albuquerque, New Mexico
Field Supervisor, New Mexico Ecological Services Field Office, U.S. Fish and Wildlife Service, Albuquerque, New Mexico
Assistant Regional Director, Ecological Services, Region 2, Albuquerque, New Mexico

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September 10, 2004

Cons. #2-22-04-F-369

Memorandum

To: Regional Director, Fish and Wildlife Service, Albuquerque, New Mexico (ARD-ES)

From: Field Supervisor, New Mexico Ecological Services Field Office, Albuquerque, New Mexico

Subject: Clarification of the Intra-Service Biological Opinion, Findings Document, the Incidental Take Permit (TE-035920-0), and the related a Safe Harbor Agreement for the Rio Grande Silvery Minnow, Southwestern Willow Flycatcher, and Bald Eagle to the Pueblo of Santa Ana in New Mexico

This memorandum transmits a clarification to the final U.S. Fish and Wildlife Service's (Service) biological opinion on the Safe Harbor Agreement and associated 10(a)(1)(A) Enhancement of Survival Permit (TE-035920-0) for the Pueblo of Santa Ana, located in Sandoval County, New Mexico. The issued permit allows incidental take of the endangered southwestern willow flycatcher (*Empidonax traillii extimus)* (flycatcher), Rio Grande silvery minnow (*Hybognathus amarus*) (silvery minnow), and threatened bald eagle *(Haliaeetus leucocephalus)* (covered species). Under this Agreement, the Pueblo of Santa Ana would voluntarily undertake management activities to enhance, restore, and maintain habitat benefiting federally listed species on Pueblo lands for the next 25 years. The lands covered by this Agreement include those lands, waters, and facilities within which the Permit authorizes incidental take of the above listed species (covered lands).

These clarifications stem from inconsistencies between the biological opinion, the findings document, and the associated 10(a)(1)(A) Enhancement of Survival Permit. In the biological opinion and findings documents, we mistakenly included language that was unclear. Therefore, the following changes should be made:

1. In the biological opinion on page 13 under "Critical Habitat" section, delete the following sentence that reads: "As discussed in the final rule, the Pueblo of Santa Ana was excluded from the critical habitat designation and it has been determined that the Jemez River below Jemez

Canyon Dam is owned by the Pueblo of Santa Ana."

Replace the above sentence with: "As discussed in the final rule, the Pueblo of Santa Ana was excluded from the critical habitat designation."

2. In the biological opinion on page 46 under "Jemez River Corridor" section, delete the following sentence that reads: "The Pueblo of Santa Ana will be formulating a land use plan for the reservoir area, and the Corps will assist the Pueblo in formulating and implementing their plans."

Replace the above sentence with: "The Pueblo of Santa Ana will be formulating a land use plan for the reservoir area."

3. In the biological opinion on page 51 under "IV. Effects of the Action" section, delete the following sentences that read: "However, due to the fact that all four of these project areas have a Federal nexus, such beneficial actions by the Pueblo would not be considered to be independent because they are part of the Federal projects. Therefore, these areas of the Rio Grande and the Jemez River are excluded from this Safe Harbor Agreement."

4. In the biological opinion on page 55 under "Rio Grande Silvery Minnows" section, delete the following sentence that reads: "This incidental take statement does not authorize take of any silvery minnows occupying Federal project areas on the Pueblo."

5. In the biological opinion on page 56 under "Terms and conditions" section, delete the following paragraph that reads: "1.1 Within nine months of signing this Agreement, the Service shall develop and make available to the Pueblo a seminar course on survey protocol, handling and preservation of voucher specimens for the silvery minnow."

6. In the biological opinion on page 56 under "Conservation Recommendations" section, delete the following sentence that reads: "The Service should seek to participate with the Pueblo of Santa Ana, as appropriate, to implement adaptive management procedures to regularly assess and improve attainment of the restoration goals of the Agreement."

7. In the Findings and Recommendations on Issuance of an Enhancement of Survival Permit to the Pueblo of Santa Ana (TE-049290-0), on page 8 under the "INCIDENTAL TAKE PERMIT CRITERIA - ANALYSIS AND FINDINGS" section, delete the following paragraph that reads: "As described in the environmental baseline of the biological opinion, the reach of the Rio Grande within the Pueblo has two large restoration projects underway in conjunction with Reclamation and the Corps that cover the 5.6 miles within the Pueblo. These restoration projects have been consulted on separately, and these areas are not included in this Agreement. Similarly, on the Jemez River, there have been two large restoration projects conducted in conjunction with the Corps, and the areas of the Jemez River around the weir and within the reservoir pool have been consulted on separately and are not included in this Agreement. All four of these Federal project areas on the Rio Grande and the Jemez River may be enhanced by activities of the Pueblo's natural resource programs, such as by exclusion of livestock grazing and planting native

riparian vegetation. However, due to the fact that all four of these project areas have a Federal nexus, such beneficial actions by the Pueblo would not be considered to be independent because they are part of the Federal projects. Therefore, these areas of the Rio Grande and the Jemez River are excluded from this Safe Harbor Agreement."

8. In the Findings and Recommendations on Issuance of an Enhancement of Survival Permit to the Pueblo of Santa Ana (TE-049290-0), on page 8 under the "INCIDENTAL TAKE PERMIT CRITERIA - ANALYSIS AND FINDINGS" section, delete the following sentence that reads: "In the two reaches of the Jemez River described above, potential beneficial, independent actions by the Pueblo may include: Maintaining perennial, flowing water in the Jemez River; creating backwaters and slack water habitats; removing exotic vegetation in conjunction with planting native riparian trees and shrubs, maintaining or improving water quality, excluding livestock grazing to allow native vegetation to reach its potential height and density; and creating wetlands with willow and cottonwood tree components."

Replace the above sentence with: "In the covered lands described above, potential beneficial, independent actions by the Pueblo may include: Maintaining perennial, flowing water in the Jemez River; creating backwaters and slack water habitats; removing exotic vegetation in conjunction with planting native riparian trees and shrubs, maintaining or improving water quality, excluding livestock grazing to allow native vegetation to reach its potential height and density; and creating wetlands with willow and cottonwood tree components."

These clarifications do not change our conclusion that the issuance of a section 10(a)(1)(A) Safe Harbor Enhancement of Survival Permit to the Pueblo of Santa Ana, and cumulative effects, is not likely to jeopardize the continued existence of the Rio Grande silvery minnow, the southwestern willow flycatcher, and the bald eagle.

for Field Supervisor — Date: 9/10/2004

Regional Director — Date: 9/10/04

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry and Resources Conservation Division, Santa Fe, New Mexico
Assistant Regional Director for Ecological Services, U. S. Fish and Wildlife Service, Albuquerque, New Mexico
Regional Safe Harbor Agreement Coordinator, U. S. Fish and Wildlife Service, Albuquerque, New Mexico
Regional Section 7 Coordinator, U. S. Fish and Wildlife Service, Albuquerque, New Mexico

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May 20, 2004

Cons. #2-22-04-F-369

Memorandum

To: Regional Director, Fish and Wildlife Service, Albuquerque, New Mexico (ARD-ES)

From: Field Supervisor, New Mexico Ecological Services Field Office, Albuquerque, New Mexico

Subject: Intra-Service Biological Opinion Regarding the Proposed Issuance of an Incidental Take Permit (TE-035920-0) and Approval of a Safe Harbor Agreement for the Rio Grande Silvery Minnow, Southwestern Willow Flycatcher, and Bald Eagle to the Pueblo of Santa Ana in New Mexico

This memorandum transmits the U.S. Fish and Wildlife Service's (Service) biological opinion on the Safe Harbor Agreement and associated 10(a)(1)(A) Enhancement of Survival Permit (TE-035920-0) for the Pueblo of Santa Ana, located in Sandoval County, New Mexico. The proposed permit would allow incidental take of the endangered southwestern willow flycatcher (*Empidonax traillii extimus)* (flycatcher), Rio Grande silvery minnow (*Hybognathus amarus*) (silvery minnow), and threatened bald eagle *(Haliaeetus leucocephalus)* (covered species). Under this Agreement, the Pueblo of Santa Ana would voluntarily undertake management activities to enhance, restore, and maintain habitat benefiting federally listed species on Pueblo lands for the next 25 years. The lands covered by this Agreement include those lands, waters, and facilities within which the Permit authorizes incidental take of the above listed species (covered lands). Beyond its independent conservation actions, the Pueblo also partners with Federal agencies to conduct collaborative conservation projects on the Pueblo. This Agreement and the associated Permit only apply to the independent conservation activities of the Pueblo. Projects and/or conservation activities that are authorized, funded or carried out, in whole or in part, by a Federal agency on the Pueblo require separate consultation with the Service under section 7 of the Endangered Species Act.

The primary objective of the Safe Harbor Agreement is to encourage voluntary habitat restoration or enhancement activities to benefit the above listed species. This Agreement follows the

Service's June 17, 1999, final Safe Harbor Policy (64 FR 32717) and final regulations (64 FR 32705). This final policy encourages property owners to voluntarily conserve threatened and endangered species without the risk of further restrictions pursuant to section 9 of the Endangered Species Act. In order to provide the necessary assurances to participating property owners, while providing conservation benefits to the covered species, accompanying permits to Agreements are issued under section 10(a)(1)(A) of the Endangered Species Act.

Consultation History

On March 12, 2003, the New Mexico Ecological Services Field Office (NMESFO) received an application for an Enhancement of Survival Permit under section 10(a)(1)(A) of the Endangered Species Act from the Pueblo of Santa Ana. The availability of the application was published in the *Federal Register* on April 23, 2003. The 30-day public comment period closed on May 23, 2003. The Service received two written comments on the application during the public comment period. The Service met with Pueblo representatives to discuss the written comments several times between August 2003 and January 2004. The Pueblo submitted to the NMESFO a revised Safe Harbor Agreement, which addressed public comments, on January 27, 2004. Two additional informational meetings were conducted with the Pueblo in March and April 2004, and the Pueblo submitted supplemental data to the Service by electronic mail on April 1, 2004.

BIOLOGICAL OPINION

I. Description of the Proposed Action

The Pueblo of Santa Ana's Safe Harbor Agreement emphasizes the protection and development of natural resources by the Pueblo to achieve the goals of the Endangered Species Act. In this Agreement, the Pueblo's existing ecosystem approach to natural resource conservation is complemented with measures that specifically address the needs of listed fish and wildlife species. The Pueblo would voluntarily undertake management activities that enhance, restore, or maintain habitat benefiting federally listed species. The management actions in this Agreement are expected to help conserve riparian forests, improve water quality, reestablish natural hydrologic processes, and control human interactions with fish and wildlife species. These activities would increase the likelihood that Pueblo lands are used by listed species.

The proposed Safe Harbor Agreement would cover the natural resource programs of the Santa Ana Pueblo, including ecosystem restoration, range/wildlife, and water resources. The Applicant's ecosystem restoration program proposes to help restore riparian, wetland, and riverine habitat along the Rio Grande and the Jemez River within the boundaries of the Pueblo. Restoration activities include replacing nonnative plant species with native willow (*Salix* spp.) and cottonwood (*Populus* spp.) and restoring native wildlife habitat. The range and wildlife program proposes to improve the health of rangeland on the Santa Ana Pueblo by continuing to exclude livestock from some riparian areas, conducting fish and wildlife surveys, and developing fire management plans.

In this Agreement, the Pueblo would implement the following program activities through the divisions of its Department of Natural Resources (DNR):

1. Notice of Transfer of Lands. The Pueblo will notify the Service of any transfer of lands covered by this Agreement out of the Pueblo.

2. Natural Resources Programs. Through its Natural Resources Programs, the Pueblo will voluntarily manage its natural resources to benefit federally listed fish and wildlife, provided the beneficial actions do not result in new restrictions being placed on the Pueblo's future use of its resources. The Pueblo's independent conservation management activities include ecosystem restoration, range and wildlife, water resources and environmental education. The DNR's Ecosystem Restoration Division concentrates on the restoration of riparian, wetland, and riverine systems through eradication of nonnative plant species, bioengineering and restoration of native wildlife habitat, including habitat for the silvery minnow. Its current scope includes developing methods for bosque, wetland, and channel restoration along the Rio Grande and Jemez River within the boundaries of the Pueblo and implementing them. DNR's Range and Wildlife Division concentrates on improving the health of the Pueblo's rangeland. The Water Resources Division is responsible for surface water and groundwater projects and programs at the Pueblo. Activities currently being implemented and anticipated to continue focus on developing water quality standards, providing technical support for water rights establishment, conserving riparian areas, improving water quality, and reestablishing natural hydrologic processes. DNR's Community Outreach Program provides Pueblo members with environmental education about the Pueblo's natural resources. The Department of Natural Resources also provides natural resource consultation to the Tribal Administration and Tribal Council. The Pueblo's DNR monitors and incorporates adaptive management principles into the voluntary conservation activities conducted by its natural resource management divisions. These divisions include:

a. Bosque Restoration Division. The Bosque Restoration Division manages the restoration of riparian, wetland and riverine systems on the Pueblo. This Division is responsible for the design, implementation and management of projects such as replacement of nonnative plant species and restoration of native wildlife habitat, including habitat for the flycatcher and silvery minnow. Its current activities include developing methods and implementing bosque restoration and channel restoration along the Rio Grande within the exterior boundaries of the Pueblo. The Division is also focusing on wetland habitat restoration in the Jemez River watershed. The Pueblo anticipates that during the term of this Agreement, this Division would implement and manage non-Federal restoration projects to benefit the covered species.

b. Range and Wildlife Division. The Range and Wildlife Division manages the health of the rangeland on the Pueblo. Projects being conducted under this Program include a rangeland vegetation and soil erosion study. This study is analyzing the impacts of long-term livestock grazing on the Pueblo rangeland watershed as reflected in vegetation cover and species composition, including a focus on soil surface erosion relative to various types of vegetation cover. This Division also manages reintroduction of native wildlife, such as the ongoing effort

between the Pueblo of Santa Ana and the Service to reintroduce the Rio Grande wild turkey (*Meleagris gallopavo merriami)* into the Pueblo's bosque. Other activities in this Program include: Organizing and conducting fish and wildlife surveys; developing fire management plans that aid in habitat protection for the species covered under this Agreement; overseeing rangeland improvements and rangeland water development; grasslands management; and assisting the Santa Ana Cattlemen's Association. The Range/Wildlife Division currently excludes cattle grazing from the 16,000-acre Jemez River corridor. Livestock grazing is generally not a concern in the Rio Grande corridor due to use of those lands for residential, agricultural and commercial purposes.

c. Water Resources Division. The Water Resources Division is responsible for surface water and groundwater hydrology projects and programs, both ongoing and under development at the Pueblo. Activities include water resource planning, development of water quality standards that would benefit the silvery minnow, drinking water quality protection, technical support for water rights establishment to protect the Pueblo's fish and wildlife water supply, and planning and coordination assistance for projects implemented by the Range/Wildlife Division to benefit riparian habitat. Other duties include technical support for river restoration management and other water resource-related projects on the Pueblo.

d. Information Technology (IT) Division. The IT Division is responsible for the maintenance of DNR's geographic information system/geographic positioning system databases. This currently involves development of an integrated program so that all information gathered within the DNR is complementary, including data related to threatened and endangered species habitat components. The other information management duties include network administration and database management. The IT Division assures that all data are accurate before maps are produced or inventory lists developed. All other DNR divisions work interactively with the IT Division when producing maps based on their inventories, measurements or models.

e. Environmental Education/Community Outreach Program. This Program concentrates on development of environmental education/community outreach activities related to the Pueblo's natural resources in order to increase community awareness of DNR's activities, endangered species issues, and the Pueblo's natural resource management values. The focal point of the Program is to involve the Pueblo youth (After School Program, Headstart and the Youth Conservation Corps) with elders (Senior Program) in an intergenerational learning environment.

f. Commitments for Protection of Covered Species. The Pueblo will conduct the following protective measures to help avoid the potential for projects to adversely impact the covered species:

For the bald eagle: If a bald eagle is present within 0.25 mile upstream or downstream of an active project site in the morning before project activity starts, or following breaks in project activity, the Pueblo will suspend all activity until the bald eagle leaves of its own volition, or a Pueblo biologist, in consultation with the Service, determines that the potential for harassment is minimal. If a bald eagle arrives during construction activities or if a bald eagle

is beyond that distance, construction need not be interrupted. If bald eagles are found consistently in an immediate project area during a construction period, the Pueblo will contact the Service to determine whether further consultation is necessary.

For the flycatcher: Construction disturbance will be avoided near occupied and known flycatcher territories from April 15 through August 31. The Pueblo shall define buffer zones around flycatcher territories in consultation with the Service on a case-by-case basis. Future project sites with occupied or suitable flycatcher habitat shall be surveyed using the minimum five-visit protocol for at least one breeding season prior to and during the year of project implementation. If flycatchers are detected within the boundaries of a proposed project, the Pueblo will consult with the Service. The Pueblo will avoid impacts to suitable flycatcher habitat caused by clearing new river survey transects. All sites proposed for transect clearing will be reviewed by a Pueblo biologist. Brushing will occur only when necessary for project purposes and shall be avoided during the April 15 through August 31 flycatcher breeding period.

For the silvery minnow: Where silvery minnows may be present in the Rio Grande and the Jemez River, pre- and post-construction fish monitoring will be conducted when the Pueblo carries out river maintenance activities. If it is necessary to redirect river flows away from a construction site, steps will be taken to allow flows to recede from the area gradually so silvery minnows can avoid entrapment. Any disconnected aquatic habitat, such as isolated pools, associated with a river maintenance site will be surveyed for silvery minnows. If found, they will be relocated into adjacent areas of flowing water. Construction activities requiring movement of equipment within the river channel will avoid potential silvery minnow habitat to the extent possible. Work will be done in xeric conditions where feasible to avoid direct impacts of construction activities to silvery minnows.

3. Quality Assurance/Quality Control. The Pueblo seeks a commensurate level of quality assurance and quality control in all Natural Resource Programs involving the measurement of environmental data. All Programs involved with environmentally related measurements utilize the Pueblo's Quality Management Plan as a guideline to ensure the quality of these measurements. The foreseeable measurements to be taken involve water quality data, stream geomorphologic assessments, aquatic studies, vegetation surveys, and other necessary environmental measurements that are needed to ensure resource protection. The system, by which quality is assured, involves the integration and coordination of the Natural Resource Programs by Quality Assurance (QA) Officers. The Tribal Administration acts as the senior governing body for management of the Natural Resource Programs. Quality Assurance and Control will be reviewed in monthly meetings between the Director of the Pueblo Natural Resource Department and individual Program Managers and quarterly Department meetings with all staff members pertinent to this Agreement. These meetings serve to update senior management and provide a forum to review current conditions. Senior Management will assure that guidelines for quality assurance are being followed by the individual Program Managers as defined in the Pueblo's Quality Management Plan. QA Officers will review habitat conditions with the respective Managers to make certain that the objectives of this Agreement are being met.

If the QA Officers find any deficiencies, adaptive management will be initiated as described in the following section. The meetings described above will also allow time for self and independent technical assessments. Any contracted individuals involved in environmental measurements for a Natural Resource Program will provide supervision to insure data quality assessments at these meetings. This will guarantee that assessments will be done on a regular basis. The program Managers and Director can determine, by the process of these meetings, if assessments should be done more frequently and, if necessary, make provisions to do so. The Pueblo will perform work within its resource programs to assure that the quality system stays intact and improves in the years to follow. This will insure that the goal of this Agreement is accomplished.

4. Adaptive Management. The Pueblo expects its current understanding of watershed processes, riparian forest functions, and the effects of the Natural Resource Program on the Pueblo ecosystems to evolve and mature over the life of this Agreement. The Pueblo intends to utilize accumulated knowledge to better and more efficiently manage its resources for the benefit of the ecosystems upon which the covered species depend.

The data obtained through its natural resource programs will serve as the foundation for adaptive management to achieve and maintain the goals of this Agreement. The ability to modify and adjust management actions in response to natural physical and biological variations will allow the Pueblo to maximize the benefits of its management actions. The threshold for initiating adaptive management discussions will be the rejection or acceptance of one or more testable hypotheses associated with a particular natural resource objective. For example, if a management action is developed, and if monitoring and research demonstrated that this action should be accepted or rejected, a discussion of changes that might improve the management action may be initiated by the Pueblo. Upon the initiation of adaptive management discussions, the Pueblo will consult with the Service. The Pueblo will consider the input of the Service in good faith when deciding whether or not to implement any adaptive management changes. Where the Pueblo determines that the objectives of the Agreement are not being achieved, or conversely, that the existing actions can be relaxed and still achieve the desired outcomes, discussion will be initiated with the Service to address possible cause and effect relationships that could be responsible for unanticipated observations. Discussions will explore the interaction of complementary management actions and external factors.

5. Resource Assessment, Monitoring And Research. The Pueblo conducts resource assessment, monitoring and research in order to gauge progress being made toward achieving natural resource objectives such as the creation and restoration of covered species habitat. These activities also provide integral support to the Natural Resource, Quality Assurance/Quality Control and Adaptive Management Programs used for this Agreement. Assessment-level work will focus on developing information useful to formulate hypotheses for the more rigorous monitoring or research components of the Pueblo's Natural Resources Programs. The methods used for assessment work will be designed to obtain information quickly and efficiently. Assessment-level work will also focus on new ideas or opportunities that may improve natural resource management. Assessment-level work includes broad overview analysis, verification of baseline

assumptions, and development of hypotheses. Monitoring-level work will be focused on providing specific information feedback for management functions. Monitoring strategies will be determined through specific questions and objectives directed at improving management actions. Monitoring efforts will be based upon well-established methods. Monitoring data will be derived from multiple sources, as is required to optimize good decision-making. Monitoring work will include the testing of specific hypotheses and determining trends in habitat conditions or animal distribution and abundance. Research-level work will fall into two categories: The testing of complex, long-term baseline hypotheses and the necessary research to fill existing data gaps. Research will be guided by specific questions intended to develop baseline data, test specific hypotheses, and fill data gaps with detailed information on specific subjects.

6. Financial Commitment. The Pueblo will provide funds as necessary to its Natural Resource Program objectives under this Agreement, not to exceed an Annual Cap. The source or sources of those funds shall be within the sole discretion of the Pueblo. The Natural Resource Programs and the Annual Cap are ambitious and over the life of this Agreement will burden the Pueblo significantly. The Pueblo will notify the Service of any material change in the Pueblo's financial ability to fulfill its obligations, and will make reasonable effort to minimize the adverse effects of any such change on achievement of the conservation goals of this Agreement. The Service shall at all times support efficient and effective use of Pueblo funds to accomplish the purposes of this Agreement. Notwithstanding anything in this Section to the contrary, in no event shall the Pueblo be required to expend more than the Annual Cap, plus any available carry over from preceding years, to design, discuss and implement Natural Resource Program activities. The Annual Cap will be an amount expressed in constant 2001 dollars, to be adjusted annually for inflation, equal to the sum of ninety thousand dollars, plus two hundred dollars for each acre added to the Agreement area after the date on which the Permit is first issued. If in any year the amount of the Annual Cap exceeds the amount expended, the excess may be carried forward. All amounts expended for Agreement activities will be charged against carryover amounts, starting with the earliest year and continuing forward, before charging the annual cap for the year in which such amounts are expended. Carryover will allow the Pueblo to accommodate annual budget variance. Expenses to be charged to the Annual Cap shall include wages, benefits and allocated overhead for Pueblo employees, consultants, experts, contractors and partners performing Natural Resource Program work and all out-of-pocket expenses incurred in connection with such work.

7. Take. The Pueblo will notify the Service at least 30 days in advance of when it expects to incidentally take any covered species. The Parties will coordinate translocation of affected individuals of the species, if possible and appropriate.

Terms and Conditions of the Section 10(a)(1)(A) Permit

The following items are the proposed terms and conditions for the section 10(a)(1)(A) permit:

- ξ Nothing in this permit or the associated Safe Harbor Agreement, either explicitly or implicitly, affects or modifies the Pueblo's land or water rights.

- The Pueblo shall notify the Service of any transfer of lands covered by this Agreement.

- The Pueblo is authorized to take the silvery minnow, flycatcher and bald eagle to the extent that take of these species would otherwise be prohibited under section 9 of the Endangered Species Act. Such take must be incidental to management activities affecting habitat associated with the activities described and covered in this Safe Harbor Agreement. The lands covered by this Agreement include those lands, waters, and facilities within which the Permit authorizes incidental take of the above listed species. Beyond its independent conservation actions, the Pueblo also partners with Federal agencies to conduct collaborative conservation projects on the Pueblo. This Agreement and the associated Permit only apply to the independent conservation activities of the Pueblo. Conservation activities that are authorized, funded or carried out, in whole or in part, by a Federal agency on the Pueblo may require separate consultation with the Service under the Endangered Species Act. This Safe Harbor Agreement does not cover any projects that have a Federal nexus.

- Silvery minnow data collected since 1995 demonstrate that silvery minnows occupy the Pueblo. For purposes of this Agreement and the associated permit, the baseline condition for the silvery minnow was determined based on the presence of the species currently occupying the Pueblo. For this reason, the baseline condition is one silvery minnow, which indicates that the Pueblo reaches of the Rio Grande and Jemez River are occupied.

  The baseline condition for the flycatcher was determined based upon formal surveys documenting that currently no breeding flycatchers (i.e., no territories) are within the covered lands. However, migrant flycatchers have been documented within the covered lands, indicating that flycatcher habitat is used seasonally. For these reasons, the baseline condition for breeding territories is zero, whereas the baseline condition for seasonal use is up to four migrant flycatchers. This baseline condition indicates that the flycatcher habitat within the Pueblo is suitable for seasonal use by flycatchers.

  The baseline condition for the bald eagle was determined based upon wintering bald eagles that have been consistently documented within the covered lands. This baseline indicates that bald eagle habitat within the Pueblo is suitable and used by one or more wintering bald eagles.

- The Permittees, to the best of their ability, will ensure that this Agreement is being implemented.

- The Permittees will make reasonable attempts to notify the Service in advance of major actions that could result in substantial take of the silvery minnow, flycatcher, or bald eagle, to allow the Service or another appropriate party access to collect and relocate individuals if warranted.

- The Permittees assume responsibility for securing any permits or other authorizations needed to carry out restoration or enhancement projects.

- The Permittees will endeavor to arrange for sufficient funding to conduct the activities identified in the Agreement and this permit.

- The Permittees reserve the right to return the land to baseline conditions at the end of this Agreement, or prior to, if the Permittees decide to terminate the Agreement. The Safe Harbor program allows for early termination of Agreements. Therefore, the Agreement can be terminated prior to the expiration date, and the Permittees can return the land to baseline conditions even if the expected net conservation benefits have not been realized. However, the purpose of this Agreement is to restore and enhance habitat for these species. Thus, the Permittees have stated that there are no activities planned that would return the property to baseline conditions. If the Permittees wish to return to baseline conditions, the Service requests reasonable advance written notice (60 days minimum, if possible) for the opportunity to relocate affected, listed species.

- Monitoring of take, as well as monitoring of the effectiveness of the Safe Harbor program will be accomplished by the Service and the Permittees. The Service shall monitor wildlife habitat development and species within the Safe Harbor Agreement project areas of the Pueblo at least once every five years. The Permittees agree to allow the Service (its members, agents, or assigns) access to the Pueblo, upon prior reasonable notice. The Permittees will provide a report to the Service on the effects and effectiveness of the Agreement's conservation actions on species at least once every five years, with the first report due in 2009, in the same month as this Agreement is finalized. If flycatcher or silvery minnow habitats become suitable, or if one or more silvery minnows or flycatchers are occupying portions of the Pueblo covered by this Agreement, the Pueblo will monitor habitat development and presence annually for flycatchers and at least twice per year, in July and October, for silvery minnows.

- All survey data acquired for a species will remain in the custody of the Pueblo. Should the Pueblo choose to participate in and share species information with the Service on an annual basis, the following information is recommended and would be acceptable: 1) Date, time of day, general habitat or ecosystem type and locations; 2) the number of times the site was visited; 3) the type of responses (vocal or visual); 4) the number of mortalities; and 5) the methodologies used.

- Should any mortality occur to an individual of a listed species during permitted activities, all operations should immediately cease and the NMESFO should be contacted within 24 hours.

- Upon locating a dead, injured, or sick silvery minnow, flycatcher, or bald eagle, or any other endangered or threatened species, the Permittees should contact the Service's Law Enforcement Office in Albuquerque, New Mexico, at 505/346-7828, for care and

disposition instructions. Extreme care should be taken in handling sick or injured individuals to ensure effective and proper treatment. Care should also be taken in handling dead specimens to preserve biological materials in the best possible state for analysis of cause of death. In conjunction with the care of sick or injured endangered or threatened species, or preservation of biological materials from a dead specimen, the Permittees and their contractor/subcontractor have the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

Species-specific Permit Conditions

a. Rio Grande Silvery Minnow

1. Within silvery minnow habitats on projects with a Federal nexus, the Permittees are authorized to sample for silvery minnows in the Rio Grande or Jemez River on the Santa Ana Pueblo, using traps, nets, seines and/or electroshock methods, in conjunction with the NMESFO, New Mexico Fishery Resources Office (NMFRO) or a Permittee approved by the Service for these activities. The Permittees are authorized to monitor reproduction of silvery minnows in conjunction with the NMESFO, NMFRO or a Permittee approved by the Service for these activities.

2. Within silvery minnow habitats on independent Pueblo projects, the Permittees are authorized to sample for silvery minnows in the Rio Grande or Jemez River on the Santa Ana Pueblo, using traps, nets and/or seines. Prior to sampling for the silvery minnow, the Permittees will be required to participate in and complete a training seminar conducted by the Service. The Service recommends that all future surveyors have an appropriate biological background, aquatic and fish experience, and obtain supervised field experience with an experienced, permitted surveyor until the Permittee considers them ready to sample independently. Additionally, any Permittees who have not conducted sampling with positive results for a couple of years are encouraged by the Service to attend another silvery minnow training seminar as a refresher course. All surveys shall be conducted according to the most recent Service-accepted survey protocol. Up to 15 adult silvery minnows may be taken per year from independent Pueblo project habitats to serve as voucher specimens. The Service-accepted protocol for specimen preservation shall be followed and specimens may be retained on the Pueblo. Surveys will be conducted at a minimum of twice per year, in July and October.

3. This permit does not authorize the salvage or transportation of silvery minnows from harms way, such as during dewatering events.

4. This permit does not authorize the release of silvery minnows without direct cooperation with the Service. All releases or transportation **from and to** the Rio Grande must be coordinated with the NMESFO and the NMFRO 30 days prior to any such activities.

b. Southwestern Willow Flycatcher

Permittees are authorized for scientific research and recovery purposes to survey for flycatchers (*Empidonax traillii extimus*) using vocalization tape playback on the Pueblo of Santa Ana. The following conditions also apply:

1. All Pueblo of Santa Ana personnel wishing to conduct surveys will be required to participate in and complete one of the flycatcher survey training seminars conducted by the Bureau of Indian Affairs, Service, U.S.G.S. Biological Resources Division, and/or State game and fish agencies prior to conducting any flycatcher surveys. Furthermore, the Service recommends that all future surveyors have an appropriate biological background, riparian bird experience, and obtain supervised field experience with an experienced, permitted surveyor until the Permittee considers them ready to conduct surveys independently. Additionally, any Permittees who have not conducted surveys with positive results for a couple of years are encouraged by the Service to attend another flycatcher training seminar as a refresher course.

2. All surveys shall be conducted according to the most recent Service-accepted survey protocol. Currently, that protocol is: Sogge, M.K., R.M. Marshall, S.J. Sferra, and T.J. Tibbitts. 1997. A Southwestern Willow Flycatcher Natural History Summary and Survey Protocol. Technical Report NPS/NAUCPRS/NRTR-97/12. National Park Service, Colorado Plateau Research Station, Flagstaff, Arizona. 37pp; and accompanying revision document titled *Southwestern Willow Flycatcher Protocol Revision 2000* (attached). A copy of this revision can be retrieved from the flycatcher document library of our web site <http://arizonaes.fws.gov>.

3. You are not authorized to conduct nest monitoring, nest searching, capture, and/or handle any flycatchers. Any nest monitoring or nest searching must be coordinated with and under the direct supervision of a permitted biologist with experience doing nest monitoring of flycatchers.

4. You shall make reasonable efforts to determine if flycatchers are marked with a silver aluminum band and/or color bands. If banded birds are sighted, you shall also make reasonable efforts to determine the band combination noting the number of bands, colors, and band location and sequence on the flycatcher's legs (e.g., red over yellow right leg/blue split pink over silver left leg).

5. If banded or unbanded flycatchers are detected during the 2nd or 3rd survey periods (1–21 June or 22 June–17 July) in a location where they were not present the previous breeding season, the Service recommends the Pueblo document and retain this information in order to assist with future conservation efforts on the Pueblo or future project sites.

6. Survey results should be documented following each survey season covered by this

permit. Permittees are not required to submit flycatcher survey forms and related information such as photos and/or maps to the Service in an annual report. However, the Pueblo can release this information, if agreed upon by the Service.

II. Status of the Species

Rio Grande Silvery Minnow

The silvery minnow was federally listed as endangered under the Endangered Species Act on July 20, 1994 (U.S. Fish and Wildlife Service 1994). The species is listed by the State of New Mexico as an endangered species. Primary reasons for listing the silvery minnow involved a number of factors, listed here and described further in the Status and Distribution section, which contributed to a collapse of population numbers throughout its historic range:

1. Regulation of stream waters, which has led to severe flow reductions, often to the point of dewatering extended lengths of stream channel;

2. Alteration of the natural hydrograph, which impacts the species by disrupting the environmental cues the fish receives for a variety of life functions, including spawning;

3. Both the streamflow reductions and other alterations of the natural hydrograph throughout the year can severely impact habitat availability and quality, including the temporal availability of habitats;

4. Actions such as channelization, bank stabilization, levee construction, and dredging result in both direct and indirect impacts to the silvery minnow and its habitat by severely disrupting natural fluvial processes throughout the floodplain;

5. Construction of diversion dams fragment the habitat and prevent upstream migration;

6. Introduction of nonnative fishes that directly compete with, and can totally replace the silvery minnow, as was the case in the Pecos River, where the species was totally replaced in a time frame of 10 years by its congener the plains minnow (*Hybognathus placitus*); and

7. Discharge of contaminants into the stream system from industrial, municipal, and agricultural sources also impact the species (U.S. Fish and Wildlife Service 1993, 1994).

These reasons for listing continue to threaten the species throughout its currently occupied range in the Middle Rio Grande.

The final recovery plan for the silvery minnow was released in July 1999 (U.S. Fish and Wildlife Service 1999a). The primary objectives are to increase numbers of the silvery minnow, enhance its habitat in the Middle Rio Grande valley, and expand its range by reestablishing the species in

at least three other areas in its historic range. The Recovery Plan is currently being revised.

Species Description

The silvery minnow is a stout minnow, with moderately small eyes, a small, subterminal mouth, and a pointed snout that projects beyond the upper lip (Sublette et al. 1990). The back and upper sides of the silvery minnow are silvery to olive, the broad mid-dorsal stripe is greenish, and the lower sides and abdomen are silver. Maximum length attained is about 3.5 inches (90 mm). The only readily apparent sexual dimorphism is the expanded body cavity of ripe females during spawning (Bestgen and Propst 1994).

The silvery minnow has had an unstable taxonomic history, and in the past was included with other species of the genus *Hybognathus* due to morphological similarities. Phenetic and phylogenetic analyses corroborate the hypothesis that it is a valid taxon, distinctive from other species of *Hybognathus* (Cook et. al. 1992, Bestgen and Propst 1994). It is now recognized as one of seven species in the genus *Hybognathus* in the United States and was formerly one of the most widespread and abundant minnow species in the Rio Grande basin of New Mexico, Texas, and Mexico (Pflieger 1980, Bestgen and Platania 1991). Currently, *Hybognathus amarus* is the only remaining endemic pelagic spawning minnow in the Middle Rio Grande. The speckled chub (*Extrarius aestivalus*), Rio Grande shiner (*Notropis jemezanus*), phantom shiner (*Notropis orca*), and bluntnose shiner (*Notropis simus simus*) have gone extinct or have been extirpated from the Middle Rio Grande (New Mexico Department of Game and Fish 1998, Bestgen and Platania 1991). The other four pelagic spawning endemic minnow species have been extirpated from the Middle Rio Grande (Dudley and Platania 1997).

Critical Habitat

Critical habitat was proposed for the silvery minnow on June 6, 2002 (67 FR 39205) and was finalized on February 19, 2003 (68 FR 8088). The critical habitat designation extends from Cochiti Dam, Sandoval County, New Mexico downstream to the utility line crossing the Rio Grande, a permanent identified landmark in Socorro County, New Mexico, a total of approximately 157 mi (252 km) (U.S. Fish and Wildlife Service 2003a). Although the final rule designates the Jemez River from Jemez Canyon Dam in New Mexico to the upstream boundary of Santa Ana Pueblo as part of the critical habitat designation, a correction notice has been drafted for publication in the *Federal Register* to remove this reach from the designation. As discussed in the final rule, the Pueblo of Santa Ana was excluded from the critical habitat designation and it has been determined that the Jemez River below Jemez Canyon Dam is owned by the Pueblo of Santa Ana. The critical habitat designation defines the lateral extent (width) as those areas bounded by existing levees or, in areas without levees, 300 feet (ft) (91.4 meters (m)) of riparian zone adjacent to each side of the bankfull stage of the Middle Rio Grande. The Pueblo lands of Santo Domingo, Santa Ana, Sandia, and Isleta within this area are not included in the critical habitat designation. Except for these areas, the final remaining portion of the silvery minnow's occupied range in the Middle Rio Grande in New Mexico is designated as critical habitat (68 FR 8088).

Some developed lands within the 300-ft (91.4-m) lateral extent are not considered critical habitat because they do not contain the primary constituent elements and they are not essential to the conservation of the silvery minnow. Lands located within the exterior boundaries of the critical habitat designation, but not considered critical habitat, include: Developed flood control facilities; existing paved roads; bridges; parking lots; dikes; levees; diversion structures; railroad tracks; railroad trestles; water diversion and irrigation canals outside of natural stream channels; the LFCC; active gravel pits; cultivated agricultural land; and residential, commercial, and industrial developments. These developed areas do not contain any of the primary constituent elements and do not provide habitat or biological features essential to the conservation of the silvery minnow.

The Service determined the primary constituent elements of critical habitat for the silvery minnow based on studies on their habitat and population biology (68 FR 8088). The primary constituent elements of critical habitat for the silvery minnow include:

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 depths and velocities, all of which are necessary for each of the particular silvery minnow life-history stages in appropriate seasons [e.g., 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 eddies created by debris piles, pools, or backwaters, or other refuge habitat within unimpounded stretches of flowing water of sufficient length (i.e., river miles) that provide a variation 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 conditions (e.g., decreased dissolved oxygen, increased pH).

The primary constituent elements identified above provide for the physiological, behavioral, and ecological requirements of the silvery minnow. The first primary constituent element provides water of sufficient flows to reduce the formation of isolated pools. We conclude this element is essential to the conservation of the silvery minnow because the species cannot withstand permanent drying (loss of surface flow) of long stretches of river. Water is a necessary

component for all silvery minnow life-history stages and provides for hydrologic connectivity to facilitate fish movement. The second primary constituent element provides habitat necessary for development and hatching of eggs and the survival of the silvery minnow from larvae to adult. Low-velocity habitat provides food, shelter, and sites for nursery habitat, which are essential for the survival and recruitment of silvery minnows (68 FR 8008). The third primary constituent element provides appropriate silt and sand substrates (Dudley and Platania 1997; Remshardt et al. 2001), which we believe are important in creating and maintaining appropriate habitat and life requisites such as food and cover. The final primary constituent element provides protection from degraded water quality conditions. We conclude that when water quality conditions degrade (e.g., water temperatures are too high, pH levels are too high, and dissolved oxygen concentrations are too low), silvery minnows will likely be injured or die.

To determine whether an action destroys or adversely modifies critical habitat, this biological opinion will evaluate whether the loss, when added to the environmental baseline, is likely to appreciably diminish the capability of the critical habitat to satisfy essential requirements of the silvery minnow. In other words, activities that may destroy or adversely modify critical habitat include those that alter the primary constituent elements (defined above) to an extent that the value of the critical habitat for both the survival and recovery of the silvery minnow is appreciably reduced (50 CFR § 402.02).

Life History

The silvery minnow travels in schools and tolerates a wide range of habitats (Sublette et al. 1990), but generally prefers low velocity (< 0.33 feet per second, 10 centimeters/second [cm/sec]) areas over silt or sand substrate that are associated with shallow (< 15.8 inches [40 cm]) braided runs, backwaters or pools (Dudley and Platania 1997). Adults are most commonly found in backwaters, pools, and habitats associated with debris piles; whereas, young-of-year (YOY) occupy shallow, low velocity backwaters with silt substrates (Dudley and Platania 1997). A study conducted between 1994 and 1996 characterized habitat availability and use at two sites in the Middle Rio Grande at Rio Rancho and Socorro (Dudley and Platania 1997). Dudley and Platania (1997) reported that this fish species was most commonly found in habitats with depths less than 19.7 inches (50 cm). Over 85 percent were collected from low velocity habitats (< 0.33 feet/sec [10 cm/sec]) (Dudley and Platania 1997, Watts et al. 2002). Habitat for the silvery minnow includes stream margins, side channels, and off-channel pools where water velocities are low or reduced from main-channel velocities. Stream reaches dominated by straight, narrow, incised channels with rapid flows are not typically occupied by the silvery minnow (Sublette et. al. 1990, Bestgen and Platania 1991).

The species is a pelagic spawner that produces 3,000 to 6,000 semi-buoyant, non-adhesive eggs during a spawning event (Platania 1995, Platania and Altenbach 1998). Adults spawn in about a one-month period in late spring to early summer (May to June) in response to spring runoff. Platania and Dudley (2000, 2001) found that the highest collections of silvery minnow eggs occurred in mid- to late May. In 1997, Smith (1999) collected the highest number of eggs in mid-May, with lower frequency of eggs being collected in late May and June. These data suggest

multiple silvery minnow spawning events during the spring and summer, perhaps concurrent with flow spikes. It is unknown if individual silvery minnows spawn more than once a year, or if some minnows spawn earlier and some minnows spawn later in the year. An artificial flow spike of 1,800 cfs (51 cubic meters/second) for 24 hours was released from Cochiti Dam on May 19, 1996. This flow spike apparently stimulated a spawning event and resulted in the collection of 49 silvery minnow eggs by researchers at Albuquerque on May 22, the day after the spike passed (Platania and Hoagstrom 1996). A late spawn was documented in the Isleta and San Acacia Reaches on July 24, 25, and 26, 2002, following a high flow event produced by a thunderstorm. This spawn was smaller than the typical spawning event in May, but a significant number of eggs were collected (N = 496) in two hours of effort (J. Smith, U.S. Fish and Wildlife Service, pers. comm., 2002). In 2002, small spawning events of a few eggs were documented as late as August 7 in all reaches except the Cochiti Reach (J. Smith, U.S. Fish and Wildlife Service, pers. comm., 2002).

Platania (2000) found that development and hatching of eggs are correlated with water temperature. Eggs of the silvery minnow raised in 30°C water hatched in about 24 hours while eggs reared in 20 – 24°C water hatched within 50 hours. Eggs were 0.06 inches (1.6 millimeters [mm]) in size upon fertilization, but quickly swelled to 0.12 inches (3 mm). Recently hatched larval fish are about 0.15 inches (3.7 mm) in standard length and grow about 0.005 inches (0.15 mm) in size per day during the larval stages. Eggs and larvae have been estimated to remain in the drift for 3 – 5 days, and could be transported from 134 to 223 miles (216 – 359 km) downstream depending on river flows. About three days after hatching the larvae move to low velocity habitats where food (mainly phytoplankton and zooplankton) is abundant and predators are scarce. Young-of-year attain lengths of 1.5 to 1.6 inches (39 – 41 mm) by late autumn (U.S. Fish and Wildlife Service 1999a). Age 1 fish are 1.8 – 1.9 inches (45 – 49 mm) by the start of the spawning season. Most growth occurs between June (post spawning) and October, but there is some growth in the winter months. In the wild, maximum longevity is about 25 months, but very few survive more than 13 months (U.S. Fish and Wildlife Service 1999a). Captive fish have lived until Age 4 (C. Altenbach, City of Albuquerque, pers. comm., 2003).

Platania (1995) suggested that historically the downstream transport of eggs and larvae of the silvery minnow over long distances was likely beneficial to the survival of their populations. This behavior may have promoted recolonization of reaches impacted during periods of natural drought (Platania 1995). The spawning strategy of releasing floating eggs allows the silvery minnow to replenish populations downstream, but the current presence of diversion dams (Angostura, Isleta, and San Acacia Diversion Dams) prevents recolonization of upstream habitats (Platania 1995). As populations are depleted upstream, and diversion structures prevent upstream movements, isolated extirpations of the species through fragmentation may occur (U.S. Fish and Wildlife Service 1999a). Adults, eggs and larvae are also transported downstream to Elephant Butte Reservoir. It is believed that none of these fish survive because of poor habitat and predation from reservoir fishes (U.S. Fish and Wildlife Service 1999a).

The silvery minnow is herbivorous (feeding primarily on algae); this is indicated indirectly by the elongated and coiled gastrointestinal tract (Sublette et al. 1990). Additionally, detritus, including

sand and silt, is filtered from the bottom (Sublette et al. 1990, U.S. Fish and Wildlife Service 1999a).

Population Dynamics

The majority of spawning silvery minnow is one year old. Two-year-old fish comprise less than 10 percent of the spawning population. High silvery minnow mortality occurs during or subsequent to spawning, consequently very few adults are found in late summer. By December, the majority (> 98 percent) of individuals are YOY (Age 0). This population ratio does not change appreciably between January and June, as Age I fish usually constitute over 95 percent of the population just prior to spawning. Generally, the population consists of only two age classes (U.S. Fish and Wildlife Service 1999a).

Platania (1995) found that a single female in captivity could broadcast 3,000 eggs in eight hours. Females produce 3 – 18 clutches of eggs in a 12-hour period. The mean number of eggs in a clutch is approximately 270 (Platania and Altenbach 1998). In captivity, silvery minnows have been induced to spawn as many as four times in a year (C. Altenbach, City of Albuquerque, pers. comm., 2000). It is not known if they spawn multiple times in the wild. The high reproductive potential of this fish appears to be one of the primary reasons that it has not been extirpated from the Middle Rio Grande. However, the short life span of the silvery minnow increases the population instability. When two below-average flow years occur consecutively, a short-lived species such as the silvery minnow can be impacted, if not completely eliminated from the dry reaches of the river (U.S. Fish and Wildlife Service 1999a).

Although only limited data are available it appears that natural recruitment and survival of YOY in 2002 and 2003 was poor when compared to 2000 and 2001. In August 2003, 30 YOY were caught within the 20 permanent sites sampled by Dudley and Platania (http://msb-fish.unm.edu/rgsm2003/pdf/03rgaug.pdf) as part of their on-going population monitoring study. In August 2002, a total of 14 silvery minnow YOY were caught from 20 sites. In August 2001, 714 silvery minnow YOY were caught from 19 sites; and, in August 2000, 219 YOY were caught from 18 sites (calculated from data present on website http://www.uc.usbr.gov/progact/rg/rgsm2002/).

Numbers of silvery minnow from the October sampling period represent those fish that survived through the summer and are likely to contribute to the spawning population in the spring. The number of silvery minnow caught in October of 2000, 2001, 2002, and 2003 were 36, 112, 11, and 2, respectively (http://www.uc.usbr.gov/progact/rg/ rgsm2002/, http://msb-fish.unm.edu/rgsm2003/pdf/03rgoct.pdf). In comparing numbers of YOY caught in August (representing recruitment) and all ages of silvery minnows caught in October, after the higher numbers caught in 2001 were recorded, as compared to 2000 or 2002, egg salvage efforts in the subsequent year (2002) resulted in considerably higher numbers of eggs caught than in 2001 or 2003. Results from population monitoring in August and October of 2003 indicate that the number of silvery minnows available for spawning in the Rio Grande in 2004 may be low.

Status and Distribution

Historically, the silvery minnow occurred in 2465 mi (3967 km) of rivers in New Mexico and Texas. They were known to have occurred from Española upstream from Cochiti Lake; in the downstream portions of the Chama and Jemez Rivers; throughout the Middle and Lower Rio Grande to the Gulf of Mexico; and in the Pecos River from Sumner Reservoir downstream to the confluence with the Rio Grande (Sublette et al. 1990, Bestgen and Platania 1991). The silvery minnow population has been declining since 1986, and has dropped precipitously since 1999 (Dudley and Platania 2002). There was a slight increase in the number of silvery minnows caught in 2001; however, catch rate declined again in 2002 and 2003 (Dudley and Platania 2002, Platania and Dudley 2003, http://msb-fish.unm.edu/rgsm2003/#data).

The construction of mainstem dams, such as Cochiti Dam and irrigation diversion dams have contributed to the decline of the silvery minnow. The construction of Cochiti Dam in particular has affected the silvery minnow by reducing the magnitude and frequency of flooding events that help to restore and maintain habitat. In addition, the construction of Cochiti Dam has resulted in changes to silvery minnow habitat below the dam. Flow in the river below Cochiti Dam is now generally clear, cool, and free of sediment. There is relatively little channel braiding, and areas with reduced velocity and sand or silt substrates are uncommon. Substrate immediately downstream of the dam is often armored cobble (rounded rock fragments generally 3 – 12 in [8 – 30 cm] in diameter). Further downstream the riverbed is gravel with some sand material. Ephemeral tributaries including Galisteo Creek and Tonque Arroyo occasionally transport sediment into the lower sections of this reach, and some of this is transported downstream with higher flows (U.S. Fish and Wildlife Service 1999a; 2001; 2003b). Recovering from the degradation imposed by Cochiti Dam, the Rio Grande gains sediment below Angostura Dam and becomes a predominately sand bed river with low, sandy banks in the downstream portion of the reach. The construction of Cochiti Dam created a barrier between silvery minnow populations. As recently as 1978, the silvery minnow was collected upstream of Cochiti Reservoir; however surveys since 1983 suggest that the fish is now extirpated from this area (U.S. Fish and Wildlife Service 1999a).

Surveys indicate a continued decline of silvery minnows in the entire Middle Rio Grande (Bestgen and Platania 1991, Platania 1993, Platania and Dudley 1997, Dudley and Platania 2002). Historically, the density of silvery minnows increased from upstream (Angostura Reach) to downstream (San Acacia Reach). This is a result of the silvery minnow eggs and larvae being carried downstream in the current and the inability of the adults to repopulate upstream reaches because the diversion dams are barriers. This distributional pattern has been observed since 1994 (Dudley and Platania 2002). In 1997, it was estimated that 70 percent of the silvery minnow population was found in the reach below San Acacia Diversion Dam (Dudley and Platania 1997). During surveys in 1999, over 98 percent of the silvery minnows captured were downstream of San Acacia Diversion Dam (Dudley and Platania 2002). This area represents 2.4 percent of the historical range. Surveys indicate a dramatic decline in the number of silvery minnows in this reach (Dudley and Platania 2002). The San Acacia Reach has had the greatest number of fish caught in surveys, however, a marked decline in numbers caught in this lower reach has been

observed in the past few years. The extensive drying in the Isleta and San Acacia Reaches in recent years and the increased level of silvery minnow augmentation in the Angostura Reach during 2002 and 2003 may result in changes in previously documented distributional patterns. In the Angostura Reach, catch rates indicated that silvery minnows were more widely distributed in 2001 and 2002, as compared to 1999 and 2000 (Dudley and Platania 2002, Dudley et al. 2003). Salvage operations in which silvery minnows were moved to the Angostura Reach from areas that were drying in the Isleta and San Acacia Reaches may have contributed to these results.

Results from egg monitoring indicate that spawning may have increased in the Angostura Reach between 1999 and 2003. Platania and Dudley (2000) only collected a total of 4 eggs at 2 sites in the Angostura Reach during their periodicity study in 1999. In 2003, the Service sampled for eggs at two locations in the Angostura Reach (Alameda and Rio Bravo) from April 21 through June 9, 2003. The peak egg collection occurred from May 15 – 20, 2003, and coincided with a release of water to create a spawning pulse that increased flows from 550 cfs (15.57 m^3s) to approximately 1000 cfs (28.32 m^3s) at the sampling locations. The Service collected over 1,697 eggs at 2 sites within the Angostura Reach in 2003. Although the sites within the Angostura Reach were geographically different between the two studies, the lower most sites for each study were within 2 miles of each other. The lower site was where Platania and Dudley (2000) collected the four eggs in their study. The Service collected 294 eggs at the lower site during a single hour peak near this location in 1999. This information is not directly comparable and should be considered with caution because Platania and Dudley (2000) did not sample on weekends and a short peak in spawning could have been missed in 1999. The Service will be conducting egg monitoring activities in the Angostura reach again in 2004.

In addition to the long-term population monitoring program carried out by Dudley and Platania, other agencies including the NMFRO and Reclamation have conducted monitoring and collection activities associated with specific projects such as the silvery minnow augmentation program, habitat use studies, habitat restoration efforts, and other population studies. Collection activities associated with these efforts have provided additional insights and information regarding the status of the silvery minnow. For example, in September 2003, Reclamation documented 81 silvery minnow during their electro-fishing survey efforts at three sites in the Angostura Reach. During October, November, and December 2003, the NMFRO collected 27, 87, and 6 silvery minnows, respectively, in the Angostura Reach during their augmentation monitoring. Of these 50 fish, 20 were marked and 100 were unmarked. Of the unmarked fish, 96 were YOY (J. Remshardt, New Mexico Fishery Resources Office, *in litt.,* 2003).

Drying of the Rio Grande has led to extensive losses of silvery minnows, especially in the San Acacia Reach where they were once most abundant (Dudley and Platania 2002). The effect of river drying was evident in the months of June and July, 2002 (Dudley et al. 2003). In June, an abnormally high catch rate occurred because fish were trapped in small, isolated pools that were easy to seine. By July these pools were dry and no fish were present at these sites. The total number of fish caught for the remainder of 2002 remained low. In October, November, and December 2002, a total of 11, 36, and 15 silvery minnows, respectively, were caught from the 20 permanent sites in the Middle Rio Grande. The total area seined in these months ranged from

13,648 – 14,205 m^2 (3.4 – 3.5 ac) (http://www.uc.usbr.gov/progact/rg/rgsm2002/). River drying in 2003 probably also contributed to low numbers of silvery minnow collected during population monitoring. In October, November, and December 2003, a total of 2, 17, and 12 silvery minnows, respectively, were caught from the 20 permanent sites. The total area seined in these months ranged from 11,409 – 13,385 m^2 (2.8 – 3.3 ac) (http://msb-fish.unm.edu/rgsm2003/index.html).

In 1996, at least 36 river miles in the San Acacia Reach were dry for 128 days and the San Marcial gage, located at the lower end of this reach had 0 cfs reading for 180 days. The Service conducted an emergency salvage of silvery minnows trapped in drying pools downstream of Isleta Diversion. Approximately 10,000 silvery minnows were salvaged, transported, and released in a perennial reach of the Rio Grande near Albuquerque (Arritt 1996). Additional salvages of silvery minnows occurred between 1997 and 2002. In 1997, at least 16 river miles were dry for approximately five to seven days. Approximately 16 river miles were dry for 28 days in 1998 (Smith 1999). The river was dry in 1999 for four to five days for at least 28 river miles (Platania and Dudley 1999). Mortality of silvery minnows was documented in 1996, 1997, and 1999 in isolated pools during river intermittency (Smith and Hoagstrom 1997, Smith 1999, Dudley and Platania 1999). Smith and Hoagstrom (1997) and Smith (1999) focused on the relative size of the isolated pools (i.e., estimated surface meters and maximum depth) in relation to pool longevity (i.e., number of days pool existed) and fish community. Smith (1999) found that the typical isolated pools found during intermittent conditions usually only lasted 48 hours. Those that persisted longer lost greater than 81 percent of their estimated surface area and more than 26 percent maximum depth in 48 hours. Because of poor water quality (high water temperatures, low dissolved oxygen) and exposure to predators, mortality of all trapped silvery minnows is expected when drying exceeds 48 hours. These small isolated pools are very different in character from the large, deep oxbow lakes and sloughs that once occurred along the river and sustained fish populations through periods of drought.

Drying occurred in 2000 for less than a week in late July (Platania and Dudley 2001). Approximately 8 – 10 mi (12.9 – 16.1 km) of river dried in 2001, with the period of intermittency usually lasting less than two days (U.S. Fish and Wildlife Service 2002a). Predatory birds have been seen hunting and consuming fish from isolated pools during river intermittence (J. Smith, New Mexico Ecological Services Field Office, pers. comm. 2003). Though the number of fish present in any pool is unknown, it must be assumed that many of the fish preyed upon in these pools are silvery minnows. Thus, while some dead silvery minnows were collected during the shorter drying events, it is assumed that many more mortalities occurred than were documented.

In 2002, the Service increased salvage efforts in response to river drying. River drying occurred during the 2002 irrigation season in the Isleta and San Acacia Reaches. Between June and August, 2002, approximately 15.75 mi (25.3 km) of river in the San Acacia Reach and 11 mi (17.7 km) in the Isleta Reach dried. These reaches of river dried and re-wetted several times due to rainstorm events. During these drying events, the Service's silvery minnow salvage crews captured and relocated 3,639 adult silvery minnows to the Angostura and Isleta Reaches, and documented 249 dead silvery minnows that counted toward the Incidental Take Statement in the

June 29, 2001, programmatic biological opinion, as clarified in an August 1, 2002, memorandum to Reclamation (New Mexico Ecological Services Field Office, *in litt.*, 2002). Approximately 98 percent of the salvaged silvery minnows were released at Central Bridge in Albuquerque, with the remainder released in the upper portions of the Isleta Reach. Re-wetting from storm runoff and the subsequent drying of the river in areas that were previously dry led to the death of additional silvery minnows (< 100) that did not count toward the incidental take statement of the June 29, 2001, programmatic biological opinion. These silvery minnows were not considered as take under the June 29, 2001, programmatic biological opinion because an "act of nature" caused the river to re-wet and subsequently dry, rather than the actions of Federal agencies (J. Smith, U.S. Fish and Wildlife Service, pers. comm., 2003).

In 2003, the Service performed 54 individual silvery minnow salvages within the Isleta and San Acacia Reaches. Approximately 35.5 river miles in the Isleta and 35.1 river miles in San Acacia Reaches were salvaged. Due to periodic rewetting from thunderstorm events, a total of approximately 90 miles of river were salvaged in 2003. From the beginning of June 2003 through mid-October 2003, the Service salvaged 713 silvery minnows from the Isleta and San Acacia Reaches. Generally, the largest number of silvery minnows collected were during the first drying event in each section. The overall number of silvery minnows collected during drying events declined after July of 2003. Age structure of the silvery minnows identified was 57 percent adult and 43 percent YOY. It is likely that some of the unidentified YOY fish collected during salvage events throughout June and early July were also silvery minnows. These fish were not identified due to the difficulties in accurately identifying small silvery minnows at this time of year and the high numbers of YOY fish salvaged during June and July (J. Smith, New Mexico Ecological Services Field Office, pers. comm., 2003). Most salvaged silvery minnows were transported to either the Rio Bravo or Central Bridges in Albuquerque, while a small proportion of the salvaged silvery minnows were used in a survivability study (J. Smith, New Mexico Ecological Services Field Office, pers. comm., 2003). In 2003, the Service and New Mexico State University have initiated a study to assess the survivability of silvery minnows that are salvaged and relocated during river drying events. The purpose of the study is to assess the direct effects (do the adults survive the short and long term effects of salvage) and indirect effects (body condition and susceptibility to disease and parasites) associated with salvage activities.

In 2000, a program was initiated to pump water from the low flow conveyance channel back into the river and minimize river drying to the maximum extent possible. The initial pumping program had a total of three stations in the San Acacia Reach. These pumps augmented flows throughout the reach within and below Bosque del Apache National Wildlife Refuge (Refuge). This program reduced the amount of intermittency in the river in 2000 and 2001. In 2002, the pumping was expanded to five stations located in the San Acacia Reach from about 3 mi (4.8 km) upstream of US 380 to near Old Fort Craig. The pumping stations at the southern boundary of the Refuge and Fort Craig have created approximately 16 mi (25.7 km) of flowing water. A new pumping station located approximately 4 mi (6.4 km) north of the southern boundary of the Refuge will provide approximately 4 mi (6.4 km) of additional flowing water when sufficient water is in the low flow conveyance channel. With these pumping stations, flow can be maintained for approximately 20 continuous miles of river, from near the middle of the Refuge,

to Elephant Butte. However, if the pumps fail, the river may become intermittent. Reclamation has contractors that check the pumps, but mechanical failures can go undiscovered for several hours. Unexpected disasters such as engine fires (one occurred in mid-July of 2002) can severely affect the ability of the pumps to deliver water (G. Pargas, Tetra Tech, pers. comm., 2002). In 2003, pumping at the South Boundary of the Refuge maintained river flow to Elephant Butte for the majority of the irrigation season.

Captive Propagation and Population Augmentation

Propagation of minnows in the United States began in the early 1930s with the culture of bait fish to support sport fisheries. Golden shiners (*Notemigonus crysoleucas*), bluntnose minnows (*Pimephales notatus*), fathead minnow (*Pimephales promelas*), and eastern silvery minnow (*Hybognathus regius*) were propagated to provide bait for game fish (Markus 1934, Raney 1941). Many aspects of culturing bait fish in ponds were described as early as 1938. The silvery minnow has been difficult to raise in captivity. The greatest success has occurred at Dexter National Fish Hatchery, while other facilities have experienced high levels of mortality (J. Brooks, U.S. Fish and Wildlife Service, *in litt.,* 2001).

In 1999, the Service identified captive propagation as an appropriate strategy to assist in the recovery of the silvery minnow (U.S. Fish and Wildlife Service 1999a). Consistent with Service policy (65 FR 183), captive propagation is conducted in a manner that will, to the maximum extent possible, preserve the genetic and ecological distinctiveness of the silvery minnow and minimize risks to existing wild populations.

In 2000, adult wild silvery minnows from the San Acacia Reach and eggs from San Marcial were collected for a pilot propagation and augmentation program. Wild gravid adults were successfully spawned in captivity at the City's propagation facilities. Approximately 500 silvery minnows were induced to spawn producing approximately 203,600 eggs (Platania and Dudley 2001). These eggs were raised for 2 – 3 days and released as larval fish at Bernalillo (91,600) and Los Lunas (112,000) (Platania and Dudley 2001).

Since 2000, silvery minnow eggs have been salvaged from the Rio Grande to supplement the captive population. Generally, the majority of eggs observed and collected during the spawn are at or below San Marcial. In 2000, an estimated 41,498 silvery minnow eggs were collected in three days just below the San Marcial Railroad Bridge (J. Smith, U.S. Fish and Wildlife Service, *in litt.,* 2000). The eggs were transported to the City of Albuquerque's propagation facilities where they were raised to adults. It was estimated that the eggs would have an estimated five to 10 percent survivorship which would result in approximately 2,075 – 4,150 adult silvery minnows (C. Altenbach, City of Albuquerque, pers. comm., 2002). However, because the project was only designed to rear 1,000 adult silvery minnows from 10,000 eggs, approximately 2,500 juvenile silvery minnows were released in the Angostura Reach of the Rio Grande in July of 2000 to provide space in the facilities to grow out remaining juveniles to a larger size.

During spring runoff in mid-May, 2001, approximately 89,500 wild eggs were collected near the

headwaters of Elephant Butte Reservoir (Platania and Dudley 2002). From May 17 – 19, 2002, the catch of silvery minnow eggs collected for captive propagation is conservatively estimated to be 922,000 (Platania and Dudley 2003). These eggs were transported to captive propagation units where they were raised to sub-adults and adults for release back into the wild. In 2003, the City coordinated egg collection activities associated with silvery minnow propagation and broodstock. Egg collection activities at San Marcial and the "white gate" location on May 19 – 20, 2003, produced approximately 298,000 eggs. Egg collection activities at Rio Bravo Bridge, North Socorro Diversion, South Boundary of the Refuge, San Marcial, and the "white gate" on May 28 – 30, 2003, produced approximately 128,000 eggs (C. Altenbach, City of Albuquerque, pers. comm., 2003).

Silvery minnow adults were induced to spawn in captivity using hormones in 2001 and into early 2002. In April of 2002, the City's propagation facilities spawned silvery minnows in captivity for the first time without the use of hormones (C. Altenbach, City of Albuquerque, pers. comm., 2002). Silvery minnows are currently housed at five facilities in New Mexico. The New Mexico facilities are: the Hatchery; New Mexico State University Coop Unit (Las Cruces); Rock Lake State Fish Hatchery; the NMFRO, and the City's propagation facilities. These facilities are actively propagating and rearing silvery minnows or are available for propagation. In 2000, the total combined capacity of these facilities was approximately 175,000 silvery minnow juveniles and adults (J. Brooks and J. Landye, U.S. Fish and Wildlife Service, *in litt.*, 2000). New facilities are being constructed at the City, the Hatchery, and at NMFRO that will increase the total capacity of all facilities to approximately 500,000 juveniles and adults. Silvery minnows are also held in South Dakota at the U.S. Geological Survey, Biological Resources Division Lab, but there is no active spawning program at this facility. As of January 2004, approximately 139,000 silvery minnows are held in various facilities (Dexter National Fish Hatchery, New Mexico Fishery Resources Office, Albuquerque Biopark, NMFRO-Las Cruces). These fish will be used for augmentation into the Rio Grande, broodstock, and research (J. Brooks, New Mexico Fishery Resources Office, *in litt.*, 2004).

Due to the increased efforts in captive propagation, studies have been developed by UNM on the genetic composition of the silvery minnow. Recent research indicates that the net effective population size (Ne) (the number of individuals that contribute to maintaining the genetic variation of a population) of the silvery minnow in the wild is between 60 – 250 fish (T. Turner, University of New Mexico, pers. comm., 2003). It has been suggested that a Ne of 500 fish is needed to retain the long-term adaptive potential of a population (Franklin 1980). No significant genetic differences have been found in populations isolated in the different reaches of the Rio Grande (D. Alo, University of New Mexico, pers. comm., 2002). Because the number of wild fish in the river appears to be low, the addition of thousands of silvery minnows raised in captivity could impact the genetic structure of the population. The propagation effort should be sufficient to maintain 100,000 – 1,000,000 fish in the wild (T. Turner, University of New Mexico, pers. comm., 2003). For instance if it were determined that 50,000 silvery minnow were in the wild, a minimum of 50,000 adult fish should be in propagation facilities. We do not know how many fish are in the wild so it is difficult at this time to determine the exact number needed in propagation facilities. However, to insure against a catastrophic event in which nearly all wild

fish are lost, it is suggested that 100,000 – 1,000,000 silvery minnow are kept in propagation facilities to maintain a sufficient amount of genetic variability for propagation efforts (T. Turner, University of New Mexico, pers. comm., 2003). Propagation will be carefully managed to ensure the long-term viability of the species. Research projects investigating the genetic fitness of the species will continue to be conducted.

There are ongoing efforts by the NMFRO and UNM to augment the wild population of silvery minnows and examine their movement. The fish are marked and released in large numbers in a few locations. After fish are released, crews sample intensively upstream and downstream from the release site in an attempt to capture the marked fish. In January 2002, approximately 13,000 silvery minnows were released by UNM into the San Acacia Reach. NMFRO released 2,082 silvery minnows 1,640 ft (500 m) above the Alameda Bridge in the City in June 2002 and 41,500 silvery minnows were released in Corrales in December 2002. In January 2003, NMFRO released approximately 61,000 silvery minnows in Bernalillo. In April 2003, 22,266 silvery minnows were released by the NMFRO and personnel from the Pueblo of Sandia's Water Resources Department in the Rio Grande within Sandia Pueblo's boundary. In 2004, NMFRO and personnel from Sandia Pueblo released approximately 48,000 silvery minnows in January and 60,000 in April.

Preliminary results indicate that the majority of silvery minnows dispersed. Monitoring within 48 hours after the release of the 41,500 silvery minnows resulted in the capture of 937 fish. Of these, 928 were marked and 927 were collected downstream of the release point. One individual was captured 15.7 mi (25.3 km) upstream from its release site (S. Platania, University of New Mexico, pers. comm., 2003).

Southwestern Willow Flycatcher

Species/Critical Habitat Description

The flycatcher is a small grayish-green passerine bird in the Family Tyrannidae. It measures approximately 5.75 in and has a grayish-green back and wings, whitish throat, light gray-olive breast, and pale yellowish belly. Two white wing bars are visible in adults; juveniles have buffy wing bars. The eye ring is faint or absent. The upper mandible is dark, and the lower is light yellow grading to black at the tip. The song is a sneezy "fitz-bew" or a "fit-a-bew" and the call is a repeated "whitt."

The flycatcher is one of four currently recognized willow flycatcher subspecies (Phillips 1948, Unitt 1987, Browning 1993). It is a neotropical migrant that breeds in the southwestern North America and winters in southern Mexico, Central America, and northern South America (Phillips 1948, Stiles and Skutch 1989, Peterson 1990, Ridgely and Tudor 1994, Howell and Webb 1995). Its breeding range includes far western Texas, New Mexico, Arizona, southern California, southern portions of Nevada and Utah, southwestern Colorado, and possibly extreme northern portions of the Mexican States of Baja California del Norte, Sonora, and Chihuahua (Unitt 1987).

The flycatcher was listed as endangered without critical habitat on February 27, 1995 (U.S. Fish and Wildlife Service 1995). Critical habitat was originally designated on July 22, 1997 (U.S. Fish and Wildlife Service 1997a,b). On May 11, 2001, the 10th Circuit Court of Appeals set aside designated critical habitat for the flycatcher. In May 2002, the Service sent out a scoping letter to more than 800 interested parties requesting information to develop a new critical habitat proposal. During January and February 2004, scoping meetings were conducted in the seven States within the range of the flycatcher to gather additional public input and identify other information for a critical habitat proposal.

A recovery plan for the flycatcher was prepared by the Southwestern Willow Flycatcher Recovery Team and finalized by the Service in August 2002 (U.S. Fish and Wildlife Service 2002b). The recovery plan includes: 1) Threats and reasons for endangerment; 2) the biology, ecology and current status of the flycatcher; 3) recovery units, objectives and criteria; 4) prioritized recovery actions; and 5) detailed papers on management issues and threats. Much of the information summarized in this section of the opinion is from Chapter 2 of the recovery plan on "Biology, ecology and status."

Life History

The flycatcher breeds in relatively dense riparian tree and shrub communities associated with rivers, swamps, and other wetlands, including lakes (e.g., reservoirs). Most of these habitats are classified as forested wetlands or scrub-shrub wetlands. Habitat requirements for wintering are not well known, but include brushy savanna edges, second growth, shrubby clearings and pastures, and woodlands near water. The flycatcher has experienced extensive loss and modification of breeding habitat, with consequent reductions in population levels. Destruction and modification of riparian habitats have been caused mainly by: 1) Reduction or elimination of surface and subsurface water due to diversion and groundwater pumping; 2) changes in flood and fire regimes due to dams and stream channelization; 3) clearing and controlling vegetation; 4) livestock grazing; 5) changes in water and soil chemistry due to disruption of natural hydrologic cycles; and 6) establishment of invasive nonnative plants. Concurrent with habitat loss have been increases in brood parasitism by brown-headed cowbirds (*Molothrus ater*) (cowbird), which inhibit reproductive success and further reduce population levels.

Suitable Habitat Characteristics

The flycatcher breeds in different types of dense riparian habitats, across a large geographic and elevational area. The majority of sites occur between 0 and 1,000 m in elevation. Most territories are found between 0 and 1,600 m, with "spikes" at 601 to 800 m (i.e., the Gila/San Pedro River confluence area in Arizona) and 1,401 to 1,600 m (the Cliff-Gila Valley in New Mexico). Although relatively few territories are known to occur above 2,000 m in elevation, flycatchers breed at three sites that are above 2,500 m.

Although other willow flycatcher subspecies in cooler, less arid regions may breed more commonly in shrubby habitats away from water (McCabe 1991), the southwestern willow

flycatcher usually breeds in patchy to dense riparian habitats along streams or other wetlands, near or adjacent to surface water or underlain by saturated soil. Common tree and shrub species comprising nesting habitat include willows (*Salix* spp.), seepwillow (mulefat; *Baccharis* spp.), boxelder (*Acer negundo*), stinging nettle (*Urtica* spp.), blackberry (*Rubus* spp.), cottonwood (*Populus* spp.), arrowweed (*Tessaria sericea*), tamarisk (salt cedar; *Tamarix ramosissima*), and Russian olive (*Eleagnus angustifolia*) (Grinnell and Miller 1944, Phillips et al. 1964, Hubbard 1987, Whitfield 1990, Brown and Trosset 1989, Brown 1991, Sogge et al. 1993, Muiznieks et al. 1994, Maynard 1995, Cooper 1996, Skaggs 1996, Cooper 1997, McKernan and Braden 1998, Stoleson and Finch 1999, Paradzick et al. 1999). Habitat characteristics such as plant species composition, size and shape of habitat patch, canopy structure, vegetation height, and vegetation density vary across the subspecies' range. However, general unifying characteristics of flycatcher habitat can be identified. Regardless of the plant species composition or height, occupied sites usually consist of dense vegetation in the patch interior, or an aggregate of dense patches interspersed with openings. In most cases, this dense vegetation occurs within the first 3 to 4 m (10 to 13 ft) above ground. These dense patches are often interspersed with small openings, open water, or shorter/sparser vegetation, creating a mosaic that is not uniformly dense. In almost all cases, slow-moving or still surface water and/or saturated soil is present at or near breeding sites during wet or non-drought years.

Thickets of trees and shrubs used for nesting range in height from 2 to 30 m (6 to 98 ft). Lower-stature thickets (2 to 4 m or 6 to 13 ft) tend to be found at higher elevation sites, with tall stature habitats at middle and lower elevation riparian forests. Nest sites typically have dense foliage from the ground level up to approximately 4 m (13 ft) above ground, although dense foliage may exist only at the shrub level, or as a low dense canopy. Nest sites typically have a dense canopy, but nests may be placed in a tree at the edge of a habitat patch, with sparse canopy overhead. The diversity of nest site plant species may be low (e.g., monocultures of willow or tamarisk) or comparatively high. Nest site vegetation may be even- or uneven-aged, but is usually dense (Brown 1988a,b; Whitfield 1990; Muiznieks et al. 1994; McCarthey et al. 1998; Sogge et al. 1997; Stoleson and Finch 1999). Historically, the flycatcher nested in native vegetation, such as willows, buttonbush, boxelder, and *Baccharis*, sometimes with a scattered overstory of cottonwood (Grinnell and Miller 1944, Phillips 1948, Unitt 1987). Following modern changes in riparian plant communities, the flycatcher still nests in native vegetation where available, but also nests in thickets dominated by the nonnative tamarisk and Russian olive and in habitats where native and nonnative trees and shrubs are present in essentially even mixtures (Hubbard 1987; Brown 1988a,b; Sogge et al. 1993; Muiznieks et al. 1994; Maynard 1995; Sferra et al. 1997; Sogge et al. 1997; Paradzick et al. 1999). Although the quality of exotic species such as saltcedar as nesting habitat for flycatchers has been debated, comparisons of reproductive performance (U.S. Fish and Wildlife Service 2002b) and physiological conditions (Owen and Sogge 2002) of flycatchers breeding in native and exotic vegetation have revealed no differences.

Open water, cienegas, marshy seeps, or saturated soil are typically in the vicinity of flycatcher territories and nests. Flycatchers sometimes nest in areas where nesting substrates are in standing water (Maynard 1995; Sferra et al. 1995, 1997). However, hydrological conditions at a particular site can vary greatly in the arid Southwest within a season and among years. Also, because

riparian vegetation typically occurs in floodplain areas that are prone to periodic disturbance, suitable habitats will be ephemeral, with a dynamic distribution (U.S. Fish and Wildlife Service 2002b). Suitable habitat patches may become unsuitable through maturation or disturbance, although this may only be temporary, and patches may cycle back into suitability. Therefore, a suitable habitat patch, either occupied or unoccupied, may not remain continuously occupied and/or suitable over the long-term. Unoccupied suitable habitat will therefore play a vital role in the recovery of the flycatcher, because it will provide suitable areas for breeding flycatchers to colonize as the population expands or following loss or degradation of existing breeding sites (U.S. Fish and Wildlife Service 2002b). Indeed, many sites will likely pass through a stage of being suitable but unoccupied before they become occupied. Potential habitats that are not currently suitable will also be essential for flycatcher recovery, because they are the areas from which new suitable habitat develops as existing suitable sites are lost or degraded. Potential habitats are the areas where changes in management practices are most likely to create suitable habitat. Therefore, habitat management for recovery of the flycatcher must include developing and/or maintaining a matrix of suitable and potential riparian patches within a watershed so that sufficient suitable habitat will be available at any given time (U.S. Fish and Wildlife Service 2002b).

Breeding Biology

Throughout its range the flycatcher arrives on breeding grounds in late April and May (Sogge and Tibbitts 1992; Sogge et al. 1993; Muiznieks et al. 1994; Sogge and Tibbitts 1994; Maynard 1995; Sferra et al. 1995, 1997). Nesting begins in late May to 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). Flycatchers typically lay three to four eggs per clutch, with a range of one to five eggs. 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 re-nesting 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.

Flycatcher nests are fairly small (3.2 in tall and wide) and are commonly placed in a shrub or tree. 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 (U.S. Fish and Wildlife Service 2002b). 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. Most typically, nests are relatively low, 6.5 to 23 feet above ground. Flycatcher nests in box elder dominated habitats are highest at almost 60 feet (U.S. Fish

and Wildlife Service 2002b).

Historic egg/nest collections and species' descriptions throughout its range document the flycatcher's widespread use of willow (*Salix* sp.) for nesting (Phillips 1948, Phillips et al. 1964, Hubbard 1987, Unitt 1987, T. Huels in litt. 1993, San Diego Natural History Museum 1995). Currently, flycatchers primarily use Geyer willow, Goodding willow, boxelder , saltcedar, 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, white alder (*Alnus rhombifolia*), blackberry (*Rubus ursinus*), and stinging nettle (*Urtica* sp.). Based on the diversity of plant species composition and complexity of habitat structure, four basic habitat types can be described for the flycatcher: monotypic willow, monotypic exotic, native broadleaf dominated, and mixed native/exotic (Sogge et al.1997).

The 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 the major prey items of the 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.

Population Dynamics

Territories, Sites and Flycatcher Movement Patterns. Flycatcher territory size likely fluctuates with population density, habitat quality, and nesting stage. Estimated territory sizes are 0.59 to 3.21 acres for monogamous males and 2.72 to 5.68 acres for polygynous males at the Kern River (Whitfield and Enos 1996), 0.15 to 0.49 acres for birds in 1.48 to 2.22 acre patches on the Colorado River (Sogge 1995c), and 0.49 to 1.24 acres in a 3.71 acre patch on the Verde River (Sogge 1995a).

Seventy percent of the breeding sites where flycatchers have been found are comprised of five or fewer territorial birds. The distribution of breeding groups is highly fragmented, with groups often separated by considerable distances. For example, in Arizona, approximately 55 miles straight-line distance separates breeding flycatchers at Roosevelt Lake, Gila County, and the next closest breeding groups known on either the San Pedro River, Pinal County or Verde River, Yavapai County. To date, survey results reveal a consistent pattern range-wide: The flycatcher population is comprised of extremely small, widely-separated breeding groups that frequently include unmated individuals. Movement data indicate that flycatchers can disperse to areas as much as 200 kilometers away from past recorded locations.

The site and patch fidelity, dispersal, and movement behavior of adult, nestling, breeding, non-breeding, and migratory flycatchers are just beginning to be understood (Kenwood and Paxton 2001, Koronkiewicz and Sogge 2001). From 1997–2000, 66 to 78 percent of flycatchers known

to have survived from one breeding season to the next returned to the same breeding site and 22 to 34 percent of returning birds moved to different sites (Luff et al. 2000). In 2001, 75 percent of adults known to have survived from 2000 returned to the same breeding site (Kenwood and Paxton 2001). All but three surviving birds (n = 28) banded at Roosevelt Lake returned to the area the next year (Kenwood and Paxton 2001). Although flycatcher territory fidelity appears to be high, they 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).

Flycatchers are believed to function as a group of metapopulations and their survival and recovery are dependent on well-distributed populations in close proximity (U.S. Fish and Wildlife Service 2002b). Esler (2000) describes Levins' metapopulation theory as addressing the demography of distinct populations (specifically extinction probabilities), interactions among subpopulations (dispersal and recolonization), and ultimately persistence of the aggregate of subpopulations, or the metapopulation. Metapopulation theory has been applied increasingly to species whose ranges have been fragmented. An incidence function analysis completed for the flycatcher incorporated a spatial component to estimate probabilities of habitat patch extinction and colonization (Lamberson et al. 2000). Modeling indicated that the likelihood of persistence of flycatcher populations is reduced when populations are small and widely distributed. Conversely, metapopulations are more stable when subpopulations are large and close together. However, where populations exceed 25 pairs, the effects of catastrophic events (e.g., fire, disease, or flood) are magnified.

Rangewide, the flycatcher population is comprised of extremely small, widely-separated breeding groups, including unmated individuals. In 2001, approximately 40 to 50 percent of 986 territories throughout the subspecies range were located at three locations: The Cliff/Gila Valley in New Mexico and Roosevelt Lake and the San Pedro/Gila confluence in Arizona. In Arizona, 63 percent of the sites (n = 46) where flycatchers were found in 2001 (Smith et al. 2002) were comprised of 5 or fewer territories. In Arizona during the 2001 season, all but the "Salt River Inflow" site at Roosevelt Lake had 20 pairs or less (Smith et al. 2002). Rangewide, 76 percent of all sites from 1993 to 2001 had 5 or less flycatcher territories present at the site (Sogge et al. 2002). Across the bird's range, there are fewer than six sites with greater than 50 territories (Sogge et al. 2002). The distribution of breeding groups is highly fragmented. For example, in New Mexico the flycatchers at Los Ojos on the Rio Chama are approximately 60 miles from the closest known site at San Juan Pueblo, and the Radium Springs site is approximately 70 miles south of the flycatchers at San Marcial.

The large distances between flycatcher breeding groups and small population sizes decrease stability and increase the risk of local extirpation due to stochastic events, predation, cowbird

parasitism, and other factors (U.S. Fish and Wildlife Service 2002b). Having 40 to 50 percent of the entire subspecies at just three locations could have dire effects on the species should catastrophic events occur that would remove or significantly reduce habitat suitability at those sites.

Additionally, flycatchers no longer occur at 65 of the 221 sites located and/or monitored rangewide since 1993, and all but two of these sites had less than 5 flycatcher territories present (Sogge et al. 2002). The two exceptions, PZ Ranch on San Pedro River (1996) and Colorado River Delta at Lake Mead (1996), were destroyed by fire and lake inundation, respectively.

Reproductive Success. In New Mexico, breeding success has been studied in the Gila River sites, and along the Rio Grande. In 2001, 133 nests were monitored in the Gila River near Gila-Cliff Valley, New Mexico. Data indicated that 34.4 percent of the nesting attempts were successful (Broadhead et al. 2002). Along the Rio Grande in 2002, 80 nests were monitored and success was 55 percent (Ahlers, in prep.). In 2001, 45 nesting attempts were documented, and 73 percent of these were successful (Ahlers et al. 2002). In 2000, the nest success along the Rio Grande was 65 percent of 26 monitored nests (Ahlers et al. 2001). Nesting was usually initiated in May or early June, with the first eggs documented in the last week of May, and the latest egg laying in the last week of July (Reclamation 2003).

In 2001, a total of 426 nesting attempts were documented in Arizona at 40 sites (Smith et al. 2002). The outcome from 329 nesting attempts was determined (not every nesting attempt was monitored). Of the 329 nests monitored, 58 percent (n=191) were successful, 35 percent failed (n=114), and 7 percent (n=24) had an outcome which could not be determined. Causes of nest failure were predation (n=82), nest desertion (n=10), brood parasitism (n=6), infertile clutches (n=12), weather (n=2), and unknown causes (n=2). Cowbirds may have contributed to other abandoned nests, but no direct evidence was detected. Three parasitized nests fledged flycatchers along with cowbird young. Nine sites had cowbird trapping in 2001 (Alamo Lake, Greer/Alpine [Alpine Horse Pasture and Greer River Reservoir], Roosevelt Lake [Lake shore], and Winkelman [CB Crossing, Cook's Lake, Dudleyville Crossing, Indian Hills, and Kearny]).

Predation and Cowbird Parasitism. Cowbird parasitism of flycatcher broods has been documented throughout its range (Brown 1988a,b; 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 flycatcher population declines (Whitfield 1994; Sogge 1995a,c; 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 1995a,c; 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 1977a,b; Brittingham and Temple 1983). Flycatchers can attempt to renest, but renesting often results in reduced clutch sizes, delayed fledging, and reduced nest success (Whitfield 1994). In one study, cowbird parasitism was often the cause of delayed fledging. Nestlings that fledged later than July 20 had a significantly lower return rate than those fledging earlier (Whitfield and Strong 1995).

Intensive nest monitoring efforts in California, Arizona, and New Mexico have shown that cowbird parasitism and/or predation can often result in failure of the nest; reduced fecundity in subsequent nesting attempts; delayed fledging; and reduced survivorship of late-fledged young. Cowbirds have been documented at more than 90 percent of sites surveyed (Sogge and Tibbitts 1992; Sogge et al. 1993; Griffith and Griffith 1994; Muiznieks et al. 1994; Sogge and Tibbitts 1994; Whitfield 1994; Griffith and Griffith 1995; Holmgren and Collins 1995; Kus 1995; Maynard 1995; McDonald et al. 1995; Sferra et al. 1995; Sogge 1995a,b; San Diego Natural History Museum 1995; Stransky 1995; Whitfield and Strong 1995;; Skaggs 1996; Spencer et al. 1996; Whitfield and Enos 1996; Sferra et al. 1997; McCarthey et al.1998). The probability of a flycatcher successfully fledging its own young from a cowbird parasitized nest is low (<5 percent). Also, nest loss due to predation appears consistent from year to year and across sites, generally in the range of 30 to 50 percent. Documented predators of flycatcher nests identified to date include common king snake (*Lampropeltis getulus*), gopher snake (*Pituophis melanoleucos affinis*), Cooper's hawk (*Accipiter cooperii*) and some corvid bird species (Paxton et al. 1997, McCarthey et al. 1998, Paradzick et al. 2000).

Cowbird trapping has been demonstrated to be an effective management strategy for increasing reproductive success for the flycatcher, as well as for other endangered passerines (e.g., least Bell's vireo [*Vireo bellii pusillus*], black-capped vireo [*V. atricapillus*], golden-cheeked warbler [*Dendroica chrysoparia*]). It may also benefit juvenile survivorship by increasing the probability that parents fledge birds early in the season. Expansion of cowbird management programs has the potential to not only increase reproductive output and juvenile survivorship at source populations, but also to convert small, sink populations into breeding groups that contribute to population growth and expansion.

Status and Distribution

Reasons for Listing and Current Threats

The flycatcher was listed as endangered because of a number of threats that caused extensive habitat loss, lack of adequate protective regulations, and other natural or manmade factors, including brood parasitism by the brown-headed cowbird (U.S. Fish and Wildlife Service 1995). The reasons for decline of the flycatcher and its current threats are numerous, complex, and interrelated. The major factors are summarized below by categories, in approximate order of their significance (U.S. Fish and Wildlife Service 2002b).

Habitat Loss and Modification. The primary cause of the flycatcher's decline is loss and modification of habitat. Its riparian nesting habitat tends to be uncommon, isolated, and widely dispersed. Historically, these habitats have always been dynamic and unstable in place and time, due to natural disturbance and regeneration events, such as floods, fire, and drought. With increasing human populations and the related industrial, agricultural, and urban developments, these habitats have been modified, reduced, and destroyed by various mechanisms. Riparian ecosystems have declined due to reductions in water flow, interruptions in natural hydrological

events and cycles, physical modifications to streams, modification of native plant communities by invasion of exotic species, and direct removal of riparian vegetation. Wintering habitat has also been lost and modified for this and other neotropical migratory birds (Finch 1991, Sherry and Holmes 1993). The major mechanisms resulting in loss and modification of habitat involve water management and land use practices, as described below.

ξ Dams and Reservoirs. Most of the major and many of the minor Southwestern streams that likely supported flycatcher habitat are now dammed (U.S. Fish and Wildlife Service 2002b). Operation of dams modifies, reduces, destroys, or increases riparian habitats both downstream and upstream of the dam site. Below dams, natural hydrological cycles are modified. Maximum and minimum flow events can both be altered. Flood flows are reduced in size and frequency below many dams. Base flows can be increased or decreased depending on how the dam is operated. High flows are often reduced or shifted from that of the natural hydrograph below dams managed for downstream water supply. Daily water fluctuations can be very high below dams operated for hydroelectric power. The more or less annual cycle of base flow punctuated by short duration floods is lost. Thus, dams inhibit the natural cycles of flood-induced sediment deposition, floodplain hydration and flushing, and timing of seed dispersal necessary for establishment and maintenance of native riparian habitats.

  Lack of flooding also allows a buildup of debris, resulting in less substrate available for seed germination, and increasing the frequency of fires. Because of reservoir evaporation, natural levels of salt and other minerals are often artificially elevated in downstream flow and in downstream alluvial soils. These changes in soil and water chemistry can affect plant community composition. Upstream of dam sites, riparian habitats are inundated by reservoirs, such as beneath Lake Powell, where Behle and Higgins (1959) considered the flycatcher to be common. In some locales, this effect is partially mitigated by temporary development of riparian habitats at inflow deltas, where source streams enter the reservoirs. However, these situations tend to be vulnerable, often inundated or desiccated as reservoir management raises and lowers the water level, resulting in unstable flycatcher populations. Although large flycatcher populations do occupy reservoir habitat, they may not be as numerous or as persistent as those that occupied miles of pre-dammed rivers (U.S. Fish and Wildlife Service 2002b).

ξ Diversions and Groundwater Pumping. Surface water diversions and groundwater pumping for agricultural, industrial, and municipal uses are major factors in the deterioration of flycatcher habitats (Briggs 1996). The principal effect of these activities is simple reduction of water in riparian ecosystems and associated subsurface water tables.

ξ Channelization and Bank Stabilization. Southwestern riparian ecosystems have also been modified through physical manipulation of stream courses. Channelization, bank stabilization, levees, and other forms of flow controls are carried out chiefly for flood control. These engineering activities affect riparian systems by separating a stream from

its floodplain. These control structures prevent overbank flooding, reduce the extent of alluvial-influenced floodplain, reduce water tables adjacent to streams, increase stream velocity; increase the intensity of extreme floods, and generally reduce the volume and width of wooded riparian habitats (Szaro 1989, Poff et al. 1997).

ξ Phreatophyte Control. In some areas riparian vegetation is removed from streams, canals, and irrigation ditches to increase watershed yield, remove impediments to streamflow, and limit water loss through evapotranspiration (Horton and Campbell 1974). Methods include mowing, cutting, root plowing, and application of herbicides. The results are that riparian habitat is eliminated or maintained at very early successional stages not suitable as breeding habitat for willow flycatchers (Taylor and Littlefield 1986). Clearing or mowing habitat can also result in establishment of exotic plant species, which can further reduce suitability.

ξ Livestock Grazing. Overgrazing by domestic livestock has been a significant factor in the modification and loss of riparian habitats in the arid Western United States (USDA Forest Service 1979, Rickard and Cushing 1982, Cannon and Knopf 1984, Klebenow and Oakleaf 1984, Clary and Webster 1989, Schultz and Leininger 1990, Belsky et al. 1999). If not properly managed, livestock grazing can significantly alter plant community structure, species composition, relative abundance of species, and stream channel morphology. The primary mechanism of effect is by livestock feeding in and on riparian habitats. Overutilization of riparian vegetation by livestock can also reduce the overall density of vegetation, which is a primary attribute of flycatcher breeding habitat. Palatable broadleaf plants like willows and cottonwood saplings may also be preferred by livestock, as are grasses and forbs comprising the understory, depending on season and the availability of upland forage. Livestock may also physically contact and destroy nests, especially in low-stature habitats (Valentine et al. 1988). Livestock also physically degrade nesting habitat by trampling and seeking shade and creating trails that nest predators and people can use. Furthermore, improper livestock grazing in watershed uplands above riparian systems can cause bank destabilization, increased runoff, increased sedimentation, increased erosion, and reduced capacity of soils to hold water.

ξ Recreation. In the warm, arid Southwest, recreation is often concentrated in riparian areas because of the shade, water, aesthetic values, and opportunities for fishing, boating, swimming, and other activities. As regional human populations grow, the magnitude and cumulative effects of these activities can be considerable. Effects may include reduction in vegetation through trampling, clearing, woodcutting and prevention of seedling germination due to soil compaction; bank erosion; increased incidence of fire; promoting invasion by exotic plant species; promoting increases in predators and scavengers due to food scraps and garbage; promoting increases in parasitic cowbirds; and noise disturbance. Recreational development can also lead to increased need for foot and vehicle access, roads, pavement, trails, boating, and structures that fragment habitat.

ξ Fire. Fire is an imminent threat in many locations of occupied and potential flycatcher breeding habitat. Although fires occurred to some extent in some of these habitats historically, many native riparian plants are neither fire-adapted nor fire-regenerated. Thus, fires in riparian habitats are typically catastrophic, causing drastic changes in riparian plant density and species composition. Busch (1995) documented that the current frequency and size of fires in riparian habitats on two regulated rivers (Colorado and Bill Williams) is greater than historical levels because reduced floods have allowed buildup of fuels, and because of the expansion and dominance of the highly-flammable tamarisk. Tamarisk and arrowweed (*Tessaria sericea*) recover more rapidly from fire than do cottonwood and willow.

ξ Agricultural Development. The availability of relatively flat land, rich soils, high water tables, and irrigation water in southwestern river valleys has spawned wide-scale agricultural development. These areas formerly contained extensive riparian habitats. Agricultural development entails not only direct clearing of riparian vegetation, but also re-engineering floodplains (e.g., draining, protecting with levees), diverting water for irrigation, groundwater pumping, and applications of herbicides and pesticides, which can also affect the flycatcher and its habitat.

ξ Urbanization. Urban development results in many impacts to riparian ecosystems and flycatcher habitat, including a variety of interrelated direct and indirect effects that can cause loss and/or the inability to recover habitat. Urban development creates increased demands for water use, which can deplete streams and aquifers and promote construction of reservoirs and structures to control floods. Urbanization also provides the need for increased transportation systems that include bridges, roads, and vehicles detrimental to riparian habitat and riparian inhabitants.

ξ Brood Parasitism. Brood parasitism by cowbirds negatively affects the flycatcher by reducing reproductive performance. Parasitism typically results in reductions in number of flycatcher young fledged per female per year. Cowbirds have probably occurred naturally in much of the flycatcher's range, for thousands of years (Lowther 1993). However, they likely increased in abundance with European settlement, and established in southern California only since 1900 (Rothstein 1994). At normal levels, parasitism is rarely an impact on host species at the population level. However, for a rare host, parasitism may be a significant impact on production of young at the population level, especially with the high predation rates flycatchers and other small passerines experience. When combined with negative influences of predation, habitat loss, and overall rarity, parasitism can be a significant contributor to population decline.

ξ Exotic Species. Several exotic plant species have become established in flycatcher riparian habitats, with varying effects on the subspecies. Saltcedar is widespread and often dominant in southwestern riparian ecosystems, often forming dense monotypic stands. Flycatchers do nest in some riparian habitats containing and even dominated by saltcedar (McKernan and Braden 1999, Paradzick et al. 2000), and available data suggest

that flycatcher productivity and survivorship are similar between native and saltcedar habitats. However, native riparian plant communities may be of greater recovery value than saltcedar, because saltcedar in some settings facilitates a periodic fire regime, can be detrimental to native riparian plants in other ways (Busch and Smith 1993), and may in some cases be of lesser value to bird communities overall (Rosenberg et al. 1991). However, this does not diminish the value of maintaining currently suitable and occupied saltcedar habitat. Saltcedar can mimic many of the ecological functions of native riparian plant species (Stromberg 1998), and in many cases supports a riparian obligate bird community that would not occur in areas where habitat conditions can no longer support native riparian vegetation. This is significant, because where saltcedar is strongly dominant, replacement with native species may be difficult or impossible without changes in current hydrologic regimes. Unlike some native tree species, saltcedar also maintains the fine branching structure as it grows to maturity, which may make it attractive to nesting flycatchers for a longer period of time. Furthermore, saltcedar flowers throughout much of the summer, which may be important in attracting pollinating insects (a major component of flycatcher diet) throughout the flycatcher's breeding season. Throughout the western United States, large tracts of saltcedar are being cleared for purposes including water salvage, flood water conveyance, and/or wetland restoration. Such actions pose a threat to flycatchers when conducted in areas of suitable habitat (occupied or unoccupied) and when conducted in the absence of restoration plans to ensure replacement by vegetation of equal or higher functional value. Russian olive is also well-established in southwestern riparian systems, and is present in some current flycatcher nest sites. The foliage of Russian olive is more broad-leaved than saltcedar, and so may be similar to willows in the ways it affects microsite conditions of temperature and humidity.

ξ Demographic and Genetic Effects. The total number of flycatchers is small, with an estimated 1100 to 1200 territories rangewide. These territories are distributed in a large number of very small breeding groups, and only a small number of relatively large breeding groups. These isolated breeding groups are vulnerable to local extirpation from floods, fire, severe weather, disease, and shifts in birth/death rates and sex ratios. The flycatcher may also be threatened by low effective population size, which is an index of the actual numbers of individuals breeding in a population and the number of offspring they produce. A species' effective population size may be much smaller than the absolute population size because of uneven sex ratios, uneven breeding success among females, polygyny, and low population numbers which exacerbate these factors (Marshall and Stoleson 2000).

ξ Migration and Winter Range Stresses. Migration is a period of high energy demands, and migrating individuals must find suitable "stopover" habitat at which to replenish energy reserves needed for the next step of migration flight (Finch and Stoleson 2000). Insufficient stopover habitat, and destruction or degradation of existing habitat, could lead to increased mortality during migration, and/or prolonged migration resulting in late arrival to wintering or breeding sites (with reduced fitness upon arrival). Recent winter

surveys in portions of Central America (Koronkiewicz et al. 1998, Koronkiewicz and Whitfield 1999, Lynn and Whitfield 2000) have found that flycatcher wintering habitat is often located in lowland areas that are subject to heavy agricultural uses, many of which negatively impact key habitat components at wintering sites. The amount of native lowland forest and wet areas, habitats in which flycatchers currently overwinter, has decreased dramatically over the last 100 years (Koronkiewicz et al. 1998). Furthermore, agricultural chemicals and pesticides are still widely used in many regions through which flycatchers migrate, and in wintering sites (Koronkiewicz et al. 1998, Lynn and Whitfield 2000), thereby exposing flycatchers to potential environmental contaminants during much of the year.

Rangewide Trend

When the flycatcher was listed as endangered in 1995, approximately 350 territories were known to exist (Sogge et al. 2001). As of the 2001 breeding season, the minimum known number of flycatchers was 986 territories. These numbers do not include flycatchers suspected to occur on some Tribal and private lands. Though much suitable habitat remains to be surveyed, the rate of discovery of new nesting pairs has recently leveled off (Sogge et al. 2001). An estimated additional 200 to 300 nesting pairs may remain undiscovered, yielding an estimated total population of 1,200 to 1,300 pairs/territories. In 2002, the total number of territories was 1,153, although this number contains a few sites where territories do not currently exist (Sogge et al. 2003).

Unitt (1987) estimated that the total flycatcher population may be 500 to 1000 pairs; thus, nearly a decade of intense survey efforts have found little more than slightly above the upper end of Unitt's estimate. The surveys of the 1990s have been valuable in developing a rangewide population estimate, but cannot identify a rangewide trend over that period. However, some local trends may be evident, as discussed below.

New Mexico Distribution and Abundance. Unitt (1987) considered New Mexico as the State with the greatest number of flycatchers remaining. After reviewing the historic status of the flycatcher and its riparian habitat in New Mexico, Hubbard (1987) concluded, "[it] is virtually inescapable that a decrease has occurred in the population of breeding flycatchers in New Mexico over historic time. This is based on the fact that wooded sloughs and similar habitats have been widely eliminated along streams in New Mexico, largely as a result of the activities of man in the area." Unitt (1987), Hubbard (1987), and more recent survey efforts have documented very small numbers and/or extirpation in New Mexico on the San Juan River (San Juan County), near Zuni (McKinley County), Blue Water Creek (Cibola County), and Rio Grande (Doña Ana County and Socorro County). Surveys and monitoring from 1993-1995 documented approximately 173 to 214 flycatcher territories in 8 drainages. Parker (1997) documented 138 territories along the Gila River in Grant County in 1996 and 174 territories in 1997. Parker asserted that the results of four consecutive years of population surveys conducted along the Gila River (64 pairs in 1994, 107 pairs in 1995, 138 pairs in 1996, 174 pairs in 1997) show an expansion in this population. However, Skaggs (1996) saw no evidence of population trends

because differences in survey objectives, methods, area, and levels of effort made comparisons inappropriate. Net increases may be due to an increased level of survey effort. Even though conclusions about population trend cannot be made without repeated and methodologically consistent surveys over a span of 5 to 10 years, the various surveys clearly indicate the area has been and remains a significant regional stronghold for the species (Skaggs 1996).

In New Mexico, flycatchers have been observed in the Rio Grande, Chama, Canadian, Zuni, San Francisco, San Juan and Gila River drainages. Flycatchers were reported at Elephant Butte State Park in the 1970s; the majority nesting in salt cedar, although the exact location of the sightings was not reported (Hundertmark 1978, Hubbard 1987). Available habitat and overall numbers of flycatchers have declined Statewide. In recent years, breeding pairs have been found within the Middle Rio Grande Project action area from Elephant Butte Reservoir upstream to the vicinity of Taos, on both the mainstem Rio Grande and on the Rio Grande de Rancho, a tributary to the upper Rio Grande. In recent years, breeding pairs have also been found on the Chama River up to the vicinity of Los Ojos.

Utah Distribution and Abundance. Specimen data reveal that the flycatcher historically occurred in southern Utah along the Colorado River, San Juan River, Kanab Creek, Virgin River, and Santa Clara River (Unitt 1987). The flycatcher no longer occurs along the Colorado River in Glen Canyon, where Lake Powell inundated historically occupied habitat, nor in unflooded portions of Glen Canyon near Lee's Ferry where flycatchers were documented nesting in 1938. Similarly, recent surveys on the Virgin River and tributaries and Kanab Creek have failed to document their presence (McDonald et al. 1995).

Colorado Distribution and Abundance. The taxonomic status and the historic distribution and abundance of flycatchers in southwestern Colorado remain unclear due to a lack of specimen data and breeding records. Preliminary data on song dialects suggest that the few birds recently documented in southwestern Colorado may be *E. t. extimus*. These sightings have prompted State and Federal agencies to delineate provisional boundaries for flycatchers and sponsor Statewide surveys. Breeding 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 a great deal of riparian habitat in southwestern Colorado that has not yet been surveyed for flycatchers; additional populations may be found with increased survey effort (U.S. Fish and Wildlife Service 2002b).

Arizona Distribution and Abundance. As reported by Paradzick et al. (2000), the greatest concentrations of flycatchers in Arizona in 1999 were near the confluence of the Gila and San Pedro rivers (236 flycatchers, 134 territories); at the inflows of Roosevelt Lake (140 flycatchers, 76 territories); between Fort Thomas and Solomon on the middle Gila River (9 flycatchers, 6 territories); Topock Marsh on the Lower Colorado River (30 flycatchers, 16 territories); Verde River at Camp Verde (7 flycatchers, 5 territories); Alpine/Greer on the San Francisco River/Little Colorado River (11 flycatchers, 8 territories); Alamo Lake on the Bill Williams River (includes

Santa Maria and Big Sandy river sites) (43 flycatchers, 23 territories); and Lower Grand Canyon on the Colorado River (21 flycatchers, 11 territories). Unitt (1987) concluded that "probably the steepest decline in the population level of *E. t. extimus* has occurred in Arizona..." Historic records for Arizona indicate the former range of the flycatcher included portions of all major river systems (Colorado, Salt, Verde, Gila, Santa Cruz, and San Pedro) and major tributaries, such as the Little Colorado River and headwaters, and White River. As of 1999, 289 territories were known from 47 sites along 12 drainages Statewide. The lowest elevation where territorial pairs were detected was 197 feet at Adobe Lake on the Lower Colorado River; the highest elevation was at the Greer town site (8,300 ft). The majority of breeding groups in Arizona are extremely small. Of the 47 sites where flycatchers have been documented, 70 percent (n = 33) contain five or fewer territorial flycatchers.

California Distribution and Abundance. The historic range of *E. t. extimus* in California apparently included all lowland riparian areas in the southern third of the State. It was considered a common breeder where suitable habitat existed (Wheelock 1912, Grinnell and Miller 1944). Unitt (1984, 1987) concluded that it was once common in the Los Angeles Basin, the San Bernardino/Riverside area, and San Diego County. Specimen and egg/nest collections confirm its former distribution in all coastal counties from San Diego County north to San Luis Obispo County, as well as in the inland counties, i.e., Kern, Inyo, Mohave, San Bernardino, and Imperial. Unitt (1987) documented that the flycatcher had been extirpated, or virtually extirpated (i.e., few territories remaining) from the Santa Clara River (Ventura County), Los Angeles River (Los Angeles County), Santa Ana River (Orange and Riverside counties), San Diego River (San Diego County), lower Colorado River (Imperial and Riverside counties and adjacent counties in Arizona), Owen's River (Inyo County), and the Mohave River (San Bernardino County). Its former abundance in California is evident from the 72 egg and nest sets collected in Los Angeles County between 1890 and 1912, and from Herbert Brown's 34 nests and nine specimens taken in June of 1902 from the Lower Colorado River near Yuma.

Survey and monitoring efforts since the late 1980s have confirmed the flycatcher's presence at a minimum of 11 sites on 8 drainages in southern California, including the Colorado River. Current known flycatcher breeding sites are restricted to coastal southern California from Santa Barbara to San Diego, and California's Great Basin near the towns of Kernville, Bishop, Victorville, the San Bernardino Mountains and along the lower Colorado River. The largest populations exist along the San Luis Rey, Santa Margarita, Santa Ynez, Kern and Owen's Rivers. Combining survey data for all sites surveyed since the late 1980s for a composite population estimate, the total known flycatcher population in southern California is 95 territories, with possibly as many as 178.

Texas Distribution and Abundance. The Rio Grande and Pecos River in western Texas are considered the easternmost boundary for the flycatcher. Unitt (1987) found specimens from four locations in Brewster, Hudspeth (Rio Grande), and Loving (Pecos River) Counties where the subspecies is no longer believed to be present. Landowner permission to survey riparian areas on private property has not been obtained; thus current, systematic survey data are not available for Texas. There have been no other recent reports, anecdotal or incidental, of flycatcher breeding

attempts in the portion of western Texas where the subspecies occurred historically. It is unknown at this time whether the flycatcher has been extirpated from Texas, but it is unlikely that there are significant numbers.

Nevada Distribution and Abundance. Unitt (1987) documented three locations in Clark County from which flycatchers had been found prior to, but not after 1962. Contemporary investigations after 1990 have verified breeding flycatchers on the Virgin River and Muddy River, the Amargosa River drainage at Ash Meadows National Wildlife Refuge, Meadow Valley Wash, and the Pahranagat River drainage (McKernan and Braden 1999, Micone and Tomlinson 2000, U.S. Fish and Wildlife Service 2002b).

In summary, more intensive and widespread surveys and monitoring efforts have documented the presence of a greater number of flycatchers than known at the time of listing. However, this does not imply an increase in the actual population, or that the status of the species has remarkably improved. Continuing losses of occupied habitats and degradation of other areas may be precluding population increases. Recovery actions may take many years to implement and decades for habitat to be restored. Protection of occupied habitats has provided some stability for covered populations, but the net result may still be a declining subspecies.

Federal Actions Throughout the Subspecies Range. Since listing in 1995, at least 86 Federal agency actions have undergone (or are currently undergoing) formal section 7 consultation throughout the bird's range (Table 1, in Appendix). Seven actions have resulted in jeopardy determinations. Many activities continue to adversely affect the distribution and extent of occupied and potential breeding habitat throughout its range (development, grazing, recreation, dam operations, etc.). Stochastic events also continue to adversely affect the distribution and extent of occupied and potential breeding habitat. For example, a catastrophic fire in June of 1996, destroyed approximately one half mile of occupied habitat on the San Pedro River in Pinal County. That fire resulted in the forced dispersal or loss of up to eight pairs of flycatchers (Paxton et al. 1996).

Analysis of the Species/Critical Habitat Likely to be Affected

The proposed action would take place in occupied habitats for the flycatcher that are important migration, breeding and recovery areas for the subspecies in relation to its rangewide distribution. No critical habitat for the flycatcher is designated in the action area. Project-related surveys, which include a minimum of five visits, will be needed to ascertain the status of the species in the action area

Bald Eagle

Species Description

Adult bald eagles are easily recognized by their white heads and tails and dark bodies. Immature bald eagles have pale areas on the head, back, breast and/or abdomen, and can be confused with

golden eagles. Bald eagles are associated with aquatic ecosystems, such as estuaries, seacoasts, large lakes, reservoirs, and major rivers, with nesting usually occurring within 2 miles of water. In winter, bald eagles often congregate at specific wintering sites that are generally near open water and offer suitable perch trees and night roosts. Fish typically comprise the main portion of the bald eagle's diet, but this species also consumes waterfowl, gulls, and carrion, depending on location, time of year, and population cycles of the prey species (U.S. Fish and Wildlife Service 1999b). In New Mexico, these birds typically roost in groups in trees at night, usually in protected areas such as canyons (New Mexico Department of Game and Fish 1988). The general daily routine for a wintering bald eagle is to leave its roost at dawn for its foraging grounds, feed until midmorning, perch for most of the midday, and possibly feed again in the late afternoon before returning to its roost site.

Bald eagle nest sites are usually in large sturdy trees along shorelines in relatively remote areas with abundant fish. The nest is often 6 to 9 feet across and more than 3 feet thick. Cliffs and rock outcrops are also selected as nest sites where large trees are not available (U.S. Fish and Wildlife Service 1999b). The nesting season lasts about 6 months and begins as early as October in the south and as late as June in the north. The female lays a clutch of one to three eggs. A second clutch may be laid if the first is lost. Incubation begins when the first egg is laid and usually lasts 34 to 36 days. The young generally fledge in 11 to 12 weeks, but the adults continue to feed them for another 4 to 6 weeks while they learn to hunt. Bald eagles reach sexual maturity at 4 to 6 years of age and can live for 30 years (U. S. Fish and Wildlife Service 1982).

Historically, the bald eagle was found throughout the United States, Canada, and northern Mexico, but was not very abundant in the southwestern United States. Bald eagles nested on both coasts of the United States, from Florida to Baja California in the south and from Labrador, Newfoundland, to the Aleutian Islands in the north (U. S. Fish and Wildlife Service 1982). In the Southwestern United States, wintering bald eagles from the Northern United States and Canada arrive in October and November, depending on climatic conditions, and normally migrate north by March and April (Ohmart and Sell 1980). The main population of bald eagles inhabiting the desert Southwest consists of wintering bald eagles.

Status and Distribution

The bald eagle was federally listed as endangered in 1967 (32 FR 4001) and 1978 (43 FR 6233) without critical habitat. In 1995, the Service reclassified the bald eagle from endangered to threatened status in the lower 48 States because the species' population had significantly increased in number and expanded in range. Reclassification does not alter conservation measures already in place to protect the species and its habitat. The bald eagles in Alaska and Canada are not at risk and are not protected under the Endangered Species Act. Bald eagles in Mexico are also not listed at this time.

The Service analyzed the status of attainment of recovery plan reclassification goals throughout the species' range. In the Southwestern Recovery Region, which includes Arizona, New Mexico, and Western Texas, the reclassification goal was production of 10 to 12 young per year over a 5-

year period and expansion of the populations' range to include one or more river drainages in addition to the Salt and Verde systems. In 1994, 30 occupied breeding areas and 21 young were documented in the Southwestern Recovery Region, and the breeding range expanded to include the Gila, Bill Williams, and San Carlos Rivers in Arizona and the Rio Grande in New Mexico. Therefore, these reclassification criteria have been met in the Southwestern Recovery Region (U.S. Fish and Wildlife Service 1999b).

The Service proposed to remove the bald eagle from the list of endangered species for the lower 48 States on July 6, 1999 (U. S. Fish and Wildlife Service 1999b). Bald eagle populations have increased from 417 breeding pairs in 1963 to 5,748 pairs in 1998 (U. S. Fish and Wildlife Service 1999b). The recovery of this species is primarily attributed to habitat protection and significant reduction in levels of persistent organochlorine pesticides in the environment.

New Mexico Distribution and Abundance

In New Mexico, the bald eagle is a winter resident from the northern border south to the Gila, lower Rio Grande, middle Pecos, and Canadian valleys. Key habitat areas include winter roost and concentration areas, such as at Navajo Reservoir, the Chama Valley, Cochiti Reservoir, the northeastern lakes, the lower Canadian valley, Sumner Reservoir, Elephant Butte Reservoir, Caballo Reservoir, and the upper Gila Basin. These sites have large numbers of waterfowl from November to March and fisheries that provide the prey base to support foraging eagles. Wintering bald eagle populations in New Mexico have increased along with reservoir construction and expansion of fish and waterfowl populations. Bald eagles have also been found occasionally in New Mexico in the summer. In the past decade, there have been at least three active bald eagle nests in Colfax and Sierra Counties in the State (New Mexico Department of Game and Fish 2002).

The U.S. Army Corps of Engineers (Corps) has conducted annual aerial winter surveys for bald eagles in the Middle Rio Grande (Albuquerque to Rio Chama confluence) and Rio Chama from 1988 through 1996. Table 2 presents the results of these surveys. The mean annual number of sightings from 1988 to 1996 is 64.

REACH	SAMPLE DATE								
	1/5/ 1988	1/18/ 1989	1/29/ 1990	1/8/ 1991	1/14/ 1992	1/22/ 1993	1/20/ 1994	1/24/ 1995	1/24/ 1996
Rio Grande - Albuquerque to Jemez River confluence	0	2	0	0	2	0	0	2	3
Jemez River - Rio Grande to Jemez Canyon Reservoir (included)	2	0	1	3	0	1	0	0	0
Rio Grande - Jemez River to Cochiti Dam	8	23	9	11	16	20	13	10	3
Cochiti Lake	18	1	3	4	9	7	5	6	4
Rio Grande - Cochiti Lake to Rio Chama	13	12	5	6	14	25	6	7	15
Rio Chama -Rio Grande confluence to Abiquiu Dam	9	6	9	8	7	4	6	6	6
Rio Chama - Abiquiu Reservoir	4	5	0	2	1	0	3	1	3
Rio Chama - Abiquiu Reservoir to El Vado Dam*	3	5	12	31	14	31	53	30	28
TOTALS	57	54	39	65	63	88	86	62	62

Table 2. Winter Counts of Adult and Immature Bald Eagles on the Rio Grande and Rio Chama. (Surveys in 1988 and 1989 did not include a portion of the Rio Chama below El Vado Dam.)

The NMDGF conducted annual winter bald eagle surveys in seven areas of the State between 1982-1990. Table 3 presents a summary of the mid-winter bald eagle counts at Elephant Butte and Caballo Reservoirs.

Year	Day	Number of Eagles at both Reservoirs	Number of Eagles in New Mexico	% of State Total
1982	Jan. 15	31	258	12.0
1983	Jan. 11	20	235	8.5
1984	Jan. 13	7	178	3.9
1985	Jan. 02	14	214	6.5
1986	Jan. 13	30	308	9.7
1987	Jan. 14	31	306	10.1
1988	Jan. 14	53	294	18.0
1989*	Jan. 06	57	219	26.0
1990	Jan. 17	113	512	22.1

Table 3. Mid-winter Counts of Bald Eagles at Elephant Butte and Caballo Reservoirs, January 1982-1990. Data were obtained from aerial censuses (S. O. Williams, New Mexico Department of Game and Fish, May 31, pers. comm., 1990). *No aerial survey for bald eagles was conducted in 1989. These were counted during waterfowl transects using different survey techniques and routes and are not comparable to surveys in other years.

Reasons for Decline

The main threats to wintering bald eagle populations are habitat loss and degradation, including declines in prey and availability of roost sites. Disturbance, contamination, and illegal taking are also threats for the bald eagle (New Mexico Department of Game and Fish 1988). Various river developments have occurred over the past one hundred years that have eliminated or controlled the dynamic components of the historic river system. Without these natural processes constantly changing and shaping the floodplain characteristics, the abundance and quality of riparian vegetation has decreased. Particularly during low water or drought years, the most dynamic areas in the Middle Rio Grande are the receding headwaters of reservoirs. Human disturbance near foraging areas probably poses a substantial threat to wintering eagles because birds will choose to move to a more secluded area with possibly less prey.

The major threats in the foreseeable future are destruction and degradation of the bald eagle's habitat and environmental contaminants. Destruction and degradation of habitat occur through direct cutting of trees for shoreline development, human disturbance associated with recreational use of shorelines and waterways, and contamination of waterways from point and non-point sources of pollution. In the Southwestern Recovery Region, the accelerated pace of development activities within bald eagle habitat and the extensive area involved are the most significant limiting factors for the bald eagle. The cumulative effects of many development projects impinge on the ability to maintain current nesting populations and ultimately may limit the extent to which recovery may occur. A significant amount of new habitat has been created in the form of reservoirs.

III. Environmental Baseline

Under section 7(a)(2) of the Act, when considering the effects of the action on federally listed species, the Service is required to take into consideration the environmental baseline. Regulations implementing the Act (50 CFR § 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects that have undergone section 7 consultation, and the impacts of State and private actions that are contemporaneous with the consultation in progress.

Status of the Species within the Action Area

Rio Grande Silvery Minnow

Repeated fish sampling in the Middle Rio Grande valley since 1993 has suggested that silvery minnow populations are concentrated downstream of the Santa Ana Pueblo. Diversion dams prevent migration to upstream habitats and can also entrain silvery minnows into irrigation canals. It was estimated in 1996, that approximately 70 percent of the known population of

silvery minnows inhabited the area of the river below the San Acacia Diversion Dam (Dudley and Platania 1997), approximately 85 miles downstream of the Pueblo. In 1999, over 98 percent of the population was located below the San Acacia Diversion Dam (Dudley and Platania 2002). However, because of the emphasis on stocking silvery minnows in the upper reaches of their range (primarily in the Angostura reach) and extensive river drying below San Acacia Diversion Dam, the proportion of silvery minnow found in the upper reaches of the Rio Grande is likely much greater than it once was and these upper reaches are now much more important for the survival of the species.

Since 1995, electroshocking surveys conducted in the Rio Grande and the Jemez River and seining surveys conducted in the Rio Grande near the confluence with the Jemez River have identified a de minimis number of silvery minnows within the Pueblo reach. In 1995 and 1996, no silvery minnows were captured within the Pueblo reach of the Rio Grande. In 1997, twenty silvery minnows were captured in this reach. In 1998 and 1999, no silvery minnows were captured in this reach. And in 2000, one silvery minnow was captured in the Pueblo reach of the Rio Grande.

Southwestern Willow Flycatcher

Presence/absence surveys and nest monitoring surveys have been conducted along the Rio Grande since 1993. No nesting flycatchers have been identified within the Pueblo. During formal surveys conducted by the Bureau of Indian Affairs, Southern Pueblos Agency, in 2001, four migrant willow flycatchers were observed early in the season, but no breeding individuals were detected. Surveys conducted in 2002 also documented migrant flycatchers on the Pueblo within the Jemez River delta (U.S. Army Corps of Engineers 2003). These results indicate that there is suitable flycatcher habitat on the Pueblo that is used seasonally by migrating flycatchers.

Bald Eagle

From November to March, wintering bald eagles frequent the Rio Grande and may roost or perch in large trees near the river. Wintering bald eagles roost in the White Rock Canyon area upstream from Cochiti Dam and forage in Cochiti Lake. Wintering bald eagles have been documented within the covered lands along the Rio Grande and Jemez River, including Jemez Canyon Reservoir (U.S. Army Corps of Engineers 2003). The Corps conducted aerial surveys for bald eagles during January from 1988 to 1996. Bald eagles were observed at Jemez Canyon Reservoir during four of these years. The number of bald eagles observed ranged between one and three. During the same period, bald eagles were observed from the confluence of the Jemez River and the Rio Grande upstream to Cochiti Reservoir, and downstream to the I-40 bridge at Albuquerque. During 2001, one bald eagle was also documented wintering in the vicinity of Jemez Canyon Reservoir. These data indicate that wintering bald eagles frequent the covered lands within the Jemez River and Rio Grande. No nesting bald eagles have been documented within the Pueblo.

Factors affecting the Species Environment within the Action Area

In the Middle Rio Grande valley, past and present Federal, State, private, and other human activities have eliminated and severely altered habitat conditions for the silvery minnow. These actions can be broadly categorized as changes to the natural hydrology of the Rio Grande and changes to the morphology of the channel and floodplain. Other factors that influence the environmental baseline are water quality, the propagation of silvery minnows, on-going research efforts, and past projects on the Middle Rio Grande. Also of importance are the current drought, the expected weather pattern for the near future, and how it may affect flow in the Rio Grande.

In the Middle Rio Grande valley, past and present Federal, State, private, and other human activities that have affected the flycatcher include irrigated agriculture, river maintenance, flood control, dam operations, water diversions, and downstream Rio Grande Compact deliveries. The Rio Grande and associated riparian areas are a dynamic system in constant change. Without this change, the riparian community will decrease in diversity and productivity. Sediment deposition, scouring flows, inundation, base flows, and channel and river realignment are processes that help to maintain and restore riparian community diversity.

Jemez River Corridor

The Jemez River is a tributary of the Rio Grande that begins in the Jemez Mountains just west of the city of Santa Fe; its lower reach flows southeasterly across the Pueblo to its confluence with the Rio Grande. In 1948, Congress authorized the construction of Jemez Canyon Dam, 2.8 miles upstream of the Rio Grande, to regulate Jemez River flows for flood damage reduction. All lands associated with the Jemez Canyon Dam and Reservoir Project are held in trust by the United States for the benefit and use of the Pueblo. The Corps and the Pueblo signed a Memorandum of Understanding in 1952 that granted the Corps a perpetual right and privilege for the construction, operation, and maintenance of the Jemez Canyon Dam and Reservoir Project. The Pueblo of Santa Ana reserved the right to use all associated lands for any purposes not inconsistent with those expressly granted to the Corps for the facility.

At the time Jemez Canyon Dam was constructed, the Rio Grande downstream from the Jemez River confluence was an aggrading channel, and eventually the riverbed in the Albuquerque reach rose several feet above the valley floor. To increase sediment retention behind Jemez Canyon Dam, the Corps and the New Mexico Interstate Stream Commission (ISC) established a 2,000 acre-foot sediment retention pool at Jemez Canyon Reservoir in 1979. In January 1986, the sediment retention pool was increased to 24,425 acre-feet. Since it was placed into operation, Jemez Canyon Reservoir has retained almost 20,000 acre-feet of sediment. Due to recognition of the need to increase sediment loads in areas downstream of the Jemez River confluence with the Rio Grande, the Corps and the ISC allowed the Memorandum of Understanding that established the Jemez Canyon Reservoir sediment retention pool to expire at the end of 2000 (U.S. Army Corps of Engineers 2000). Approximately 12,000 acre-feet of sediment was released from September through October, 2000, and the reservoir was completely evacuated in October 2001. It is now operated as a dry reservoir. A supplemental release of water occurred in May 2001, to

accommodate movement of sediment as a part of habitat restoration and construction on the Rio Grande and Jemez River on the Santa Ana Pueblo.

The Jemez Canyon Dam is still utilized for flood control. The Jemez River flows passed through Jemez Canyon Dam are restricted to 7,000 cfs. When the passage of inflow through the Reservoir would exceed the channel capacity of the Rio Grande downstream, the Corps initiates flood control storage. Floodwaters are stored only until downstream conditions again permit evacuation of the floodwaters. In addition, Jemez Canyon Dam and Reservoir have been utilized to store and provide conservation water to further efforts to repopulate and promote the recovery of the silvery minnow in the Middle Rio Grande. These actions were approved by the Rio Grande Compact Commission in April 2001, and authorized by the Conservation Water Agreement signed by the Pueblo, the Corps and the ISC in July 2001. The Conservation Water Agreement remained in effect until December 31, 2003. In the future, the Corps is anticipated to continue utilizing Jemez Canyon Reservoir and Dam as a flood control facility. It is also possible that the operation of Jemez Canyon Reservoir and Dam will be modified to utilize sediment currently trapped in the Reservoir to feed downstream sediment-starved reaches of the Rio Grande for the benefit of the silvery minnow and flycatcher.

In conjunction with the Jemez Canyon Dam evacuation project, the Corps has also been working with the Pueblo to address associated environmental concerns, including: Potential entrenchment of the Jemez River for 5.5 miles upstream from the dam, water and wind erosion of potential contaminants in exposed lake-bed sediments, problems with proper flood gate closure due to sediment, and revegetation of and removal of grazing from within the reservoir area. The Pueblo of Santa Ana will be formulating a land use plan for the reservoir area, and the Corps will assist the Pueblo in formulating and implementing their plans.

In March 2004, consultation with the Service was completed on the Jemez River Low-head Weir Project (Cons. #2-22-03-I-453). The Corps and the Pueblo of Santa Ana will construct a weir perpendicular to the Jemez River channel, approximately 2.5 miles upstream of Jemez Canyon Dam (U.S. Army Corps of Engineers 2003). The structure will consist of a series of four interlocked weirs across the Jemez River to arrest river channel incision and the resulting effects of lowering the water table in the Jemez Canyon Reservoir delta. The weir is expected to maintain or improve 390 acres of bosque habitat on Pueblo land. In addition, the Corps will create an earthen berm over a portion of the project. The borrow material for the berm will be taken from a site where 2.5 acres open water and emergent wetland will be developed to provide additional flycatcher habitat.

As a result of these projects, the Pueblo has collaborated with the Corps on projects that will restore approximately 360 acres of bosque habitat along the river, and 1,050 acres of riparian habitat in the dam pool. Not yet planned for restoration are the 2.9 river miles of the Jemez River between the Jemez Canyon Dam and the confluence with the Rio Grande. This area is comprised of approximately 160 acres of bosque/riparian area. Also, the Jemez River upstream of the weir project has not been restored to native composition (A. Oglesby, Santa Ana Pueblo, electronic mail message, April 1, 2004). This area measures approximately 1,440 acres;

however, because of the intermittent nature of the river, this habitat may contain a large upland component along with riparian habitats.

Rio Grande Corridor

Historically, the Rio Grande was a sinuous and braided river. As it migrated, it created ephemeral mosaics of riparian vegetation and wetland. The installation of flood control structures and reservoirs, the onset of widespread irrigated agriculture and livestock grazing, and the introduction of nonnative species have resulted in significant modification to the Rio Grande floodway, groundwater levels, and water quality.

Recent physical changes have occurred in the reach of the Rio Grande around the Pueblo. In 1973, Cochiti Dam was completed upstream of the Pueblo. While operations at Cochiti Dam ensure consistent flows, the flows are now generally clear, cool, and free of sediment. Downstream of Cochiti Dam, the river is narrowing and increasingly channelized. The downstream substrate is transforming to armored cobble. The alteration of flow and thermal regimes and the introduction of nonnative fishes and vegetation into this reach of the Rio Grande have resulted in severe reductions in the populations of silvery minnows and flycatchers (U.S. Fish and Wildlife Service 2003b).

Within the Pueblo, the river has been altered by channelization and dam and levee construction, resulting in its transformation from a wide, braided sand bed system to a single-channel, incised gravel bed system. Wetlands and large slackwater areas are generally no longer available for aquatic organisms. The cold, clear water releases from Cochiti Dam and the entrenched channel with a gravel bed have created an aquatic system that favors cool-water fishes and invertebrates, and limits warm water fisheries below the dam and downstream to Albuquerque, New Mexico. Consequently, the existing aquatic communities in the Santa Ana reach of the Rio Grande differ from those that occurred historically. Nonnative riparian species such as salt cedar, Russian olive, and Siberian elm have invaded the bosque and are out-competing native species such as willows and cottonwoods. In addition, the bosque within the Pueblo contains mainly single-aged stands of older cottonwoods and lacks the diversity of a healthy, multi-aged riparian forest. Past river management actions have reduced and altered the minnow habitat from historic conditions (U.S. Fish and Wildlife Service 2003b. The narrowing and deepening of the channel, lack of side channels and off-channel pools, and changes in natural flow regimes have all degraded spawning, nursery, feeding, resting, and refugia required for minnow survival and recovery (U.S. Fish and Wildlife Service 2003b). In addition, Angostura Diversion Dam, directly upstream of the Pueblo, blocks upstream silvery minnow migration and restricts redistribution. Cochiti Dam, approximately 25 miles upstream of the Pueblo, is also a barrier. Recent fish surveys demonstrate that habitat around and through the Pueblo's reach of the Rio Grande is poor for the silvery minnow. The coarser substrate, deeper channel, and higher velocities that occur in the incised channel downstream of the dams do not provide the conditions preferred by the silvery minnow.

In recent years, the Pueblo has initiated ecological restoration projects that have resulted in

significant improvements to the Rio Grande riparian and riverine ecosystems within the Pueblo. The objective of the restoration efforts at the Pueblo is to prevent further channel degradation in the Pueblo reach and maintain or improve current geomorphic and aquatic habitat characteristics to the degree possible given the existing regulated flow regime. The majority of these efforts have been conducted under a contract with the Bureau of Reclamation (Reclamation), authorized under the Indian Self-Determination and Education Assistance Act. ESA compliance for these activities was completed in section 7 consultations between Reclamation and the Service. Planned future restoration projects will be conducted under the authority granted to the Corps in Section 1135(b) of the Water Resource and Development Act of 1986. ESA compliance for these activities will be completed through section 7 consultations between the Corps and the Service. With the assistance of Reclamation, the Pueblo has completed significant habitat restoration along the upper two miles of the Rio Grande within its borders. The river channel was realigned, allowing portions of the former channel to be retained as backwater habitat. A gradient restoration facility (GRF) has been installed with a 500-foot long fish passage apron. A GRF is a sloping rock structure that provides vertical channel stabilization while maintaining fish passage. The hydraulic design objective of the GRF is to stabilize and enhance the Rio Grande channel within the Pueblo, encourage upstream aggradation, and allow free passage of the silvery minnow through the reach. Sustained swimming speeds, which vary with species and fish size, are often used in fish passage design; unfortunately, this information is not currently available for the silvery minnow. Because silvery minnows are known to pass through the Santa Ana reach of the Rio Grande, hydraulic data collected by Reclamation at three representative riffles were used as a basis for fish passage design. The GRF design criteria was established so that hydraulic conditions at the GRF would not present conditions that are less passable for silvery minnow than those observed at other existing riffles in the reach.

Other restoration work completed with the assistance of Reclamation included re-engineering the river channel and lowering adjacent river bars to widen the channel and encourage localized over-bank flooding. The Pueblo is now working with Reclamation to plant 45 acres of river bank, backwater areas, and floodplain zones with coyote willow, black willow and Rio Grande cottonwood. The Pueblo is currently working with the Corps on a restoration Project that will continue the efforts described above, along the remaining 4 miles of the Rio Grande within the Pueblo. With the assistance of the Corps, the Pueblo intends to install two additional GRFs. While the GRFs will stabilize the river channel upstream, the riverbed is expected to continue to degrade immediately below the downstream GRF. Therefore, the Corps and the Pueblo will also install a downstream bed sill, composed of gravel, well below the downstream GRF. This gravel sill will provide a transitional riffle between the stabilized river channel within the Pueblo reach and the degrading channel downstream of the Pueblo. The subsequent creation of low-velocity flows will create better habitat opportunities for the silvery minnow. Overbank flooding encouraged by this work and the concurrent creation of backwater habitat is anticipated to encourage a healthier riparian zone for flycatchers and other native wildlife.

In their Safe Harbor Agreement, the Pueblo states that with the cooperation of the Service, Reclamation, and the Bureau of Indian Affairs, the Pueblo has removed salt cedar and Russian olive from approximately 500 acres and restored native vegetation in much of the restored

floodplain area. The Pueblo will also continue to exclude all livestock from the riparian area. Without the completion and maintenance of the habitat restoration efforts described above, the Rio Grande and its riparian ecosystem within the Pueblo are expected to deteriorate to pre-restoration conditions. Future conditions without implementation of the Pueblo's restoration projects have been projected by the Corps to form a basis for comparison of restoration benefits. The Corps has completed a 50-year trends analysis that confirms that without the restoration efforts of the Pueblo and its Federal partners, the hydrology, geomorphology, and ecology of the Rio Grande in the Pueblo reach will deteriorate severely (U.S. Army Corps of Engineers 2002).

In summary, without river restoration efforts within the Santa Ana reach of the Rio Grande, the observed degradation would continue, resulting in a significantly deeper and narrower channel. The minimum channel elevation would drop an additional 6 feet throughout the reach (U.S. Army Corps of Engineers 2002). Entrenchment would effectively eliminate slackwater and overbank areas. The Corps has projected future hydraulic conditions for 50 years both without the installation of two additional GRFs and with the installation of the GRFs within the Pueblo reach (U.S. Army Corps of Engineers 2002). Because the GRFs are designed to accommodate fish passage, their installation would result in relatively small changes to the existing geomorphic conditions; however, the long-term benefits compared to the future without-project condition will be significant.

The Pueblo's restoration efforts will result in hydraulic changes in overbank areas (highflow side channels and point bars) that will provide additional preferable aquatic habitat following the installation of GRFs. The area of overbank inundation will increase moderately compared to existing conditions. Because the expected future condition without restoration efforts is a deep and narrow channel with little appreciable overbank areas, construction of GRFs represents a significant improvement in geomorphic and habitat characteristics.

Throughout the Middle Rio Grande Valley, the river, floodplain, and the associated fish and wildlife populations are expected to continue to experience adverse effects from new and ongoing Federal, State, and private water resource development projects. Additionally, increasing urbanization and development within the historic floodplain will continue to eliminate remnant riparian areas located outside the levees, putting increased pressure on the habitat and wildlife in the riparian zone within the floodway. As described above, without restoration efforts, the channel in the Santa Ana reach of the Rio Grande would become narrower and deeper, negatively affecting warm water fishes and reducing native aquatic habitat. Widespread extirpation of native fish species would continue, further altering the aquatic community. The lack of flooding in the riparian zone and a lowered water table would continue to restrict opportunities for wetland formation and maintenance, causing the remaining cottonwoods to die off, and replacement of native vegetation with nonnative vegetation, such as salt cedar and Russian olive, to increase. Suitable flycatcher habitat would continue to be reduced in quantity along the Rio Grande and Jemez River on the Pueblo. Lacking recruitment of native riparian habitat, mature cottonwood stands would die naturally of senescence. Without adequate cottonwood regeneration, bald eagle perch habitat would be eliminated from the Pueblo reach. Native fish and wildlife populations in the Santa Ana reach would continue to follow the same

decline as throughout the Middle Rio Grande valley. Without the effective implementation of recovery measures for the silvery minnow and flycatcher, existing habitat for these and other native species within the Pueblo would disappear almost entirely in the foreseeable future. In response to these concerns, on the Rio Grande, the Pueblo has collaborated with Reclamation and the Corps on projects that are predicted to restore approximately 5.6 river miles and approximately 1,400 acres of bosque habitat along the river (A. Oglesby, Santa Ana Pueblo, electronic mail message, April 1, 2004).

IV. Effects of the Action

The overall effects of this proposed 25-year Safe Harbor Agreement are expected to be beneficial, as the Agreement is designed to provide a net conservation benefit for the flycatcher, bald eagle and silvery minnow. The net conservation effect would occur through creating, restoring and/or enhancing habitat for these species. The restoration activities proposed by the Pueblo should directly or indirectly contribute to recovery of the flycatcher, bald eagle and silvery minnow. Adverse effects would likely result to all of the listed species described above from returning the environment back to its baseline condition at any time during the Agreement.

The vehicle for the Pueblo's Safe Harbor Agreement is their natural resource program that emphasizes the protection and development of the Pueblo natural environments to achieve the goals of the Endangered Species Act. In this Agreement, the Pueblo's existing ecosystem approach to natural resource conservation is complemented with measures that specifically address the needs of listed fish and wildlife species. The Pueblo would voluntarily undertake management activities that enhance, restore, or maintain habitat benefiting federally listed species. The management actions in this Agreement are expected to help conserve riparian forests, improve water quality, reestablish natural hydrologic processes, and control human interactions with fish and wildlife species. These activities would increase the likelihood that Pueblo lands are used by the flycatcher, bald eagle and silvery minnow.

The proposed Safe Harbor Agreement would cover the natural resource programs of the Santa Ana Pueblo, including ecosystem restoration, range and wildlife, and water resources, when they are conducted independently by the Pueblo. The Applicant's ecosystem restoration program proposes to help restore riparian, wetland, and riverine habitat within the boundaries of the Pueblo. Restoration activities include replacing nonnative plant species with native willow and cottonwood and restoring native wildlife habitat. The range and wildlife program proposes to improve the health of rangeland on the Santa Ana Pueblo by continuing to exclude livestock from some riparian areas, conducting fish and wildlife surveys, and developing fire management plans.

As described in the environmental baseline, the reach of the Rio Grande within the Pueblo has two large restoration projects underway in conjunction with Reclamation and the Corps that cover the 5.6 miles within the Pueblo. These restoration projects have been consulted on separately, and these areas are not included in this Agreement. Similarly, on the Jemez River,

there have been two large restoration projects conducted in conjunction with the Corps, and the areas of the Jemez River around the weir and within the reservoir pool have been consulted on separately and are not included in this Agreement. All four of these Federal project areas on the Rio Grande and the Jemez River may be enhanced by activities of the Pueblo's natural resource programs, such as by exclusion of livestock grazing and planting native riparian vegetation. However, due to the fact that all four of these project areas have a Federal nexus, such beneficial actions by the Pueblo would not be considered to be independent because they are part of the Federal projects. Therefore, these areas of the Rio Grande and the Jemez River are excluded from this Safe Harbor Agreement.

Two very large reaches of the Jemez River could be independently restored by the Pueblo: The 2.9 miles of the Jemez River from the Jemez Canyon Dam to the confluence with the Rio Grande, which comprises approximately 160 acres of bosque/riparian area, and the reach of the Jemez River on the Pueblo upstream from the 390 acres that is predicted to be restored around the weir project on the Jemez River. This area measures approximately 1,440 acres, and due to the intermittent nature of the river in this reach, it may contain a large upland component along with riparian habitats.

In this Agreement, the Pueblo would implement program activities through the divisions of its Department of Natural Resources. The Pueblo's independent conservation management activities include ecosystem restoration, range and wildlife, water resources and environmental education. The DNR's Ecosystem Restoration Division concentrates on the restoration of riparian, wetland, and riverine systems through eradication of nonnative plant species, bioengineering and restoration of native wildlife habitat, including habitat for the silvery minnow. Its current scope includes developing methods for bosque, wetland, and channel restoration along the Rio Grande and Jemez River within the boundaries of the Pueblo and implementing them. DNR's Range and Wildlife Division concentrates on improving the health of the Pueblo's rangeland. The Water Resources Division is responsible for surface water and groundwater projects and programs at the Pueblo. Activities currently being implemented and anticipated to continue focus on developing water quality standards, providing technical support for water rights establishment, conserving riparian areas, improving water quality, and reestablishing natural hydrologic processes. DNR's Community Outreach Program provides Pueblo members with environmental education about the Pueblo's natural resources. DNR also provides natural resource consultation to the Tribal Administration and Tribal Council. The Pueblo's DNR monitors and incorporates adaptive management principles into the voluntary conservation activities conducted by its natural resource management divisions.

This Safe Harbor Agreement is comprised of a program of possible beneficial activities, but without specific projects being proposed. Therefore, the likely benefits to the covered species will depend on the independent projects implemented under this Agreement, the details of which are not available for this biological opinion. In the two reaches of the Jemez River described above, potential beneficial, independent actions by the Pueblo may include: Maintaining perennial, flowing water in the Jemez River; creating backwaters and slack water habitats; removing exotic vegetation in conjunction with planting native riparian trees and shrubs,

maintaining or improving water quality, excluding livestock grazing to allow native vegetation to reach its potential height and density; and creating wetlands with willow and cottonwood tree components. In addition, the covered species would likely benefit from education programs that would enhance protection of these species and their habitats.

V. Cumulative Effects

Cumulative effects include the effects of future State, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section, because they require separate consultation following section 7 of the Act.

Other than those aspects of the present project delineated in the Agreement, there are no present and future projects, authorized or under review, that are expected to contribute to any cumulative losses to the above listed species or their habitats.

VI. Conclusion

After reviewing the current status of the flycatcher, bald eagle, and silvery minnow, the environmental baseline for the action area, the effects of the proposed issuance of a section 10(a)(1)(A) Safe Harbor Enhancement of Survival Permit on The Pueblo of Santa Ana, and cumulative effects, it is the Service's biological opinion that this action, as proposed, is not likely to jeopardize the continued existence of these species. No critical habitat is currently designated for the flycatcher and bald eagle, therefore, none will be affected. No critical habitat for the silvery minnow was designated on Pueblo of Santa Ana lands; thus, no destruction or adverse modification of critical habitat is anticipated.

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, or to attempt to engage in any such conduct. 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 include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the 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 taking under the Act,

provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Amount or Extent of Take

We have developed the following incidental take statement based on the premise that the Agreement would be implemented in its entirety. We analyzed incidental take that could theoretically occur during two different phases of this Agreement, both from: 1) Implementing projects within the Pueblo's covered lands during the 25-year duration of the Agreement, and 2) returning covered lands to baseline conditions. With regard to the first category of incidental take, that occurring during implementation of a project or projects, we do not anticipate any incidental take to result from this cause. As described in the proposed action, the Pueblo has incorporated protective measures as standard operating procedures for any actions they implement to help avoid the potential for projects to adversely impact the covered species. Therefore, no incidental take is anticipated to occur from implementation of any projects covered by this Agreement. If any projects implemented during this Agreement are anticipated to cause incidental take, the Pueblo will contact the Service for further assistance prior to implementation of the project. The remainder of this incidental take statement refers to the second category of incidental take, that resulting from the Pueblo returning covered lands to baseline conditions.

Southwestern Willow Flycatcher

For the purposes of this Agreement and the associated Permit, the baseline condition for the flycatcher was determined based upon formal surveys documenting that currently no breeding flycatchers (i.e., no territories) are within the covered lands. However, migrant flycatchers have been documented within the covered lands, indicating that the flycatcher habitat is suitable and used seasonally. For these reasons, the baseline condition for breeding territories is zero, whereas the baseline condition for seasonal use is up to four migrant flycatchers. This baseline condition indicates that the flycatcher habitat within the covered lands is suitable for use seasonally by flycatchers. The Pueblo will maintain this baseline condition on covered lands throughout the term of this Agreement.

On the lower Jemez River, from the dam to the confluence, it is anticipated that this area could potentially support a group of flycatcher nesting pairs after the area has been restored and protected and water supplied throughout the breeding season from April through August each year. The size of these colonies varies widely across the range of the subspecies, but approximately eight to twelve pairs have been recorded in other groups on the Rio Grande. On the upper Jemez River, water flow is intermittent, but there are opportunities for restoring wetlands and river banks. It is anticipated that up to four pairs could occupy restored or constructed wetlands in the upper portions of the Jemez River. Therefore, if both of these areas are restored independently by the Pueblo, incidental take in the form of harm or harassment is authorized for up to 16 pairs of flycatchers and their offspring over the 25-year duration of this Agreement. Five-visit surveys will be required prior to removal of any flycatcher habitat. This incidental take statement can be amended, if the number of flycatchers occupying the covered

lands is higher than anticipated. This incidental take statement only applies to projects that are carried out independently by the Pueblo.

Bald Eagle

For the purposes of this Agreement and the associated Permit, the baseline condition for the bald eagle was determined based upon wintering bald eagles that have been consistently documented within the covered lands. This baseline indicates that bald eagle habitat within the covered lands is suitable and is used by one or more wintering bald eagles. The Pueblo will maintain this baseline condition throughout the term of this Agreement.

It is anticipated that up to four bald eagles could occupy the lower Jemez River and up to two bald eagles could occupy restored or constructed wetlands in the upper portions of the Jemez River. Therefore, if this entire area is restored independently by the Pueblo, incidental take in the form of harassment is authorized for up to 6 bald eagles over the 25-year duration of this Agreement. A survey will be required prior to removal of any bald eagle habitat, and this incidental take statement can be amended, if the number of wintering bald eagles roosting on covered lands is higher than anticipated. This incidental take statement only applies to projects that are carried out independently by the Pueblo.

The Service will not refer the incidental take of any bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. § 703-712), or the Bald and Golden Eagle Protection Act of 1918, as amended (16 U.S.C. § 668-668d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

Rio Grande Silvery Minnow

The silvery minnow data collected since 1995 are variable, but are useful to demonstrate that silvery minnows occupy the Pueblo. For purposes of this Agreement and the associated Permit, the baseline condition for the silvery minnow was determined based on the presence of the species currently occupying the covered lands. For this reason, the baseline condition is one silvery minnow, which indicates that the Pueblo reach of the Rio Grande and Jemez River is occupied. The Pueblo will maintain this condition throughout the term of this Agreement.

Due to the programmatic nature of this Safe Harbor Agreement and the variable and cryptic nature of silvery minnow presence in the wild, it is difficult to anticipate an exact number of silvery minnows that would be expected to occupy habitats created independently by the Pueblo. Therefore, if any such projects are going to be removed in the future, the Pueblo shall determine the number of silvery minnows occupying the habitat by conducting four sampling efforts during the year prior to removing the project. Two of these samples will be taken in July and October of the year in which the habitat would be affected. The timing of the remaining sampling efforts will be determined in conjunction with the Service. After the samples are completed, the Pueblo and the Service will determine the number of silvery minnows anticipated to be taken by the project, and this Agreement will be amended with the number determined to be removed and

relocated at that time. This incidental take statement does not authorize take of any silvery minnows occupying Federal project areas on the Pueblo.

The net impact of the potential incidental take authorized under this Agreement is, at worst, a return to the baseline level of silvery minnows occupying the Pueblo reach of the Jemez River. However, the voluntary conservation activities undertaken as part of this Agreement will likely increase the numbers of silvery minnows and the total area of suitable, actively managed silvery minnow habitat in the Rio Grande and Jemez River.

This is the total level of take anticipated for the proposed actions as described in the Description of Proposed Action section of this opinion. Absent written agreement to the contrary or waiver, the Pueblo shall notify the Service at least 60 days in advance of when they expect to carry out an activity that is likely to result in the taking of a listed covered species to provide the Service with an opportunity to rescue affected individuals of such species, if possible and appropriate. Such notification shall be provided to:

Field Supervisor
U. S. Fish and Wildlife Service
New Mexico Ecological Services Field Office
2105 Osuna, N.E.
Albuquerque, New Mexico 87113
Phone: 505/346-2525

Effect of the Take

In the accompanying biological opinion, the Service determined that these levels of anticipated take are not likely to result in jeopardy to any of the above species affected by the Agreement or destruction or adverse modification of any critical habitat associated with any of these species.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize or avoid impacts of incidental take to the flycatcher, bald eagle, and silvery minnow:

1.0 The Service shall require that the applicant comply with and implement the issued section 10(a)(1)(A) Enhancement of Survival permit.

Terms and conditions

In order to be exempt from the prohibitions of section 9 of the Act, the following non-discretionary terms and conditions, which implement the reasonable and prudent measures described above, must be complied with:

1.1 Within nine months of signing this Agreement, the Service shall develop and make available to the Pueblo a seminar course on survey protocol, handling and preservation of voucher specimens for the silvery minnow.

1.2 The Service shall require that the authorization granted by the section 10(a)(1)(A) permit is subject to full and complete compliance with, and implementation of, the Agreement for the Pueblo of Santa Ana and all specific conditions contained in the permit.

1.3 Reporting requirements will be consistent with the July 13, 2001, A Confidential and Proprietary Information Agreement Between the Pueblo of Santa Ana and the United States Fish and Wildlife Service, and the July 14, 2001, Pueblo of Santa Ana and the U.S. Fish and Wildlife Service, Region 2 Protocol for Information Management.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize or avoid the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We recommend the following:

The Service should seek to participate with the Pueblo of Santa Ana, as appropriate, to implement adaptive management procedures to regularly assess and improve attainment of the restoration goals of the Agreement.

The Service should seek to amend the Agreement to include any species that become listed during its duration, as appropriate.

In order for the NMESFO to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the NMESFO requests notification of the implementation of any conservation recommendations.

Reinitiation Notice

This concludes formal (intra-Service) consultation on the actions outlined in the request. 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.

We appreciate your continued coordination and support for the recovery of the silvery minnow, flycatcher and bald eagle and your concern for our natural resources. In future communications regarding this consultation, please refer to consultation #2-22-04-F-369. If you have any comments or questions about this opinion, please contact Dr. Patricia Zenone at the letterhead address or at (505) 761-4718.

Field Supervisor _____ Date _____

Regional Director _____ Date _____

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry and Resources Conservation Division, Santa Fe, New Mexico
Assistant Regional Director for Ecological Services, U. S. Fish and Wildlife Service, Albuquerque, New Mexico
Regional Safe Harbor Agreement Coordinator, U. S. Fish and Wildlife Service, Albuquerque, New Mexico
Regional Section 7 Coordinator, U. S. Fish and Wildlife Service, Albuquerque, New Mexico

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APPENDIX

Table 1. Agency actions that have undergone formal section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide.

Action (County)	Year	Federal Agency[1]	Incidental Take Anticipated
Arizona			
Apache Maid Allotment (Yavapai, Coconino)	1995	USFS	None
Tuzigoot Bridge (Yavapai)	1995	NPS	Take of 1 WIFL each year the site is occupied
Windmill Allotment (Yavapai)	1995	USFS	Take of 1 WIFL nest annually for 2 years due to parasitism
Solomon Bridge (Graham)	1995	FHWA	Take of 2 territories
Tonto Creek Riparian Unit (Maricopa)	1995	USFS	Take unquantifiable. Take as a result of parasitism, disturbance, modification of nesting habitat, loss of nesting sites.
Eastern Roosevelt Lake Watershed Allotment (Maricopa)	1995	USFS	Take unquantifiable. Take as a result of parasitism, disturbance, modification of nesting habitat, loss of nesting sites.
Cienega Creek (Pima)	1996	BLM	Take of 1 WIFL nest annually by cowbird parasitism
Glen Canyon Spike Flow (Coconino)	1996	USBR	Take unquantifiable. Take of WIFL habitat, loss of riparian understory habitat
Verde Valley Ranch Development (Yavapai)	1996*	Corps	Take of 2 flycatcher territories
Modified Roosevelt Dam (Gila, Maricopa)	1996*	USBR	Take of 45 territories through habitat removal; take of 90 birds via reduced productivity/ survivorship.
Lower Colorado River Operations and	1997*	USBR	Take unquantifiable. Take as a result of

Maintenance - Lake Mead to Southerly International Border - AZ/CA/NV (Mohave, La Paz, Yuma)			riparian habitat loss and degradation, inundation, reduced productivity and survivorship, nest loss/abandonment, parasitism, recreation, fire, predation.
Blue River Road (Greenlee)	1997	USFS	Take unquantifiable. Take of WIFL habitat, feeding, sheltering, increased rates of mortality, starvation, predation.
Skeleton Ridge - Cedar Bench Allotments (Yavapai)	1997	USFS	Take unquantifiable. Take of WIFL habitat.
White Canyon Fire – Emergency Consultation (Pinal)	1997	BLM	Take of 4 WIFL pairs from harassment
U.S. Hwy 93 Wickenburg (Mohave,Yavapai)	1997	FHWA	Harassment of 6 birds in 3 territories and 1 bird killed/decade
Safford District Grazing Allotments (Greenlee, Graham, Pinal, Cochise & Pima)	1997	BLM	Take unquantifiable. Take as a result of parasitism, disturbance, modification of nesting habitat, loss of nesting sites.
Lower Gila Resource Plan Amend. (Maricopa, Yavapai, Pima, Pinal, La Paz, Yuma)	1997	BLM	Take unquantifiable. Take of WIFL habitat. through loss of cottonwood and willow seedlings, bark stripping, and trailing.
Storm Water Permit for Verde Valley Ranch (Yavapai)	1997	EPA	Take unquantifiable. Take in the form of degraded watershed and riparian WIFL habitat, and loss of WIFL habitat due to groundwater pumping and polluntants.
Gila River Transmission Structures (Graham)	1997	AZ Electric Power Coop. Inc.	Take from harassment or harm due to habitat modification, reduced productivity, disturbance, parasitism.
Land and Resource Management Plans for the 11 National Forests and National	1997	USFS	None

Grasslands of the Southwestern Region of the U.S. Forest Service (Various AZ and NM)			
Phoenix Resource Management Plan (Apache, Navajo, Gila, Maricopa, Pinal, Pima, Santa Cruz, Yavapai)	1998	BLM	None
Yuma Resource Management Plan (Yuma, La Paz, Mohave)	1998	BLM	None
Arizona Strip Resource Mgmt Plan Amendment (Mohave)	1998	BLM	Take of 1 nesting attempt every 3 years. Take through parasitism, habitat loss from fire, recreation, development
CAP Water Transfer Cottonwood/Camp Verde (Yavapai, Maricopa)	1998	USBR	Take unquantifiable. Take through parasitism, disturbance, modification of nesting habitat, loss of nesting sites
Cienega Creek Stream Restoration Project (Pima)	1998	BLM	Take of 1 WIFL through harrassment
Kearny Wastewater Treatment (Pinal)	1998	FEMA	Take unquantifiable. Take through WIFL habitat loss, modification, harassment
Bridge Fire, San Pedro National Conservation Area, Emergency Consultation (Cochise)	1998	BLM	None
SR 260 Cottonwood to Camp Verde (Yavapai)	1999	FHWA	Take unquantifiable. Take as a result of harm, injury, and death as a result of the loss of nesting sites, disturbance, modification of habitat, reduced productivity and survivorship, parasitism, and collision with vehicles.

Reintroduction of Beaver into the San Pedro NCA (Cochise)	1999	BLM	Take of 1 WIFL nest every 5 years due to beaver, and 1 WIFL nest every 5 years due to flooding increased predation/parasitism
Fort Huachuca Programatic (Cochise)	1999	DOD	None
Alamo Dam Reoperation (LaPaz, Mohave)	1999	ACOE	Take of a WIFL nest with 2 eggs/fledglings every 20 years due to inundation.
Duncan HWY 75 Bridge over Gila River (Greenlee)	2000	FHWA	None
Red Creek Grazing Allotment (Gila)	2000	USFS	None
Lower Colorado River, Interim Surplus Criteria Criteria/4.4 Plan (Mohave, La Paz, Yuma)	2001	USBR	Take of 372 acres of flycatcher habitat
Mingus Ave Extension, Bridge over Verde River (Yavapai)	2001	ACOE	Take of 3.34 acres of flycatcher habitat
Pleasant Valley Grazing Allotment, Apache (Greenlee)	2001	USFS	None
Peck Canyon Scour HWY I-19 protection (Santa Cruz)	2001	Corps	None
The Homestead at Camp Verde Development (Yavapai)	2001	EPA	None
25 grazing allotments on Tonto National Forest (Various)	2002	USFS	None
Eagle Creek watershed grazing allotments -	2002	USFS	None

Tule, Mud Springs, Double Circle, East Eagle, Baseline - Horse Spring and Dark Canyon (Greenlee)			
Dos Pobres -San Juan project (Graham)	2002	BLM	None
Re-initiation of Lower Colorado River Operations and Maintenance - Lake Mead to Southerly International Border - AZ/CA/NV (Mohave, La Paz, Yuma)	2002	USBR	None
Re-initiation of Fort Huachuca Programmatic (Cochise)	2002	DOD	None
Las Cienagas NCA RMP (Pima and Santa Cruz)	2002	BLM	Harassment of 6 flycatchers due to maintenance of road and trail crossings, recreational use, livestock management actions, fence maintenance and mortality of 1 due to increased cowbird parasitism
Lake Mead NRA Management Plan (Mohave County, AZ and Clark County NV)	2002	NPS	harassment to nesting and migrating birds due to recreationists. Harm as result of the loss of >5% of occupied/suitable habitat as a result of recreational activities (fire, etc.)
Issuance of Section 10 permit for Operation of Roosevelt Dam at Roosevelt Lake HCP (Gila, Maricopa)	2003	USFWS/SRP	take of up to 1,250 acres of occupied habitat in a single year 2-3 times over a 50-year period. Loss of nesting habitat, nestlings and eggs due to habitat modification
Livestock grazing on 18	2003	BLM	harm, harassment,

allotments along the Middle Gila River Ecosystem			injury and/or death resulting in degradation of 5 territories, greater than 10 percent parasitism, harassment of 5 pairs due to livestock management activities.
Issuance of permit for Safe Harbors Agreement for 60 acres at EC Ranch (Apache County)	2003	USFWS/J.W. Crosswhite	baseline is 0, ability to take all flycatchers at end of 50 year agreement by removing habitat
Re-initiation of U.S. Hwy 93 (Mohave,Yavapai)	2003	FHWA	harassment and harm of 2 pairs of flycatcher through reduced productivity and survivorship as a result of permanent loss of nesting habitat, 2 birds killed or injured per decade to collision, and harassment and harm from increased predation and parasitism as a result of habitat modification, fragmentation
California			
Prado Basin (Riverside/San Bernardino)	1994	Corps	None
Orange County Water District (Orange)	1995	Corps	None
Temescal Wash Bridge (Riverside)	1995	Corps	Take of 2 flycatchers
Camp Pendleton (San Diego)	1995	DOD	Take 4 flycatcher territories
Lake Isabella Operations 1996 (Kern)	1996	Corps	Inundation 700 acres critical habitat; reduced productivity 14 pairs
Lake Isabella Long-Term Operations (Kern)	1997	Corps	Annual inundation of 1,100 ac critical habitat
H.G. Fenton Sand Mine and Levee near Pala on the San Luis Rey River (San Diego)	1997	Corps	None
Re-initiation of Lake Isabella Dam Operation	2000	Corps	inundation of 1,100 ac critical habitat and

(Kern)			reduced survival and productivity of all nesting pairs and young
Questar' s southern trails pipeline, CA, AZ, UT			
(various)	2000	FERC	?
Mill Creek Diversion, Prado Basin (Riverside)	2000	Corps	None
Level 3 long haul fiber optic network, San Diego CA to CA/AZ state line			
(San Diego, Imperial)	2000	BLM	?
Land and Resource Plans for 4 southern CA National Forests	2001	USFS	Take as described in 1-6-99-F-21, riparian species biological opinion
San Timoteo Creek Reach 3B Flood Control Project (San Bernardino)	2001	Corps	Take of 1 pair of flycatchers and 16.2 ac of flycatcher habitat
CA FDA 5-year permit for malathion use (Imperial, Riverside)	2001	BLM	2 flycatchers
Prado mainstem and Santa Ana River flood control and Norco Bluffs stabilization project (Orange, Riverside, San Bernardino)	2001	Corps	None
Four grazing allotments on San Bernardino NF (San Bernardino)	2001	USFS	None
Cleveland NF grazing program (Orange, Riverside, San Diego)	2001	USFS	Two parasitized nests/year. Take through parasitism, nest abandonment, loss of eggs/young, degradation of nesting habitat
Highway 71 widening amendment (Riverside)	2002	FHWA	None
Colorado			
AB Lateral - Hydroelectric - Hydropower Facility, Gunnison River to Uncompahgre River (Montrose)	1996	USBR	None

TransColorado Gas Transmission Line Project (Meeker, Colorado to Bloomfield, New Mexico)	1998	BLM	None
Pagosa Area Water and Sanitation District Water Intake (Archuleta County)	2000	Corps	1 pair of flycatchers
US Highway 160/County Road 501 widening -realignment, Bayfield (La Plata County)	2001	FHWA	2 pairs of flycatchers
Archuleta County Rd 119 widening/realignment, Pagosa Springs (Archuleta County)	2001	Corps	1 pair of flycatchers
Los Pinos Bridge replacement (La Plata County)	2003	FHWA	harm to 1 pair of flycatchers due to loss/deterioration of habitat
Nevada			
Gold Properties Resort (Clark)	1995	BIA	Take of 1 flycatcher from habitat loss
Las Vegas Wash, Pabco Road Erosion Control Structure	1998	Corps	Take of 2-3 pairs of flycatchers
Clark County Multiple Species Habitat Conservation Plan	2000	USFWS	Conditional upon actions not yet completed by Clark County
Crystal Springs Exotic Vegetation Removal Project (Lincoln County)	2002	USFWS	Take of 1 pair of flycatchers due to habitat loss
New Mexico			
Corrales Unit, Rio Grande (Bernalillo)	1995	Corps	None
Rio Puerco Resource Area (Various)	1997	BLM	None
Taos Resource Area (Various)	1997	BLM	1 pair of flycatchers
Caballo Resource Area (Various)	1997	BLM	None
Farmington District Resource Management Plan (Various)	1997*	BLM	None
Mimbres Resource	1997*	BLM	1 pair of flycatchers

Area Management Plan (Various)			
Discretionary actions related to water management on the Middle Rio Grande River (various)	2001*	USBR/Corps	None
Issuance of permit for Safe Harbor Agreement for 309 acres at Spur Ranch (Catron County)	2002	USFWS/Paterson	Baseline is 0, ability to take up to 12 adult flycatchers and offspring by intensive grazing or timber harvest at end of Agreement
Discretionary actions related to water management on the Middle Rio Grande River (various)	2003*	USBR/Corps	Take of up to 15 territories, including adults and offspring, over 10 years by dewatering habitat

BIA = Bureau of Indian Affairs; BLM = Bureau of Land Management; Corps = Army Corps of Engineers; DOD = Dept. of Defense; EPA = Environmental Protection Agency; FEMA = Federal Emergency Management Agency; FHWA = Federal Highway Administration; NF = National Forest; NPS = National Park Service; USBR = U.S. Bureau of Reclamation; USFS = U.S. Forest Service; WAPA =Western Area Power Administration.

* Jeopardy opinions.