

ENVIRONMENTAL ASSESSMENT FOR
ESTABLISHING ADDITIONAL POPULATIONS OF
THE FEDERALLY ENDANGERED MOHAVE TUI CHUB
IN THE MOJAVE DESERT,
KERN, LOS ANGELES, AND SAN BERNARDINO COUNTIES,
CALIFORNIA

LEAD AGENCY:

U.S. FISH AND WILDLIFE SERVICE, VENTURA FISH AND WILDLIFE OFFICE

COOPERATING AGENCIES:

BUREAU OF LAND MANAGEMENT, CALIFORNIA STATE OFFICE

CHINA LAKE NAVAL AIR WEAPONS STATION

EDWARDS AIR FORCE BASE

MOJAVE NATIONAL PRESERVE

SAN BERNARDINO NATIONAL FOREST

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EXECUTIVE SUMMARY

The U.S. Fish and Wildlife Service and cooperating agencies (Agencies) propose to establish additional populations of the federally endangered Mohave tui chub (*Siphateles bicolor mohavensis*) in the Mojave River watershed and the California portion of the Mojave Desert. This is the general historic distribution of the species. Establishing additional populations would contribute to the conservation of the Mohave tui chub. It is also the primary criterion identified in the *Recovery Plan for the Mohave Tui Chub* (USFWS 1984) to downlist the Mohave tui chub to threatened. The Agencies have identified locations where these populations could be established that are described and analyzed in the EA. However, there may be additional locations where populations could be established or may not currently meet the criteria for ensuring the long-term viability of populations of Mohave tui chubs but would in the future. Therefore, this document also describes and analyzes impacts to generic locations. If any additional specific locations meet the descriptions and analysis of generic locations in this environmental assessment, those locations for establishing additional populations of Mohave tui chubs would be covered by this environmental assessment. Consequently, this EA is both a specific and generic NEPA document.

There are four alternatives: Alternative A - No action, Alternative B - establishing populations at existing aquatic habitats, Alternative C - establishing populations at newly created/modified aquatic habitats, and Alternative D - establishing populations at existing and newly created/modified aquatic habitats. Potential locations for establishing populations of Mohave tui chubs include: Morning Star Mine Pond, Coxey Pond, Victor Valley College Pond, Deep Creek, Holcomb Creek, Edwards Air Force Base's Golf Course Pond and Piute Ponds, and creating new aquatic habitat at Camp Cady and Victor Valley College/Mojave River Fish Hatchery..

New populations would only be established on lands with the invitation of the landowner/land management agency. Several criteria would be used to screen locations to ensure the likelihood that the additional populations would be viable and would result in no impacts to minimal impacts to endemic natural and cultural resources and other resource issues at the selected sites. One of these is the landowner/land management agency would invite the Agencies to establish a Mohave tui chub population on their property. Measures would be implemented to ensure the health of the Mohave tui chubs during capture, transport, and release and to ensure that nonnative species are not transported during this process.

The preferred alternative is Alternative D. This alternative provides the greatest level of flexibility in identifying suitable locations that meet the physical, chemical, and ecological needs of the Mohave tui chub while also providing flexibility to avoid or minimize impacts to the human environment.

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CHAPTER 1. NEED FOR THE PROPOSAL

BACKGROUND

The United States Fish and Wildlife Service's (USFWS's) major responsibilities are to manage the Nation's public resources, which include endangered and threatened species, migratory birds, and anadromous fishes (fish that breed in freshwater but spend their adult life in saltwater). Through the Endangered Species Act of 1973, as amended (16 U.S.C. 153 et seq.)(ESA), Congress directed the USFWS and other Federal agencies to work with other Federal, state and local agencies, and private citizens to recover and conserve species listed under the ESA so they may be removed from the list. The purpose of the ESA is to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved. The ESA's goal is to ensure that listed species, and the ecosystems upon which they depend, are managed and conserved so the species are conserved for the long term and no longer require the protections of the ESA.

The Mohave tui chub (*Siphateles bicolor mohavensis*) was once found extensively in the Mojave River and its tributaries in southern California. It is the only native fish known to the Mojave River drainage system (Hubbs and Miller, 1943). Pure strains of these chubs steadily declined since about 1938 with the introduction of the non-native species of coastal California arroyo chub (*Gila orcutti*).

The Mohave tui chub had been eliminated in the Mojave River proper by 1969 (Miller 1969). Habitat modifications, including damming the headwaters and withdrawals of the river's underflow, were major causes for the decline of the species along with the introduction of non-native fish species. Because of these threats and others, the USFWS and the California Department of Fish and Game (CDFG) listed the Mohave tui chub as endangered in 1970 and 1971, respectively.

Currently there are four known genetically pure Mohave tui chub populations: Lark Seep, China Lake Naval Air Weapons Station (NAWS) near Ridgecrest (Department of the Navy); Desert Studies Center, Zzyzx, near Soda Springs (Mojave National Preserve); Camp Cady, east of Barstow (CDFG); and the Lewis Center for Educational Research, Apple Valley (Figure 1-1). All of these sites are isolated populations in manmade habitats in the Mojave Desert of California.

In 1984, the USFWS issued a *Recovery Plan for the Mohave Tui Chub* (Recovery Plan) that provided criteria to downlist the species to threatened and delist (removed from the list of threatened and endangered species under the ESA). The downlisting criteria included establishing six self-sustaining populations of greater than 500 Mohave tui chubs, in good or excellent quality habitat, throughout the Mojave Desert basin, with various cooperating agencies and individuals (i.e., Department of Defense, National Park Service, etc.). Delisting criteria include establishing viable populations of the Mohave tui chub in the Mojave River. These populations must have demonstrated that they experienced a flood event and persisted. The ultimate goal of the Recovery Plan is to delist or remove the Mohave tui chub from the list of

endangered and threatened species by assuring that the species and its ecosystem are self-sustaining.

The purpose and need of this environmental assessment (EA) is to present and analyze a proposed action to establish additional populations of the endangered Mohave tui chub in the former range of the species in the Mojave Desert. In the past, the Mojave River Basin included Harper Lake, Lake Manix and its subbasins (Coyote Lake, Troy Lake, Cronese Lakes), and Lake Mojave (Soda Lake and Silver Lake) (Enzel et al. 2003). The USFWS believes that by establishing additional populations of the Mohave tui chub and meeting other criteria, the species can be downlisted to threatened (USFWS 1984). This position is based on the best information currently available and includes consultation with species experts and relevant resource and land management agencies. Increased numbers and various locations of Mohave tui chub populations would minimize the likelihood of loss of most or all of the populations from stochastic events and climate change thereby ensuring the long-term conservation of the species.

We have identified some locations where these populations could be established and these are described in the EA (Figure 1-1) and site specific analysis is presented. However, there may be additional locations where populations could be established in the future that we are unaware of or may not currently meet the criteria for ensuring the long-term viability of populations of Mohave tui chubs but would in the future. Therefore, this document also contains generic analysis of impacts. If any future locations in the project area that are not identified in this document meet the descriptions and analysis in the generic analysis of this environmental assessment, those locations for establishing additional populations of Mohave tui chubs would be covered by this environmental assessment.

We have included a generic approach in this environmental assessment because this document does not identify all the locations where we may propose to establish additional populations of the Mohave tui chub now or in the future. We do not know all possible locations where additional populations of Mohave tui chubs could be established presently and additional locations may become available in the future. Rather, the approach is to identify an area where additional populations of Mohave tui chubs may be established now and in the future, and analyze the environmental consequences for those likely (i.e., a generic analysis). As each site and associated activities are considered, they will be compared to the analysis in this EA. If the proposed site and associated activities have been adequately described and analyzed in the EA, then establishing the population of Mohave tui chubs would move forward and require no additional NEPA compliance. If the proposed site and activities were not adequately described and analyzed in this EA, additional NEPA compliance would be conducted prior to establishing the additional population site.

RELEVANT LAWS, REGULATIONS, POLICIES, AND OTHER PLANNING DOCUMENTS

This Environmental Assessment (EA) has been prepared in compliance with

- National Environmental Policy Act (NEPA);
- the President's Council for Environmental Quality (CEQ) Regulations, 40 Code of Federal Regulations (CFR) Sections 1500–1508;

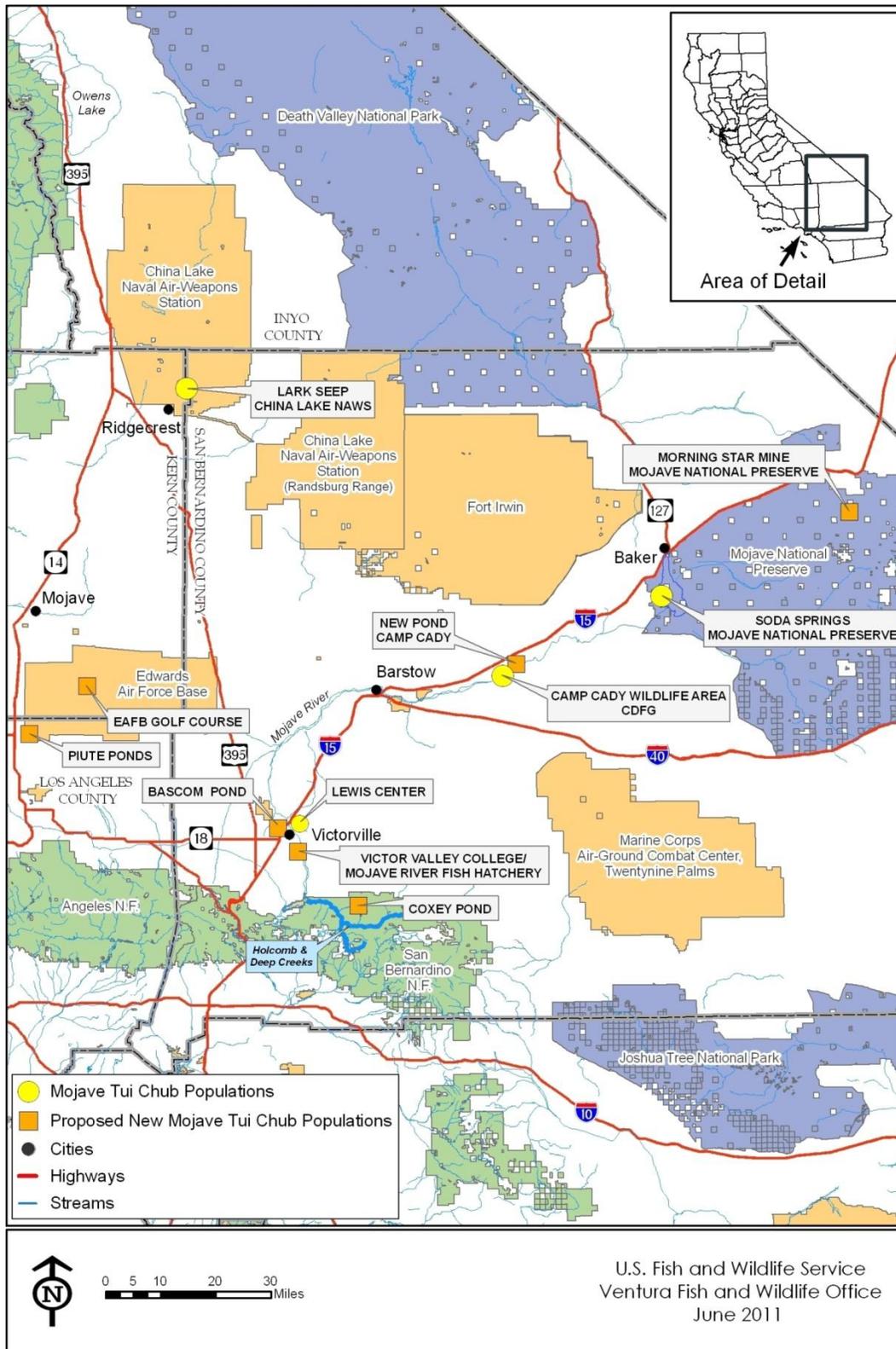


Figure 1-1. Current locations of Mohave tui chub populations and some identified locations for establishing additional populations

- Department of the Interior's Departmental Manual (DM) for NEPA compliance (516 DM 6, 30 AM 2-3);
- U.S. Fish and Wildlife Service's (USFWS) directive manual 550 FW 1-3 and 505 FW 1-5;
- National Park Service's Handbook and Director's Order DO-12;
- Bureau of Land Management's (BLM) NEPA Handbook H-1790-1;
- U.S. Forest Service's Regulations for National Environmental Policy Act Compliance, Title 36 Code of Federal Regulations (CFR) Part 220; and
- Department of Defense requirements including 32 CFR 989 (Air Force), and 32 CFR 775 (SECNAV Instruction 5090.6).

U.S. Fish and Wildlife Service Policies and Planning Documents

The Recovery Plan identified criteria to downlist the Mohave tui chub. One of the criteria is to establish a minimum of six self-sustaining populations in secured areas for a minimum of 5 years. To meet the minimum six population requirement, we need at least two additional populations, although more would be preferable. The size of the habitat for the existing four populations is small, most are less than 1 acre, and the likelihood of a population being extirpated by a local event is high. All Federal agencies have a mandate to support recovery activities under both the ESA and NEPA.

- ESA Sec. 2 (C) (1) It is further declared to be the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act.
- ESA Sec. 2 (C) (2) It is further declared to be the policy of Congress that Federal agencies shall cooperate with State and local agencies to resolve water resource issues in concert with conservation of endangered species.
- ESA Sec. 7 (a)(1) The Secretary shall review other programs administered by him and utilize such programs in furtherance of the purposes of this Act. All other Federal agencies shall, in consultation with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of this Act.
- ESA Sec. 10 (a)(1)(A) The Secretary may permit, under such terms and conditions as he shall prescribe any act otherwise prohibited by section 9 for scientific purposes or to enhance the propagation or survival of the affected species.
- NEPA Section 101 states that "...it is the continuing responsibility of the Federal Government to ... (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice; (5) achieve a balance between population and resource use which will permit high standards of living

and a wide sharing of life's amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources."

The Recovery Plan provides the recovery criteria and recovery tasks, which when fully implemented, would result in conservation and recovery of the species. To downlist the Mohave tui chub from endangered to threatened, the Recovery Plan recommends that six populations need to be established, with a minimum population size of 500 healthy fish at each location. These populations should be located adjacent to the Mojave River to be within or along the historical habitat of the Mohave tui chub. All six populations need to remain free of any threats to their integrity for 5 consecutive years and the populations should have been exposed to and survived a flood before reclassifying to threatened.

To delist the Mohave tui chub, the subspecies must be successfully re-established in a majority of its historical habitat in the Mojave River. Re-establishment means that the populations of Mohave tui chub are viable. Specific tasks to achieve delisting were not presented in the Recovery Plan but are to be developed pending evaluation of results on experimental reintroductions.

CHAPTER 2. PROPOSED ACTION AND ALTERNATIVES

INTRODUCTION

The proposed action describes what we desire to accomplish. The action alternatives describe different ways to accomplish the proposed action. We include a no-action or status quo alternative to use as a baseline point for comparison with the action alternatives.

PROPOSED ACTION

The proposed action is to establish and maintain additional populations of Mohave tui chubs in suitable habitat that would be self-sustaining. This proposed action would be implemented in the Mojave Desert in California (the Mojave River drainage basin and isolated man-made waters in the Mojave Desert in California), and would support the goal in the Recovery Plan to conserve the Mohave tui chub and meet one of the criteria for downlisting from endangered to threatened. Establishing additional populations of Mohave tui chubs within the Mojave Desert in California would minimize considerably the risks of the species' extinction because it would be less likely that any random, catastrophic events (e.g., floods), or other threats (e.g., predation, disease, etc.), would affect equally and simultaneously any current spatially segregated populations. The new locations would be within the former range of the Mohave tui chub, that is, the Mojave River basin, and now isolated waters in the Mojave Desert in California.

Capture of Mohave Tui Chubs

We, in coordination and cooperation with other entities, propose to capture, transport, and release a minimum of 500 small Mohave tui chubs between 61 and 101 millimeters (mm) at additional locations to establish additional populations of the species. Mohave tui chubs would be captured from existing populations that represent the diversity in the gene pool of the species. Thus, fish may be captured from one or more populations to assure genetic diversity. We would transport them to aquatic habitats. Typically, Mohave tui chubs are captured and transported in the following manner. Mohave tui chubs are trapped using funnel (minnow) traps or similar traps. Clean, dry traps are placed in the water in the late afternoon or evening and removed the following morning. All Mohave tui chubs from each trap are carefully removed and placed in a bucket with fresh water from the source population. The fish are carried to a nearby processing station (e.g., shaded portable table) where they are measured and their health assessed. The Mohave tui chubs that qualify for transport to the receiving site are placed in a holding tank for transport. The other Mohave tui chubs are released at their point of capture.

Transport of Mohave Tui Chubs

The holding tank is covered creating a dark environment, which minimizes stressful behavior. The water in the holding tank is from the source population site. The water temperature is reduced to 14-16 degrees Centigrade (C) by the addition of ice in plastic bags. The electrical conductivity of water in the holding tank is adjusted to approximately 1,000 - 2,000 $\mu\text{S}/\text{cm}^2$ by the addition of uniodized granular NaCl, a sea-salt simulator from the pet trade, or Stresscote®. Dissolved oxygen is maintained above saturation by continuous bubbling of compressed oxygen gas into the holding tank at the lowest practical rate using a two-stage welding-type regulator.

Once trapping, health assessment, and selection of Mohave tui chubs is completed, the fish are transported to the receiving site. Transport is via motorized vehicle on existing roads to the receiving site.

Release of Mohave Tui Chubs

Upon arriving at the receiving site, the aquatic environment in the holding tank is tempered with water from the receiving site. Approximately 50 percent of the holding tank's water is replaced with water from the receiving site once every 15 minutes for a minimum of three exchanges, or until the water temperature is within 2 degrees C of the receiving site. Small numbers of Mohave tui chubs in the holding tanks are netted using small hand nets; they are placed in clean buckets with water from the receiving site. No imported water from the source population (the holding tank) is placed into the receiving site. Once the fish are in the clean bucket, they are poured slowly with the lip of the bucket below water level into the receiving site.

Only receiving sites that meet the physical, chemical, and ecological requirements of the Mohave tui chub would be selected as release sites. Examples of the physical requirements for the Mohave tui chub include a perennial water source, pooled water or pools located within reaches of flowing streams, water of sufficient depth, and aquatic habitat with low occurrences of flood events (USFWS 1984). Chemical requirements include water within the known tolerance levels of Mohave tui chubs for temperature (up to 30 degrees C), pH (preferably less than 9), dissolved oxygen (greater than 1 milligram/liter), salinity (less than 11 parts per thousand), and conductivity (less than 18,000 micromhos/centimeter) (USFWS 1984). Ecological requirements include sufficient cover for protection from avian predators and temperature regulation (emergent and/or riparian vegetation), absence of aquatic or amphibious predators, and appropriate substrate for spawning and foraging (submergent vegetation) (USFWS 1984).

The proposed action would occur at various locations within the general historical range of the Mohave tui chub in the Mojave Desert with the goal of establishing additional populations of the species to comply with criteria identified in the Recovery Plan for the Mohave tui chub. All required permits and permissions would be obtained prior to implementing the proposed action. Trapping, transportation, and release of Mohave tui chubs would be conducted according to the ESA, CESA, and California Fish and Game Code 5515.

The proposed action would be accomplished through cooperative planning, implementation, and management with various Federal, State, and local agencies and interested parties. It would include the development and implementation of a public outreach and education program. The proposed action would occur at various locations within the general historical range of the Mohave tui chub in the Mojave Desert with the goal of establishing the species in the Mojave River basin to meet delisting criteria.

All required permits and permissions would be obtained prior to implementing the proposed action. For example, establishing additional populations of the Mohave tui chub requires trapping individuals from one location and moving them to another. Trapping is "take" under the ESA. The ESA defines take as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or to attempt to engage in such conduct." The terms 'harm' and 'harass' are further defined in the USFWS regulations as follows. "Harm" means an act that actually kills or

injures wildlife. Such acts may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" means an intentional or negligent act or omission, which creates the likelihood of injuring wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns, which include, but are not limited to, breeding, feeding, or sheltering. Take is prohibited under section 9 of the ESA unless a permit or biological opinion is issued by the USFWS authorizing the take.

Under the ESA, take may be or purposeful or incidental. Purposeful take is that which is intended to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. Thus, if any of the action alternatives are implemented and would harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or to attempt to engage in such conduct for an endangered or threatened species, the action cannot occur until the entity obtains a purposeful take permit under section 10(a)(1)(A) of the ESA.

The ESA defines "incidental take" as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity such as recreation (e.g., fishing, boating, wading, or swimming), forestry, agriculture, flood control, and other activities that are in accordance with Federal, Tribal, state, and local laws and regulations. A person may take a Mohave tui chub as long as the "take" is not the purpose of the proposed action and was a result of an otherwise legal activity (e.g. water pump operation, agricultural diversion, etc.) but only after obtaining an incidental take permit from the USFWS.

Similar prohibitions exist in California law under CESA and California Fish and Game Code. The definition of take in the California Fish and Game Code (i.e., to hunt, pursue, capture, or kill or attempt the same) was considered in assessing the potential for impacts on state listed and fully protected species. A scientific collecting permit is required to take, collect, capture, mark, or salvage, for scientific, educational, and non-commercial propagation purposes, mammals, birds and their nests and eggs, reptiles, amphibians, fishes, and invertebrates (California Fish and Game Code Section 1002). Fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take. However, the CDFG may authorize the taking of species for necessary scientific research, including efforts to recover an endangered, threatened, or fully protected species (California Fish and Game Code Section 5515). The authorization for take of an endangered, threatened, or fully protected species requires an additional permit called a Memorandum of Understanding.

The proposed action and action alternatives include purposeful take of the Mohave tui chub. We would request a section 10 recovery permit as needed and complete section 7 consultation prior to making a decision on issuing the permit to comply with the ESA. The USFWS may only issue a recovery permit if the proposed action will contribute to the recovery of the species. In addition, we would coordinate with the CDFG, comply with the California Fish and Game Code, and obtain authorizations from them prior to implementing the proposed action.

Depending on the wishes of the State, local, or private landowner, there are options available for managing the Mohave tui chub population and habitats on these lands. The options range from the landowner hosting a Mohave tui chub population while the USFWS and/or California

Department of Fish and Game manage and monitor the population and habitat to the landowner conducting all the management and monitoring activities. If the landowner desires to implement activities that may result in take that would benefit the Mohave tui chub, we would evaluate this approach and the landowner's qualifications/experience, and if appropriate, issue a section 10(a)(1)(A) permit to the landowner. In either situation, a minimum time would be agreed upon prior to establishing a population to ensure that this action would contribute to the recovery of the Mohave tui chub and included in a signed management agreement. Monitoring and reporting requirements would be included as conditions of the section 10 permit. On Federal lands, the land management agency is usually responsible for managing the resources on their lands. However, the USFWS is available to provide technical assistance to working closely with the Federal agency in managing a population and its habitat. Federal agencies may view this as an activity that implements their section 7(a)(1) responsibility under the ESA.

Measures to Mitigate Adverse Effects

The proposed action also contains many safeguards to avoid and/or minimize potential impacts of this action on the human environment (mitigation measures) including the Mohave tui chub. Many of these mitigation measures are described below. For site selection, we would consider the following:

- selecting additional sites within the native or historical habitat whenever possible;
- restricting the release of Mohave tui chubs to protected or isolated sites, whenever possible;
- restricting the release of Mohave tui chubs to sites where, if there is potential for dispersal, this effect on the human environment has been evaluated and is acceptable;
- restricting the release of Mohave tui chubs to sites that fulfill the life history requirements of the species;
- restricting the release of Mohave tui chubs to sites that contain sufficient habitat to support a viable population;
- prohibiting the release of Mohave tui chubs into areas where the Mohave tui chub could hybridize with other species or subspecies;
- prohibiting the release of Mohave tui chubs into areas where other endemic taxa could be adversely affected; and
- restricting the release of Mohave tui chubs to sites that have safeguards in place to ensure that tui chubs are not injured or killed during the operation/use of the aquatic site.

For the Mohave tui chub translocation, we would:

- choose Mohave tui chub stock from appropriate sources to provide stock that is both genetically pure and with the greatest genetic diversity or fitness;
- examine the introduced Mohave tui chubs for the presence of undesirable pathogens (disease and parasites) prior to release;
- obtain Mohave tui chubs of sufficient number which reflect the genetic composition of the species;
- implement actions to avoid the transport of non-native species and pathogens from the source site to the receiving site (e.g., quagga mussels, chytrid fungus, etc.) (see Appendix B for Methodology to Avoid Spreading Pathogens and Non-native Species);

- carefully and quickly transport Mohave tui chubs from the source population(s) to the new location;
- introduce the Mohave tui chubs under the most favorable conditions; and
- document the release of Mohave tui chubs.

Post-introduction activities, we would:

- conduct systematic monitoring of the introduced populations;
- conduct monitoring of the habitat;
- implement adaptive management as needed, including restocking and/or habitat management, if warranted;
- determine the cause of failure if an introduction fails; and
- document the findings and conclusion of the post-introduction process in a report.

Many of these mitigation measures are contained in the American Fisheries Society Policy Statement #19 on the Introduction of Threatened and Endangered Fishes. Additional mitigation measures that would be implemented are listed in Appendix A- Methodology to Capture, Transport, and Release Mohave Tui Chubs.

This EA identifies three action alternatives and a status quo alternative and considers their impacts on the human environment. It outlines project alternatives, describes existing conditions in the project area, and analyzes the effects of each alternative on the human environment. This EA has been prepared in accordance with NEPA and regulations of the Council on Environmental Quality (CEQ) (40 CFR 1508.9).

Population Monitoring and Reporting

All alternatives considered would require a minimum of 1 year of annual monitoring for collecting baseline information on the new populations and the habitat (e.g., water quality, water depth, surface area, substrate, cover, invasive species, etc.). After the initial year, post-release population monitoring would be conducted a minimum of once every year for 5 years. After 6 consecutive years of monitoring, if the results indicate a growing or stable population of Mohave tui chubs with recruitment occurring and acceptable physical, chemical, and ecological habitat parameters, population monitoring would be conducted a minimum of every other year. If at any time, the monitoring results indicate an adverse change or decline in habitat condition or population size or trend, population monitoring would increase to a minimum of twice per year and adaptive management would be implemented to halt the population decline. A decline in population size or trend would occur when using two standard deviations, there is a decline in a population from the previous sampling event. This information will allow accurate assessment of future trends in fish population structure. All monitoring would be conducted in coordination with the USFWS and CDFG. Monitoring activities may be conducted by entities authorized under an issued permit or other authorities including other Federal agencies, the CDFG (under section 6 of the ESA), and educational institutions. The USFWS would provide training in habitat monitoring and fish sampling techniques as needed.

Adaptive Management

As stated in the Recovery Plan, the Agencies will periodically review, evaluate, and revise research, monitoring, and management activities to ensure progress toward recovery of the

Mohave tui chub. Monitoring will determine the success and future direction of the proposed action to establish additional populations. As phases of the project are completed or relevant findings verified, new information may identify additional or alternative methods, research, or recovery actions that may be needed.

DESCRIPTION OF ALTERNATIVES

Listed below are various alternatives that if implemented would achieve the proposed action. In addition, the no action or status quo alternative is described as a baseline to compare with the various alternatives presented.

Alternative A: No-Action Alternative

This alternative is the status quo. Under this alternative, no Mohave tui chubs would be captured and no new populations would be established. The populations at Zzyzx (MC Spring and Lake Tuendae), the Lark Seep complex, Camp Cady Wildlife Area (Camp Cady), and Deppe Pond would continue to be managed and monitored by Mojave National Preserve, NAWS, CDFG, and the Lewis Center with assistance from CDFG and USFWS. The long-term viability of these four populations is presumed to be stable with fluctuations in population size. The status of the Mohave tui chub would remain endangered with no progress toward recovery.

Alternative B: Establish additional Mohave tui chub populations at existing aquatic habitats

Under this alternative, we would trap from the source populations a minimum of 500 healthy Mohave tui chubs between about 61 and 101 millimeters (mm) long, and transport them to existing aquatic habitats. Because of its status as a Federal and State endangered species and State fully protected species, the USFWS and CDFG would oversee the capture, transport, release, and monitoring of the Mohave tui chubs.

Typically, Mohave tui chubs are captured and transported in the following manner. Mohave tui chubs are trapped using funnel (minnow) traps or similar traps. Clean, dry traps are placed in the water in the late afternoon or evening and removed the following morning. All Mohave tui chubs from each trap are carefully removed and placed in a bucket with fresh water from the source population. The fish are carried to a nearby processing station (e.g., shaded portable table) where they are measured and their health assessed. The Mohave tui chubs that qualify for transport to the receiving site are placed in a holding tank for transport. The other Mohave tui chubs are released at their point of capture.

The holding tank is covered creating a dark environment, which minimizes stressful behavior. The water in the holding tank is from the source population site. The water temperature is reduced to 14-16 degrees Centigrade (C) by the addition of ice in plastic bags. The electrical conductivity of water in the holding tank is adjusted to approximately 1,000 - 2,000 $\mu\text{S}/\text{cm}^2$ by the addition of uniodized granular NaCl, a sea-salt simulator from the pet trade, or Stresscote®. Dissolved oxygen is maintained above saturation by continuous bubbling of compressed oxygen gas into the holding tank at the lowest practical rate using a two-stage welding-type regulator.

Once trapping, health assessment, and selection of Mohave tui chubs is completed, the fish are transported to the receiving site. Transport is via motorized vehicle on existing roads to the receiving site. Minimum size of the Mohave tui chubs is 60 mm. Trapping, transport, and release of Mohave tui chubs would not occur until all applicable permissions under the ESA, CESA, and California Fish and Game Code 5515 have been obtained.

Upon arriving at the receiving site, the aquatic environment in the holding tank is tempered with water from the receiving site. Approximately 50 percent of the holding tank's water is replaced with water from the receiving site once every 15 minutes for a minimum of three exchanges, or until the water temperature is within 2 degrees C of the receiving site. Small numbers of Mohave tui chubs in the holding tanks are netted using dip nets; they are placed in clean buckets with water from the receiving site. No imported water from the source population (the holding tank) is placed into the receiving site. Once the fish are in the clean bucket, they are poured slowly with the lip of the bucket below water level into the receiving site.

The Lark Seep complex, Camp Cady, and Zzyzx populations have been selected as source populations because they contain the greatest genetic diversity of the existing populations of Mohave tui chubs. The 500+ introduced Mohave tui chubs would help ensure maximum diversity of alleles in the population's gene pool. Mohave tui chubs would usually be trapped in the spring or late summer/fall to maximize capture of young fish and avoid the breeding season so breeding activity would not be affected.

The recent estimates of population size for Mohave tui chubs at Lark Seep, Lake Tuendae, and Camp Cady are 3,460 (North Channel only), 4,066, and 5,915, respectively. During the breeding season, each female produces 5,000 to 50,000 eggs. With the small area of habitat at each population site, the large population size, and the millions of eggs produced each year at each site, recruitment is limited. Most fry in these source populations do not survive the first year from high mortality from predation and exceeding the carrying capacity of the small aquatic habitats. Therefore trapping and transporting young fish from source populations to receiving sites provides the greatest likelihood these young fish will survive at their new location while not reducing the overall number of Mohave tui chubs at the source populations throughout the year.

We anticipate that there will be two general types of aquatic habitat considered as receiving sites, lentic or ponded habitats and flowing or riverine habitats. Examples of lentic habitats include Morning Star Mine Pond at Mojave National Preserve and ponds on golf courses and school campuses (e.g., the golf course pond at Edwards Air Force Base (EAFB) and Victor Valley College pond). Examples of flowing or lotic habitats include Deep Creek and Holcomb Creek in San Bernardino National Forest and the Mojave River at the Mojave Narrows. The receiving sites will be analyzed and selected based on the mitigation measures listed above and in Appendix A.

Existing aquatic habitat would be identified and evaluated for consideration for establishing additional populations of Mohave tui chubs. The evaluation process includes meeting or being able to meet several criteria among which are providing the physical, chemical, and ecological needs of the Mohave tui chub; meeting the issue and concern requirements and analyses discussed later in this document; and obtaining the permission of the land owner. Currently

identified existing aquatic sites include Morning Star Mine Pond, the golf course pond at EAFB, and small pond at Victor Valley College for lentic habitat, and Deep Creek and Holcomb Creek for lotic habitat.

If a site does not currently meet these criteria, it would not be selected under this alternative. If a site does meet these criteria and after Mohave tui chubs have been introduced the receiving site no longer meets these criteria, we would implement the minimal amount of actions necessary to provide for the physical, chemical, and ecological needs of the species (i.e., adaptive management). Such actions may include removing non-native species, removing emergent vegetation (e.g., cattails (*Typha* spp.) and detritus that clog the aquatic habitat, deepening aquatic habitat to provide for protection from thermal extremes for the Mohave tui chub, restoring aquatic habitat that is converting to wetland/ upland habitat from sedimentation (an erosion source elsewhere) or other forms of deposition, and modifying a small portion of the habitat so other necessary or already permitted activities may occur/continue with negligible to no impact to the Mohave tui chub or its habitat (e.g., temporary removal of water at the aquatic habitat to fight wild fires, use of aquatic habitat for livestock grazing, etc.).

Alternative C: Establish additional Mohave tui chub populations at newly created/modified aquatic habitats

This alternative is the same as Alternative B regarding the selection of existing populations of Mohave tui chubs as the host populations, capture, transport, and release of Mohave tui chubs at additional sites. It differs in that additional populations of Mohave tui chubs would be established after creating new aquatic habitats or modifying existing aquatic habitats. For example, a landowner who has no aquatic habitat on his property may want a population of Mohave tui chubs. In this situation, we would work with the landowner to determine how and where to create a pond that would comply with applicable Federal, State, and local requirements and avoid or minimize impacts to the human environment to the maximum extent practicable. As in Alternative B, the newly created aquatic habitat would need to provide the physical, chemical, and ecological needs of the Mohave tui chub; meet the issue and concern requirements and analyses discussed later in this document; and obtain the permission of the land owner.

For modifying existing aquatic habitats, a landowner must have aquatic habitat that does not meet the physical, chemical, or ecological requirements of the Mohave tui chub but can be easily modified to meet those needs. For example, the aquatic habitat may not be sufficiently deep, there may be little or no water flow, or non-native competitive or predatory species may be present. We would work with the landowner to determine how to meet these requirements, comply with applicable Federal, State, and local requirements, and avoid or minimize impacts to the human environment to the maximum extent practicable. Actions taken to meet the physical, chemical, and biological needs of the Mohave tui chub may include removing non-native species, removing emergent vegetation (e.g., cattails (*Typha* spp.) and detritus that clog the aquatic habitat, deepening aquatic habitat to provide for protection from thermal extremes for the Mohave tui chubs, restoring aquatic habitat that is converting to wetland/ upland habitat from sedimentation (an erosion source elsewhere) or other forms of deposition, and modifying a small portion of the habitat so other necessary or already permitted activities may occur/continue with

negligible to no impact to the Mohave tui chub or its habitat (e.g., temporary removal of water at the aquatic habitat to fight wild fires, use of aquatic habitat for livestock grazing, etc.).

Actions taken to avoid or minimize impact to the human environment include surveying the proposed project site and access road(s) to determine if Federal or State listed, proposed, candidate, or special status species or cultural resources are present or would be affected. If they are, we would move the site to avoid impacting these resources, if possible. If not possible and the impacts would require analysis in a separate environmental document under NEPA, the appropriate site specific documents would be prepared to comply with NEPA and other applicable environmental laws.

For specific locations identified in this environmental assessment, the following information describes activities that would take place at each site to create and/or improve aquatic habitat and manage this habitat to meet the physical, chemical, and ecological requirements of the Mohave tui chub.

Coxey Pond: The footprint of Coxey Pond and the dams that form Upper and Lower Coxey Ponds would not be altered. Coxey Pond's aquatic habitat would be improved by removing some of the cattails and deepening the pond. A back hoe or similar equipment would be transported to Coxey Pond on existing roads and placed near the existing bank. The backhoe would remove many of the cattail root wads, and accumulated detritus from cattail leaves from the bottom of Coxey Pond, deepening the pond in some locations and providing more open lacustrine habitat for the Mohave tui chub. It would also deter the re-establishment of cattails in Coxey Pond. Coxey Pond would continue to support emergent vegetation. The removed detritus and cattail root wads would be hauled to a nearby upland location to naturally decompose. The location would be such that future runoff from rain and snow would not wash the material into Coxey Pond or other aquatic habitat.

Piute Ponds: One or more of the existing ponds at Piute Ponds, located on EAFB, would be modified to help regulate water quality and quantity to the pond(s) and manage the occurrence of non-native species. Lining the pond(s) would not be necessary because of the layer of clay located below the soil's surface. Heavy equipment would use existing roads to create new berms and control structures to regulate the flow from one pond to the next. Water would continue to be supplied from the wastewater treatment plant in Lancaster, which is operated by Los Angeles County.

New Pond at Camp Cady: The CDFG may construct a new lined pond at the Camp Cady Wildlife Area (CCWA). The New Pond would be located about a mile downstream and northeast from the East Pond on the north side of the Mojave River and about 700 feet north of the main channel of the Mojave River. The pond would be less than 2 acres. Existing dirt roads would be used to access the pond site. The pond would be excavated using heavy equipment, and the excavated material would be used to create a berm around the perimeter of the pond. The New Pond at Camp Cady would be lined, similar to West and East Ponds at CCWA. Water from an existing artesian water source at the site would be improved by adding a pipe to direct water flow into the New Pond. The CDFG has an existing water right.

New Pond at Victor Valley College/Mojave River Fish Hatchery: Specific information on the size and location of the pond is not available. The pond would be lined and less than 2 acres. It would be located either north of the existing campus small pond in an area previously disturbed by grading and off-road vehicle use or at the Mojave River Fish Hatchery northwest of the raceways in an area previously cleared of vegetation. The hatchery is immediately north of the college campus. If located on campus north of the existing small pond, it may be adjacent to the outflow channel from the fish hatchery. At either site, the material excavated to create the pond would be used to form a low berm around the edge of the pond. The berm would prevent runoff from adjacent current or future landscaped areas from entering the pond. Heavy equipment would access the pond site using existing roads or previously landscaped areas (e.g., lawns). Excess excavated material, if any, would be hauled to an approved disposal site.

The water source for either site would likely be supplied by an existing water right to the CDFG or Victor Valley College.

New Pond on the Bascom Property: The Bascom property is located in Victorville on the west side of the Mojave River immediately upstream from the Mojave Narrows. It is directly across from the Lewis Center. The pond would be created by deepening an existing low area that intermittently receives subsurface water during rising water levels in the nearby Mojave River. The low area or ephemeral pond would be deepened and the footprint expanded slightly to increase the current maximum area of surface water from 0.38 acre to 0.5 acre. The pond would be lined and an auxiliary water supply would be from a nearby well to ensure a perennial supply of water to the pond. Most of the site would be fenced to prevent livestock from entering that portion of the pond, or the entire pond would be fenced to exclude cattle and a trough connected to the pond to provide water to livestock.

Alternative D: Establish additional Mohave tui chub populations at existing and newly created/modified aquatic habitats (Alternatives B and C)

This alternative is a combination of Alternatives B and C.

ISSUES AND CONCERNS

The following issues were identified using Federal laws, regulations, executive orders (EOs), agency management policies, and our knowledge of limited or easily impacted resources. Through interagency consultation, past planning efforts, coordination with environmental groups, and input from CDFG, the following issues were identified and considered in the decision-making process for this EA to help compare the impacts of the alternative management strategies. Following is a brief discussion of why certain issues were selected for further analysis and why others were dismissed from further consideration. Issues are related to potential environmental effects of project alternatives and were identified by a representative from each of the Federal agencies potentially affected and the CDFG. Once the issues were identified, they were used to help formulate the alternatives and any additional mitigation measures. Using substantive issues, environmental statutes, regulations, and executive orders, the impact topics were selected for detailed analysis. A summary of the impact topics and the rationale applied in their inclusion or dismissal is given below.

ISSUES AND IMPACT TOPICS IDENTIFIED FOR FURTHER ANALYSIS

The following relevant impact topics are analyzed in the EA:

Threatened, Endangered, Proposed, Candidate, and Fully Protected Species: This topic includes species protected under Federal or State laws and species designated as special status species by the land management agencies in the action area. The ESA requires an examination of the effects to all federally proposed and listed threatened or endangered species. This section will address all proposed and listed Federal and State threatened and/or endangered species. The Mohave tui chub is a Federal, California state-listed endangered, and California fully protected species. Therefore, threatened, endangered, proposed, and fully protected species are addressed as an impact topic in this document.

Aquatic Habitat/Essential Habitat: NEPA calls for an examination of the impacts on all components of the human environment. The NPS and DOD policy is to protect the natural abundance and diversity of natural communities. The BLM policy is to manage lands in a manner that will protect the quality scientific, ecological, environmental, and water resource values. The USFS Manual for land management planning states that management for species diversity, in conjunction with management for ecosystem diversity, helps provide appropriate ecological conditions for federally-listed species, species-of-concern, and species-of-interest (FSM 1921.73). All alternatives would involve the management of wildlife resources, specifically the Mohave tui chub, and impacts to the source and receiving aquatic habitats. Aquatic habitat is addressed as an impact topic in this document. The creation of aquatic habitats means the loss of other forms of habitat, most likely upland habitat. To ensure that the lost upland habitat is not essential for terrestrial species, essential habitats are addressed as an impact topic.

Recreation: The type of recreation that may be impacted would be fishing. Currently the locations for fishing are limited by the availability of perennial aquatic habitat in the Mojave Desert region in California. Currently, fishing is for non-native species that were intentionally introduced and are periodically stocked to provide for recreational enjoyment (e.g., Deep Creek and Holcomb Creek). Although limited in area, fishing is a popular recreational activity and will be addressed as an impact topic. Other forms of recreation such as OHV use, hunting, camping, hiking, equestrian riding, and picnicking would not be affected by the proposed action.

IMPACTS TOPICS CONSIDERED BUT DISMISSED FROM FURTHER CONSIDERATION

Air Quality: A few motorized vehicles would transport trapping equipment to the source population sites (Lark Seep Complex, Camp Cady, Zzyzx, etc.), and transport the captured Mohave tui chubs to the receiving sites. This bout of activity would be limited to a few days during the year and would not occur every year. All vehicles would use existing roads and access points to aquatic habitats, some of which are a cleared dirt surface. There would be no new surface disturbance from trapping, transport, release, and management efforts. Given the magnitude and duration of the operation of these vehicles in a year, there would be negligible, localized, short-term adverse effects on air quality. No measurable impacts are expected.

Air quality may be impacted from construction of new aquatic habitats or modification of existing aquatic habitats. In these scenarios, heavy equipment would be used to excavate a large hole (e.g., likely less than 2 acres and less than 6 feet deep) that would be lined and filled with water. The transport of heavy equipment to the site and the operation of the equipment to excavate the hole would produce dust (PM₁₀), carbon monoxide (CO), ozone (O₃), and sulfur dioxide (SO₂). Dust emissions would be controlled by applying water or other non-toxic materials to the excavated site. The other sources of emissions would be of short duration (e.g., a few days to a few weeks), and contribute negligible amounts of pollution in the project area. No measureable impacts are expected; therefore, this topic will not be evaluated further.

Soils and Vegetation: Soils and vegetation at the source population sites (Lark Seep Complex, Camp Cady, Zzyzx, etc.) have been impacted previously from the construction and management of aquatic habitats in which the Mohave tui chub occur. Access to existing aquatic habitats to establish additional populations of Mohave tui chubs would use existing roads and access points and would not result in new surface disturbance. Thus, soils and vegetation would experience negligible impacts.

At existing aquatic habitats with no proposed modifications (e.g., Morning Star Mine Pond, Golf Course Pond (EAFB), and Victor Valley College Pond), the footprint of these ponds would not be altered by construction. No heavy equipment would be used so there would be no impacts to air quality,

At aquatic habitats with proposed modifications (e.g., Coxey Pond, Piute Ponds, etc.), existing roads and access points would be used to perform the work. Work may include removing detritus and muck from the bottom of the impoundments and opening cattail-choked aquatic habitats to provide a mix of open water and emergent vegetation. Species diversity of native emergent vegetation would be improved to resemble its assemblage (e.g., establishing native sedges and rushes) prior to initial human disturbance, which favors the proliferation of cattails. The footprint of these aquatic sites would not be altered. Because aquatic and wetland habitat would be impacted this impact topic will be assessed under aquatic resources and wetlands.

For newly-created aquatic sites, the proposed size of these sites would be less than 2 acres at each site. The new pond at either Victor Valley College or the Mojave River Fish Hatchery would be located in an area that has previously been disturbed by earth moving and grading activities and covered with non-native vegetation. The new pond at Camp Cady would be accessed using an existing road. Less than 2 acres of previously disturbed saltbush ruderal vegetation and saltgrass vegetation would be converted to aquatic habitat with some emergent vegetation, a rare habitat in the Mojave Desert. The location and size of the impacts to soils and vegetation from these activities would be negligible. Most of the locations would experience no impact to soils and vegetation from the proposed action, and a few locations that would be impacted would change vegetation from upland desert or non-native vegetation to rare aquatic habitat. Given the number of proposed locations, the types of changes to soils and vegetation, and the area that would be impacted from the proposed action when compared to impacts in the project area, these impacts to soils and vegetation would be negligible. This topic will not be evaluated further.

Biodiversity and Ecosystems: Establishing new populations of Mohave tui chubs in isolated man-made waters would result in little to no impact to natural ecosystems. Establishing new populations at existing streams (e.g., Holcomb Creek and Deep Creek) would return the Mohave tui chub to the watershed from which it was previously extirpated. The release of Mohave tui chubs in these situations would have no impact to natural ecosystems with the implementation of the mitigation measures identified previously. The Mohave tui chub is endemic to the Mojave River system; Holcomb and Deep Creeks are tributaries of the Mojave River and therefore part of the system. The Mohave tui chub is an omnivorous species that forages on insect larvae, small fish (including Mohave tui chub larvae), and detritus. The Mohave tui chub would also become a new prey species for aquatic snakes and some non-native fish and bird species. Biodiversity would increase by one species, thereby bringing the level of biodiversity in these aquatic habitats closer to their former level of natural biodiversity.

Wetlands: The management of wildlife resources would include the management of wetland habitats for the benefit of the Mohave tui chub. At some locations, this may mean an increase in wetland habitat. At others, it may mean a reduction. There are EOs and legislation (e.g., Clean Water Act) that regulate certain activities in wetlands. However, the amount of wetland habitat that would be created at new aquatic sites or modified at existing sites would be less than 2 acres at each site. This is because the size of the man-made aquatic sites and their shallow areas would be small. Wetland habitat is needed by the Mohave tui chub for cover and for bank stabilization. However, encroachment of certain species of emergent vegetation, if left unchecked, will eventually deposit plant material filling the wetted areas and converting them to upland habitat. Because of the small area of wetland habitat that will be created (we estimate less than 10 new aquatic sites with each site less than 2 acres) and the small amount of wetland habitat that will be maintained by habitat management activities to prevent the conversion of wetland habitat to upland habitat, wetlands are dismissed as an impact topic in this document.

Impact on Minority or Low-Income Persons or Populations (Environmental Justice [EJ] and Executive Order 12898): All activities implemented by the Agencies were evaluated for their impacts on the human environment and compliance with EO 12898 to ensure EJ. There are no minority or low income populations within the proposed action area on Federal land. On non-Federal land, the proposed action would be implemented at locations that are publicly owned and/or accessible to the public in the Mojave Desert (Victor Valley College, Camp Cady, etc.). Possible locations on private land would occur at the invitation of the landowner. Because the proposed management methods would not pose a disproportional risk to low income persons or their environment and their implementation would result in minimal to no ground disturbing activities, we do not anticipate that any of the alternatives would result in adverse or disproportionate environmental impacts to persons of any race, income, or culture.

Protection of Children from Environmental Health and Safety Risks (Executive Order 13045): Because the Agencies determined that identifying and assessing environmental health and safety risks is a high priority, they considered impacts that the alternatives analyzed in this EA might have on children. Establishing new populations of Mohave tui chubs is not a situation or circumstance where children would have potential exposure to environmental health and safety risks. At a few locations, aquatic habitat would be created. These habitats would either be

fenced or located in areas that are not easy to access or likely to be visited by unaccompanied children which would avoid the likelihood of drowning. Therefore, the creation of aquatic habitat that provides good to excellent habitat for the Mohave tui chub should not be an environmental health or safety risk to children. These habitats would be managed for natural conditions and good water quality. Therefore, implementation of any of the alternatives is not likely and not reasonably foreseeable to pose an environmental health or safety risks to children.

Cultural Resources: Establishing additional populations of Mohave tui chub should have no effect on cultural resources at existing aquatic habitats as they are at existing man-made aquatic habitats and/or access to the habitats already exists. There would be no new surface disturbance at these existing sites. At existing aquatic habitats, establishing additional populations of Mohave tui chubs and the capture of Mohave tui chubs from source populations would not affect objects, sites, or properties that are listed on or eligible for listing on the National Register of Historic Places (NRHP).

At sites proposed for creation of aquatic habitat, a cultural resources inventory would be completed and the Tribes would be consulted to determine if the sites are considered sacred or have other special meaning. If cultural resources are present or coordination with the Tribes results in an expression of concern, we would prepare a separate NEPA document to discuss and analyze impacts to cultural resources for that site. Because we have not identified locations for the creation of aquatic habitat, we are unable at this time to analyze the impacts to cultural resources from creating aquatic habitat at such locations. Therefore, impacts to cultural resources are dismissed from further consideration in this document at this time.

Water Resources (including municipal watersheds)and Floodplains: Water would be needed to transport Mohave tui chubs from their existing locations to the proposed new locations. This water would be collected from the source population site and would occur only when transporting Mohave tui chubs from that source population. The amount of water needed to transport the fish in a fish truck is less than water held in a small fire truck. The amount and frequency of water removed from a source population site would have negligible impacts when compared to the water present at each source and recipient site or in the action area.

At newly created aquatic habitats (e.g., new pond at Camp Cady), the size of the aquatic habitat would be small (e.g., less than 2 acres) and the source of the perennial water would be from an existing artesian source using the CDFG's water rights or in compliance with California law. Once established, the amount of water needed to maintain the small aquatic habitats would be negligible when compared to the amount used in nearby communities in the project area. Therefore, there would be negligible impacts to water resources.

The created aquatic habitats that would receive populations of Mohave tui chubs would be located outside the 100-year floodplain. The populations that would be placed in natural aquatic habitats (e.g., Holcomb Creek, Deep Creek, etc.) are in the floodplain but there would be no physical alteration to the floodplain with the release and management of the Mohave tui chubs in these areas. Therefore, there would be no effect to floodplains.

Because of the negligible impacts to water resources and floodplains, these impact topics are dismissed from further consideration.

Carbon-based Energy Use: A few motorized vehicles would be used to trap, transport, and release Mohave tui chubs to receiving aquatic habitat, and periodically manage the species and its habitat. However, the number of vehicles used would be small per event (less than five) and the duration of the trapping, transporting, and releasing of Mohave tui chubs would be limited to a maximum of a few days for each site. For management activities, the number of vehicles used for the quarterly activities the first year would be small (less than five) with a decreasing number of trips as the Mohave tui chub becomes established. These impacts would be negligible when compared to overall production and use of carbon-based fuels in the action area. Because the impacts would be negligible, localized, and short-term, we dismiss the impact of carbon-based energy use from further consideration for existing aquatic habitats.

The creation or modification of aquatic habitats at a few locations would likely include the transport and use of heavy machinery (e.g., backhoe, dump truck). However, the duration of operation of this machinery would be limited given the size of the aquatic habitat created (a few weeks for construction, a few days every few years for habitat maintenance, if needed). When compared to the operation of construction equipment in the Mojave Desert in California or the Mojave River watershed, this contribution to greenhouse gas emissions is considered negligible. Therefore carbon-based energy as an impact topic is dismissed from further consideration.

Wilderness, Wilderness Study Areas, Inventoried Roadless Areas, or National Recreation Areas: The actions proposed in the alternatives would not be implemented within designated, proposed, or potential wilderness areas. While sites in wilderness areas may meet site selection criteria, establishing a new population would be unlikely because of the need to transport large numbers of fish in a water tank, which usually requires a motorized vehicle. Motorized vehicles are not allowed in wilderness areas. However, in the unlikely event that a site is identified that is within a designated, proposed, or potential wilderness area, a separate NEPA document would be prepared for this site. Because a Federal action to establish new populations of Mohave tui chubs is unlikely in wilderness areas, wilderness impacts are dismissed from further consideration.

Noise: Motorized vehicles would be used to access all aquatic habitats that would receive Mohave tui chubs. These vehicles would use existing roads that are open to the public for vehicle use. The increase in the level of use of motorized vehicles from trapping, transporting, releasing, and managing Mohave tui chubs and their habitats would result in a negligible increase vehicle operation that already occurs in the project area.

The creation of new aquatic habitats at a few locations would likely include the transport and use of heavy machinery (e.g., backhoe, dump truck). However, the duration of operation of this machinery would be limited given the size of the aquatic habitat created (a few weeks for construction, a few days every few years for habitat management, if needed). When compared to the noise produced from vehicles and heavy equipment in the project area (e.g., the frequency of this noise source and its duration), this contribution to noise is considered negligible. Therefore, noise as an impact topic is dismissed from further consideration.

Park Lands: Park lands include lands managed by Federal, State, and local agencies for their park qualities. At the Federal level, the NPS manages three national parks within the Mojave Desert in California, Death Valley National Park, Joshua Tree National Park, and Mojave National Preserve. The Mohave tui chub occurs at Mojave National Preserve. One location, MC Spring, is a natural spring, the other, Lake Tuendae, is a man-made structure located nearby and constructed prior to the NPS acquiring management responsibilities for these lands. The man-made structure is not considered park land as it is not a body of water that conveys the characteristics of an area of land preserved in its natural state and reserved for the enjoyment and recreation of visitors.

The National Park Service Organic Act of 1916 (16 U.S.C. 1 *et seq.*), as amended, established the NPS and directed this agency to promote and regulate the use of the national parks, monuments, and reservations to “conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.” The NPS has a mandate to manage natural aquatic and upland habitats and the native wildlife where they occur within park boundaries.

Receiving sites for the Mohave tui chub may be located within Mojave National Preserve. With the exception of the Mojave River, these sites would not likely be at natural aquatic sites in the Preserve. This is because historically the Mohave tui chub is only known to occur in the Mojave River and tributaries within the Preserve. Therefore, other natural aquatic habitats (e.g., seeps, springs), unless currently or historically connected to the Mojave River, are not known to be historic locations for the Mohave tui chub.

Other park lands in the Mojave Desert in California include lands managed by the California State Parks and regional parks. State park lands include Red Rock Canyon, Saddleback Butte, and Providence Mountains State Parks which are located outside the range of the Mohave tui chub or currently contain no aquatic habitat. Regional parks include the Mojave River Forks and Mojave Narrows regional parks. Both are located in and adjacent to the Mojave River. These parks are managed for outdoor recreation around managed water flow in the Mojave River (e.g., water releases from dams). The first park is located near the Mojave Forks Dam; the second is an artificial long lake in the Mojave River bed with stocked non-native trout, catfish, and bass and a water playpark. These parks are not managed for their native aquatic species or habitat and would not meet criteria for establishing additional populations of Mohave tui chubs under their current management practices even though they are within the historical range of the Mohave tui chub.

Other federally managed lands (BLM, USFS, or DOD) within the range of the Mohave tui chub are not managed for parkland qualities. BLM lands are managed for multiple use, USFS lands are managed to achieve quality land management under the sustainable multiple-use management concept to meet the diverse needs of people, and DOD lands are managed to promote the National Defense mission. Because these agencies do not manage for park lands, establishing additional populations on aquatic habitats managed by these agencies would not impact park lands.

Establishing additional populations of Mohave tui chubs in the Mojave Desert is limited primarily by the availability of aquatic habitat. One type of aquatic habitat is man-created ponds usually located on golf courses, campuses, and other locations. Although not considered park lands, these aquatic habitats are used generally for the visual enjoyment of visitors. However, establishing populations of Mohave tui chubs at these non-parkland sites would not affect the size, shape, or esthetics of the aquatic habitats. This issue is dismissed from further consideration because we are not proposing to establish additional populations of Mohave tui chubs at natural aquatic habitats that would require human alteration to meet the physical, chemical, and ecological needs of the species.

Socio-economics: Some of the sites selected for establishing new populations of Mohave tui chubs are existing aquatic habitats. At these sites, work will be limited to trapping, transporting, releasing, and managing the Mohave tui chubs and their habitat. This work can only occur under a recovery permit and can only be performed by persons with specialized skills. Most of this work will likely be performed by Federal and State agency personnel with assistance from academic institutions. Therefore, there will be no increase in jobs from this activity.

The creation of new aquatic habitats would require the use of persons with skills in construction and the use of heavy equipment. At these few sites, a few personnel may be hired to create the aquatic habitat. However, the number of locations where this would occur would be small, the number of persons employed would be small because of the small size of the aquatic habitats created, and the duration of the employment would be temporary – a few weeks at most. Given the size of the project area and the number of persons employed in the Mojave Desert, the impacts of this additional employment on the economics of the area would be negligible.

The proposed action will occur at existing aquatic sites in urban and rural environments or back country environments. New aquatic sites would be created in similar settings. Impacts to the existing social activities or social composition of local communities or all communities within the project area would not change. The proposed action would not result in changes to community general planning documents. Therefore, socio-economics as an impact topic is dismissed from further consideration.

Other Resources or Special Uses: The actions discussed in this EA involve negligible to minor (usually less than a few acres) or no new ground disturbance (depending on the need to create or modify existing aquatic habitat), negligible to minimal use of vehicles and motorized equipment (numbers of vehicles and equipment, frequency and duration), and for most or all alternatives use of existing access routes. Most of the actions would be conducted at locations previously modified by human activities such as surface mines, urban development, man-made ponds or impoundments, and areas previously graded and landscaped with non-native vegetation. Some sites would be at existing natural aquatic habitat (e.g., Holcomb Creek, Deep Creek, etc.). At these locations, there would be no activities to modify the physical habitat. The translocation activities (trapping, transporting, and releasing Mohave tui chubs) would be of temporary duration, usually a few days per year. Monitoring Mohave tui chub populations and their habitat would require a few more days per year.

Based on the type of activities that would be implemented under the proposed action, their frequency, and their duration, the following impact topics should not be affected by implementation of any of the alternatives: geology (including rocks and streambeds), minerals, water quality, prime and unique farmlands, ecologically critical areas, unique ecosystems, natural soundscapes, traffic, visual quality, visitor experience, energy requirements and conservation, natural or depletable resources, urban quality, stream-flow characteristics, and seismicity. Sacred sites, Indian Trust resources, and sites on the Department of the Interior's National Registry of Natural Landmarks would be addressed when site specific analysis is conducted for the proposed creation of aquatic habitat.

Additional NEPA may be required when "site specific" analyses are done. There are no wild and scenic rivers in or adjacent to the project area. Each of these topics was analyzed as it relates to the potential alternatives. Each was dismissed because of lack of relevance and/or lack of impact from implementation of the alternatives. In addition, there are no potential conflicts between the proposed project and land use plans, policies, or controls (including State, local, or Native American) for the project area.

CHAPTER 3. AFFECTED ENVIRONMENT

GENERAL DESCRIPTION OF THE MOJAVE DESERT IN CALIFORNIA AND MOJAVE RIVER WATERSHED

Much of the information in this section was obtained from the West Mojave Plan (BLM *et al.* 2005), the General Management Plan for Mojave National Preserve (NPS 2002a), and the Final Environmental Impacts Statement and Forest Management Plan for the San Bernardino National Forest (USFS 2005).

Climate: The project area is a desert characterized by hot summer temperatures (average daily highs above 100 degrees Fahrenheit) and low annual precipitation (approximately 5 inches). Snow can occur during the winter. Daily temperatures ranges of 40 degrees can occur and variations of 80 percent of annual precipitation can occur. Rainfall is primarily in the winter in the western Mojave Desert but grades to a bimodal winter-summer pattern in the eastern Mojave Desert. High winds can occur; peak wind velocities above 50 miles per hour (MPH) are not uncommon.

Air Quality: Much of the time, air quality in the Mojave Desert is good. There are, however, times that localized areas do not meet air quality standards due to locally generated pollutants, caused by prevailing winds. Air quality non-attainment occurs for PM₁₀, ozone, sulfates and/or hydrogen sulfide, and reduced visibility from oxides of nitrogen (NO_x), oxides of sulfur (SO_x), and reactive organic gases (ROG). In general, air quality improves as the distance from surface disturbance caused by human activity increases.

Geology: The project area is mainly in the Mojave Desert geomorphic province (Mojave Block) of California but includes the Basin and Range Province. The Mojave Desert province can be divided into western and eastern portions. The western portion lies within the wedge where the San Andreas and Garlock faults meet, and is bounded on the east by the Mojave River and a line running northwest from Barstow to Red Rock Canyon (Sharp 1975, as cited in BLM *et al.* 2005). Uplifts along the two major fault systems include the El Paso Mountains along the northwest side of the Garlock fault, and the San Gabriel and San Bernardino Mountains along the southwest side of the San Andreas fault. The western Mojave Desert contains great expanses of gentle surface with isolated knobs, buttes, ridges, and local hilly areas.

The eastern portion consists of alluvial filled basins (downthrown blocks) between mountain ranges separated by normal faults, but includes thrust-fault-emplacement basin and ranges. In the southern half, the mountain ranges have a general northwest trend, whereas in the northern half these features have no consistent orientation.

The Basin and Range province has valleys (basins) and mountains (ranges) aligned roughly north to south. The province extends from the Wasatch Mountains of Utah to the eastern side of the Sierra Nevada in California. In the Mojave Desert of California, the area north of the El Paso Mountains and east of U.S. Highway 395 is part of the Basin and Range province. This part of North America is a region where the earth's crust has been extended (stretched thinner) from east to west, and mountain ranges in this province are generally bounded by faults associated with this thinning and stretching. This includes the Coso Mountains, the Argus Mountains, the Slate

Mountains, and their adjacent valleys. The Coso Mountains are mostly igneous/volcanic rocks, including pumice, basalts, cinders and obsidian. The Argus and Slate Ranges are mostly igneous/granitic rocks, with some volcanic rocks and exposures of limestone formations.

Soils: The soils of the Mojave River Area are comprised of three groups. Soils of the Mojave Desert on flood plains, alluvial fans, and terraces and in basins are dominantly in low positions in arid areas and are comprised of seven map units. Slopes are nearly level to strongly sloping. Elevation ranges from about 1,700 feet to about 4,000 feet. Soil depths range from deep to shallow and are moderately to somewhat excessively drained. The surface layer is sand, loamy sand, loamy fine sand, sandy loam, loam, and clay. Soils are used mainly for irrigated crops, home-site development, wildlife habitat, and livestock grazing.

Soils outside the Mojave River floodplain range in depth from very shallow to very deep. They are well drained with a surface layer of gravelly sand, very gravelly sand, cobbly sandy loam, gravelly sandy loam, sandy loam, and loam. Soils are used for wildlife habitat, and in some areas, grazing, and a source of gravel. Elevation ranges from about 1,800 to 4,500 feet.

Soils of the San Gabriel and San Bernardino Mountains on mountains, foothills, alluvial fans, and terraces are gently sloping to steep and range in elevation from 3,400 to 6,200 feet. They are deep and well drained. The surface layer is sandy loam and loamy fine sand. Soils are used for wildlife habitat, grazing, home-site development, irrigated crops and pasturelands.

Water Resources: This area is one of the most arid areas in the nation. In the Mojave Desert, the evaporation exceeds the precipitation by at least 25:1. Prominent mountain ranges along the coast to the west and south create an orographic effect on precipitation. Precipitation amounts are much greater on the windward or ocean-facing slopes of the mountain ranges, whereas arid conditions prevail on the leeward slopes of the mountains, helping to create the Mojave Desert. Because of the arid nature of the project area, water supply is the single most limiting resource. The presence or absence of a reliable supply of good quality water has determined the pattern of vegetation, wildlife, and human activities such as agricultural, urban, and industrial development. Groundwater withdrawn by wells furnishes nearly all of the developed water. Many of the State or federally listed or sensitive species depend upon the presence of groundwater either directly or for their habitat.

Surface water is scarce. Streams that originate high in surrounding mountains on the west and south may have perennial flow in the higher altitudes; however, at the lower altitudes and throughout the Mojave Desert in California virtually no water exists in streambeds or riverbeds, except locally after infrequent, heavy cloudbursts or prolonged winter rains. The playas may be covered by water from the runoff for as long as two months a year. There are many locally important springs and seeps most of which are associated with the mountain areas.

The Mojave River originates near the southern boundary of the project area. Major watersheds in San Bernardino and San Gabriel Mountains contribute to the stream flow in the area. Sheep Creek originates in the San Gabriel Mountains. The West fork of the Mojave River and Deep Creek originate in the San Bernardino Mountains and are the headwaters of the Mojave River. The Mojave River has three major tributaries within the desert – Fremont Wash, Buckthorn

Canyon, and Oro Grande Wash. These Tributaries flow only after intense storms. The above ground flow of the Mojave River is intermittent in most places with water flows above ground only after storms. Perennial flows occur near Victorville, Camp Cady, and in Afton Canyon. In these places, hard rock barriers force ground water to the surface. The amount of water in the Mojave River varies greatly from year to year with more than 300,000 acre-feet in one year and less than 10,000 acre-feet in another.

During the Pleistocene, the Mojave River flowed from the San Bernardino and San Gabriel Mountains north to Barstow, then east to Silver Lake and the Mojave National Preserve. In the last Ice Age, extending from 30,000 to 10,000 years ago, the Mojave River discharged to the south into the Mojave Valley, Lavic Lake, Dale Lake, Bristol Lake, and other playas extending nearly to the Colorado River. Thus, the Mojave River is a remnant of what it was 10,000 years ago.

Biological Resources: The project area is rich in terrestrial biological diversity because of its varied vegetation communities and landforms and because of its location adjacent to the Transverse Ranges, the Sierra Nevada, the Colorado Desert, and the Great Basin. More than 30 distinct plant communities occur in the project area. These include cismontane and desert interior dunes, Sonoran and Mojavean desert scrub, creosote bush scrub, shadscale scrub, Joshua tree tall scrub and open woodland, Joshua tree woodland, Mojave mixed wood scrub, smoke tree woodland and scrub, desert wash scrub, riparian forest and woodland, riparian scrub, desert wash riparian woodland, saltbush scrub, and at the higher elevations juniper woodland, pinyon pine woodland, scrub oak chaparral, gray pine-oak woodland, interior live oak woodland, Jeffrey pine forest, pinyon-juniper woodland, and montane meadow.

The aquatic diversity of the Mojave Desert in California is low because its aquatic habitat is limited. There are perennial seeps and springs that are rare, scattered, and isolated. The Mojave River watershed is perennial at its headwaters in the San Bernardino Mountains and includes tributaries such as Deep Creek and Holcomb Creek. The Mojave River is perennial at the Mojave Narrows in Victorville/Apple Valley, at Camp Cady, and in Afton Canyon. Thus, natural aquatic habitat for the Mohave tui chub is limited to these remnants of perennial aquatic habitat. Other perennial riverine habitats in the Mojave Desert include portions of the Amargosa River and its tributaries.

Dominant terrestrial woody plants include creosote bush (*Larrea tridentata*), burrobush (*Ambrosia dumosa*), saltbush (*Atriplex canescens*), ephedra (*Ephedra nevadensis*), cholla (*Opuntia* sp.), and desert rue (*Thamnosma montana*). Joshua tree (*Yucca brevifolia*) may occur at higher elevations) along with various species of oak (*Quercus* spp.), pinyon pine (*Pinus monophylla*), juniper (*Juniperus* spp.), Jeffery pine (*Pinus jeffreyi*). Riparian species include willow (*Salix* spp.), cottonwood (*Populus fremontii*), and mesquite (*Prosopis* spp.).

Existing aquatic habitats at higher elevations, such a Coxey Pond and its adjacent wet meadow would typically have vegetation characterized by a dense growth of sedges (*Carex* spp.), rushes (*Juncus* spp.) and witchgrass (*Panicum capillare*). Other herbaceous species include yarrow (*Achillea millefolium*), hedge-nettle (*Stachys* sp.) and the exotic weed white sweet clover

(*Melilotus alba*). Palmer's mariposa lily (*Calochortus palmeri* var. *palmeri*), a San Bernardino National Forest (SBNF) sensitive plant species, may also occur in these settings.

Common native terrestrial wildlife species in the Mojave Desert are listed below.

Table 3-1. Common native terrestrial wildlife species in the Mojave Desert

| COMMON NAME | SCIENTIFIC NAME |
|------------------------------|--------------------------------------|
| MAMMALS | |
| jackrabbit | <i>Lepus californicus</i> |
| antelope ground squirrel | <i>Ammospermophilus leucurus</i> |
| round-tailed ground squirrel | <i>Xerospermophilus tereticaudus</i> |
| desert woodrat | <i>Neotoma lepida</i> |
| Botta's pocket gopher | <i>Thomomys bottae</i> |
| deer mouse | <i>Peromyscus maniculatus</i> |
| Merriam's kangaroo rat | <i>Dipodomys merriami</i> |
| Coyote | <i>Canis latrans</i> |
| BIRDS | |
| red-tailed hawk | <i>Buteo jamaicensis</i> |
| common raven | <i>Corvus corax</i> |
| mourning dove | <i>Zenaida macroura</i> |
| Anna's hummingbird | <i>Calypte anna</i> |
| horned lark | <i>Eremophila alpestris</i> |
| black-throated sparrow | <i>Amphispiza bilineata</i> |
| REPTILES | |
| side-blotched lizard | <i>Uta stansburiana</i> |
| western whiptail | <i>Cnemidophorus tigris</i> |
| desert spiny lizard | <i>Sceloporus magister</i> |
| red racer | <i>Coluber constrictor</i> |
| Mojave rattlesnake | <i>Crotalus scutulatus</i> |
| AMPHIBIANS | |
| red-spotted toad | <i>Bufo punctatus</i> |

As mentioned above, the Mohave tui chub is the only fish native to the Mojave River system. Other native fish species in the Mojave Desert are isolated to the few remaining perennial aquatic habitats and include the Salt Creek pupfish (*Cyprinodon salinus*) in Death Valley and Shoshone pupfish (*Cyprinodon nevadensis shoshone*) in the Amargosa River.

Several endangered, threatened, and sensitive plant and animal species occur in or on the edge of the project area (Table 3-2). Besides the endangered Mohave tui chub, other federally listed species that are aquatic or riparian-dependent include the endangered mountain yellow-legged frog (*Rana muscosa*), arroyo toad (*Anaxyrus californicus*), least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax trailli extimus*), and threatened Inyo California towhee (*Pipilo crissalis eremophilus*). Critical habitat has been designated for all federally listed species except the Mohave tui chub and triple-ribbed milk-vetch.

In the Coxe Pond/Meadow area, two recently described, rare butterfly species have been identified. *Euphilotes battoides vernalis*, a blue butterfly, is known only from a 1-square mile area of pebble plain habitat around Coxe Meadow. Its entire life history is tied to a single host plant, Kennedy's buckwheat (*Eriogonum kennedyi* var. *kennedyi*). The second butterfly, a checkerspot (*Euphydryas editha erlichii*) has also been observed in the same area.

In addition to the bird species mentioned above, other species of native migratory birds occur in the area. Portions of the area may also be foraging locations or nesting sites for the golden eagle (*Aquila chrysaetos*). Both native migratory birds and the golden eagle are protected by Federal regulations.

State listed species are listed in Table 3-2. State fully protected species include the Mohave tui chub and golden eagle.

Table 3-2. Species protected by Federal and State laws that may occur in/near the current/former range of the Mohave tui chub

| Common Name | Scientific Name | Status | Habitat Used |
|---|---|-------------|--------------------------|
| FISH | | | |
| Mohave tui chub | <i>Siphateles bicolor mohavensis</i> | FE, SE, SFP | Aquatic |
| AMPHIBIANS | | | |
| Arroyo toad ^{1,2,3} | <i>Anaxyrus californicus</i> | FE, CH | Aquatic, wetland, upland |
| Mountain yellow-legged frog ^{2,3} | <i>Rana muscosa</i> | FE, CH | Aquatic, wetland, upland |
| REPTILES | | | |
| Mojave desert tortoise | <i>Gopherus agassizii</i> | FT, ST, CH | Upland |
| BIRDS | | | |
| Golden eagle | <i>Aquila chrysaetos</i> | BGEPA, SFP | Upland |
| Mountain plover | <i>Charadrius montanus</i> | FPT | Aquatic/Riparian |
| Western yellow-billed cuckoo | <i>Coccyzus americanus occidentalis</i> | C, SE | Riparian |
| Least Bell's vireo | <i>Vireo bellii pusillus</i> | FE, CH | Riparian |
| Southwestern willow flycatcher ^{1,2,3} | <i>Empidonax trailli extimus</i> | FE, SE, CH | Riparian |
| Inyo California towhee | <i>Pipilo crissalis eremophilus</i> | FT, CH, SE | Riparian |
| MAMMALS | | | |
| Mohave ground squirrel | <i>Xerospermophilus mohavensis</i> | ST | Upland |
| PLANTS | | | |
| Lane Mountain milk-vetch | <i>Astragalus jaegerianus</i> | FE, PCH | Upland |

| | | | |
|---|--|--|--------|
| Cushenbury buckwheat | <i>Eriogonum ovalifolium</i> var. <i>vineum</i> | FE, CH | Upland |
| Thorne's buckwheat | <i>Eriogonum ericifolium</i> var. <i>thornei</i> | SE | Upland |
| Cushenbury milk-vetch | <i>Astragalus albens</i> | FE, CH | Upland |
| Cushenbury oxytheca | <i>Oxytheca parishii</i> var. <i>goodmaniana</i> | FE, CH | Upland |
| Triple-ribbed milk-vetch | <i>Astragalus tricarinatus</i> | FE | Upland |
| Parish's daisy | <i>Erigeron parishii</i> | FT, CH | Upland |
| Mojave tarplant | <i>Hemizonia mohavensis</i> | SE | Upland |
| BGEPA = Bald and Golden Eagle Protection Act C = candidate CH = critical habitat FE = federally endangered FPE = federally proposed endangered FT = federally threatened PCH = proposed critical habitat SE = state endangered SFP = state fully protected ST = state threatened | | ¹ Coxey Creek, San Bernardino National Forest ² Deep, Creek, San Bernardino National Forest ³ Holcomb Creek, San Bernardino National Forest | |

In addition, the BLM, USFS, and CDFG have identified sensitive species/species of special concern that occur in the Mojave Desert (Table 3-3). Most of these species are terrestrial with the exception of the partially-plated three-spine stickleback (*Gasterosteus aculeatus microcephalus*).

Table 3-3. Sensitive species/species of special concern that occur in the current and former range of the Mohave tui chub

| Common Name | Scientific Name | Status | Habitat Used |
|--|---|-------------------------------|-----------------|
| FISH | | | |
| partially-plated three-spined stickleback ^{1,2,4} | <i>Gasterosteus aculeatus microcephalus</i> | SS-USFS | Aquatic |
| AMPHIBIANS | | | |
| yellow-blotched salamander | <i>Ensatina eschscholtzii croceater</i> | SS-BLM SS-USFS SSC-CDFG | Riparian/upland |
| large-blotched salamander | <i>Ensatina klauberi</i> | SS-USFS SSC- | Riparian/upland |

| | | CDFG | |
|--|---------------------------------------|---|-------------------------|
| REPTILES | | | |
| southwestern pond turtle | <i>Actinemys marmorata pallida</i> | SS-BLM SS-USFS SSC- CDFG | Aquatic/riparian |
| Mojave fringe-toed lizard ⁵ | <i>Uma scoparia</i> | SS-BLM SSC- CDFG | Upland |
| two-striped garter snake ^{1,2,3,4} | <i>Thamnophis hammondi</i> | SS-USFS | Aquatic/riparian/upland |
| MAMMALS | | | |
| California leaf-nosed bat | <i>Macrotus californicus</i> | SSC- CDFG | Upland |
| Townsend's big-eared bat | <i>Plecotus townsendii pallescens</i> | SSC- CDFG | Upland |
| California mastiff bat | <i>Eumops perotis californicus</i> | SSC- CDFG | Upland |
| American badger | <i>Taxidea taxus</i> | SSC- CDFG | Upland |
| ¹ Coxey Pond, San Bernardino National Forest ² Coxey Creek, San Bernardino National Forest ³ Deep Creek, San Bernardino National Forest ⁴ Holcomb Creek, San Bernardino National Forest ⁵ Golf Course Pond, Edwards Air Force Base ⁶ Piute Ponds, Edwards Air Force Base ⁷ Morning Star Mine Pond, Mojave National Preserve | | SS-BLM = Sensitive species, Bureau of Land Management SS-USFS = Sensitive species, US Forest Service SSC = Species of special concern, California Department of Fish and Game | |

Aquatic habitats usually support sensitive wildlife species because of the rarity of their habitats. They also support general wildlife species, some of high public interest (e.g., mule deer, certain migratory birds, upland game birds, etc.).

Several non-native plant and animal species occur throughout the Mojave Desert in California. These species were intentionally and unintentionally introduced by human activity. Once introduced, many of these species have out-competed, displaced, and/or preyed on native species resulting in their reduction or extirpation, or they introduced diseases that resulted in the reduction or extirpation of native species. Examples of non-native fish in the Mojave River system (including Coxey, Deep, and Holcomb Creeks) and other aquatic habitats in the Mojave Desert in California include non-native trout (*Salmo* spp.), crappie (*Pomoxis nigromaculatus*), bass (*Micropterus* spp.), mosquitofish (*Gambusia affinis*), goldfish (*Carassius auratus*), arroyo chub, hitch (*Lavinia exilicauda*), partially-plated three-spine stickleback (*Gasterosteus aculeatus microcephalus*), and possibly hybrid tui chub. Other examples of non-native species in the area include bullfrog (*Rana catesbeiana*), quagga mussel (*Dreissena* sp.), cheatgrass (*Bromus*

tectorum), red brome (*Bromus rubens*), and split grass (*Schismus* spp.). Because of their phenologies and growth habits, these last three species displace native plants and provide fuel that promotes the spread of fire in non-fire adapted vegetation communities (e.g., Mojave Desert vegetation communities).

Cultural Resources: The California Desert has been inhabited for at least 8,000 to 12,000 years and perhaps longer (BLM *et al.* 2005). Evidence of the earliest occupations is sparse and difficult to date or interpret. Between 8,000 and 12,000 years ago, settlements were centered on lakes, which are now the dry playas characteristic of the Mojave Desert and Great Basin. These lakes, and especially marsh environments along their edges, were particularly rich in plant and animal species that provided food, fibers, medicines, tools, clothing, and ritual objects necessary for daily existence. From 8,000 to 6,000 years ago, climatic change caused the lakes to dry, necessitating cultural adaptation to the loss of a prime habitat. One adaptation included increased use of upland areas. Around 6,000 years ago, food gathering and land use patterns began to appear that continued into the historic period. These involved use of a greater variety of habitats and plant and animal resources. People generally followed a pattern of exploitation of seasonally available resources by moving through a more-or-less defined homeland, usually returning to a primary habitation (“village”) for winters. This pattern of seasonal movement from place to place resulted in use of large areas by relatively small populations, and left the remains that are now archaeological sites widely scattered over the landscape.

During historic times, Euro-American history begins in the mid-1700s with early Spanish exploration. Agriculture or precious metals attracted Spanish-Mexican and American settlers to the area until the 1800s when fur trappers and caravans crossed the desert. In 1848, the California gold rush contributed to pressure to establish railroad routes across the desert. In the 20th century, automobile routes were established along with ranching, agriculture, and later military bases prior to the United States’ entry into World War II.

Historic resources in the project area include trails, wagon roads, railroads, and highways; past mining operations and settlements associated with them; homesteading with ranching-grazing operations; railroad grades and railway structures; military installations to keep the peace between settlers and Native Americans; and military training camps during World War II.

Several sites in the project area are listed on the National Register of Historic Places. In addition, there are sites of significance, which are unevaluated properties. These properties are managed to avoid damage or alterations that might affect qualities that could make them eligible for listing in the National Register of Historic Places. These sites include Deep Creek, which has a scientific resource value, and Camp Cady, which has a scientific, conservation, and public resource value.

Socio-economics: More than 750,000 people reside in the California Mojave Desert. Most of these people live in San Bernardino and Los Angeles Counties. The Federal government (e.g., BLM, NPS, DOD, and USFS) manages most of the area with most of the remaining lands privately owned and subject to the general plans of the counties and cities. The Federal government is the largest single employer in the area. However, more than one third of the jobs are in the service sector, one quarter in the trade sector, and one-sixth in the government sector (Federal, State, and local). Mining and grazing, the two economic activities that originally

brought permanent settlement to the Mojave Desert, contribute less than 1.5 percent of the jobs. Many of the residents closer to the Los Angeles Basin (e.g., in the Lancaster-Palmdale and Victor Valley areas) commute to the Los Angeles Basin for employment.

Recreation: The Mojave Desert in California is located between Los Angeles and Las Vegas. It is the recreational backyard of these metropolitan areas whose combined populations are greater than 19 million residents. About 2 million participate in off-highway vehicle activities and a greater number camp, hike, or drive for pleasure. The Mojave Desert provides an easily accessible, uncrowded recreation experience. The variety of its mountains, bajadas, dry lakes, dunes, and badlands, the diversity and affluence of its visitors, and its volume of space provides many recreation opportunities for its visitors and residents.

The types of recreation are highly varied and include vehicle-dependent and vehicle-assisted recreation. Examples of the former include motorcycle activities; four-wheel drive exploring; sight-seeing; vehicle speed events, endurance events, and competitions; experimental vehicles/aircraft; and dry land wind sailing. Examples of the latter include target shooting, hunting, fishing, equestrian rides, hiking, mountain biking, bird watching, botany, rockhounding, camping, and picnicking.

Transportation: The road system within the Mojave Desert in California is the primary means of transportation. This system is mostly composed of four classifications of paved roads (major highways, arterials, collectors, and local streets) plus thousands of miles of unpaved roads in the Mojave Desert. The design, construction, and maintenance of the surface road system are the responsibility of each local jurisdiction's roads department or California Department of Transportation. State roadways in the planning area consist of Interstate freeways, freeways, expressways, highways and surface streets. Mass transit and rapid transit systems in the Mojave Desert of California are limited to the more conventional modes, specifically bus.

The Mojave Desert in California is a major rail corridor for bringing goods in and out of Southern California ports and Los Angeles metropolitan area. The rail network is operated by the private sector with the Southern Pacific and the Burlington Northern-Santa Fe rail systems carrying freight through and beyond the boundaries of the Mojave Desert in California.

Several private, municipal, and regional airports are in the west Mojave Desert in California. These facilities provide opportunities for air traffic and the movement of goods. A wide variety of air flights come out of the region including small private plane operations, passenger flights, and freight movement. In addition, there are several military airfields located within the Mojave Desert in California.

Land Uses: Most of the lands in the project area are managed by the Federal government. They include lands managed by the BLM, DOD, NPS, and USFS.

The Mojave Desert is part of the 25 million-acre California Desert Conservation Area (CDCA), with 12 million acres of those lands administered by the BLM. The BLM manages portions of the Mojave Desert under the Northern and Eastern Mojave Plan (NEMO) and the West Mojave Plan (WEMO), amendments to the CDCA Plan. Land is managed for scenic, ecological, and

cultural resource values, as well as uses that include mining, livestock grazing, recreation, and energy development. The BLM manages much of the middle portion of the Mojave River which flows through alluvial fans, terraces, and flood plains in the West Mojave and is a major source of ground water. Portions of the river are eligible for Wild and Scenic River designation.

There are four large military bases within the Mojave Desert in California: China Lake Naval Air Weapons Station (NAWS), Edwards Air Force Base (EAFB), Fort Irwin, and the Marine Corp Air Ground Combat Center at Twentynine Palms (MCAGCC). The mission of these bases varies. The primary mission of the first two bases is to develop and test weapons and aircraft that will be used to defend the United States. The primary mission of the last two bases is to train troops using simulated battlefield conditions with or without live fire. Among these four bases, NAWS currently hosts the largest of the four existing populations of Mohave tui chubs in the Lark Seep complex (North Channel, George Channel and G-1 Channel). EAFB has three man-made perennial aquatic habitats within its boundaries, Piute Ponds, Golf Course Pond, and Branch Memorial Park pond. Perennial aquatic habitat at Fort Irwin and MCAGCC is rare. At Fort Irwin, the aquatic habitat are isolated springs that are fenced, and in near pristine conditions. At MCAGCC, the aquatic habitat is primarily limited to the wastewater treatment ponds on the south end of the base.

The Mojave National Preserve is a 1.6 million-acre unit of the NPS that represents a combination of Great Basin, Sonoran, and Mojave desert ecosystems. Nowhere else in the United States can such a wide variety of desert plant life be found in such combinations and in such close proximity to each other. Mojave National Preserve is located in southern California, bounded by Interstate Highways 15 and 40 approximately halfway between Las Vegas and Joshua Tree National Park. Its eastern boundary primarily follows the Nevada-California border. The eastern portion of the Mojave River is in Mojave National Preserve including its terminus at Silver Lake near Baker, California.

At the southern end of the Mojave Desert are the San Bernardino and San Gabriel Mountains and the San Bernardino and Angeles National Forests. Both forests are managed by the U.S. Forest Service under land management plans. National forests identify species of concern, which are significant to each forest's biodiversity. The headwaters and part of the historic range of the Mohave tui chub occur on the northern slopes of the San Bernardino Mountains in the San Bernardino National Forest. Because some of these lands are higher in elevation and are the origin of the Mojave River, they provide opportunities to re-establish Mohave tui chubs in their former range while also considering future potential environmental effects from climate change (e.g., warmer temperatures).

SPECIFIC LOCATIONS TO ESTABLISH ADDITIONAL POPULATIONS OF MOHAVE TUI CHUBS AT EXISTING AQUATIC HABITAT

There are four existing populations of Mohave tui chubs in the Mojave Desert and we have identified eight man-made sites as possible locations for establishing additional populations of Mohave tui chubs. In addition, we propose to establish additional populations in Deep Creek and Holcomb Creek. All of these sites meet the physical, chemical, and ecological requirements of the Mohave tui chub. This list is not intended to be a complete list of sites where viable Mohave

tui chub populations could occur in the future or of the sites that are analyzed in this environmental assessment.

Table 3-4. List of existing and potential sites for Mohave tui chub populations

| NAME OF LENTIC HABITAT SITE | LAND OWNERSHIP | ELEVATION (FEET) |
|---|--|-------------------------|
| EXISTING MOHAVE TUI CHUB POPULATIONS | | |
| Lake Tuendae | Mojave National Preserve | 952 |
| Lark Seep Complex | China Lake Naval Air Weapons Station | 2,180 |
| Camp Cady -West and East Ponds | California Department of Fish and Game | 1,714 |
| Lewis Center –Deppe Pond and Tui Slough | Lewis Center for Educational Research | 2,743 |
| ESTABLISH ADDITIONAL POPULATIONS OF MOHAVE TUI CHUBS AT EXISTING AQUATIC HABITAT | | |
| Morning Star Mine Pond | Mojave National Preserve | 4,802 |
| Golf Course Pond | Edwards Air Force Base | 2,427 |
| Victor Valley College Pond | Victor Valley Community College District | 2,807 |
| Deep Creek | San Bernardino National Forest | 3,700-5,400 |
| Holcomb Creek | San Bernardino National Forest | 4,400-6,200 |
| ESTABLISH ADDITIONAL POPULATIONS OF MOHAVE TUI CHUBS AT CREATED/MODIFIED AQUATIC HABITAT | | |
| Coxey Pond | San Bernardino National Forest | 5,595 |
| Piute Ponds | Edwards Air Force Base | 2,282 |
| New Pond at Camp Cady | California Department of Fish and Game | 1,703 |
| New Pond at Victor Valley College/CDFG Hatchery | Victor Valley Community College District/ California Department of Fish and Game | 2,807 |
| New Pond on Bascom Property | Private | 2,729 |

Morning Star Mine Pond

The Morning Star Mine is a former gold and silver mine located on approximately 1,130 acres of unpatented mining claims in the Ivanpah Valley in eastern San Bernardino County. Full-scale development of the Morning Star Mine dates back to the late 1970s. Maximum annual gold production reached 19,776 ounces during 1989. Mining and milling ceased in 1990 but the mine remained open until 1995 (NPS 2002b).

The main features of the mine site are an open pit, waste rock piles, two heap leach pads, and an ore-bearing solution containment pond. Other features include various access roads and

buildings, above ground fuel and chemical storage tanks, monitoring wells, groundwater supply wells, and remnants of the cyanide treatment system. The National Park Service is currently remediating the mine site. During this time the site is closed to the public.

The mine site is about 4,500 feet above mean sea level. The open pit mine at the top is approximately 800 feet square and 150 feet deep with surface water present at the bottom of the pit 15 to 20 feet deep. This is Morning Star Mine Pond. The site has shallow soils with exposed rock in the mine pit area. Water at Morning Star Mine Pond is from natural ground water. Water quality is good based on samples tested by Mojave National Preserve and the CDFG. Soils in the mine area are composed of alluvial material eroded from the nearby highlands. A poorly developed A-horizon soil exists in the upper six-inches of the alluvial materials (NPS 2002b). Biological resources at the pond are limited. There are no known vertebrate species that occupy the pond. A few tamarisk are growing at the water's edge. The area around the mine site is a transitional zone between Joshua Tree Woodland with the Creosote plant community at lower elevations (NPS 2002b). Much of the mine site and specifically the mine pit that surrounds and forms the pond consists of exposed rocky surfaces and is devoid of vegetation.

Special status species that occur near the mine site are the Mojave desert tortoise and loggerhead shrike (*Lanius ludovicianus*), a California sensitive species (NPS 2002b). There are no known federally listed or proposed candidate plant species at or near the mine site (NPS 2002b).

No National Historic Preservation Act considerations are known at this time to occur within the mine remediation project boundary (NPS 2002b).

Land use in the vicinity of the mine site consists primarily of dispersed recreation within the Mojave National Preserve (NPS 2002b). The nearest population center to the project site is Nipton with a population of about 100. It is approximately 20 miles east of the mine site.

Golf Course Pond (EAFB)

The Muroc Lake Golf Course is located in the southwest portion of the cantonment area at EAFB. It has a man-made pond surrounded by manicured greens and fairways. The 0.34-acre pond is within the 185-acre golf course. Access to the pond is by driving the golf cart road or overland on the grass between fairways. The pond receives a combination of tertiary treated waste water from EAFB's Waste Water Treatment Facility and well water. The water flows through the golf course pond via an underground pipe. The opening of the outflow and inflow pipes may be modified to prevent the Mohave tui chub from leaving the pond.

The pond has submergent vegetation and limited emergent vegetation (cattails and rushes). It is surrounded by a lawn of non-native sod grass. The pond is used by non-native mosquitofish, waterfowl, and other migratory birds. There are no known federally or State-listed, proposed, or candidate species, or species of special concern that live at or use the pond as a life requisite for feeding, breeding, shelter, or migration.

There are no known cultural resources at the pond. It has been excavated, graded, and shaped into its current perimeter by heavy equipment several decades ago. Any cultural resources present would have been buried or damaged by these past activities.

The uses of the pond include a backup supply of water to irrigate the greens and a water hazard for golfers to avoid. The use of the land around the pond is to play golf. Occasionally a golf ball will land in the pond and cannot be retrieved.

Victor Valley College Pond

The Victor Valley College Pond is an existing pond about 0.75 acre in size. It is located on the east side of the 253-acre campus and is bordered by a building and parking lot on the west, a baseball field on the north, a cleared area on the east, and a cleared area and irrigated lawn on the south. It is circled by a dirt access road. The perennial pond gets its water from a well and runoff during high rainfall events. Some of the water in the pond is used to irrigate nearby athletic fields.

Victor Valley College is a community college with an enrollment of about 13,000 undergraduate students. The college district includes the nearby communities of Victorville, Apple Valley, Hesperia, Adelanto, Phelan, and nearby unincorporated areas. Access to the campus is on the south side from Bear Valley Road, a major road with access to nearby Interstate 15. The campus is bordered on the west by Spring Valley Parkway, on the north by a residential community and the Mojave Fish Hatchery, and on the east by a levee and the Mojave River. The levee protects the campus from high flows in the Mojave River, which occurs along the eastern edge of the campus, and confines the river's floodplain to area east of this levee.

Coxey Pond

Coxey Pond is located on the north side of the San Bernardino Mountains in the San Bernardino National Forest. There are two ponds; Upper and Lower Coxey Ponds are located at the headwaters of Coxey Creek, a tributary of Deep Creek and the Mojave River in the San Bernardino National Forest. They are at the downslope edge of Coxey Meadow, an open grassy meadow less than 10 acres in area.

The ponds were formed from construction of two small earthen dams several decades ago. The dams impound the water from the spring or seep and any runoff from the meadow. The upper dam is about 150 feet long and releases overflow through one standpipe. The upper dam periodically fills with water after large precipitation events, but as a perennial water source it is a shallow and unreliable pond. The lower earthen dam was built at the lower end of the meadow. It is about 250 feet long and releases overflow through two six foot diameter corrugated metal standpipes into Coxey Creek.

Lower Coxey Pond is a perennial pond with water depths of at least 3 feet in the late summer. Upper and Lower Coxey Ponds are each less than 1 acre in surface area. Over time, much of the footprint of Lower Coxey Pond has been invaded by cattails. The leaves or debris from the cattails has fallen into the pond decreasing both the depth and aquatic area of the pond. The

cattails are slowly converting Coxey Pond from lacustrine habitat to upland habitat. Currently about 50 percent of the lower pond is covered with dense stands of cattails with some bulrush. From digital orthophoto quads from around 1996, the lower pond showed little open water while the upper pond appeared to be small and mostly shallow open water.

In the past, fires upslope from Coxey Pond destroyed vegetative cover leaving the soil vulnerable to erosion from precipitation. Soil erosion impacted water quality and accumulated in low areas and behind impoundments (e.g., Coxey Pond). Since 1999, this scenario has occurred twice at Coxey Pond.

As mentioned above two recently described, rare butterfly species have been identified. *Euphilotes battoides vernalis*, a blue butterfly, is known only from a 1-square mile area of pebble plain habitat around Coxey Meadow. Its entire life history is tied to a single host plant, Kennedy's buckwheat (*Eriogonum kennedyi* var. *kennedyi*). The second butterfly, a checkerspot (*Euphydryas editha erlichii*) has also been observed in the same area. Resident special status species include the two-striped garter snake and possibly the resident three-spined stickleback.

The area adjacent to Coxey Pond was historically used for gold mining and for grazing. These activities no longer occur at the site. The lower pond is periodically used by the San Bernardino National Forest as a water source to fight fires in the area. Because of the encroachment by cattails and recent nearby fires upslope from Lower Coxey Pond, the pond has been impacted from deposition of cattails and recent accumulations of eroded soils. Fire crews have deepened the pond to maintain an adequate source and depth of water to use in fire-fighting efforts.

Because of the long-term presence of water at this site and past use of the site for mining and grazing, the area around Coxey Pond has been surveyed and found to have pre-historic and historic resources. However, impacts to these resources have been avoided during previous modifications to Coxey Pond for fire-fighting efforts.

Access to the site is from Fawnskin via a well maintained dirt road (Coxey Road). Coxey Pond is about 8.7 aerial miles from Fawnskin. Because of its remote location in the San Bernardino National Forest, there is little development near Coxey Pond. Permitted uses in the forest nearby include private recreational camps and seasonal hunting for gamebirds.

The nearest community is Fawnskin (elevation 6,815 feet) with a population of 500 (US Census 2000). The median household income was about 37,000 dollars; unemployment was less than 2 percent. Most people commute to work but are employed in nearby communities.

Piute Ponds

Piute Ponds are located in the southwest corner of EAFB in Kern County. The ponds are southwest of and adjacent to Rosamond Dry Lake. The surface soils at Piute Ponds are a sandy loam with an underlayment of clay, which keeps the surface water from percolating into the ground.

Piute Ponds are located near the terminus of Amargosa Creek. The ponds are a series of interconnected man-made impoundments constructed in 1961 to evaporate effluent discharged from the Lancaster Water Reclamation Plant (LWRP) operated by the Los Angeles County Sanitation District (EAFB 2008). Currently Piute Ponds is composed of a South Impoundment/South Duck Pond, North Impoundment/North Duck Pond, Big Piute Pond, North Buffer Pond, an overflow area to Rosamond Dry Lake, and Little Piute Pond northwest of the duck ponds (Piute Ponds 2011). Piute Ponds currently receive more than 2,400 million gallons of treated waste water from the LWRP each year. Additional water flows intermittently to Piute Ponds from the Amargosa and other creeks in the area (EAFB 2008). The existing infrastructure includes culverts, spillways, and unpaved roads that allow access to the ponds. The large berms that impound the water are topped with dirt roads, which provide access to all of the ponds.

Although a man-made feature, Piute Ponds is the largest freshwater marsh in Los Angeles County. Some of the ponds support native emergent vegetation (cattails and rushes) (wetland habitat). Some of the berms contain native riparian vegetation (willows and cottonwoods) and non-native tamarisk. Piute Ponds is a mosaic of vegetation communities including Transmontane freshwater marsh/ruderal, Transmontane alkali marsh, Alkali meadow, and Shadscale scrub (Piute Ponds 2011).

The footprint of the ponds varies from 200 to 800+ acres, depending on the volume of waste water discharged from the wastewater treatment facility and the rate of evaporation. Currently the Los Angeles County Sanitation District releases secondary treated effluent into Piute Ponds. This water contains high levels of nitrogen, which may not provide suitable habitat for the Mohave tui chub. The LWRP is upgrading its facility to discharge tertiary treated water as required by Federal and State regulation. This additional treatment would improve water quality and reduce the nitrogen levels in the water discharged to Piute Ponds.

Effluent from the LWRP enters at the southwest corner of the ponds and flows northeast, eventually overflowing on to Rosamond Dry Lake located immediately northeast of the ponds. Piute Ponds are located in the Antelope Valley, a closed basin with no outlet to the ocean.

Piute Ponds are an important stop for migratory birds on the Pacific Flyway. The site is designated as an Important Bird Area by the Audubon Society and identified as a Significant Ecological Area by the County of Los Angeles (Cooper 2004). Piute Ponds support more than 200 species of birds (LACSD 2004) and single-day populations of greater than 5,000 waterfowl and 10,000 total birds have been recorded. Piute Ponds is one of a few areas in the state supporting a successful white faced ibis (*Plegadis chihi*) rookery. Black-crowned night herons (*Nycticorax nycticorax*) and great blue herons (*Ardea herodias*) breed at the ponds regularly (Piute Ponds 2011). The muskrat (*Ondatra zibethicus*) and non-native African clawed frog (*Xenopus leavis*) also occur at Piute Ponds.

No Federal or State threatened or endangered species are known to occur at the site (EAFB 2008). The golden eagle (*Aquila chrysaetos*) has been observed at Piute Ponds and is protected under the Bald Eagle and Golden Eagle Protection Act. Species of special concern include the snowy plover, interior population (*Charadrius alexandrinus*), mountain plover (*Charadrius montanus*), and tri-colored blackbird (*Agelaius tricolor*) (Piute Ponds 2011).

The area known as Piute Ponds was formerly a military installation for a short time, then a ranch for about 100 years. Whatever cultural resources that may have been present before the creation of Piute Ponds are now flooded, buried, damaged, or destroyed from construction of the berms and other features to contain and manage the discharged water. Their integrity has been undermined from inundation by water for several decades.

Socioeconomic activities at Piute Ponds are limited. Piute Ponds are located within the boundary of EAFB which controls access to it. EAFB is interested in managing Piute Ponds for its wildlife and associated recreational and educational values (Alderman 2009). The largest recreational activity at Piute Ponds is bird watching but other activities include viewing, hiking, photography education, and hunting. Hunting for waterfowl takes place on a limited basis from fall through winter. School groups from local schools visit Piute Ponds to study the natural resources at the site and learn from the interpretive materials on-site. Piute Ponds are open to the public by obtaining a special access letter or base hunting permit from EAFB.

New Pond at Camp Cady

The 1,870-acre Camp Cady Wildlife Area (CCWA) is located on the Mojave River about 20 miles east of Barstow and 5 miles northeast of Newberry Springs, San Bernardino County. The primary goal of the CCWA is to preserve, protect, and enhance desert-riparian habitat and wildlife species associated with the habitat type. Elevation ranges from 1,680 to 1,760 feet (CDFG 2011 website). The CCWA is located within and north of the Mojave River floodplain. It includes approximately 4 miles of riverbed, adjacent floodplains and terrace bluffs that support more than 600 acres of desert riparian forest habitat (CDFG 2005). The adjacent uplands rise 20 to 50 feet higher than the floodplain.

Access to Camp Cady and its facilities is by existing paved and dirt roads from Interstates 15 and 40. Harvard Road, a road intersecting Interstate-15 to the north, bisects the CCWA. There are several roads within the CCWA, which are for maintenance use only.

The Camp Cady Wildlife Area is located entirely in what is classed as “younger alluvium” derived from the Mojave River by flood flows throughout the last 1.5 million years originating from the largely-granitic San Bernardino Mountains. The following types of soils are present on CCWA: Victorville sandy loam, Badland and Dune land. The sand and gravelly sand types are generally well drained soils derived from granitic sources on alluvial fans. The sandy loams are on the terrace uplands and are of aeolian origin.

Habitat at the Camp Cady Wildlife Area includes Mojave desertscrub habitat, consisting of saltbush and creosote-bursage, and riparian habitat, consisting of honey and screwbean mesquite, willow, and cottonwood trees, non-native tamarisk, saltgrass, saltbush, and cattails. Nine vegetation associations have been mapped and include:

- Tamarisk (*Tamarix* spp.) – 787 acres
- Honey Mesquite-Torillo-Tamarisk (*Prosopis glandulosa-Prosopis pubescens-Tamarix* spp.) – 285 acres
- Mixed Saltbush (includes ‘ruderal’ habitat) (*Atriplex* spp.) – 638 acres

- Desert Bush Seepweed Scrub (*Suaeda moquinii*) – 19 ac
- Creosote Bush-Desert Tea-Pencil Cactus (*Larrea tridentata-Ephedra californica-Opuntia ramosissima*) – 29 acres
- Creosote Bush-Shadscale (*Larrea tridentata-Atriplex confertifolia*) – 140 acres
- Fourwing Saltbush (*Atriplex canescens*) – 8 acres
- Cattail (*Typha* spp.) - <1 acre
- Bulrush (*Scirpus* spp.) - <1 acre

The riparian habitat occurs along the Mojave River, which passes through the center of the CCWA. In the higher elevation areas of the CCWA, creosote bush grows co-dominantly with shadscale and along with occasional cacti, desert tea, and numerous native annual herbs.

Camp Cady provides habitat for various species of small mammals, hawks, shorebirds, quail, dove, and songbirds, and reptiles. More than 200 species of migratory and breeding birds and several species of bats use the riparian habitat here and along other portions of the Mojave River (CDFG 2005).

Two of the three existing ponds at the CCWA are refugia for the federally and State-endangered and State fully-protected Mohave tui chub (*Siphateles bicolor mohavensis*). These ponds, each approximately 0.5 acre, are located south of the Mojave River and were constructed in the 1980s (CDFG 2005). The third pond is used as an auxiliary water supply for fire protection in the event of a power failure during a fire. Historically, Nelson's bighorn sheep (*Ovis canadensis nelsoni*), a CDFG "fully protected" species reportedly obtained water from the Mojave River near CCWA, although its presence at this location has not been documented in recent years. The CCWA lies within the range of the southwestern willow flycatcher and least Bell's vireo: both species are federally and State endangered. The southwestern pond turtle, a species of special concern, uses the Mohave tui chub ponds for habitat. Some of the upland areas provide potential habitat for the federally and State-threatened Mojave desert tortoise (*Gopherus agassizii*) and burrowing owl (*Athene cunicularia*) (State Species of Special Concern).

Camp Cady was originally established in 1860 by the United States Army for the protection of European settlers. From 1884 until 1979 when it was purchased by the CDFG, Camp Cady was a private ranch. A number of historical buildings were located at Camp Cady at the time of acquisition including three barns, a bunk house, Will Frakes' (main) house, one garage, and a water tower/pump house. In addition to these structures, there is an old corral and the remains of a log structure from the 1900s near the CCWA headquarters (CDFG 2005).

Native American artifacts are present on the property, and are commonly found along the Mojave River. A preliminary literature search has been conducted by the Archaeological Information Center, San Bernardino County Museum. Based on the available historical records and maps, CCWA is considered "high" in the sensitivity assessment for prehistoric/historic archaeological resources; "high" for historic resources and "unknown" in cultural landscapes and ethnic resources (CDFG 2005). We presume that there may be pre-historical and historical resources at or near the upland site for the new pond at Camp Cady because of past use of this area by the U.S. Army in the 18th century and its use as a working ranch since that time. Also, Native Americans may have used the site intermittently prior to the Army's occupation because of its proximity to the Mojave River.

The Mojave River flows underground throughout much of the lower Mojave River Valley. It surfaces at Camp Cady providing surface and near-surface water. One or more artesian wells also occur on the wildlife area. Nearby farms pump ground water to irrigate crops. Because the surrounding area continues to be overdrafted without basin recharge, less water has been available in the Mojave River at the CCWA in recent years due to a lower local and regional groundwater table.

Recreation uses at the CCWA include limited camping; hiking, birdwatching; wildlife viewing; and hunting dove, quail, and rabbit. Land uses in the area include a private camp downstream and agriculture near the Mojave River. About 3,000 people live in the closest community, Newberry Springs, which is about 5 miles from the CCWA (US Census 2000).

The proposed pond site is on the north side of the Mojave River and about 0.8 mile downstream from the East Pond. The site is north of the current river channel by about 0.2 mile and about 20 feet higher in elevation. The vegetation is sparse with large open areas of sandy loam soils with a low density and cover of four-wing saltbush, live mesquite, and numerous mesquite snags. Creosote bush vegetation is located nearby north of the site. The nearest stand of riparian vegetation is a thin ribbon of mesquite along the north bank of the Mojave River channel, about 850 feet south. Existing dirt roads lead up to the site.

New Pond at Victor Valley College/Mojave River Fish Hatchery

The size of the new pond would be less than 2 acres. If located on the campus, the new pond would likely be located within the 20.5-acre area on the northeast side of the campus. The area is highly disturbed open land. It is located in an urban setting in the City of Victorville. There is an outflow channel from the CDFG's Mojave Fish Hatchery and a housing development north of the site; a baseball field, campus buildings, and a parking lot to the south; houses and a road to the west; and the west bank levee of the Mojave River to the east. If located on the grounds of the fish hatchery, the pond would likely be placed in the 1.3-acre cleared area off the northwest corner of the raceways. Water would be provided to the pond from the same source as water to the Mojave River Fish Hatchery. An outflow structure from the pond, if needed, would connect to the existing outflow channel from the fish hatchery.

Native flora at the sites is minimal to absent. There is no native woody riparian vegetation at or adjacent to the sites. No Federal or State listed or special status species are known to occur at the sites nor is there habitat present that would likely support them. The sites are near the Mojave River indicating that prehistoric use was likely, but the sites have been previously disturbed by grading. Therefore, the current status of cultural resources is unknown. Current land use is limited to activities compatible with the operation of the college and the hatchery. Vehicle access is limited to traveling through the fish hatchery or through the Victor Valley College campus. The sites can be accessed by walking along the west levee or through the campus.

Construction of the Victor Valley College started in 1963. Student enrollment is greater than 13,000. The college is located at the southeast corner of the city of Victorville. Victorville has a population greater than 100,000 people and encompasses 72 square miles. The adjacent Town of

Apple Valley, on the east side of the Mojave River, has a population of more than 72,000 people and encompasses 73 square miles. Immediately south of the campus is the town of Hesperia with a population of more than 62,000 people and encompasses 67 square miles. Thus, this pond location would be sandwiched between three urban cities.

The Mojave River Hatchery was constructed in 1947, with additional facilities added in 1949 and 1952. The water used at the hatchery is aerated well water to reduce the nitrogen content to meet the needs of the non-native trout produced at the hatchery. The hatchery provides about two-thirds of the catchable-sized trout stocked south of the Tehachapi Mountains in California.

The outflow channel from the hatchery to the Mojave River is a 150-foot lined channel, then a 1200-foot long earthen channel with runs and pools, eventually discharging into the Mojave River. South of the outflow channel, the area appears to have been previously bladed or crisscrossed with tracks from off-road vehicle use. When viewing aerial photography of the site, parallel lines in the soil are visible indicating the site may have been used previously for farming or was graded.

New Pond on the Bascom Property

This pond is located on private land along the eastern edge of Victorville. The pond's footprint would be enlarged from 0.38 acre to about 0.5 acre and the pond would be lined. The pond is bounded on the north by the rocky outcrop of the Mojave Narrows, a railroad track atop a berm and Mojave River to the east, and previously cleared land to the south and west. The ephemeral pond and pond site appear to be the downstream portion of an old oxbow of the Mojave River. Vegetation at the pond site is sparse; a few mature cottonwood trees remain along the edge of the semi-circular oxbow west of the pond site. The rest of the area is devoid of perennial woody vegetation. The Mojave River was cut off from direct access to this former oxbow by the construction of the railroad track in the late 1800s and berm, which narrowed and now delineate the edge of the Mojave River floodplain.

The pond's current ephemeral water supply would be enhanced by water from a nearby well to ensure a perennial supply of water to the pond. Most of the pond site would be fenced to prevent livestock from entering most of the pond, or the entire pond would be fenced to exclude cattle and a trough constructed near the pond to provide water for livestock.

The pond site is part of the historic Bascom Ranch. Cattle grazing still occurs on this remnant parcel of open space within the Victorville city limits. Access to the pond site is by a dirt road off of 11th Street and C Street.

CHAPTER 4. ENVIRONMENTAL CONSEQUENCES AND SELECTION OF PREFERRED ALTERNATIVE

INTRODUCTION

This section presents the likely beneficial and adverse effects to the human environment that would result from implementing the four alternatives. It discusses the potential for each alternative to impair the implementation of the mission of each land owner/land management agency. It also assumes that the mitigation identified in the Measures to Mitigate Adverse Effects and Population Monitoring and Reporting sections of this EA would be implemented under the action alternatives.

This section forms the scientific and analytic basis for the comparison of alternatives. It consolidates the discussions of the following elements:

- The environmental direct and indirect impacts of the alternatives for the proposed action,
- Any adverse environmental effects which cannot be avoided should the proposed action be implemented,
- The relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
- Any irreversible or irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

Cumulative impacts are discussed for each alternative.

Short-term impacts are defined as effects occurring only during or immediately after implementation of the alternative.

Long-term impacts are defined as effects that could occur for an extended period after implementation of the alternative. The effect could last several years or more and could be beneficial or adverse.

METHODOLOGY

Significance Criteria (by Impact Topic)

In the Council on Environmental Quality's regulations for implementing NEPA (Section 1508.27), "significantly," as used in NEPA, requires considerations of both context and intensity:

a. Context—This means that the significance of an action must be analyzed in several contexts such as society as a whole (human/national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

b. Intensity—This refers to the severity of impact.

Criteria and Thresholds for Impact Analysis

Table 4-1 presents the significant criteria that were developed and used to evaluate the various potential impacts to each resource area for each alternative considered.

The impacts of the various alternatives are summarized in Table 4-2.

Impact analyses and conclusions are based on coordinating with appropriate agency staff of the affected land management agencies that are cooperating agencies and likely to be affected by implementation of the proposed action (e.g., Mojave National Preserve, Edwards Air Force Base, Naval Air Weapons Station-China Lake, Bureau of Land Management-California Desert District, San Bernardino National Forest, California Department of Fish and Game). These entities are the most knowledgeable about the resources in the project area. The analyses are based on a review of existing literature and information provided by agencies' experts. Any impacts described in this section are based on preliminary design of the alternatives under consideration. Effects are quantified where possible; in the absence of quantitative data, best professional judgment prevailed.

Table 4-1. List of Significance Criteria to Determine the Threshold for Significance Regarding Various Potential Impacts for each Impact Topic

| Impact Topic | Significance Criteria of the Proposed Action |
|--|---|
| Threatened and Endangered Species (includes proposed, candidate, fully protected, species) | Causes mortality, permanent habitat loss, or lowered reproductive success for individuals of State or Federally threatened or endangered plant or animal species or plants or animals proposed for State or Federal listing as threatened or endangered, candidate species, or species of special concern |
| | Causes long-term or permanent displacement of substantial portions of local populations of State or federally listed, proposed, or candidate plant or animal species, or species of special concern including areas used as movement corridors or areas that provide connectivity among populations |
| | Causes mortality, permanent habitat loss, or lowered reproductive success for wildlife species designated by the state of California as fully protected species |
| | Reduces a plant or wildlife species to a level that meets the definition of threatened or endangered |
| Aquatic Habitat/ Essential Habitat | Diminishes habitat for fish, wildlife, or plants by the loss of the available habitat or number of individuals of any plant or animal species (sensitive or non-sensitive species) that could affect the abundance of a species or the biological diversity of an ecosystem beyond normal variability |
| | Cumulatively causes the measureable degradation or loss of sensitive or unique habitats |
| | Causes long-term or permanent displacement of substantial portions of local populations of state or federally listed, proposed, or candidate plant or animal species, or species of special concern by impacting areas used as movement corridors or areas that provide connectivity |

| | |
|-----------------------------|---|
| | among populations |
| | Increases or reduces flows that substantially diminish habitat for fish, wildlife, or plants |
| | Degrades or contaminates water supply for its beneficial use |
| Recreational Fishing | Diminishes the opportunity to engage in recreational fishing by reducing the quantity of the recreational fishery habitat in the project area such that there is a 10 percent or more reduction in the size of the catchable fish population. |
| | Increases the use of existing recreational facilities such that a substantial deterioration of the facility would occur or be accelerated |
| | Diminishes or displaces the opportunity to engage in recreational fishing by reducing the fishable area currently used for recreational fishing in the project area by 10 percent or more. |

Table 4-2. Comparison of the environmental impacts of each alternative with the issues and impact topics – establishing new populations of Mohave tui chubs

| | Threatened and Endangered Species | Aquatic Habitat/Essential Habitat | Recreational Fishing |
|--|--|---|--|
| Alternative A No New Action | No change | No change | No change |
| Alternative B Establish populations at existing aquatic habitat | Beneficial moderate increase to Mohave tui chubs, no impact to other protected species | Minimal increase in aquatic habitat; negligible decrease in wetland habitat | Negligible decrease in areas where fishing would occur |
| Alternative C Establish populations at newly created aquatic habitat | Beneficial moderate increase to Mohave tui chubs; no change or negligible adverse impacts to other protected species | Minimal increase aquatic habitat and negligible increase in wetland habitat | Minimal decrease in areas where fishing would occur |
| Alternative D Establish populations at existing and newly created aquatic habitat | Beneficial moderate increase to Mohave tui chubs; no change or negligible adverse impacts to other protected species | Minimal increase in aquatic habitat and negligible increase/decrease in wetland habitat depending on the site | Minimal decrease in areas where fishing would occur |

1. No Change or None–There is no impact expected.
2. Negligible–The impacts are very small and possible, but not probable or likely to occur.
3. Minimal–The impacts are not expected to be measurable and are within the capacity of the impacted system to absorb the change, or the impacts can be compensated for with little effort and resources so the impact is not substantial.
4. Minor–The impacts are measurable, but are within the capacity of the impacted system to absorb the change, or the impacts can be compensated with limited effort and resources so the impact is not substantial.
5. Moderate–The impacts are measurable but do not violate any laws or regulations and are within the capacity of the impact system to absorb or can be mitigated with effort and/or resources so that they are not significant.
6. Major–The impacts individually or cumulatively could be significant.

ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES

Threatened and Endangered Species

Alternative A – No New Action

There would be no change to existing conditions. No individuals or species would be added or lost. Therefore, there would be no new effect on threatened and endangered (protected) species.

Alternative B - Establish Additional Populations at Existing Aquatic Habitats

Trapping, Transport, Release, and Species Monitoring:

Mohave tui chubs would be trapped and transported to new locations. The capture and transport of up to 600 small Mohave tui chubs to a new location would not result in the loss of a substantial number of Mohave tui chubs from the source population. This is because one Mohave tui chub adult female produces 5,000 or more eggs per year. After hatching, most of these fry do not survive to adulthood at the source population. Because young-of-the-year fish would be trapped and transported, they would be “saved” by being transported and released at the recipient site to establish a new population. Thus in less than 1 year from the time of capture, there would be an increase in the number of Mohave tui chubs at the recipient site and the net result would be an overall increase in the number of Mohave tui chubs and populations. Because more fry would survive to adulthood at the recipient site and there would be another population of Mohave tui chubs established, this action would result in a minor beneficial effect to Mohave tui chubs.

The transport of Mohave tui chubs from existing populations to new populations would occur primarily within the range of the Mojave desert tortoise. The action of driving a vehicle on existing roads for transport and monitoring can result in an increased probability of vehicular strikes of Mojave desert tortoises. However, this impact will likely be negligible given the large number of vehicle trips per day on roads in the Mojave Desert when compared to the two to four vehicle trips per translocation event, the two to five vehicle trips per monitoring event. In addition, these vehicles would remain on existing roads where visibility of a Mojave desert tortoise on a road would be excellent, maximum speed limits would be adhered to including limits of 20 m.p.h. on dirt roads, and all workers associated with the alternative would receive Mojave desert tortoise awareness training including checking under vehicles before moving them. Outside of Mojave desert tortoise habitat, other threatened and endangered species should not be affected by the trapping, transport, release, and monitoring of Mohave tui chubs. Activities would be confined to existing roads and cleared areas. Implementation of these activities should result in no to negligible adverse impacts to the threatened and endangered species with the exception of the Mohave tui chub. The mitigation measures implemented for the Mohave tui chub will reduce the adverse impacts to the species to a minimal level. The establishment of additional populations of Mohave tui chubs would have minimal beneficial impacts for this species. Therefore, the trapping, transport, release, and monitoring of the Mohave tui chub to establish additional populations at existing aquatic sites would have a minimal impact on threatened and endangered species.

Habitat Monitoring and Management:

Habitat monitoring would occur prior to releasing Mohave tui chubs at the receiving site and periodically after Mohave tui chubs have been released. This activity includes taking water quality samples and measuring the physical, chemical, and ecological parameters of the aquatic habitat such as water depth, surface area, water temperature, dissolved oxygen, pH, conductivity, and heavy metals. The amount of water removed for sampling would be less than two gallons and would be performed at most four times a year but typically once a year. This activity would be performed to avoid or minimize disturbing the Mohave tui chubs and any other wildlife species that may be present. The impact to protected species from this activity is considered negligible.

Habitat management may occur at the receiving site prior to establishing Mohave tui chubs and/or after establishing chubs to maintain the physical, chemical, and ecological parameters needed by the Mohave tui chub to persist at this location. Habitat management includes a number of activities including, removal or reduction of non-native species; modifying water depth to provide both deep and shallow habitats; and managing invasive emergent vegetation to ensure a mosaic of open water, water with emergent vegetation, and water with riparian vegetation. These latter two management actions would be limited to lentic or still water aquatic habitats (e.g., ponds).

For the removal or reduction of non-native species, we would periodically sample for the presence of non-native species in and adjacent to the aquatic site using various methods including observations, netting, and live trapping. If non-native species are present, we would implement a regimen to reduce or remove the non-native species. The methodology used would include physical or ecological measures such as removal by hand, mowing or cutting (for plants), netting, live trapping, temporary drawdown of water, and electrofishing. No chemical methods would be used to reduce or eliminate non-native species. Most currently available chemical methods are highly toxic to aquatic environments and may possibly destroy Mohave tui chubs (if present) or other beneficial organisms in the aquatic habitat. Once removed from the site, the disposition of non-native species would comply with the current land management plan for the relevant land management agency.

Modifying water depth to provide both deep and shallow water may require the one-time or periodic use of heavy equipment, such as a back hoe, to remove sediment and plant debris. This situation is more likely to occur in small lentic aquatic habitats such as Coxey Pond in San Bernardino National Forest. These aquatic habitats are small, shallow reservoirs or ponds. Soil and plant material sources upslope may be washed downslope and captured behind the small dam or wall that forms the pond. On-site plant debris from cattails may contribute substantially to the debris deposited in these ponds.

A backhoe or other equipment would be transported to the aquatic site on existing roads and would be parked away from the edge of the aquatic habitat. Standard spill prevention and response measures would be implemented to prevent potential pollutants (e.g., fuel, oil, transmission fluid, hydraulic fluid) from entering the aquatic habitat. The backhoe would remove sediment and debris (e.g., cattail root wads) from the bottom of the aquatic site. The removal would not change the footprint of the aquatic habitat; rather it would deepen the aquatic

habitat in some locations, providing more open water for the Mohave tui chub and greater ability of the aquatic habitat to buffer temperature extremes in winter and summer. It would also deter the re-establishment of cattails in these deeper ponded areas. The aquatic habitat would still contain cattails but their removal at some areas would allow native species of sedges and rushes to become established. These emergent species are important in providing bank stabilization for the aquatic habitat and contributing to the plant and habitat biodiversity at the sites. The removed sediment and debris would be transported to a nearby upland location to naturally decompose. The location would receive prior approval by the jurisdictional land management agency. The location would be outside the immediate watershed of aquatic site so future runoff from precipitation events would not re-deposit the material into the aquatic habitat. If the source of the sediment and debris in the aquatic habitat is primarily from upslope in the watershed (e.g., erosion), we may construct a small berm around some of the aquatic habitat to deter future deposition from erosion sources. The berm would be rounded and less than 2 feet in height. The sediment removed from the aquatic habitat would be the source of the berm material as it is from the watershed of the affected aquatic habitat. The bermed material would be placed using heavy equipment or hand labor, depending on the available access around the upslope edge of the aquatic habitat.

Impacts to threatened and endangered species at these lentic habitat locations include crushing species that are present on the access roads/sites used by equipment to work in the aquatic habitat. These areas would be surveyed prior to bringing and using that equipment at the aquatic sites to ensure that these species are avoided. Impacts from operating equipment in aquatic habitat include reduced water quality and increased sedimentation in the water column. The suspended sediments impede the ability of aquatic organisms including Mohave tui chubs to breathe, feed, and look for predators (by reducing visibility). However, these impacts would be short-term (a few days to a week), would impact a small area of aquatic habitat (usually 1 acre or less), and would occur once prior to establishing the population of Mohave tui chubs or once every several years.

Berm construction may result in the burial of threatened and endangered species. To avoid this impact, the berm site and access areas would be surveyed prior to and during the berm construction process. If species are found during the survey, the location of the berm would be modified to avoid the threatened or endangered species.

Removal of sediment and debris may also result in the mortality or injury of any threatened or endangered species present in the construction area. Prior to initiating this activity, we would coordinate with the appropriate land management and regulatory agencies to determine if any threatened, endangered, or sensitive species may be present in the project area. If they may be present, we would consult with the appropriate agencies to develop and implement site specific measures to avoid impacts to the species. If avoidance is not possible, we would obtain necessary permits/authorizations as required by appropriate Federal and State regulations.

These and any other habitat management activities that may affect threatened and endangered species would likely be conducted during times of the year (e.g., the fall and winter) that avoid the breeding season for species and during the periods when surface water is available to wildlife at other nearby locations.

To manage invasive emergent vegetation and ensure a mosaic of water-dependent habitats, we may remove invasive vegetation such as cattails using hand tools or a specially designed small boat. The boat is a platform that holds a mechanism that cuts the vegetation below the water's surface. The platform facilitates the collection of this cut plant material so it can be hauled away to an upland site to naturally decompose. These methods have been used at other aquatic habitats occupied by Mohave tui chubs and no adverse effects to the species have been observed. As the equipment is placed in the water and during operation, any chubs in the area disperse. The area affected by this operation is less than 0.25 percent of the surface area of a pond at any given time. This allows more than 99 percent of the habitat in the pond still available for feeding, breeding, or shelter. To ensure that no new non-native species (e.g., quagga mussels, etc.) are introduced to the aquatic habitats, the mitigation measures in the proposed action and Appendices A and B would be implemented. Thus, the impact to aquatic species in the pond from managing emergent vegetation is considered negligible to protected species.

At some sites (e.g., Deep Creek, Holcomb Creek), existing permitted or emergency activities (e.g., watering livestock, temporary pumping of water for firefighting) are likely to continue to occur. These activities may temporarily adversely impact the Mohave tui chub from the death or injury of some individuals but the long-term impact would be beneficial from establishing and managing additional and sustained populations of the Mohave tui chub.

If habitat monitoring data indicate that the aquatic habitat is being lost because it is converting to upland habitat, the cause(s) of this loss (e.g., excess growth and buildup of emergent plant materials and submerged plant debris) would be removed to provide the physical, chemical, and ecological parameters needed to sustain a population of Mohave tui chubs at the site. This activity would be performed using hand tools or a boat with access provided by standing on shore, wading into the water, or sitting in a small boat. Removing emergent vegetation, debris, and sediment may result in the short-term disturbance of Mohave tui chubs and other species that occur or use the aquatic habitat, but the activity would be limited to a few days a year and would be confined to a portion of the total area of aquatic habitat. Habitat management activities would likely be conducted in the fall and winter, which is outside the breeding season for fish, amphibians, birds, and mammals and during the time when water is most readily available to wildlife.

For habitat monitoring and management activities, we would comply with applicable Federal and State regulations regarding water quality and protected species, and develop and implement protective measures to avoid, and if not possible, minimize disturbance to species that occur in or use the aquatic habitat. Thus, the impacts to threatened and endangered species from habitat monitoring and management at existing aquatic habitat sites should be negligible in the short-term, and minimally beneficial in the long term.

Alternative C – Establish Additional Populations at Newly Created/Modified Aquatic Habitats

These aquatic habitats would likely be created by constructing dikes or berms or berms and depressions to contain surface water. Because these habitats would be man-created, they would be small in size (i.e., most less than 2 acres) and would be lentic or pond habitats. Examples of

newly created aquatic habitats would be a new pond at Camp Cady or a new pond at Piute Ponds.

Construction/ Modification of Aquatic Habitats:

Sites would be selected based on a number of factors including proximity to and availability of a reliable and authorized source of water, invitation by the landowner, and ability of the land owner/manager to monitor and manage for the Mohave tui chub and aquatic habitat or assist with these activities. Construction/modification of aquatic habitats would most likely occur at disturbed habitats in urban settings (e.g., New Pond at Victor Valley College, Bascom Pond) or rural settings (e.g., Coxey Pond, and Piute Ponds). One or two sites may be at undisturbed upland habitat (e.g., New Pond at Camp Cady). Access may already exist (e.g., previously disturbed habitats - Piute Ponds, Coxey Pond, Bascom Pond, New Pond at Victor Valley College and undisturbed habitat - New Pond at Camp Cady) or may be created (e.g., undisturbed habitat).

The conversion of undisturbed or disturbed upland habitat to aquatic habitat and the use of existing access roads or construction of new access roads may result in the death or injury of special status species such as the Mojave desert tortoise. It may also result in the loss of habitat used for breeding, feeding, shelter, or impede or prevent movement. However, the size of the habitat converted from upland habitat to aquatic habitat would likely be less than 2 acres at each site. As an example, the loss of 2 acres of Mojave desert tortoise habitat at a dozen or fewer locations in the Mojave Desert (upland habitat) is minimal when compared to the thousands of acres of habitat present. The location of the newly created aquatic habitat would be limited to sites with existing water. This means that the created aquatic habitat would be a small extension (2 acres or less) of aquatic habitat already present. The size and location of this aquatic habitat is unlikely to impact the movement of the Mojave desert tortoise or fragment its habitat. Although additional aquatic habitat would be present within the range of the common raven, a predator of the Mojave desert tortoise, the created or modified habitat would be designed with steep banks and sufficient water depths to meet the needs of the Mohave tui chub and minimize or eliminate the shallow areas needed by cattails to grow. These factors would also limit the common raven's access to these modified or new aquatic habitats. In addition, creation of new aquatic habitat would benefit a number of terrestrial, amphibious, and aquatic native species in addition to the Mohave tui chub. Because water is the most limiting factor in the desert, the creation of a new perennial source of water would be used by numerous resident and migratory wildlife species.

The specific sites identified in the action alternatives are not located in habitat typically used by the Mojave desert tortoise for feeding, breeding, or shelter. The proposed site of the New Pond at Camp Cady may provide habitat used by the Mojave desert tortoise to move from one area to another, but this location is between riparian and creosote vegetation. Because the Mojave desert tortoise is not known to use riparian vegetation, it is unlikely that the Mojave desert tortoise would be moving from creosote vegetation through sparse live and dead mesquite to riparian vegetation. Thus the construction and operation of the New Pond at Camp Cady is unlikely to impact the Mojave desert tortoise.

Each site would be evaluated for its potential impacts on threatened and endangered species. Avoidance and minimization measures will be incorporated into the design of the aquatic habitat and the methods of construction/modification. Appropriate Federal, State, and local agencies

will be consulted in the development and construction/modification of the aquatic habitat to ensure that adverse impacts are avoided whenever possible. Avoidance measures include alterations in timing, location, and method of construction. Because there is flexibility in designing, locating, and implementing the construction/modification of aquatic habitats at all locations and because disturbed locations will likely have few to no new impacts on special status species, the construction/modification of small aquatic habitats should have minimal impacts on threatened and endangered species present at or near the sites. The creation of one or more aquatic habitats and establishing one or more populations of the Mohave tui chub would have moderate beneficial impacts to this species.

To avoid the take of migratory birds, ground disturbing activities would occur outside the nesting season (March 1 – August 30). The construction activities would also avoid the removal of native woody riparian vegetation. At some locations (e.g., Coxey Pond), the modifications to the aquatic habitat would improve habitat for migratory and wetland birds and provide a new or reliable perennial water source for resident and migratory wildlife.

Trapping, Transport, Release, and Species' Monitoring:

Under this alternative, new populations of Mohave tui chubs would be established at newly created/modified aquatic habitat. The effects to Mohave tui chubs and other threatened and endangered species would be similar to those described in Alternative B above. Therefore, the trapping, transport, release, and monitoring of the Mohave tui chub to establish additional populations at newly created aquatic sites would have a minimal impact on threatened and endangered species.

Habitat Monitoring and Management:

Under this alternative, the habitat at the newly created aquatic habitats would be monitored and managed. The effects to threatened and endangered species for this alternative would be similar to those described in Alternative B above. However, because we would design and construct this aquatic habitat, if done correctly we should be able to avoid or minimize the conditions that would require deepening aquatic habitats. Thus, management to deepen aquatic habitat may not be needed at newly created aquatic habitats. As with Alternative B, we would comply with applicable Federal and State regulations regarding water quality and protected species, and develop and implement protective measures to avoid, and if not possible, minimize disturbance to species that occur at the project site or nearby.

At some sites (e.g., Coxey Pond, Bascom Pond), existing permitted or emergency activities (e.g., watering livestock, temporary pumping of water for firefighting) are likely to continue to occur. These activities may temporarily adversely impact the Mohave tui chub and a small portion of its habitat. These activities would continue/occur periodically with minimal loss of Mohave tui chubs but long-term beneficial impacts from maintaining populations of the Mohave tui chub.

Thus, the impacts to threatened and endangered species from habitat monitoring and management at existing aquatic habitat sites should be negligible in the short-term, and minimally beneficial in the long term.

Alternative D – Establish Additional Populations at Existing and Newly Created/Modified Aquatic Habitats

Construction of Aquatic Habitats:

The impacts to threatened and endangered species from the construction of new aquatic habitat would be similar to those described in Alternative C above.

Trapping, Transport, Release, and Species' Monitoring:

The impacts to threatened and endangered species would be similar to those described in Alternative B.

Habitat Monitoring and Management:

The effects to threatened and endangered species for this alternative would be similar to those described in Alternative C above.

Aquatic Habitat/Essential Habitat

Alternative A – No New Action

Under this alternative, no action would be implemented that would result in a change in the amount. Therefore, this alternative would result in no effect to wildlife habitats.

Alternative B – Establish Additional Populations at Existing Aquatic Habitats

Trapping, Transport, Release, and Species' Monitoring:

This activity would be limited to a few days per year. All vehicles would use existing roads and access points to water bodies, many of which are a bladed, compacted dirt surface. There would be no new surface disturbance from trapping, transport, release, and monitoring efforts. Impacts to aquatic habitat and essential habitat from this activity would include no long-term change to the species' habitat. Placement and removal of fish traps (24 inches x 12 inches) may result in disturbance of sediment. However, this disturbance would be very small, localized, and limited to a few days per year. The release of Mohave tui chubs at new locations would not affect water quality. Nothing would be placed in the water at the receiving site except Mohave tui chubs and a limited amount of water from the donor site. The aquatic habitat would remain unchanged regarding surface area and shape. No chemicals would be placed in the aquatic habitat as these would likely harm the Mohave tui chub. Therefore, there would be negligible impacts to existing aquatic habitat.

We are unaware of any other changes to the physical, chemical, or ecological components of the aquatic habitat or essential habitat of the Mohave tui chub or other species from these activities.

Habitat Monitoring and Management:

As mentioned above, this activity includes collecting water quality samples and measuring the physical, chemical, and ecological parameters of the aquatic habitat such as water depth, surface area, water temperature, dissolved oxygen, pH, conductivity, and heavy metals. The possible adverse impacts to the aquatic environment from these activities, such as stirring sediment so it

becomes suspended in the water column and other impacts to water quality, would be avoided or minimized by restricting the impact to a small, localized site.

If habitat-monitoring data indicate that aquatic habitat is being lost through conversion to upland habitat, the cause(s) of this loss (e.g., excess growth and buildup of emergent plant materials and submerged plant debris, increased runoff and deposition of sediment, etc.) would be identified. The deposited materials would be removed at levels sufficient to maintain the physical, chemical, and ecological parameters needed to sustain a population of Mohave tui chubs at the site. This activity would be performed using hand tools or a boat with mechanical scissors. Access would occur by standing on shore, wading into the water, or sitting in a small boat. Removing emergent vegetation, debris, and sediment may result in the short-term disturbance of water quality parameters such as turbidity, but the activity would be limited to a few days a year and would be confined to one portion of the aquatic habitat site at any one time. Habitat management activities would likely be conducted in the fall and winter, when dissolved oxygen levels are higher and water temperatures are cooler to minimize stress on aquatic species. Given the magnitude and duration of the habitat management activities, there should be negligible, localized, short-term adverse effects from these activities. When habitat management activities are completed, the result would be an increase in the area and volume of aquatic habitat.

At some sites (e.g., Deep Creek, Holcomb Creek), existing permitted or emergency activities (e.g., watering livestock, temporary pumping of water for firefighting) are likely to continue to occur. These activities may adversely impact the aquatic habitat by temporarily impacting water quality and reducing the water level at an aquatic habitat site. For example, periodic pumping of water from a pool in a stream may lower the water level of the pool, but because of the continual inflow of water from upstream, the water level in the pool would return quickly. Because these activities would be temporary or restricted to limited area within the aquatic habitat, there would be minimal to negligible impacts to the aquatic habitat.

If large-scale events (e.g., fire upslope) result in significant modifications to the aquatic habitat sites (e.g., runoff and deposition of sediment and debris), short-term use of heavy equipment may be necessary to restore the long-term physical, chemical, and biological parameters of the aquatic habitat for the Mohave tui chub. Such equipment would be land-based (e.g., backhoe). We would comply with applicable Federal and State regulations regarding water quality and protected species, and develop and implement protective measures to avoid, and if not possible, minimize disturbance to wildlife species that occur in or use the area near the aquatic habitat. We estimate that the use of heavy equipment at an aquatic habitat site would be for a few days during the year and would be necessary following severe natural events, which should be infrequent. Thus, the impacts to aquatic habitat from habitat monitoring and management at existing aquatic habitat sites should be negligible in the short-term for ongoing management, minimally adverse following the occasional severe natural event, and minimally beneficial in the long term by maintaining aquatic habitat which is a rare habitat in the Mojave Desert in California.

Alternative C – Establish Additional Populations at Newly Created/Modified Aquatic Habitats

Construction/Modification of Aquatic Habitats:

Sites would be selected based on a number of factors including proximity to and availability of a reliable and authorized source of water, invitation by the landowner, and ability of the land owner/manager to monitor and manage for the Mohave tui chub and the aquatic habitat. Construction of new aquatic habitat would likely occur in upland habitat near water sources. Thus, no surface water would be present during construction and there would be no impact to water quality from construction of these ponds. These upland sites may be previously disturbed habitats in urban or rural settings (e.g., school campus, fish hatchery, mine site) or undisturbed upland habitat. Access may already exist (e.g., previously disturbed habitat) or may be created (e.g., undisturbed habitat).

The construction of new aquatic habitat sites would result in surface disturbance and the operation of heavy equipment. This activity would result in the permanent conversion of undisturbed or previously disturbed upland habitat to aquatic habitat. This loss of habitat may include habitat used for breeding, feeding, shelter, or impede or prevent movement/connectivity. However, this impact would be localized, affect a small area at each site (e.g., estimate 2 acres or less), occur at a small number of sites, would be a one-time event, and the construction activity would be of short duration. Water would likely be supplied from subsurface wells or other sources with appropriate water rights. Water quality would be adequate to support these additional populations of Mohave tui chubs. The amount of water needed to establish and maintain the newly created aquatic habitats would be a small when compared to the amount of water used daily in the Victor Valley, a small area in the Mojave Desert of California.

The modification of existing aquatic habitats would occur when the water level was low (e.g., Coxey Pond, Piute Ponds) or not present (e.g., Bascom Pond, Piute Ponds). The latter situation would result in no impact to water quality. At Coxey Pond, modifications using heavy equipment would occur outside the breeding, fire, and bird hunting seasons. The preferred time is in the fall or end of the dry season as water levels in Coxey Pond should be low. The use of mechanized equipment in the pond to deepen it would result in temporarily placing sediment in the water column, but this activity would occur for only a few days. The result would be a larger amount of aquatic habitat. At Piute Ponds, modifications to the existing aquatic habitat using mechanized equipment would occur in a small area of the 200+acre site and would be confined to one pond so as not to affect the water quality of the other ponds. To facilitate the use of heavy equipment, surface disturbance would occur when the site had minimal to no water and outside the breeding, migration, and hunting seasons. Because we are proposing to establish one or a few small ponds (e.g., less than 2 acres each) and not constructed concurrently, the impact to water quality from the use of heavy equipment would occur for only a few days. The source material to construct the additional berms would be from on site, or if brought from off site, would be tested to ensure it was not contaminated with materials (e.g., chemicals, metals, etc.) that are harmful to native species that live in or use aquatic habitats.

Each site will be evaluated for its potential impacts on special status species. Avoidance and minimization measures will be incorporated into the design of the aquatic habitat and the method of construction. Appropriate Federal, State, and local agencies will be consulted in the development and construction of the aquatic habitats to ensure that impacts are avoided whenever possible. Avoidance measures may include alterations in timing, location, and method of construction. Because there is flexibility in designing and implementing the construction of

aquatic habitats at previously undisturbed locations and because previously disturbed locations will likely have few to no new impacts on special status species, the construction of small aquatic habitats should have minimal impacts on threatened and endangered species. For example, the loss of 2 acres of Mojave desert tortoise habitat at a handful of locations in the Mojave Desert is minimal when compared to the thousands of acres of habitat present. The creation of new aquatic habitat should have minimal beneficial impacts to the Mohave tui chub.

The creation of new perennial aquatic habitat would result in a negligible increase in surface water. However, it would benefit a number of native terrestrial, amphibious, and aquatic species in addition to the Mohave tui chub. Because water is the most limiting factor in the desert, the creation of a new perennial source of water would be used by numerous resident and migratory wildlife species and may become essential habitat for some of these species. Given these conditions, the effects to aquatic and essential habitat would be minimal and beneficial at a local level and negligible within the project area given its size and the size of the new perennial aquatic habitats.

Trapping, Transport, Release, and Species' Monitoring:

The impacts to aquatic and essential habitats would be similar to those described in Alternative B above.

Habitat Monitoring and Management:

The impacts to aquatic and essential habitats would be similar to those described in Alternative B above .

Alternative D – Establish Additional Populations at Existing and Newly Created/Modified Aquatic Habitats

Construction of Aquatic Habitats:

The impacts to aquatic and essential habitats from the construction of new aquatic habitat would be similar to those described in Alternative C above.

Trapping, Transport, Release, and Species' Monitoring:

The impacts to aquatic and essential habitats would be similar to those described in Alternatives B above.

Habitat Monitoring and Management:

The effects to aquatic and essential habitats for this alternative would be similar to those described in Alternative B above.

Recreational Fishing

Alternative A – No New Action

Under this alternative, no action would be implemented that would result in a change in the amount or location of recreational fishing. Therefore, this alternative would result in no effect to recreational fishing.

Alternative B – Establish Additional Populations at Existing Aquatic Habitats

Trapping, Transport, Release, and Species' Monitoring:

This activity would be limited to a few days per year. All vehicles would use existing roads and access points to aquatic habitat, many of which are a bladed, compacted dirt surface. There would be no new surface disturbance from trapping, transport, release, and monitoring efforts. Impacts to recreational fishing from trapping and transport would not occur because the locations of populations of Mohave tui chubs do not allow recreational fishing (e.g., Lake Tuendae, Lark Seep Complex). The release of Mohave tui chubs at some locations may occur at current or previous fishing locations. For example, portions of Deep Creek and Holcomb Creek have an introduced trout fishery. Locations such as Deep Creek would likely receive Mohave tui chubs at locations upstream from the current area with non-native trout. Other locations (e.g., Coxey Pond, etc.) may be small local “fishing holes” created by the local angling community that provide limited recreational fishing opportunities for non-native sport fishing (e.g., bluegill (*Lepomis macrochirus*), small-mouth bass (*Micropterus dolomieu*)). They also contain non-native aquatic animals (e.g., goldfish (*Carassius auratus*), bullfrog, etc.). The release of sport fish and pets is unauthorized under State and Federal regulations and policies. Both pond and stream habitats in the watershed of the Mojave River have non-native aquatic species. Aquatic habitats (e.g., Coxey Pond, Piute Ponds) with non-native species that may be detrimental to the Mohave tui chub would be renovated by removing the non-native species and, as necessary, increasing the depth of the pond. Renovation methods would include live trapping, electrofishing, and dewatering. Chemical treatments that poison animals would not be used.

Nonnative and unauthorized aquatic species would be removed or their numbers reduced from all sites into which the Mohave tui chub will be released. Recreational fishing would no longer occur at these fishing holes. This would reduce the area and availability of recreational fishing; however, this reduction would be small (less than 1 acre) per site and likely not more than one or two sites. The number and aerial loss of recreational fishery in the Mojave Desert area in California would be small compared to the remaining number and aerial extent of authorized recreational fishing in the Mojave Desert in California. The amount of aquatic habitat would not change, just the type of fishery. Therefore, there would be negligible impacts to existing recreational fishery.

Habitat Monitoring and Habitat Management:

As mentioned above, this activity includes collecting water quality samples and measuring the physical, chemical, and ecological parameters of the aquatic habitat such as water depth, surface area, water temperature, dissolved oxygen, pH, conductivity, and heavy metals. The adverse impacts to the recreational fishery from these activities, such as stirring sediment so it becomes suspended in the water column and other impacts to water quality, would be avoided or minimized by restricting the impact to small, localized sites. In addition, these activities should already be occurring on a periodic basis by agencies that manage the recreational fishery and water quality in streams and rivers (e.g., Deep Creek, Holcomb Creek, and the Mojave River). At lentic or ponded sites, these activities may not currently occur but would be initiated at sites with Mohave tui chubs. These activities would have no impact on the recreational fishery as the Mohave tui chub would likely not survive at a small ponded location with non-native fish

because of pressures from predation, competition, and introduced diseases. Therefore, there would be no recreational fishery at such a site and therefore no impacts to a recreational fishery.

If habitat-monitoring data indicate that aquatic habitat is being lost through conversion to upland habitat, the cause(s) of this loss (e.g., excess growth and buildup of emergent plant materials and submerged plant debris, increased runoff and deposition of sediment, etc.) would be identified. Habitat management activities would then be implemented to remove or reduce these impacts at levels sufficient to maintain the physical, chemical, and ecological parameters needed to sustain a population of Mohave tui chubs at the site. Although the conversion of aquatic to upland habitat and therefore loss of aquatic habitat is unlikely to occur in a perennial riverine habitat, the activities implemented to maintain the physical, chemical, and ecological parameters for the Mohave tui chub would also likely benefit other species of a recreational fishery (e.g., non-native trout). These activities would likely be performed using hand tools because of limited vehicle access. Human access would occur by standing on shore, wading into the water, or siting in a small portable boat. Removing emergent vegetation, debris, and sediment may result in the short-term disturbance of water quality parameters such as turbidity, but the activity would be limited to a few days a year and would be confined to one portion of the aquatic habitat site at any one time. Habitat management activities would likely be conducted in the fall and winter, when dissolve oxygen levels are higher, water temperatures are cooler, and after the breeding season. Given the magnitude and duration of the habitat monitoring, there should be negligible, localized, short-term adverse effects from these activities. When these habitat management activities are completed, the result would be a negligible to minimal improvement to the aquatic habitat and recreational fishery depending on the size of the lost aquatic habitat and size of the improved habitat.

Thus, the impacts to the recreational fishery from habitat monitoring and management at existing aquatic habitat sites should be negligible to minimal in the short-term for ongoing management and minimally beneficial in the long term by maintaining aquatic habitat in areas that the Mohave tui chub shares with or is upstream from a recreational fishery.

Alternative C – Establish Additional Populations at Newly Created/Modified Aquatic Habitats

Construction of or Modifications to Aquatic Habitats:

Sites would be selected based on a number of factors including proximity to and availability of a reliable and authorized source of water, invitation by the landowner, and ability of the land owner/manager to monitor and manage for the Mohave tui chub and the aquatic habitat. Construction of new aquatic habitat would likely occur in upland habitat near water sources. Thus, no surface water would be present during construction and there would be no impact to water quality from construction of these ponds. These upland sites may be previously disturbed habitats in urban or rural settings (e.g., school campus, mine site) or undisturbed upland habitat. Access may already exist (e.g., previously disturbed habitats) or may be created (e.g., undisturbed habitat).

The construction of new aquatic habitat sites would result in no impact to recreational fishery. These would be newly created aquatic sites with no existing fishery. No recreational fishery is proposed to be introduced at these newly created aquatic sites.

The modification of existing aquatic habitat would result in negligible impacts to recreational fishery. If sport fish are present in an existing aquatic habitat and have been stocked legally, the site would not qualify for establishing a population of Mohave tui chubs. If sport fish are present and the stocking was not authorized, each site would be evaluated for the ability to remove the non-native fish before releasing Mohave tui chubs at the site. If it is feasible to remove the non-native fish, this would be accomplished prior to releasing Mohave tui chubs. Because the stocking of fish in California is regulated by the CDFG, there should only be sites where non-native fish have been legally stocked. However, there may be a few sites (e.g., Coxey Pond) where unauthorized stocking of non-native fish has occurred. Because these sites are rare, the removal of these sites from future recreational fishing would be negligible for the recreational fishery.

Trapping, Transport, Release, and Species' Monitoring:

Because there are no recreational fish species at these new aquatic sites, there would be no impacts to the recreational fishery from the trapping, transport, release, and monitoring of the Mohave tui chub at the new population locations. There are no recreational fish species at these sites.

At existing sites that are modified, there may be an unauthorized recreational fishery present. Locations such as Coxey Pond may be small local “fishing holes” created by the local angling community that provide limited recreational fishing opportunities for non-native sport fishing (e.g., bluegill (*Lepomis macrochirus*), small-mouth bass (*Micropterus dolomieu*). They also contain non-native aquatic animals (e.g., goldfish (*Carassius auratus*), bullfrog, etc.). The release of sport fish and pets at these locations is unauthorized under State and Federal regulations and policies without first obtaining appropriate permits. Both pond and stream habitats in the watershed of the Mojave River have non-native aquatic species. . Aquatic habitats (e.g., Coxey Pond, Piute Ponds) with non-native species that may be detrimental to the Mohave tui chub would be renovated by removing the non-native species and, as necessary, increasing the depth of the pond. Renovation methods would include live trapping, electrofishing, and dewatering. Chemical treatments that poison animals would not be used.

Prior to the release of Mohave tui chubs, these “fishing holes” with nonnative and unauthorized aquatic species would be removed or their numbers reduced. Recreational fishing would no longer occur at these fishing holes because sport fish species would no longer be present. This would reduce the area and availability of recreational fishing; however, this reduction would be small (less than 2 acres) per site and likely not more than one or two sites. The number and aerial loss of recreational fishery in the Mojave Desert area in California would be small compared to the remaining number and aerial extent of authorized recreational fishing in the Mojave Desert in California. The amount of aquatic habitat would not change, just the type of fishery. Therefore, there would be minimal impacts to the existing recreational fishery.

Habitat Monitoring and Habitat Management:

Because there are no recreational fish species at these new aquatic sites, there would be no impacts to the recreational fishery from habitat monitoring and habitat management.

At modified aquatic sites, there would be no impacts to recreational fishery. Any non-native fish species that were previously present would have been removed during previous modifications to aquatic habitat and release and monitoring of the Mohave tui chub.

Alternative D – Establish Additional Populations at Existing and Newly Created/Modified Aquatic Habitats

Construction of Aquatic Habitats:

The impacts to the recreational fishery from the establishment of Mohave tui chub populations at existing and new aquatic habitat would be similar to those described in Alternatives B and C above.

Trapping, Transport, Release, and Species' Monitoring:

The impacts to the recreational fishery from the trapping, transport, release, and species' monitoring of Mohave tui chub populations at existing and new aquatic habitat would be similar to those described in Alternatives B and C above.

Habitat Monitoring and Management:

The impacts to the recreational fishery from the habitat monitoring and management for the Mojave tui chub at existing and new aquatic habitat would be similar to those described in Alternatives B and C above.

SELECTION OF ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is that which will promote NEPA, as expressed in section 101 of NEPA. Based on the analysis of impacts for the four alternatives, we have selected Alternative D, establishing populations of Mohave tui chubs at existing and newly created aquatic habitats, as the environmentally preferred alternative. Alternative D provides the flexibility needed to adjust management actions through the selection of the appropriate locations to advance the recovery of the Mohave tui chub while avoiding or minimizing impacts to the human environment through modifications to the design, location, timing, and other factors of the aquatic site. If the selected site does not meet the analysis in the EA of minimal to negligible impacts on the human environment for identified resources, the project would be dismissed from further consideration under this document. It also allows the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable or unintended consequences; ensures that important historic, cultural, and natural aspects of our natural heritage will be preserved; maintains, wherever possible, an environment that supports diversity and variety of individual choice; fulfills the responsibilities of this generation as trustee of the environment for succeeding generations; and enhances the quality of renewable resources.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The resources involved with the proposed action and action alternatives include threatened and endangered species and wetland habitats/essential habitats. The maximum commitment of resources and manpower would be the addition of about three to eight of populations of Mohave tui chubs and the establishment of about three new small aquatic habitat sites with associated

wetland habitat. For new aquatic sites, upland habitat would be converted to aquatic and some wetland habitat. Monitoring and management of the Mohave tui chub populations and aquatic habitat would require four to six biologists (on average) for a few days annually at each site. Larger aquatic sites would require more biologists. These people would likely be biologists on staff at the management agencies (e.g., Mojave National Preserve, etc.) or agencies with regulatory jurisdiction (e.g., USFWS or CDFG) for the specific site.

CUMULATIVE EFFECTS

This section of the EA analyzes cumulative impacts associated with the proposed action and action alternatives in the Mojave Desert, specifically the areas in and around existing aquatic habitats in the Mojave Desert in California. The CEQ regulations define “cumulative impact” as the impact on the environment from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The identified impacts were analyzed in accordance with NEPA (42 USC 4321-4347), the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508) and the CEQ guidelines for conducting cumulative impact analysis (Considering Cumulative Effects under the National Environmental Policy Act, Executive Office of the President, January 1997).

The 1997 CEQ guidelines clarified NEPA requirements for cumulative impact analysis, focusing on issues affected by the proposed action, and using resource-based analyses as opposed to activity-based analyses. The recommended CEQ methodology identifies and analyzes other past and present projects and forecasts for future actions that have affected (or will affect) resources or issues in the region. In addition, the U.S. Environmental Protection Agency’s (EPA) 1999 guidance on cumulative impact analysis and the USFWS guidance on analyzing threats to endangered species were used in the analysis of the cumulative impacts.

In analyzing the specific impacts of the action alternatives considered, the following cumulative analyses were identified.

Table 4-3 presents the resources analyzed based on CEQ guidelines and the three levels of analysis performed. Level 1 reflects resources (or issues) that did not have any potential cumulative effects concerns, thus no further analyses were needed. Level 2 analyses were conducted for those resources (or issues) that might be subject to potential cumulative effects. Level 3 analyses were conducted for those resources (or issues) that were identified as having cumulative effects resulting from direct and indirect effects of the potential actions and other past, present, or future actions. Level 3 analyses included a more in-depth review of the combined effects on specific relevant topics within the given resource (or issue).

The impacts to recreational fishing from implementation of each of the four alternatives would be negligible (Table 4-4). We considered/analyzed this level of impact for this resource issue and did not carry it forward for further discussion/analysis in the Cumulative Impacts section.

Table 4-5 presents the Level 3 analysis as it relates to endangered, threatened, proposed, and fully protected species and aquatic habitat/essential habitat.

Other than the alternatives proposed in this document and the information provided in Chapter 1 under “Background,” we are unaware of any past, current, or planned future actions that would directly or indirectly impact the Mohave tui chub other than research to learn more about the physical, chemical, and ecological requirements of the species, the specific threats that stress the species, and how these threats can be reversed to aid in the recovery of the Mohave tui chub. The only future actions that may impact the Mohave tui chub that we are aware of are those proposed in this document and future research. These future actions are beneficial to the Mohave tui chub and would contribute to the recovery and conservation of the species.

Impacts for endangered, threatened, proposed, and fully protected species were discussed under the Environmental Consequences Section. Implementation of the three action alternatives presented in this EA would likely have no to minimal adverse effects on the Federal and State threatened Mojave desert tortoise and State threatened Mohave ground squirrel and moderate beneficial effects on the Mohave tui chub. For other endangered, threatened, proposed, and fully-protected species, the implementation of the three action alternatives would likely have no to minimal short-term adverse effects and no to minimal long-term beneficial effects.

Cumulative impacts on aquatic habitat/essential habitat are also expected to range from minor adverse to minor beneficial. Two of the action alternatives would create and maintain an increased amount of rare aquatic habitat in the Mojave River watershed and the Mojave Desert in California. Implementation of Alternatives C or D would likely benefit those species that depend on aquatic habitats for some or all of their life requisites of feeding, breeding, shelter, or migration, but would adversely impact those species that use the small amount of upland habitat that would be converted to aquatic habitat. However, these two alternatives may also decrease the available upland habitat for the Mojave desert tortoise, but this loss would be no more than a few acres at each site and less than five of sites. Most or all new aquatic habitat would not be located in areas identified as essential upland habitat (e.g., critical habitat, habitat for core populations, areas that provide connectivity between populations) for terrestrial species.

Table 4-3. Level of Analysis for Each Resource Area.

| <p style="text-align: center;">Level 1 No Impacts Identified</p> | <p style="text-align: center;">Level 2 Analysis and Discussion</p> | <p style="text-align: center;">Level 3 Detailed Analysis</p> |
|---|---|---|
| <p>Air Quality</p> <p>Soils and Vegetation</p> <p>Biodiversity and Ecosystems</p> <p>Wetlands</p> <p>Environmental Justice</p> <p>Protection of Children from Environmental Health and Safety Risks</p> <p>Cultural Resources</p> <p>Water Resources and Floodplains</p> <p>Carbon-based Energy Use</p> <p>Wilderness, Wilderness Study Areas, Inventoried Roadless Areas, or National Recreation Areas Wetlands</p> <p>Noise</p> <p>Park Lands</p> <p>Socio-economics</p> <p>Geology</p> <p>Minerals</p> <p>Water Quality</p> <p>Prime and Unique Farmlands</p> <p>Ecologically Critical Areas</p> <p>Unique Ecosystems</p> <p>Natural Soundscapes</p> <p>Traffic</p> <p>Visual Quality</p> <p>Visitor Experience</p> <p>Energy Requirements and Conservation</p> <p>Natural or Depletable Resources</p> <p>Urban Quality</p> <p>Stream Flow Characteristics</p> <p>Seismicity</p> <p>Sacred Sites</p> <p>Indian Trust Resources</p> <p>Traffic</p> <p>Human Health and Safety</p> | <p>Recreational Fishing</p> | <p>Threatened, Endangered, Proposed, and Fully Protected Species</p> <p>Aquatic Habitat/Essential Habitat</p> |

Table 4-4. Analysis of Recreational Fishing

| Recreation Quick Look Questions | |
|--|---|
| <u>Yes</u> | Are there areas within the project area that are used for recreational fishing? <i>Many of the perennial water areas in the Mojave River watershed are legally stocked with sport fish and are used for recreational fishing. Other aquatic sites (e.g., golf course and local park ponds) are used for recreational fishing in the Mojave Desert in California.</i> |
| <u>No</u> | Does the proposed action increase the potential for additional recreational activities? |
| <u>Slight</u> | Does the proposed action have the potential to limit recreational activities? <i>Proposed action would limit recreational fishing at a few new and existing aquatic sites but recreational fishing is currently not authorized at these sites.</i> |
| <u>Slight</u> | Are there any limitations to recreation that cannot be mitigated? <i>After implementing mitigation for recreation (e.g., avoiding sites with authorized stocking of non-native sport fish), recreational fishing would no longer be permitted at the few sites where unauthorized stocking and fishing had occurred. This would be a small area (e.g., less than 2 acres per site) and a small number of sites. The rest of the Mojave River watershed and Mojave Desert in California would be available for recreational fishing.</i> |
| <u>No</u> | Is a detailed cumulative effects analysis needed? |

Table 4-5. Level 3 Analysis—Endangered, Threatened, Proposed, or Fully-protected Species and Aquatic Habitat/Essential Habitat (Refer to Table 4-3)

| | |
|-------------------|---|
| <u>No</u> | Would any of the alternatives result in significant changes (as defined under NEPA)? |
| <u>No</u> | Would the proposed action result in the removal of listed species from the wild? <i>The proposed action would result in a potential incremental loss of upland habitat used by species such as the federally and State threatened Mojave desert tortoise State threatened Mohave ground squirrel.</i> |
| <u>No</u> | Has the project area been surveyed for listed species? <i>Site specific surveys would be conducted prior to deciding whether to convert upland habitat to aquatic habitat or to modify aquatic habitat.</i> |
| <u>Yes</u> | Does the proposed action result in the removal from the wild of non-listed species? <i>If a site is selected that has non-native species that compete with or prey on the Mohave tui chub, these non-native species would be removed prior to establishing a new population of Mohave tui chubs.</i> |
| <u>Yes</u> | Will the proposed action take place on sensitive habitats? <i>Locations will include aquatic habitat which in the Mojave Desert is considered to be sensitive and rare habitat. However, the action alternatives would ultimately improve the quality and quantity of this habitat.</i> |
| <u>Yes</u> | Will the proposed action take place near or in designated wilderness? <i>The proposed action may occur near wilderness but would not likely occur in designated wilderness. Because of the access restrictions in wilderness areas, it would be difficult to transport Mohave tui chubs to a site and to maintain the habitat without vehicle access. However, if we implement the proposed action in wilderness areas, we would follow all applicable rules for wilderness areas including no use of mechanical equipment.</i> |
| <u>No</u> | Does the proposed action involve the use of hazardous or toxic material in association with wildlife species? <i>Hazardous or toxic materials are hazardous the Mohave tui chub.</i> |
| <u>Yes</u> | Are any State or Federal permits or authorization required for the proposed action? <i>Both State permits and Federal authorization are required.</i> |
| <u>Yes</u> | Is additional cumulative impact analysis required? |

Environmental Protection Agency's Ten Ecological Processes

The U.S. Environmental Protection Agency (EPA) suggests that in reviewing cumulative impacts, the reviewers should focus on specific resources and ecological components that can be affected by the incremental effects of the proposed action and other actions in the same geographic area. The EPA identified 10 ecological processes (EPA 1999) that should be evaluated to determine potential adverse effects on habitat and ecological resources:

- **Habitats Critical to Ecological Processes.** Loss of keystone habitats, such as desert springs, native grasslands, coastal sage scrub, and riparian forests and wetlands are not planned with the proposed action or action alternatives. Additionally, construction on undisturbed land, if it occurs, would be minimal and less than a few acres. Vehicle traffic would use existing roads and previously disturbed areas for any research and monitoring activities of Mohave tui chub habitat. Therefore, no potentially adverse effects to habitat to ecological processes are expected.
- **Patterns and Connectivity of Habitat Patches.** Because the action alternatives require no new construction or ground disturbing activities, or the ground disturbing activities would be limited to about 2 acres, there would be no loss of connectivity among habitat patches, or change in homogeneity across the landscape. The habitats that would be created would be aquatic with some wetland habitat, which are rare habitats in the Mojave Desert. Thus, the proposed action and action alternatives would not result in the loss of rare habitats.
- **Natural Disturbance Regimes.** No disruption of natural disturbance regimes (i.e., fire or flood) would be expected to result from the action alternatives. Increases to water sources and storage (e.g., dams), construction in the floodplain, and accumulation of woody materials and debris are not planned. As such, additional fire or water sources would not be expected from implementation of the proposed action or action alternatives.
- **Structural Complexity.** The action alternatives do not require the loss or reduction of components that create structural diversity, such as coarse woody debris, Joshua trees, and downed trees. Because of this, there would be no reduction in structural complexity to riparian areas; and reduced complexity of micro-site structures would not be anticipated. In a few locations, a small increase in structural complexity may occur from creating small areas of aquatic habitat.
- **Hydrologic Patterns.** Changes in water chemistry, including temperature changes, reduced infiltration, increased surface flow, and wider variations in flow and increased flashiness, would not be expected from implementation of the action alternatives. Construction activities that might alter the hydrologic patterns are not planned. No changes to current operations of existing water bodies are proposed.
- **Nutrient Cycling.** Because direct or indirect contact with the habitat would be limited to primarily man-made ponds, a disruption of feedback loops that conserve and recycle nutrients or increase leaching of nutrients from the system, or alter levels and normal patterns of variation of nutrients would not be expected. Stream segments (e.g., Deep Creek) would not have their flow through processes modified or their nutrient cycling affected.
- **Purification Services.** The method by which the ecosystem breaks down waste and detoxifies contaminants and the ability of the system to process waste materials, toxics,

or other contaminants would not be affected because the natural systems' processes will not be adversely affected by any of the action alternatives and no toxic wastes are proposed to be placed in the environment. If any are generated, they would be managed and disposed of according to specific Federal and State guidelines.

- **Biotic Interactions.** No major changes to biotic interactions or new biotic interactions previously unknown to the planning area are proposed. Contact with special status species is highly regulated and will be complied with at the Federal and State levels. Ground disturbing activities are proposed but are limited in size, location, and duration, and would convert terrestrial habitat to rare aquatic and wetland habitat.
- **Population Dynamics.** Mechanisms that tend to adversely affect biological populations including fluctuations in population size, increases in population irruptions, and causes of population crashes would not be affected. There would be limited contact with these populations and measures would be implemented to avoid the introduction/transport of pathogens and non-native species. There would be strict adherence to Federal and State regulations and guidance as noted above.
- **Genetic Diversity.** Loss of genotypes, a reduction in generic variation, and genetically based deformities and reproduction dysfunction would not be expected. One of the purposes of the proposed action is to maintain genetic diversity and mitigation measures include ensuring genetic diversity of the Mohave tui chub at each site. In addition, the Mohave tui chub is sensitive to environmental perturbations such as pesticides, metals, or other hazardous materials frequently associated with mutations, thus requiring strict prohibitions of the use of these chemicals in or near the habitat of this species. Given these requirements it is unlikely that there is any potential for impacting genetic diversity.

Table 4-6 summarizes the potential impacts of each alternative on the 10 ecological processes the EPA has specifically identified for potential adverse impacts.

Table 4-6. Adverse impacts on EPA's 10 ecological processes from implementation of the proposed action and action alternatives

| Ecological Process | Alternative A | Alternative B | Alternative C | Alternative D |
|---|----------------------|----------------------|----------------------|----------------------|
| Habitat Critical to Ecological Processes | None | None | None | None |
| Patterns and Connectivity of Habitat Patches | None | None | None | None |
| Natural Disturbance Regimes | None | None | None | None |
| Structural Complexity | None | None | None | None |
| Hydrologic Patterns | None | None | None | None |
| Nutrient Cycling | None | None | None | None |
| Purification Services | None | None | None | None |
| Biotic Interactions | None | None | None | None |
| Population Dynamics | None | None | None | None |
| Genetic Diversity | None | None | None | None |

The data in Table 4-3 were determined by considering:

- Whether the resource is especially vulnerable to incremental effects;
- Whether the proposed action is one of several similar actions in the same geographic area;
- Whether other activities in the area have similar effects on the resource;
- Whether these effects have been historically significant for this resource; and
- Whether other analyses in the area have identified cumulative effects.

The adequacy of the cumulative impact analysis depends upon how well the analysis considers impacts that are due to past, present, and reasonably foreseeable actions. This can be best evaluated by considering whether the environment has been degraded (to what extent); whether ongoing activities in the area are causing impacts; and the trend for activities and impacts in the area (EPA 1999).

Past, Present, and Reasonably Foreseeable Actions

USFWS Guidance on Analysis of Threats to Listed Species

For the cumulative impacts under the USFWS guidance, we will focus the discussion on the resource issues for threatened and endangered species and wetland habitat/essential habitat. For these issues we have identified potential cumulative impacts to habitat degradation/habitat loss, non-native species, disease/contaminants, and mortality. Tables 4-7 summarize the USFWS guidance on analysis of threats to listed species associated with the proposed action.

Past and Present Actions

Habitat Degradation/Habitat Loss: In this document, we are defining habitat degradation and habitat loss as the alteration and/or removal of native habitat in the Mojave Desert in California. For threatened and endangered species, past Federal actions that have impacted the Mohave tui chub and other aquatic, amphibious, and riparian-dependent listed species (e.g., arroyo toad, least Bell's vireo, southwestern flycatcher, etc.) including the construction and operation of the Mojave River Dam on the Mojave River and its tributaries and ongoing flood control actions in the Mojave River channel and adjacent areas (e.g., levee construction and maintenance). Other past non-Federal actions included the diversion and withdrawal of waters from the Mojave River and its tributaries leaving much of the river dry except for locations at the Mojave Narrows, Camp Cady and Afton Canyon and additional flood management projects. These actions resulted in habitat degradation and loss of most of the perennial aquatic, wetland, and riparian habitats in the Mojave River system that was once used by these species for food, water, and reproduction, and (for the bird species) migration. The diverted water has been used to support the needs of a growing human population in the desert or to support agency missions with the use of surface and ground water greater than the supply.

Presently, these actions continue to be implemented resulting in the continued loss and degradation of aquatic, wetland, and riparian habitats, which are rare habitats in the Mojave Desert of California. These habitats provide essential life requisites of breeding, feeding, shelter, and migration for many species included Federal and State threatened and endangered species. In addition, these actions do not contribute to the recovery of these species.

Non-native Species: In the past, there was little knowledge of, recognition of, or concern for the impacts that might result from the introduction of non-native species to the Mojave River and its tributaries or other aquatic habitat in the Mojave Desert in California. Initially, intentional and unintentional unauthorized and unregulated importation of non-native fish species to the Mojave River by anglers resulted in the establishment of the non-native arroyo chub in the Mojave River. This was followed by regulated introductions of non-native predacious fish to the Mojave River for the recreational enjoyment of anglers, and the unintentional introduction of fish endemic to northern California waters from the operation of the California Aqueduct. The unintentional and intentional introductions of non-native aquatic and amphibious species to the aquatic habitats of the Mojave River impacted the Mohave tui chub, contributing to its extirpation from the Mojave River and its tributaries in the 20th century. Unfortunately, these past actions are difficult to undo.

Table 4-7. Guidance from the USFWS on analysis of threats to listed species associated with the proposed action

| Fish and Wildlife Service Concerns | Past | Present | Alternatives Plus Reasonably Foreseeable Actions | | | |
|------------------------------------|---|--|--|---|--|--|
| | | | Alternative A (Status Quo) | Alternative B | Alternative C | Alternative D |
| Habitat Degradation/ Loss | Historic land management actions degraded or destroyed habitat, much of it permanently lost | Current land management actions cause limited habitat degradation and loss | Minor adverse , continued loss and degradation of habitat from population growth and human activities to T and E species and wetland/essential habitats | Negligible beneficial for water-dependent species and habitats because of increase in complexity of habitats; no impact to upland species | Minor beneficial for water-dependent T and E species and habitats because of increase in acreage and complexity of habitats; minimal adverse to upland T and E species from loss of habitat | Minor beneficial for water-dependent T and E species and habitats because of increase in acreage and complexity of habitats; minimal adverse to upland T and E species from loss of habitat |
| Non-native Species | Both intentional and unintentional introductions of non-native species occurred to aquatic habitats for recreation and water delivery | Both intentional and unintentional introductions of non-native species continue to occur primarily at the state and local levels | Minor adverse , intentional and unintentional introductions would continue to occur degrading food and shelter resources for T and E species and essential habitats | Negligible beneficial , reduction in presence of non-native species from management of aquatic habitat | Negligible beneficial , reduction in presence of non-native species from management of aquatic habitat | Negligible beneficial , reduction in presence of non-native species from management of aquatic habitat |
| Disease/ Contaminants | Non-native species introductions may have inadvertently introduced diseases. Contaminant discharge was unregulated until the late 1970s | Non-native species introductions bring diseases as they have recently with the Mojave desert tortoise; Contaminants are regulated but discharges still occur | Minimal adverse , diseases may continue to be introduced with the introduction of non-endemic species; discharges of contaminants still occur but the extent of their impact is unclear | No impact to T and E species or habitats from disease; the release of new contaminants would not occur as habitats would be monitored and managed to avoid discharge of contaminants | No impact to T and E species or habitats for disease; Negligible beneficial from release of contaminants as habitats would be monitored and managed to avoid discharge of contaminants | No impact to T and E species or habitats for disease; Negligible beneficial from release of contaminants as habitats would be monitored and managed to avoid discharge of contaminants |
| Mortality | No documented direct take; since listing in 1970s, take permitted only for research purposes and to contribute to recovery | No documented direct take; since listing in 1970s, take permitted only for research purposes and to contribute to recovery | No impact , no direct mortality but mortality and injury may occur from loss or degradation of habitat | Negligible adverse to MTCs from monitoring; no impact to other T and E species | Negligible adverse to MTCs from trapping during monitoring; Negligible beneficial to water-dependent T and E species from increased availability of water and food; Negligible adverse to upland T and E species from attracting predators to new water sites | Negligible adverse to MTCs from trapping during monitoring; Negligible beneficial to water-dependent T and E species from increased availability of water and food; Negligible adverse to upland T and E species from attracting predators to new water sites |

1. No Change or None—There is no impact expected.
2. Negligible—The impacts are very small and possible, but not probable or likely to occur.
3. Minimal—The impacts are not expected to be measurable and are within the capacity of the impacted system to absorb the change, or the impacts can be compensated for with little effort and resources so the impact is not substantial.
4. Minor—The impacts are measurable, but are within the capacity of the impacted system to absorb the change, or the impacts can be compensated with limited effort and resources so the impact is not substantial.
5. Moderate—Potentially adverse impacts that are measurable but do not violate any laws or regulations and are within the capacity of the impact system to absorb or can be mitigated with effort and/or resources so that they are not significant.
6. Major—Potentially adverse impacts that individually or cumulatively could be significant.

During the last few decades, Federal land management agencies have become aware of the impacts of non-native species on the habitats in the Mojave Desert in California. Current management plans include actions to reduce the likelihood of introducing new species in the future. However, non-native fish species are well established in the Mojave River drainage and their complete removal is unlikely. This would be a significant step toward returning the Mohave tui chub to the Mojave River and its tributaries and restoring the Mojave River ecosystem, fulfilling the two purposes of the ESA.

Disease/Contaminants: We are unaware of any disease or contaminant issues associated with Mohave tui chub management projects in the past. Past actions by regulatory agencies to establish additional populations of Mohave tui chubs were concerned about disease and contaminants, as the species is highly susceptible to contaminants and evolved in an environment with no exposure to diseases from other fish species. It is likely that disease(s) introduced with non-native fish species in the 20th century contributed to the extirpation of the Mohave tui chub in the Mojave River and its tributaries.

The current methods used to establish additional populations include testing recipient sites for water quality before establishing additional populations of Mohave tui chubs. The methods implemented include procedures for assuring the transport of healthy Mohave tui chubs and implementing management techniques that will reduce or eliminate any stress-caused disease issues in the relocated fish. The implementation of these methods should have had no effect on other threatened or endangered species. Diseases rarely cross taxonomic lines (e.g., fish to birds). Because the Mohave tui chub was and is the only native fish in the Mojave River watershed, the introduction of diseases has not been an issue.

Mortality: Within the Mojave River system and Mojave Desert, we are not aware of any land management plan or permitted actions that authorized the mortality of the Mohave tui chub. Since its listing in 1970 and 1971, respectively, this mortality would require prior authorization by the USFWS and CDFG for any purposeful or incidental take. Under the authorities of the ESA and CESA, the USFWS and CDFG have issued take permits in the past to take Mohave tui chubs to conduct research and management actions that would contribute to the recovery of the species. Occasionally one or a few fish die from the handling, but this is rare.

Comparison of Alternatives under USFWS Guidance

Alternative A: No New Action (Threatened and Endangered Species and Wetland/Essential Habitats)

The cumulative impacts to the Mohave tui chub associated with the proposed action are expected to be the same as those described above in Present Actions (Threatened and Endangered Species), for habitat degradation, habitat loss, non-native species, disease, contaminants, and mortality. We have analyzed these impacts and determined that Alternative A (no new action or status quo) results in minor adverse impacts for habitat degradation and loss, minor adverse impacts from non-native species introduction, minimal impacts from disease/contaminants, and no impact from direct human mortality.

The cumulative impacts to the other threatened and endangered species in the Mojave River system and Mojave Desert in California would be a reduction in the number of individuals in the species from the degradation and/or loss of aquatic, wetland, and riparian habitats needed for feeding, breeding, shelter, and/or migration. Species likely impacted include the least Bell's vireo, southwestern willow flycatcher, yellow-billed cuckoo, and arroyo toad that depend on riparian, wetland, and aquatic habitats for one or more of their life requisites. Degradation or loss of these habitats would occur from continuing urban development, flood management measures, and increased use of surface and ground water for residential, industrial, commercial, and agricultural use.

Introductions of non-native species especially plant species would continue to outcompete native species, thereby degrading food sources and shelter for threatened and endangered species. Disease introductions are unknown but likely to occur as they have in the recent past (e.g., Mojave desert tortoise) and result in minimal adverse impacts. Discharges of unauthorized contaminants, although regulated, will continue to occur accidentally or intentionally. These discharges may result in the mortality or injury of species or abnormalities to offspring resulting in a negligible to minimal adverse impact. There should be no impact from intentional direct mortality as all species are protected from take except by permit. However, mortality from loss or degradation of habitat will continue to occur.

Alternative B: Additional Populations at Existing Aquatic Habitats

The cumulative impacts to the Mohave tui chub from implementation of this alternative would be establishing more populations of the species. This would benefit the Mohave tui chub. For habitat degradation /habitat loss, it would provide no benefit to a negligible benefit for other aquatic, wetland, or riparian species (e.g., arroyo toad, least Bell's vireo, southwestern willow flycatcher.) Because there would be no alteration to existing habitat other than maintaining and managing existing aquatic habitat, the threatened and endangered species in upland habitats would not be affected, and those in wetland and riparian habitats would be negligibly affected. Managing existing aquatic habitat may result in a reduction in some types of wetland habitat, an increase in others, and a slight increase in riparian habitat.

There would be a negligible change in non-native species. This action alternative would not result in the intentional introduction of non-native species and may result in the same or fewer locations of aquatic habitat with non-native species. The unintentional introduction of non-native species to additional sites would be avoided or minimized by the implementation of the mitigation measures listed earlier and the ongoing monitoring and management of the Mohave tui chub and its habitat. The ongoing management actions may reduce or eliminate some non-native species at some locations resulting in a negligible beneficial impact.

No impacts from disease or contaminants are anticipated as the fish would be monitored for health before their release, they would be monitored regularly after their release, and their habitat (e.g., physical, chemical, and ecological characteristics) would be monitored for changes such as the introduction of contaminants. Any disease the fish may have would not likely cross taxonomic lines to other threatened or endangered species such as plants, reptiles, or birds.

The introduction of Mohave tui chubs may result in a few deaths from handling and transport. Once the population is established, there should be negligible mortality from monitoring and management activities for the population or the habitat. The other threatened and endangered species should experience no change in the current levels of mortality.

Alternative C: Additional Populations at Newly Created/Modified Aquatic Habitats

This action would benefit the Mohave tui chub and other threatened and endangered species that rely on aquatic, wetland, and riparian habitats as part of their life requisites. New aquatic habitats would be created and not lost or degraded, thus adding to the limited number that currently exists. If these habitats produce stable populations of Mohave tui chubs, these actions contribute to the conservation of the Mohave tui chub and bring it closer to meeting the downlisting recommendations in the Recovery Plan. The addition of these water-dependent habitats would likely benefit the riparian avian species during migration as a food and shelter source. The number of upland sites proposed to be converted to aquatic habitat is small and each site would be 2 acres or smaller. Given the large area of upland habitat in the Mojave Desert compared to the rare occurrence of aquatic habitat, upland species such as plant species would likely incur negligible impacts. If a site is proposed and a listed plant species is present, the site would be rejected and a new site proposed to avoid the species.

The Mojave desert tortoise and Mohave ground squirrel are likely the only listed upland species that may be impacted by the creation of new aquatic sites. However, as mention in the Proposed Action and Description of Alternatives under Alternative C, the project site would be surveyed to ensure that no listed, proposed, candidate, or special status species is at the project site. Because of their broad range across some upland habitats, there is the possibility that upland habitat that is used by the Mojave desert tortoise and Mohave ground squirrel would be converted to aquatic habitat. However, the conversion of the habitat would be small in size (e.g., 2 acres or less). When compared to the annual home range of one Mojave desert tortoise (28 acres for an adult female, 64 acres for an adult male)(Walde and Bol 2004) and lifetime home range (much larger) of a Mojave desert tortoise, the conversion of 2 acres of upland to aquatic habitat at one site would be minimal. For the Mohave ground squirrel, the annual home range is smaller than for the Mojave desert tortoise, ranging from a mean of 16.6 acres for males and 1.8 acres for females during the breeding season up to 26.7 and 4.7 acres for males and females, respectively, during the post-breeding season (Harris and Leitner 2004). This conversion of habitat may now provide a source of food and water previously not available within the smaller home range of the Mohave ground squirrel. This action is considered to be minimal adverse for upland threatened and endangered species

There would be a negligible beneficial change for non-native species. The non-native predatory or competitive species that occur at these sites would be reduced or removed from these aquatic habitats. The actions proposed would not result in the intentional introduction of non-native species. The unintentional introduction of non-native species would be avoided or minimized by the implementation of the mitigation measures described earlier and in Appendix A and the ongoing monitoring and management of the Mohave tui chub and its habitat.

No impacts from disease or contaminants are anticipated as the Mohave tui chubs would be monitored for health before their release, they would be monitored regularly after their release, and their habitat (e.g., physical, chemical, and ecological characteristics) would be monitored for unusual results including contaminants. Any disease the fish may have would not likely cross taxonomic lines to other species such as plants, reptiles, or birds. The creation of aquatic habitats and the management of these habitats and the Mohave tui chub should not result in an increase in diseases or discharge of contaminants that would impact the Mohave tui chub or other special status species.

The introduction of Mohave tui chubs may result in a few deaths from handling and transport. Once the population is established, there should be negligible mortality from monitoring and management activities for the population or the habitat. The other threatened and endangered species should experience no change in the current levels of mortality.

Mortality to riparian-dependent species such as the southwestern willow flycatcher and least Bell's vireo may decrease because of the increased availability of riparian habitat. Mortality to upland species such as the desert Mojave tortoise and Mohave ground squirrel may increase slightly. Although the creation of new water sources may attract other species to the aquatic site and adjacent areas including predators of the Mojave desert tortoise and Mohave ground squirrel, it is more likely that the new aquatic habitat would be located near an existing water site that already provides water for upland species including predators of the Mojave desert tortoise and Mohave ground squirrel.

Alternative D: Additional Populations at Existing and Newly Created/Modified Aquatic Habitats

This action would be a combination of Alternatives B and C above. The impacts to threatened and endangered species and wetland/essential habitats would be the same as for Alternative C except more aquatic and water-related habitats would be affected from combining alternatives B and C.

CHAPTER 5. COORDINATION AND ENVIRONMENTAL REVIEW

AGENCY COORDINATION

This NEPA document is the result of ongoing coordination and cooperation among several Federal and State agencies and organizations within the historic range of the Mohave tui chub, many of whom are cooperating agencies in the preparation of this EA. The agencies participating as cooperating agencies for this EA and in the implementation of recovery actions to establish additional populations of the Mohave tui chub include:

Fish and Wildlife Service, Ventura Fish and Wildlife Office
Mojave National Preserve
Edwards Air Force Base
China Lake Naval Air Weapons Station
Bureau of Land Management, California State Office
San Bernardino National Forest
California Department of Fish and Game
Desert Managers Group

RELEVANT LAWS, REGULATIONS, AND EXECUTIVE ORDERS

National Environmental Policy Act

All Federal agencies must comply with provisions of NEPA. An Environmental Assessment (EA) is required under NEPA to evaluate reasonable alternatives that will meet stated objectives and to assess the possible impacts to the human environment. The EA serves as the basis for determining whether implementation of any of the action alternatives to accomplish the proposed action would constitute a major Federal action significantly affecting the quality of the human environment. The EA facilitates the involvement of government agencies and the public in the decision making process.

Other Federal Laws, Regulations, and Executive Orders

In undertaking any of the action alternatives to accomplish the proposed action, the USFWS and cooperating agencies would comply with a number of Federal laws, executive orders, legislative acts, and other authorities including:

- Endangered Species Act of 1973, as amended;
- National Forest Management Act of 1976 (16 U.S.C. 1600-1614), as amended, directs the U.S. Forest Service to “strive to provide for a diversity of plant and animal communities when managing national forest lands.” Individual national forests may identify species of concern, which are significant to each forest’s biodiversity.
- Forest Service Manual sections 2673.5 on translocation and 2674 on reintroduction of listed species;
- Federal Land Policy and Management Act of 1976;
- National Park Service Organic Act of 1916;

- Protection of Historical, Archaeological, and Scientific Properties (Executive Order 11593);
- Migratory Bird Treaty Act of 1918, as amended;
- Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d);
- Clean Water Act of 1977;
- National Historic Preservation Act of 1966, as amended;
- Floodplain Management (Executive Order 11988); and
- Protection of Wetlands (Executive Order 11990).

Distribution and Availability

Copies of this Environmental Assessment were sent to Federal, State, and County agencies, tribes in the Mojave Desert in California, and interested individuals. Additional copies of this document are available at U.S. Fish and Wildlife Service, Ventura Fish and Wildlife Office's website [<http://www.fws.gov/ventura>] or at the office, 2493 Portola Road, Suite B, Ventura, California 93003 (tel. 805-644-1766, ext. 301).

Related Environmental Documents

The following plans that contain similar or related actions concerning Mohave tui chub recovery and management or endangered species recovery and management in the Mojave Desert in California. The activities recommended in the proposed action and action alternatives can be found in some of these documents. While these plans address Mohave tui chub or endangered species declines, many of their actions have not been implemented which is the purpose of this EA.

Recovery Plan for the Mohave Tui Chub (*Gila bicolor mohavensis*)—This recovery plan prepared by the USFWS guides all entities in the tasks need to be implement to downlist and delist the Mohave tui chub. Preparation of a recovery plan is required under section 4 of the ESA.

BLM Land Management Plans for the California Desert Conservation Area—The BLM uses the California Desert Conservation Area (CDCA) Plan and Amendments to guide management on the lands it administers in the Mojave and Colorado Deserts in California. Any decisions made as a result of this EA process would be consistent with the guidance in the CDCA Plan and Amendments and the Federal Land Policy and Management Act of 1976.

Mojave National Preserve General Management Plan—The subject plan was completed in 2002. This document guides the management of lands administered by the NPS within the Mojave National Preserve.

San Bernardino National Forest Land Management Plan- The subject plan was completed in 2005. It guides the management of lands administered by the San Bernardino National Forest, which includes lands in the Mojave Desert and tributaries of the Mojave River. This plan places an emphasis on management for the conservation and protection of threatened and endangered species.

Integrated Natural Resources Management Plans—Each of the military installations within the California desert (Naval Air Weapons Station China Lake [NAWS], Edwards Air Force Base, National Training Center [NTC] at Fort Irwin, Marine Corps Logistics Base [MCLB] Barstow, Marine Corps Air Ground Combat Center Twentynine Palms [MCAGCC], and Chocolate Mountains Aerial Gunnery Range) is required to maintain and implement an Integrated Natural Resources Management Plan (INRMP).

The purpose of each INRMP is to develop and follow a prescribed planning process for the management of natural resources on the individual installation. Development and implementation of the INRMP must support military mission readiness by ensuring that lands and airspace are available for sustained use. This process meets statutory requirements under the Sikes Act Improvement Act (SAIA), Public Law 105-85, Div. B Title XXIX, Nov. 18, 1997, 111 Statutes 2017–2019, 2020–2033. This Act requires the Secretaries of the Army, Air Force, and Navy to prepare and implement INRMPs for each military installation, unless exempted due to the absence of significant natural resources.

Each installation coordinates with the USFWS and the CDFG to ensure that each INRMP reflects the mutual agreement of these parties on conserving, protecting, and managing natural resources on each installation. As required by the SAIA, the INRMPs are provided for public comment.

County General Plans—California state law requires each county to prepare and adopt a comprehensive and long-range general plan for its physical development (Government Code Section 65300). A comprehensive general plan provides the County with a consistent framework for land use decision-making. Traditionally, the general plan has been organized as a collection of "elements" or subject categories such as land use, housing, conservation, noise, circulation, open space, and safety. The conservation element addresses the conservation, development, and use of natural resources including water, forests, soils, rivers, and mineral deposits. The open-space element details plans and measures for preserving open space for natural resources, the managed production of resources, outdoor recreation, public health and safety, and the identification of intensive agriculture and irrigated pasturelands. For the Mojave Desert in California, there are four counties each with a county general plan for these elements. These plans are Inyo County General Plan, Kern County General Plan, Los Angeles County General Plan (Antelope Valley), and San Bernardino County General Plan.

List of Preparers and Reviewers

Judy Hohman, U.S. Fish and Wildlife Service, Ventura Fish and Wildlife Office, Ventura, CA

Dr. Debra Hughson, Mojave National Preserve, Barstow, CA

Danette Woo, Mojave National Preserve, Barstow, CA

Amy Fesnock, Bureau of Land Management, California State Office, Sacramento, CA

Sandra McGinnis, Bureau of Land Management, California State Office, Sacramento, CA

Dr. Dan Reinke, Edwards Air Force Base, CA

John O'Gara, China Lake Naval Air Weapons Station, CA

Robin Eliason, San Bernardino National Forest, San Bernardino, CA

Dave Austin, San Bernardino National Forest, San Bernardino, CA

Steve Parmenter, California Department of Fish and Game, Bishop, CA

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APPENDIX A

**METHODOLOGY TO CAPTURE, TRANSPORT,
AND RELEASE MOHAVE TUI CHUBS**

APPENDIX A-METHODOLOGY TO CAPTURE, TRANSPORT, AND RELEASE MOHAVE TUI CHUBS

- All capture, transport, and release (translocation) activities will be personally supervised by a biologist experienced in the capture, handling, transport, and release of Mohave tui chubs.
- Each step of the translocation effort will be recorded.
- The recipient site will be surveyed to confirm the absence of predatory fishes (including any species of bass, sunfish, catfish, or trout), or any native fish population that might be unintentionally affected. If present, the site will not be deemed an acceptable recipient site for the Mohave tui chub.
- Identification of the source population(s) and the number of fish to be translocated will be determined using the best available information on the gene pool of each source population, the reproductive strategy of the Mohave tui chub, the size of the source population(s), and the best available information from population viability analysis for the species.
- Waders, traps and other gear used in Mohave tui chub habitats will be appropriately dried, washed, disinfected, or frozen to prevent introduction of non-native biota or pathogens.
- A vehicle readiness check will be completed prior to initiating the capture of Mohave tui chubs to assure all fluids are topped off, a spare tire is present and inflated, a functional tire jack is present, tires are undamaged and not excessively worn, signal lights are operational, and brakes are in good working condition. A second vehicle will follow the vehicle transporting the Mohave tui chubs to obtain emergency services promptly if the transport vehicle breaks down.
- At the site of the capture of the source population, the recorded information will include the date, time, and location (including UTM coordinates) of capture from the source population, the number of unsuitable fish released into the source population, if any, and a description of why the fish were considered unsuitable (e.g., too large, too small, evidence of disease or parasites, etc.). The water temperature, dissolved oxygen, and specific conductance will be measured and recorded along with weather conditions and whether any fish mortality occurred during the capture.
- Fish will be captured using minnow traps or Susan traps designed at China Lake Naval Air Weapons Station. Traps will be placed in the waters of the source population(s) in the evening where dissolved oxygen levels are adequate and retrieved the following morning. Mohave tui chubs between 61 and 101 millimeters in length and showing no visible signs of injuries, anomalies, parasites, or disease will be held for translocation. All other Mohave tui chubs will be released at the point of capture. No more than 20 percent source population will be held for transport to the recipient site.
- Fish will be held and transported in an un-sealed container such as a hard-surfaced cooler filled with clear water obtained from the habitat of the source population. The holding container will be bubbled with oxygen gas to maintain the dissolved oxygen concentration at or above saturation.
- The water temperature in the holding container will be managed using bagged ice, insulation, and vehicle climate control to maintain water temperature within 5 degrees

Centigrade (C) of the source habitat at the time of capture. If the temperature of the recipient habitat is expected to be more than 5 degrees C cooler than the source habitat, the water temperature of the holding container may be gradually cooled during transport to roughly match the temperature of the water at the recipient site.

- Mohave tui chubs will be released at the recipient site during the day to the behavior of the newly released fish can be observed.
- Upon arrival at the recipient site, the water temperature and specific conductance of the transport and recipient site waters will be recorded. If the water temperature difference is 5 degrees C or less, the fish holding container water will be “tempered” to the recipient water conditions using three partial water exchanges of 50 percent, spaced at least 5 minutes apart. If the water temperature difference is greater than 5 degrees C, the fish holding container water will be “tempered” to the recipient water conditions using partial water exchanges of approximately 30 percent, spaced at least 5 minutes apart, until the difference between the fish and recipient water is less than 2 degrees C.
- Excess water during tempering will be poured onto the ground in a location where it cannot run off into the recipient habitat.
- A fresh, clean, dry dip net will be used each time fish are transferred between holding containers and into recipient waters. Fish will be removed from the dip net by dropping them at a height less than one foot above the water, without immersing the dip net into the recipient container or habitat so as not to cross contaminate the two water sources.
- Five minutes after the final water exchange, all the fish will be removed and placed in 5 gallon buckets freshly filled with 4 gallons of water from the recipient habitat. The buckets and fish will then be slowly submerged in the recipient habitat, rotated slightly past the horizontal, and the fish will be allowed to swim out. Any fish remaining after one minute will be poured out by gently raising the bucket, causing the water and fish to slowly escape over the still-submerged lip of the bucket.
- The fish will be observed at the recipient site for a minimum of 15 minutes after their release to see if there are any behavioral indications of stress.
- The date, time, location, weather conditions, water quality measurements, and observed behavior of the Mohave tui chubs at the recipient site will be recorded.

APPENDIX B

METHODOLOGY TO REDUCE/PREVENT THE SPREAD OF INVASIVE AQUATIC ORGANISMS

APPENDIX B – METHODOLOGY TO REDUCE/PREVENT SPREAD OF INVASIVE AQUATIC ORGANISMS¹

Background:

Amphibian populations are declining rapidly throughout the world. One factor in amphibian declines is emerging infectious diseases such as chytrid fungus (*Batrachochytrium dendrobatidis*). One possible means of spreading a pathogen from site to site is on biologist's nets, boots, waders and any equipment that has been in contact with the water or mud. Therefore extra precautions must be taken to reduce the possibility of spreading this or other pathogens. The best prevention is to thoroughly clean and dry all gear before moving on to another site, especially another creek. If that is not possible and you are planning to be in the water in two or more different drainages in one day try to have two sets of clean dry gear.

Knowing that it is not always possible to have clean and dry gear for every site that may need to be visited in a day, we have developed the following procedures to minimize our potential for spreading of disease. These procedures should be followed when using the same equipment from site to site, even if no pathogens have been previously detected at a site. This sterilization practice is a standard procedure for all surveys (including fish, wildlife, and botany) in creeks, it is not optional.

Disinfect All Equipment:

- If you must use the same gear between watersheds - remove all mud and soak wet gear in Sparquat solution between sites (see instructions below).
- Disinfect all equipment before leaving any site (or prior to going in the field if equipment sanitation history is unknown). Wash first to remove all clumps of dirt etc., then disinfect with Sparquat solution (see instructions below).
- Wash and completely dry your field clothes after each field day.
- Tires and wheels on your vehicle count as field gear to be considered if they get wet or muddy. Wash and completely dry vehicle one day before driving to an area with a stream crossing and/or after vehicle has driven through a stream crossing where Chytrid is known to occur.

Instructions for using Sparquat 256™:

- Remove all mud and debris possible from gear
- Empty one 4 ounce sample bottle filled with Sparquat 256™ to 2.5 gallons of water (1.2% solution*).
- Completely immerse **all** wet gear for one minute**
- Can reuse solution until it becomes highly diluted or muddied.
- When done with the dilute solution, toss it out on the road or parking area where it can evaporate (at least 300 feet away from streams or aquatic habitats).
- If wet shoes have been in the vehicle, scrub floor and pedals with disinfectant solution.

*A 1.2% solution of Sparquat 256™ in water will kill both Chytrid and Didymo in one minute. It also kills Whirling disease with 10 minutes of exposure. Didymo and whirling disease are not concerns in California yet, but these measures help keep it that way.

****One minute exposure does not mean that you have to keep your booted foot in the bucket for a full minute. Just dip all wet gear in the bucket for full coverage and pull out. It will take more than one minute for most field gear to dry out so you have achieved the one minute needed plus many bonus killing minutes in most cases. Equipment made of plastic, metal or other fast drying materials would stay immersed for full minute. Rinsing equipment with tap water is suggested but not necessary.**

Do not let concentrated Sparquat 256 liquid come in contact with your skin and use in a well-ventilated area. See the attached MSDS for warnings and exposure instructions.

Although we have been testing the use of un-rinsed 1.2% Sparquat 256 exposed gear since 2007 with no adverse skin reactions, there is a potential for adverse reaction in some. The best prevention is to always rinse disinfected gear with fresh potable water (from a chlorinated or deep well source) before re-donning.

Suggestions:

For people wading in the water every day, keep a tub of one of these chemical baths in the truck. Get in the habit of keeping a 5 gallon bucket and a few Sparquat 256™ filled sample bottles in your field vehicle. Dunk your boots, away from the stream, to clean off the mud and disinfect at the same time.

Other ways to disinfect (not using Sparquat 256™):

1. Complete drying and heating. Leaving gear to dry out in the sun on a hot day should be very effective. ***

Caution:

- Thick deposits of mud may not completely dry for a very long time. Mud should be removed from gear at the site if possible, but certainly before using the same gear in another site.
- Shoe laces will be wet (and infectious) long after the rest of the boot is dry. Many water shoes are available today that have no or quick dry lace systems.
- Do not use felt-soled wading shoes. They pick up tiny organisms that remain alive in the porous material.
- Complete drying is not optimal for a quick turnaround for field equipment use.

2. Clorox Bleach at a 1:10 ratio (bleach to water) works similarly to Sparquat 256™.

Caution:

- Bleach can damage field equipment.
- Bleach evaporates quickly and cannot be used more than once for cleaning.

***There are numerous publications with conflicting information about the effectiveness of drying; therefore, opinions differ between biologists regarding its effectiveness. Check with jurisdictional agency biologist to see if complete drying is an acceptable method to use.

¹ Adapted from San Bernardino National Forest Fish and Wildlife Program (April 2009).

APPENDIX C

RELEVANT LAWS AND AUTHORITIES

APPENDIX C – RELEVANT LAWS AND AUTHORITIES

1.0 RELEVANT LAWS AND AUTHORITIES

1.1 COMPLIANCE WITH MAJOR APPLICABLE FEDERAL LAWS

Several Federal laws regulate endangered species and Federal land management. The agencies involved in this action must comply with these laws, as well as consult and cooperate with each other and other agencies, as appropriate. The following Federal laws are relevant to the actions considered in this environmental assessment (EA):

a. National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [U.S.C.] 4321–4347, Public Law [PL] 91-190)—Environmental documents prepared pursuant to NEPA must be completed before Federal actions can be implemented. The NEPA process requires careful evaluation of the need for action, and that Federal actions be considered alongside all reasonable alternatives, including the “No Action Alternative.” The NEPA also requires that potential impacts on the human environment be considered for each alternative, the alternatives and impacts must be considered by the decision maker(s) prior to implementation, and that the public is to be informed.

This EA has been prepared in compliance with NEPA; the President’s Council for Environmental Quality (CEQ) Regulations, 40 Code of Federal Regulations Section 1500–1508; and Department of the Interior’s Departmental Manual (DM) for NEPA compliance (516 DM 6, 30 AM 2-3); U.S. Fish and Wildlife Service’s (USFWS) directive manual 550 FW 1-3 and 505 FW 1-5; Bureau of Land Management’s NEPA handbook H-1790-1; and National Park Service’s handbook and Director’s Order DO-12. It was also reviewed to comply with Department of Defense requirements including Title 32 Code of Federal Regulations (CFR) Part 989 (Air Force), 32 CFR 651 (Army), Marine Corps Order 5090.2a (Environmental Protection), and 32 CFR 775 (SECNAV Instruction 5090.6). The U.S. Marine Corps is regulated under 32 CFR 775.

Pursuant to NEPA and CEQ regulations, this EA documents the analysis of a proposed Federal action, and all reasonable alternatives thereto, including the “No Action” or Status Quo alternative. The EA evaluates impacts anticipated from all alternatives, informs decision-makers and the public, and serves as a decision-aiding mechanism. The EA was prepared using an interdisciplinary approach to address all aspects of the natural and social sciences relevant to the potential impacts of the action. The direct, indirect, and cumulative impacts of the proposed action through each action alternative are analyzed.

b. Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531–1544)—Under the ESA, all Federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the ESA (Section 2[c]). Section 7 consultations with the USFWS are conducted to use the expertise of the USFWS to ensure that "any action authorized, funded, or carried out by such an agency...is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat of such species...which is determined to be critical..." "(E)ach agency shall use the best scientific and commercial data available." (Section 7[a][2]).

c. Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703–711; 40 Stat. 755), as amended—The MBTA provides the USFWS with regulatory authority to protect bird species that migrate outside the United States. This law prohibits the “take” or killing of these species by any entity, unless permitted by the USFWS. People can obtain permits to take migratory birds under this law that are causing damage to resources. The Migratory Bird Treaty Reform Act of 2004 was passed to clarify the original intent of the MBTA, the conservation and protection of migratory birds native to North America. It directed the USFWS to establish a list of nonnative bird species found in the United States. Species on this list will not receive MBTA protection. The USFWS has prepared and published this list in the *Federal Register*.

d. National Historic Preservation Act (NHPA) of 1966, as amended (U.S.C. 470 *et seq.*)—The NHPA requires Federal agencies to: 1) evaluate the effects of any Federal undertaking on cultural resources; 2) consult with the State Historic Preservation Office (SHPO) regarding the value and management of specific cultural, archaeological, and historic resources; and 3) consult with appropriate American Indian tribes to determine whether they have concerns for traditional cultural resources in areas of these Federal undertakings.

e. Sikes Act Improvement Act of 1997, as amended—The Sikes Act requires the Department of Defense to manage the natural resources of each of its military reservations within the United States and to provide sustained, multiple use of those resources. To meet these goals, the act requires Integrated Natural Resource Management Plans be prepared for military installations. These plans must be developed in coordination with the USFWS and appropriate state fish and wildlife agency, and reflect the mutual understanding of the parties concerning conservation, protection, and management of fish and wildlife resources.

f. Wilderness Act of 1964 (16 U.S.C. 1131–1136, 78 Stat. 890, and PL 88-577)—The Wilderness Act established a national wilderness preservation system composed of federally owned areas designated by Congress as wilderness areas. The lands in this system must be managed to leave them unimpaired for future use and enjoyment as wilderness. The purpose of the Wilderness Act is to ensure that an increasing human population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition. It is the policy of Congress to secure for present and future generations the benefits of an enduring resource of wilderness.

Each Federal agency with wilderness is responsible for administering the wilderness for the purposes for which it was established (e.g., a national park) and in a manner that preserves its wilderness character. With limited exceptions, no commercial enterprise or permanent road is allowed within a wilderness area. Temporary roads, motor vehicles, motorized equipment, landing of aircraft, structures and installations are only allowed for administration of the area. The use of aircraft may be permitted in wilderness areas where their use has already been established. Measures may be taken to control fire, insects, and disease.

g. California Desert Protection Act of 1994 (16 U.S.C. 410)—The California Desert Protection Act established and expanded Death Valley and Joshua Tree National parks and created Mojave National Preserve. Through this law, Congress declared that appropriate public lands in the California desert must be included within the National Park System and the National Wilderness Preservation System. The purpose of these lands is to preserve their scenic,

geologic, and wildlife values; perpetuate their significant and diverse ecosystems; protect and interpret ecological and geological features, maintain wilderness resource values; and promote public understanding and appreciation.

h. Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (Executive Order [EO] 12898)—Environmental justice promotes the fair treatment of people of all races, incomes, and cultures with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment implies that no person or group of people should endure a disproportionate share of the negative environmental impacts resulting either directly or indirectly from the activities conducted to execute this country’s domestic and foreign policies or programs. Environmental justice has been defined as the pursuit of equal justice and equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. All Federal activities are evaluated for their impact on the human environment and compliance with EO 12898 to ensure environmental justice. Any sites selected and methods used to establish additional populations of Mohave tui chubs and manage for the species and their aquatic habitats will be used as selectively and environmentally conscientiously as possible.

i. Protection of Children from Environmental Health and Safety Risks (EO 13045)—Children may suffer disproportionately from environmental health and safety risks, including their developmental physical and mental status for many reasons. Because the Agencies make it a high priority to identify and assess environmental health and safety risks, the Agencies considered impacts that the alternatives analyzed in this EA might have on children. Establishing new populations of Mohave tui chubs is not a situation or circumstance where children would have potential exposure to environmental health and safety risks. At a few locations, aquatic habitat would be created. These habitats would either be fenced or located in areas that are not easy to access or likely to be visited by unaccompanied children which would avoid the likelihood of drowning. In addition these habitats would be managed for natural conditions and good water quality. Therefore, the creation of aquatic habitat that provides good to excellent habitat for the Mohave tui chub should not be an environmental health or safety risk to children.

j. Reducing predation by common ravens on the Mojave desert tortoise, as proposed in this EA, would only involve legally available and approved management methods in situations or under circumstances where it is highly unlikely that children would have the potential for exposure.

APPENDIX D

**LISTS OF SPECIAL STATUS SPECIES
AT OR NEAR LOCATIONS IDENTIFIED AS SUITABLE FOR
ESTABLISHING ADDITIONAL POPULATIONS
OF ENDANGERED MOHAVE TUI CHUBS.**

Table D-1. Special status species for Coxeys Pond, Deep Creek, and Holcomb Creek (located in the Mountaintop District of San Bernardino National Forest, California)

| COMMON NAME | SCIENTIFIC NAME | OCCURRENCE* and HABITAT TYPE** | |
|--------------------------------------|---|--------------------------------|------------------------|
| INVERTEBRATES | | | |
| springsnails | <i>Pyrgulopsis sp.</i> | Y | AQ – seeps and springs |
| simple hydroporus diving beetle | <i>Hydroporus simplex</i> | Y | AQ |
| greenest tiger beetle | <i>Cicindela tranquebarica viridissima-</i> | ? | R |
| Andrew's marble butterfly | <i>Euchloe hyantis andrewsi</i> | Y | M, R |
| vernal blue butterfly (Coxey Meadow) | <i>Euphilotes baueri (battoides) vernalis</i> | Y | Pebble plain |
| AMPHIBIANS | | | |
| Monterey ensatina salamander | <i>Ensatina eschscholtzii eschscholtzii</i> | Y | R |
| Red spotted toad | <i>Bufo punctatus</i> | Y | R |
| REPTILES | | | |
| mountain garter snake | <i>Thamnophis elegans elegans</i> | Y | M, R |
| BIRDS | | | |
| common snipe | <i>Gallinago gallinago</i> | Y | M |
| white-faced ibis | <i>Plegadis chihi</i> | Y | M |
| American bittern | <i>Botaurus lentiginosus</i> | P | M |
| western least bittern | <i>Ixobrychus exilis hesperis</i> | L | M |
| osprey | <i>Pandion haliaetus</i> | Y | R |
| white-tailed kite | <i>Elanus leucurus</i> | Y | R |
| northern harrier | <i>Circus cyaneus</i> | Y | M |
| sharp-shinned hawk (breeding) | <i>Accipiter striatus</i> | Y | R |
| Cooper's hawk (breeding) | <i>Accipiter cooperii</i> | Y | R |
| mountain quail | <i>Oreortyx pictus</i> | Y | R |
| western screech owl | <i>Otus kennicottii</i> | Y | R |
| northern pygmy owl | <i>Glaucidium gnoma</i> | Y | R |
| long-eared owl | <i>Asio otus</i> | Y | R |
| black swift | <i>Cypseloides niger</i> | Y | R (waterfalls) |
| calliope hummingbird | <i>Stellula calliope</i> | Y | R |
| Lewis' woodpecker | <i>Melanerpes lewis</i> | Y | R |
| Nuttall's woodpecker | <i>Picoides nuttallii</i> | Y | R |
| purple martin | <i>Progne subis</i> | Y | R |
| tree swallow | <i>Tachycineta bicolor</i> | Y | R |
| oak titmouse | <i>Baeolophus inornatus</i> | Y | R |
| American dipper | <i>Cinclus mexicanus</i> | Y | S |
| Swainson's thrush | <i>Catharus ustulatus</i> | Y | R |
| Bendire's thrasher | <i>Toxostoma bendirei</i> | Y | R |
| American pipit (water pipit) | <i>Anthus rubescens</i> | Y | R |
| loggerhead shrike | <i>Lanius ludovicianus</i> | Y | R |
| Cassin's vireo (solitary) | <i>Vireo cassinii</i> | Y | R |
| warbling vireo | <i>Vireo gilvus</i> | Y | R |
| yellow warbler | <i>Dendroica petechia brewsteri</i> | Y | R |
| MacGillivray's warbler | <i>Oporornis tolmiei</i> | Y | R, M |
| common yellowthroat | <i>Geothlypis trichas</i> | Y | R |
| Wilson's warbler | <i>Wilsonia pusilla</i> | Y | R |

| COMMON NAME | SCIENTIFIC NAME | OCCURRENCE* and HABITAT TYPE** | |
|--|----------------------------|---|------|
| yellow-breasted chat | <i>Icteria virens</i> | P | R |
| summer tanager | <i>Piranga rubra</i> | P | R |
| Lincoln's sparrow | <i>Melospiza lincolni</i> | Y | R |
| tri-colored blackbird | <i>Agelaius tricolor</i> | Y | R, M |
| MAMMALS | | | |
| fringed myotis | <i>Myotis thysanodes</i> | Y | R, M |
| occult little brown bat | <i>Myotis lucifugus</i> | L | M |
| western small-footed myotis | <i>Myotis ciliolabrum</i> | Y | R |
| ringtail | <i>Bassariscus astutus</i> | Y | R |
| western spotted skunk | <i>Spilogale gracilis</i> | P | R |
| *OCCURRENCE INFORMATION: | | **HABITAT TYPES/HABITAT COMPONENTS | |
| <p>L = Occurrence of the species is likely; suitable habitat exists and the species is known for nearby locations.</p> <p>P = Occurrence of the species is possible; suitable habitat exists.</p> <p>Y = Species is known to occur.</p> | | <p>AQ = aquatic; lakes, reservoirs, ponds, vernal pools/puddles</p> <p>M = marshes, meadows; both freshwater areas and moist meadows</p> <p>R = riparian (streamside thickets and woodlands)</p> <p>S = streams</p> | |

APPENDIX E

**SUMMARY OF PUBLIC INVOLVEMENT
AND
RESPONSE TO COMMENTS**

E.1. SUMMARY OF PUBLIC INVOLVEMENT

The U.S. Fish and Wildlife Service (USFWS) followed the *National Environmental Policy Act (NEPA)* and its implementing regulations as developed by the Council on Environmental Quality (CEQ) to encourage public participation in this process. The public involvement and notification process to date are described in the following sections.

E.1.1. General Process

Various Federal and State agencies identified issues related to the proposed action during interagency meetings and informal discussions beginning in 2008. Several Federal agencies were invited to be cooperating agencies and accepted this invitation (Bureau of Land Management, China Lake Naval Air Weapons Station, Edwards Air Force Base, Mojave National Preserve, and San Bernardino National Forest).

Although no formal scoping was conducted, there were public presentations made at two meetings of the Desert Managers Group (DMG) and updates at additional meetings regarding the direction and progress of the preparation of the Environmental Assessment for Establishing Additional Populations of the Federally Endangered Mohave Tui Chub in the Mojave Desert, Kern, Los Angeles, and San Bernardino Counties, California (EA). These presentations/updates included requests for input and comments from the Federal, State, and local agencies that are members of the DMG and the public. The DMG meetings are open to the public and their agenda is posted prior to the meeting dates.

The comment period for the EA opened on June 13, 2011 and closed on July 15, 2011. The EA was distributed to all local libraries in the proposed action area, posted on the Ventura Fish and Wildlife Office website's home page, the Desert Managers Group web site's home page, the Mojave National Preserve's Fish page and Park News page.

We received two comment letters. The respondents supported the proposed action but had questions and concerns about the limitations of the specific sites identified, the absence of specific sites identified in the Mojave River, and the depth of analysis of the impacts. A copy of the comment letters received and a list of the comments and responses is at the end of this Appendix.

E.1.2. Tribal Contacts

The USFWS coordinated a separate effort with the tribes with lands of interest in the Mojave Desert area of California. The USFWS sent letters and the EA to 12 tribes and 3 cultural organizations. We received no response.

E.2. COMMENT LETTERS RECEIVED

We received two comment letters (see below).



Michael J. Connor, Ph.D.
California Director
P.O. Box 2364, Reseda, CA 91337-2364
Tel: (818) 345-0425
Email: mjconnor@westernwatersheds.org
Web site: www.westernwatersheds.org

Working to protect and restore Western Watersheds

By Email

July 15, 2011

Field Supervisor
Attn: Mohave Tui Chub EA
U.S. Fish and Wildlife Service
2493 Portola Road, Suite B
Ventura, California 93003

Email: <fws8mtcea@fws.gov>

RE: Environmental Assessment for Establishing Additional Populations of the Federally Endangered Mohave Tui Chub in the Mojave Desert, Kern, Los Angeles, and San Bernardino Counties, California

Dear Field Supervisor:

Western Watersheds Project thanks you for this opportunity to provide comments on the *Environmental Assessment for Establishing Additional Populations of the Federally Endangered Mohave Tui Chub in the Mojave Desert, Kern, Los Angeles, and San Bernardino Counties, California* dated June 2011. Western Watersheds Project works to protect and conserve the public lands, watersheds, fish, wildlife and other natural resources of the American West through education, scientific study, public policy initiatives, and litigation.

The Mohave tui chub, *Siphateles bicolor mohavensis*, was federally listed as endangered in 1970 and state-listed as endangered in 1971. The Mohave tui chub is a fully protected species under the California Fish and Game Code. A Recovery Plan for the Mohave tui chub was published in 1984 ("Recovery Plan").¹ No critical habitat rules have been published for the Mohave tui chub.

The purposes of the Endangered Species Act ("ESA") are to provide for the conservation of endangered species and threatened species and to provide the means whereby the ecosystems upon which endangered species and threatened species depend may be conserved. The ESA

¹ U.S. Fish and Wildlife Service. 1984. Recovery plan for the Mohave tui chub, *Gila bicolor mohavensis*. U.S. Fish and Wildlife Service, Portland, Oregon. 56 pp.

directs all Federal departments and agencies to seek to conserve endangered species and threatened species and to utilize their authorities in furtherance of the purposes of the Act.

The Endangered Species Act (“ESA”) directs that “the Secretary shall develop and implement plans (hereinafter in this subsection referred to as “recovery plans”) for the conservation and survival of endangered species.” 16 U.S.C. § 1533 (4)(f)(1). The 1984 Recovery Plan set the goal for downgrading to threatened status of establishing at least six secure, self-sustaining populations with delisting being considered upon successful establishment of viable populations in the majority of its historic habitat in the Mojave River. The Recovery Plan proposed establishing additional self-sustaining populations along the Mojave River at Camp Cady, Mojave Narrows, and Afton Canyon to reach recovery.

We agree that it is important to maintain multiple captive populations of Mohave tui chub to reduce the risks of chance events or management errors resulting in the extinction of the species. However, maintaining populations outside of habitat is at best a stop gap measure, and a risky one at that given the prior history of multiple failed introductions (see Recovery Plan at 15) and the relatively recent loss of the Desert Research Center population. This needs to be recognized and addressed in the EA.

The EA should take a candid look at impacts of continuing to establish additional captive populations without initiating any of the other measures that are required to re-establish the species in the wild. It is now 41 years since the Mohave tui chub was listed and 27 years since the Recovery Plan was published. In that time, several refugia have been established and/or failed. It is well established in the literature that captive fish populations are often subject to rapid significant evolutionary change in morphological, behavioral, and physiological traits in ways that may compromise fitness in a more natural setting (Lynch and O’Hely, 2001²). In the latter context, genetic drift has already occurred in the founder DH Springs population and at the Camp Cady refuge (Chen et al, 2006³). Yet no action appears to have been taken to even initiate assessment of reaches of the river where habitat persists (such as in Afton Canyon) for suitability for reintroduction, and no plans have been proposed to remove introduced fish and other predators.

This candid look at the impacts of continuing to establish additional captive populations without initiating any of the other measures required to re-establish the species in the wild should also include quantitative assessments of the likely loss of genetic fitness and behavioral fitness that would occur for each alternative analyzed in the EA. The EA should also provide a quantitative analysis of how informative the use of the proposed 5 year survival period as a gauge of success will be, given that several populations (such as the Desert Research Center population) have been lost well after they reached the 5-year benchmark.

² Lynch, M. and O’Hely, M. 2001. Captive breeding and the genetic fitness of natural populations. *Conserv. Genet.* 2: 363-378.

³ Chen, Y., Parmenter, S. and May, B. 2006. Genetic structure and management history of Mohave tui chub (*Siphateles bicolor mohavensis*). Abstract of presentation at the 38th Annual Meeting of the Desert Fishes Council. Available online at: http://www.desertfishes.org/meetings/2006/DFC_Program_2006_Abstacts_2_sided.pdf

Although the EA mentions the perennial flows along stretches of the Mojave River at Afton Canyon (EA at 25, 69) it provides no proposal or discussion regarding establishing a refugium at Afton Canyon, even though this is one of the three sites specifically identified in the Recovery Plan. Nor does the EA disclose why the USFWS has not specifically identified the area as a site for establishing a refugium in this EA.

Afton Canyon seems to be a highly suitable location and is part of the Mojave River system, and in fact seems to be the only stretch of the river where reintroduction to the wild may be feasible. The BLM recently expanded the Afton Canyon Natural Area and ACEC (WMP 2006). Reaches of the Mojave River within Afton Canyon are the only stretches of the river deemed eligible for Wild and Scenic River designation. In addition, the Cady Mountain cattle grazing allotment has been now closed and the riparian areas are recovering from grazing impacts.

The Recovery Plan specifically identified the pond below Afton campground as a refugium. The pond is now silted but would appear to be a good location for re-excavation for a reintroduction refugium. There are other ponds along the riparian reach that may also be suitable. The Canyon is also habitat for an important relictual population of western pond turtle.⁴ Re-excavation of the pond would benefit this species too. There are problems associated with introduced pests such as bullfrog (which also occurs at Camp Cady). Improved management of these introduced pests would also benefit the western pond turtle since bullfrogs predate on the young and hamper recruitment.

According to the 2006 West Mojave Plan (WMP 2006, Appendix D.1.1):

Afton Canyon is a BLM showcase for riparian restoration. For over ten years, invasive tamarisk plants have been removed and replaced with native willows and cottonwoods. The riparian area is fenced to exclude cattle. The canyon supports a relictual population of Western pond turtles and is a potential site for re-introduction of the Mojave tui chub.

The West Mojave Plan (WMP 2006, Appendix D.1.1) amended the Afton Canyon management plan by adding the following text to the Purpose:

This management plan adopts the provisions of the West Mojave Plan for protection of the following species and their habitat:

- All species of bats
- Bighorn sheep
- Prairie falcon
- Golden eagle
- Vermilion flycatcher
- Yellow-breasted chat
- Yellow warbler
- Summer tanager
- Least Bell's vireo (potential habitat)
- Western pond turtle
- Desert tortoise
- Mojave fringe-toed lizard

⁴ Lovich J., and Meyer, K. 2002. The Western pond turtle (*Clemmys marmorata*) in the Mojave River, California, USA: highly adapted survivor or tenuous relict. *Journal of Zoology*, London 256: 537-545.

In addition, the management plan allows for the re-introduction of the Mojave tui chub into the Mojave River at such time as CDFG and USFWS deem appropriate. Activities of the wildlife agencies to restore habitat for the Mojave tui chub, including the removal of non-native fish, would be allowed.

Clearly then, the public lands at Afton Canyon could provide both the location of a refugium and act as the focus for planning for release of the Mohave tui chub back into natural habitat.

The EA allows for development of refugia on private lands but provides no further explanation of this. The EA should explain the status of any fish transferred to private lands, the measures that ensure that any populations established on private lands are maintained in perpetuity, the source of funding, and any guarantee/bond requirements.

On a minor note, the EA incorrectly uses Hubbs and Miller, 1943 to support the statement that the Mohave tui chub is the only fish native to the Mojave River. EA at 1. To the contrary, Hubbs and Miller, 1943 considered both the Mohave tui chub and the Arroyo chub (which they called *Gila orcuttii*) to be native to the Mojave River system. They hypothesized that in prior periods the Mohave tui chub and Arroyo chub were lentic and lotic habitat specialists respectively.

Western Watersheds Project thanks you for the opportunity to be involved in this important planning process. Please add Western Watersheds Project to the list of interested public at the address listed below and continue to keep us informed as this process develops. If you have any questions please feel free to contact me by telephone at (818) 345-0425 or by e-mail at <mjconnor@westernwatersheds.org>.

Yours sincerely,

A handwritten signature in black ink that reads "Michael J. Connor". The signature is written in a cursive style and is underlined with a single horizontal line.

Michael J. Connor, Ph.D.
California Director
Western Watersheds Project
P.O. Box 2364
Reseda, CA 91337



CENTER for BIOLOGICAL DIVERSITY

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science, education, policy, and environmental law*

via email and USPS

7/15/2011

Field Supervisor
Attn: Mohave tui chub EA
U.S. Fish and Wildlife Service
2493 Portola Road, Suite B
Ventura, California 93003
fws8mtcea@fws.gov

RE: Comments on Environmental Assessment for Establishing Additional Populations of the Federally Endangered Mohave Tui Chub in the Mojave Desert, Kern, Los Angeles, and San Bernardino Counties, California (EA).

Dear Field Supervisor Noda,

These comments on the U.S. Fish and Wildlife Service's draft environmental assessment for establishing additional populations of the federally endangered Mohave tui chub in the Mojave Desert, Kern, Los Angeles, and San Bernardino Counties, California are submitted on behalf of the staff and members of the Center for Biological Diversity ("Center"). The Center is a national, nonprofit organization whose mission is to protect and restore endangered species and wild places through science, policy, education, advocacy, and environmental law. The Center has over 320,000 members and e-activists, many of whom reside in California, and recreate or live in the Mojave desert and surrounding environs. The Center's members and staff regularly visit the Mojave desert for purposes of research, photography, hiking, and other recreational, scientific, and educational activities.

The Center strongly supports the implementation of the Recovery Plan for the Mojave tui chub (MTC) in order to achieve recovery. However, we have many specific concerns about the proposed draft Environmental Assessment (EA) for establishing additional populations of the federally endangered Mohave tui chub. While we support introductions of MTC into in compliance with the Recovery Plan in order to achieve recovery, we find the EA sorely lacking in the environmental analysis of the introduction sites.

I. The EA fails to Provide Adequate Analysis of the Action.

Little if any information is presented on the quality of the habitat or if the MTC can be sustained at the new sites. As the Service is aware, the Recovery Plan recognizes that prior introductions have failed (13/14 attempts) because of inadequate water quality and quantity and lack of appropriate spawning areas (at pg.14). In fact, the Recovery Plan states "Future transplant sites should be *closely scrutinized* to insure that adequate conditions exist. Future

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Ileene Anderson, Biologist
8033 Sunset Boulevard, #447 • Los Angeles, CA 90046-2401
tel: (323) 654.5943 fax: (323) 650.4620 email: ianderson@biologicaldiversity.org
www.BiologicalDiversity.org

transplants need not suffer the uncertainties of indiscriminate introductions” (at pg.14) [emphasis added]. These basic habitat issues are not addressed in the EA for the new sites.

Further information on water quality is imperative. No information on the range of pH, water temperature or dissolved oxygen is provided. The EA alludes to some of the ponds being used as a water reservoir for other activities (irrigation, fire-fighting etc.) but those issues associated with water availability are not analyzed. Will there be adequate water available at all times to support MTC? Surely FWS does not want MTC introductions sucked up into fire tanks and used for fires suppression activities. Yet this is the very scenario that could arise for the Coxey ponds.

Another issue that remains unacknowledged is water quality for those ponds sustained in part by tertiary treated wastewater, which is known to affect reproduction in fishes because of endocrine disruption¹. This issue should be analyzed for those proposed introduction sites that rely on wastewater (Piute Ponds, Golf Course Pond and others).

The DEA is also unclear if adequate food resources and reproductive sites are available for successful MTC persistence at any of the introduction sites. In fact the DEA fails to actually describe what the habitat needs for the MTC are. In order to provide the public and decision-makers adequate information, the NEPA document should present the habitat requirements and then analyze each of the proposed introduction sites for those habitat elements.

For the golf course site (and potentially other sites), will pesticide use occur? If so, how will that affect the invertebrates upon which the MTC rely?

The DEA fails to identify and analyze many important ecological issues related to the introduction sites and must include an analysis of these critical issues in a revised draft to help insure that future introduction, which are critically needed, are successful. Tragically, the track record for MTC introductions is mostly failure and reasons documented. The Service must prepare a more comprehensive assessment of suitability of these sites before proposing them.

II. The EA Includes Unconstructed Sites.

Inclusion of unconstructed sites is wholly inappropriate to include in the DEA. While we definitely support creating new opportunities for MTC introductions, it is impossible to identify much less evaluate the environmental issues of unconstructed ponds that currently exist only on paper. No information is provided on water quality/quantity requirements etc. MTC should not be “fish-farmed”, but instead the created habitat should try to mimic to the greatest extent possible, natural habitat for sustainability especially in light of global climate change. No restoration plan is provided for these unconstructed sites (new ponds at Camp Cady, Victor Valley College/CDFG Hatchery and Bascom property). Absent these basic data, inclusion of these sites in the environmental review is incomplete at best.

III. Proposed Sites Should Be Within the Historic Habitat Area for the MTC

No clear nexus is provided for the EAFB site and its historic connection to the Mojave River environs. In order to meet the criteria in the Recovery Plan six refugia need to be established and “located adjacent to the Mohave River and therefore within or along the tui chub’s historic natural range” (at pg. 18) We found no justification of introduction of this

¹ Jenkins et. al 2009.

species outside of its historic range and believe the DEA should focus on compliance with the recovery plan.

IV. DEA fails to Evaluate Additional Introduction Areas Recommended in the Recovery Plan

The DEA does not include other Recovery Plan recommended areas including Afton Canyon pond, and the mainstem of the Mohave River. (at pg. 21). Both of these areas are called out as potential areas for (re-) introduction and fit the criteria of the recovery plan by being in/adjacent to the Mohave River. Please include an analysis of these areas in the revised NEPA document.

Thank you for the opportunity to submit comments on this important issue. The Center respectfully requests that a revised draft environmental document be produced that addresses all of these important issues. We want to see the recovery of the MTC, and therefore the planning for introduction must assure, to the greatest extent, successful introductions.

Please add me onto the “interested parties” list for this issue and feel free to contact me directly at 323-654-5943.

Sincerely,



Ilene Anderson
Biologist/Public Lands Desert Director
Center for Biological Diversity
8033 Sunset Blvd., #447
Los Angeles, CA 90046
ianderson@biologicaldiversity.org

References (included)

Jenkins, J.A., Goodbred, S.L., Sobiech, S.A., Olivier, H.M., Draugelis-Dale, R.O., and Alvarez, D.A., 2009, Effects of wastewater discharges on endocrine and reproductive function of western mosquitofish (*Gambusia* spp.) and implications for the threatened Santa Ana sucker (*Catostomus santaanae*): U.S. Geological Survey Open-File Report 2009-1097., 46 p. (Revised May 2009).

E.3. LIST OF COMMENTS RECEIVED AND RESPONSES

Below is a list of the comments received and the responses to the comments for Environmental Assessment to Establish Additional Populations of the Mohave Tui Chub in Kern, Los, Angeles, and San Bernardino Counties, California.

Comment 1: In the past there have been multiple failed introductions of Mohave tui chub populations. Little information is provided on efforts that would be taken to scrutinize establishing additional sites for establishing populations of Mohave tui chubs.

Response: We are concerned about the high number of past failed introductions of Mohave tui chub populations. To avoid this situation in the future, we (an interagency group) first assess the location to see if it meets the physical, chemical, and ecological needs of the Mohave tui chub and other criteria. Please see our response to Comment Number 5. In Chapter 2 Proposed Action-Release of Mohave Tui Chubs, and Measures to Mitigate Adverse Effects, we have added examples of the habitat characteristics that would meet the physical, chemical, and ecological needs of the Mohave tui chub and reduce or avoid the likelihood of failed introductions.

Comment 2: There are concerns that the preferred alternative is continuing the practice of establishing captive populations of Mohave tui chubs without initiating measures to establish the species in the wild (i.e., the Mojave River). Isolated populations present management problems such as significant evolutionary change in genetic, morphological, behavioral, and physiological traits in ways that may compromise fitness in a more natural setting.

Response: The EA includes establishing Mohave tui chubs in Deep Creek and Holcomb Creek, tributaries of the Mojave River, and was written to include other areas within the range of the Mohave tui chub, including other locations in the Mojave River drainage. The establishment of additional populations considers the issues of founder effect as discussed under “Proposed Action, Capture of Mohave Tui Chubs” and genetic drift. Currently it would be difficult to establish Mohave tui chubs in the Mojave River because of the continued stocking of non-native predatory fish in the river, the introductions of non-native aquatic species (e.g., hitch) to the Mojave River from Central Valley waters, and periodic large releases of water with high velocities from upstream sources to which the Mohave tui chub, a lentic species, does not appear to be adapted.

Comment 3: The EA does not assess the perennial reaches of the Mojave River for establishing populations of Mohave tui chubs including Afton Canyon, which is mention in the Recovery Plan.

Response: There are four locations or reaches where the Mojave River has perennial flow and thus initially may be suitable sites for establishing populations of Mohave tui chubs: (1) upstream of the river in the San Bernardino Mountains (e.g., Deep Creek, etc.), (2) Mojave Narrows, (3) Afton Canyon, and (4) MC Spring. Mohave tui chubs currently occur at MC

Spring and in ponds adjacent to the river at Camp Cady and the Mojave Narrows. Surface water flow at the Camp Cady Wildlife Area is ephemeral; the Mojave River historically surfaced in the center of the Wildlife Area and generally flowed from late October to August but has had only one year of flow since 1982-83 (CDFG 2005). We identified Deep and Holcomb Creeks (reach 1) as a specific potential area for establishing additional population(s). We considered establishing MTCs in the Mojave Narrows (reach 2) and at Afton Canyon (reach 3). The Mojave Narrows was not identified at this time because of the presence of non-native predatory fish, the continued stocking of these species for recreation, and the past and continuing inadvertent transport of California fish species from other watershed, including hitch (*Lavinia exilicauda*) and arroyo chub, and potential diseases associated with the non-native aquatic species to the Mojave River. The Mohave tui chub evolved with little or no aquatic predation or competition as the only fish species native to the Mojave River (USFWS 1984). We did not specifically identify the Afton Canyon reach in the EA because we believe that a substantial amount of effort would be needed to successfully establish and maintain a population of Mohave tui chubs at this location under current upstream management conditions, presence of non-native predacious aquatic and amphibious species, and other reasons. Severe downpours or heavy snow runoff periodically flush the lower portion of the Mojave River causing widespread change in stream condition and abundance/composition of aquatic organisms. For example, the pond at Afton Canyon referred to in the Recovery Plan no longer exists; it was filled with sediment during a high flow event. However, we did not eliminate Afton Canyon as a site for establishing Mohave tui chubs in the future. We acknowledge that the 2005 West Mojave Plan contains language stating that the Afton Canyon management plan allows for the re-introduction of the Mojave tui chub into the Mojave River at such time as CDFG and USFWS deem it appropriate. To ensure that any Mohave tui chub population will be established and persist for the long term, we must ensure that the locations meet the physical, chemical, and ecological requirements of the species and have commitments from the land owner. These and other requirements will help us avoid past actions that, while well-intentioned, established populations of Mohave tui chubs that were unsuccessful through time. If conditions at the Mojave Narrows and Afton Canyon can be modified to meet the criteria for establishing additional populations (e.g., the physical, chemical, and ecological needs of the Mohave tui chub, etc.) and if the landowners are willing to host a population of Mohave tui chubs for the long term, we would work with them to establish populations of Mohave tui chubs at these reaches.

Comment 4: The Recovery Plan should be revisited regarding the adequacy of criteria for downlisting and delisting.

Response: The purpose of the EA is to describe and analyze the implementation of some of the tasks identified in the 1984 Recovery Plan. We agree that it is desirable to review the Recovery Plan in light of new information about the Mohave tui chub, the watershed and habitat, conservation biology, and other information. Please recall that the Recovery Plan is a guidance document. In reviewing the available information on the Mohave tui chub, including the 2009 5-year status review, the Report on a Workshop to Revisit the Mohave Tui Chub Recovery Plan and a Management Action Plan (Hughson and Woo 2004), and the lessons learned from the failures of establishing past populations, we considered this information in the development of

the proposed action and the preferred alternative. We believe it provides us with the flexibility to establish additional populations at a number of locations and obligates us to ensure that those locations will provide for the long-term survival of the Mohave tui chub populations.

Comment 5: The EA did not provide information on Mohave tui chub populations established on private lands including measures that would be implemented to ensure the long-term survival and management of the population/habitat, funding sources, and any guarantees or financial/bonding requirements.

Response: We added information to the EA to address this request (Chapter 2, Proposed Action, Release of Mohave Tui Chubs. Depending on the wishes of the private landowner, there are options available for managing the Mohave tui chub population and habitats on private lands. These range from the private landowner hosting a Mohave tui chub population while the USFWS and/or California Department of Fish and Game manage and monitor the population and habitat to the landowner conducting all the management and monitoring activities. If the landowner desires to implement activities that may result in take that would benefit the Mohave tui chub, we would evaluate this approach and the landowner's qualifications/experience, and if qualified, issue a permit to the landowner. In either situation, a minimum time would be agreed upon prior to establishing a population to ensure that this action would contribute to the recovery of the Mohave tui chub. Monitoring and reporting requirements would be included as conditions of the permit.

Comment 6: The EA lacks information on water quality and quantity (e.g., perennial water supply) requirements of the Mohave tui chub.

Response: This information has been added under Chapter 2. Proposed Action and Alternatives, Alternative B.

Comment 7: Concerns were expressed and information presented on the effects of treated waste water as a habitat source for populations of Mohave tui chubs.

Response: We appreciate the information provided in the recent journal article on the effects of waste water on species of fishes. We will strongly consider this recent information in our evaluation of future specific and generic locations for establishing additional populations of Mohave tui chubs.

Comment 8: The EA should provide information on the habitat needs of the Mohave tui chub and an analysis of each proposed location to determine if the location meets the needs of the species.

Response: Additional information about the habitat needs of the Mohave tui chub has been added. Please refer to our responses to Comments 1, 3, and 6. As possible locations are identified, we will analyze them to determine if they meet the physical, chemical and ecological requirements of the Mohave tui chub to support and sustain a population. This is one of several

factors analyzed when considering locations for additional populations of Mohave tui chubs (please see Chapter 2 Proposed Action and Alternatives, Measures to Mitigate Adverse Effects). The habitat needs of the Mohave tui chub are analyzed and used with other information to determine if an additional population could be established successfully and persist at a new location based on information about that location.

Comment 9: The proposed site for establishing additional populations should be within the historic habitat area for the Mohave tui chub.

Response: Please see our response to Comment 4. The Recovery Plan (USFWS 1984) identified that there are limited options available for creating additional refugia for the Mohave tui chub. The Recovery Plan, which is a guidance document, recommended establishing three or more additional populations bringing the total number of populations to six or more. Restoring the Mohave tui chub to threatened status would be achieved by assuring the preservation of populations and by establishing at least three additional self-sustaining populations that are protected from threats to their habitats. On or before 1984, an advisory committee identified sites as having the best potential for establishing additional populations. Unfortunately, one of the three existing populations in 1984 (Desert Research Station) no longer exists. The other three locations specifically mentioned in the Recovery Plan are Camp Cady, Afton Canyon Campground Pond, and Mojave Narrows Regional Park in addition to the main stem Mojave River. Since that time various environmental changes have occurred within the historic range of the Mohave tui chub including land use, economic growth, water availability, and a better understanding of climate change. The Mohave tui chub has been established at Camp Cady. The campground pond at Afton Canyon has silted in from periodic flood events since 1984, and Mojave Narrows Regional Park is stocked with non-native, predacious fish. Limiting the possibility of establishing populations to previously extirpated sites does not consider factors such as climate change or sites that have been irretrievably altered by man or nature. Our desire would be to establish Mohave tui chubs in the Mojave River and to provide a means whereby the ecosystem upon which this endangered species depends, the Mojave River, may be conserved and managed. Until we are able to collaborate with local, State and Federal agencies that have jurisdiction over the Mojave River and its watershed, our interim goal is to have six or more populations of Mohave tui chubs thus reducing the probability of extinction, and include climate change in the analysis of requirements for downlisting and delisting.

Comment 10: The EA includes future unconstructed aquatic sites making it impossible to evaluate the impacts of these sites.

Response: The Council on Environmental Quality's regulations for implementing NEPA (section 1508.9) state that an environmental assessment should briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact and should include brief discussions of the need for the proposal, alternatives, the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted. We provided these discussions and analyses for both specific and generic locations. A generic description and analysis of impacts were presented

(please see Chapter 4 Environmental Consequences, Selection of a Preferred Alternative); this is not an unusual practice in NEPA documents. This approach was used to streamline the NEPA compliance process. If the impacts of future locations analyzed in this EA for generic locations are adequate, then no further NEPA compliance would be needed. If additional impacts are identified that were not analyzed in this EA, then additional NEPA compliance would be required.

Comment 11: Isolated populations present management problems such as significant evolutionary change in genetic, morphological, behavioral, and physiological traits in ways that may compromise fitness in a more natural setting such as the Mojave River.

Response: During the planning, establishment, and management of additional populations, we considered genetic issues such as founder effect as discussed under Chapter 2, Proposed Action, Capture of Mohave Tui Chubs and genetic drift. At the present time there is difficulty in establishing Mohave tui chubs in the Mojave River because of past and ongoing actions including the continued stocking of non-native predatory fish, the introductions of non-native aquatic species (e.g., arroyo chub, hitch) to the Mojave River from other watersheds which may hybridize, compete for resources, and introduce diseases to which the Mohave tui chub is not adapted.. Also, the Mojave River experiences periodic large releases of water with high velocities from upstream sources to which the Mohave tui chub, a lentic species, does not appear to be adapted. Unfortunately, there no longer is a natural setting for the Mohave tui chub. Please see our response to Comment 9.

Comment 12: The EA does not discuss the specific impacts of uses of aquatic habitats in addition to hosting additional populations of Mohave tui chubs (e.g., water withdrawal for firefighting, etc.).

Response: Please see our responses to Comments 8, 9, and 11. The circumstances at each aquatic site are different and will require individual analysis to determine if they meet the physical, chemical, and ecological needs of the Mohave tui chub. Because water is a scarce resource in the Mojave Desert, it is unlikely that any aquatic habitat where we consider establishing additional populations of Mohave tui chubs will have only one purpose and use. For example, withdrawing water from Coxey Pond for firefighting is an occasional use that, with implementation of a simple design, can minimize or eliminate Mohave tui chubs being “sucked up into fire trucks and used for fire suppression activities.” We did not provide detailed information on how each aquatic habitat would be managed given the current use(s) of the habitat. Our understanding of the Council on Environmental Quality’s regulations for implementing NEPA is that a detailed analysis is not required for an environmental assessment (40 Code of Federal Regulations 1508.9). However, if a site could not be managed to meet the physical, chemical, and ecological needs of the Mohave tui chub, the site would not receive Mohave tui chubs.

APPENDIX F.

ENDANGERED SPECIES ACT CONSULTATION



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

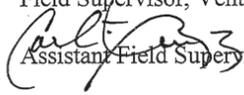


IN REPLY REFER TO:
81440-2011-F-0281

August 26, 2011

Memorandum

To: Field Supervisor, Ventura Fish and Wildlife Office, Ventura, California

From:  Assistant Field Supervisor, Ventura Fish and Wildlife Office, Ventura, California

Subject: Intra-Service Biological Opinion for Establishing Additional Populations of Mohave tui Chubs in the Mojave Desert in California (8-8-11-FW-22)

The U.S. Fish and Wildlife Service (Service) proposes to establish additional populations of the federally endangered Mohave tui chub (*Siphateles bicolor mohavensis*) in the Mojave Desert in California. At issue are the effects to the Mohave tui chub from implementation of this proposed action, which is a recommended task in the Recovery Plan for the Mohave Tui Chub (USFWS 1984) (Recovery Plan). This review is in accordance with section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). The proposed action would take place at various discrete locations in the Mojave National Preserve, Edwards Air Force Base, San Bernardino National Forest, California Desert District of the Bureau of Land Management, lands managed by local/state agencies (e.g., Victor Valley College, California Department of Fish and Game, etc.), and private lands. The proposed action may also include additional locations to receive Mohave tui chubs that were not specifically mentioned in the Environmental Assessment for Establishing Additional Populations of the federally Endangered Mohave Tui Chub in the Mojave Desert, Kern, Los Angeles, and San Bernardino Counties, California (USFWS 2011) (EA). Any additional populations would only be established on lands managed by willing landowners and in aquatic habitat that meets the physical, chemical, and ecological requirements of the Mohave tui chub. Critical habitat has not been designated for the Mohave tui chub.

As part of this consultation, we previously determined that the proposed action is not likely to adversely affect the federally threatened Mojave desert tortoise (*Gopherus agassizii*) or designated critical habitat for this species. Built into the project description are measures that would ensure avoidance of adverse effects to the Mojave desert tortoise and critical habitat. In the unlikely event that a site is proposed that may adversely affect the Mojave desert tortoise, the Service would initiate and complete the consultation process as required under section 7(a)(2) of the Act. Additionally, we previously determined that the proposed action would have no effect on the federally endangered southwestern willow flycatcher (*Empidonax traillii extimus*), least Bell's vireo (*Vireo bellii pusillus*), mountain yellow-legged frog (*Rana muscosa*), arroyo toad

(*Anaxyrus californicus*), Lane Mountain milk-vetch (*Astragalus jaegerianus*), Cushenbury buckwheat (*Eriogonum ovalifolium* var. *vineum*), Cushenbury milk-vetch (*Astragalus albens*), Cushenbury oxytheca (*Oxytheca parishii* var. *goodmaniana*), triple-ribbed milk-vetch (*Astragalus tricarinatus*), or the federally threatened Inyo California towhee (*Pipilo crissalis eremophilus*), and Parish's daisy (*Erigeron parishii*). The proposed action would have no effect on critical habitat designated for the southwestern willow flycatcher, least Bell's vireo, mountain yellow-legged frog, arroyo toad, Lane Mountain milk-vetch, Cushenbury buckwheat, Cushenbury milk-vetch, Cushenbury oxytheca, Inyo California towhee, or Parish's daisy.

This biological opinion was prepared using the following sources of information: the EA (USFWS 2011), the Recovery Plan, the 5-Year Status Review for the Mohave Tui Chub (USFWS 2009), electronic correspondence, and information in our files. A complete record of this consultation can be made available at the Service's Ventura Fish and Wildlife Office.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is to establish and maintain additional populations of the Mohave tui chub that would be self-sustaining in suitable habitat. This proposed action would be implemented in the Mojave Desert in California (the Mojave River drainage basin and isolated man-made waters in the Mojave Desert in California), and would support the Service's goal in the Recovery Plan to conserve the species and meet one of the criteria for downlisting from endangered to threatened.

The proposed action would occur at various locations within the general historical range of the Mohave tui chub in the Mojave Desert. All required permits and permissions would be obtained prior to implementing the proposed action. Trapping, transportation, and release of Mohave tui chubs would be conducted according to the ESA, California Endangered Species Act, and California Fish and Game Code 5515.

We, in coordination and cooperation with other entities, propose to capture, transport, and release a minimum of 500 small (between 61 and 101 millimeters (mm)) Mohave tui chubs at various locations to establish additional populations of the species. Mohave tui chubs would be captured from existing populations that represent the diversity in the gene pool for the species. Thus, fish may be captured from one or more populations to assure the full representation of genetic diversity.

Capture of Mohave Tui Chubs

Mohave tui chubs are trapped using funnel (minnow) traps or similar traps. Clean, dry traps are placed in the water in the late afternoon or evening and removed the following morning. All Mohave tui chubs from each trap are carefully removed and placed in a clean bucket with fresh

water from the source population. The fish are carried to a nearby processing station (e.g., shaded portable table) where they are measured and their health assessed. The Mohave tui chubs that qualify for transport to a receiving site are placed in a holding tank for transport. The other Mohave tui chubs are released at their point of capture.

Transport of Mohave Tui Chubs

Once the trapping, health assessment, and selection of Mohave tui chubs are completed, the fish are transported to the receiving site. Transport is via motorized vehicle on existing roads to the receiving site. The selected Mohave tui chubs would be transported to other aquatic habitats in a holding tank that is covered creating a dark environment which minimizes stressful behavior. The water in the holding tank is from the source population site. Water temperature is reduced to 14-16 degrees Centigrade (C) by the addition of ice in plastic bags. The electrical conductivity of water in the holding tank is adjusted to approximately 1,000 - 2,000 $\mu\text{S}/\text{cm}^2$ by the addition of uniodized granular sodium chloride, a sea-salt simulator from the pet trade, or stresscote®. Dissolved oxygen is maintained above saturation by continuous bubbling of compressed oxygen gas into the holding tank at the lowest practical rate using a two-stage welding-type regulator.

Release of Mohave Tui Chubs

Upon arriving at the receiving site, the aquatic environment in the holding tank is tempered with water from the receiving site. Approximately 50 percent of the holding tank's water is replaced with water from the receiving site once every 15 minutes for a minimum of three exchanges, or until the water temperature is within 2 degrees C of the receiving site. Small numbers of Mohave tui chubs in the holding tanks are netted using small hand nets; they are placed in clean buckets with water from the receiving site. No imported water from the source population (the holding tank) is placed into the receiving site. Once the fish are in the clean bucket, they are poured slowly with the lip of the bucket below water level into the receiving site.

Measures to Avoid and/or Minimize Adverse Effects

The proposed action also contains many safeguards to avoid and/or minimize potential adverse effects of this action to the Mohave tui chub. For site selection, we would consider the following:

- selecting additional sites within the native or historical range whenever possible;
- restricting the release of Mohave tui chubs to protected or isolated sites, whenever possible;
- restricting release of Mohave tui chubs to sites where, if there is potential for dispersal, this effect on the human environment has been evaluated and is acceptable;
- restricting the release of Mohave tui chubs to sites that fulfill the life history requirements of the species (e.g., absence or management of invasive species or non-native predatory species, absence of introduced diseases lethal to the Mohave tui chub, etc.);

- restricting the release of Mohave tui chubs to sites that contain sufficient habitat to support a viable population for the long term;
- prohibiting the release of Mohave tui chubs into areas where the Mohave tui chub could hybridize with other species or subspecies; and
- prohibiting the release of Mohave tui chubs into areas where other endemic taxa could be adversely affected.

For the proposed action, we would:

- choose Mohave tui chub stock from appropriate sources to provide stock that is both genetically pure and with the greatest genetic diversity or fitness;
- examine the introduced Mohave tui chubs to ensure that undesirable pathogens (disease and parasites) are not present prior to release;
- obtain introduced Mohave tui chubs of sufficient number and character to reflect the genetic composition of the species;
- implement actions to avoid the transport of non-native species and pathogens from the source site to the receiving site (e.g., quagga mussels, chytrid fungus, etc.);
- carefully and quickly transport Mohave tui chubs from the source population(s) to the receiving site;
- introduce the Mohave tui chubs under the most favorable conditions; and
- document the release of Mohave tui chubs.

In addition, the standard protocol for trapping Mohave tui chubs would be used. This includes:

- Measuring the dissolved oxygen level at the trap sites prior to placing the traps. If the dissolved oxygen level is below 4 milligrams per liter or the water temperature exceeds 25 degrees C, trapping will not occur;
- All traps will be checked and emptied at least once every 16 hours;
- All field gear used to collect, transport, weigh, and measure Mohave tui chubs will be disinfected prior to being used at each site that is occupied by the species. The disinfection protocol will consist of at a minimum: rinsing field gear with tap water from a hose to remove organic matter or debris that may be attached to the field gear; submersing field gear in a 16 parts water to 1 part bleach solution for a minimum of 15 minutes; triple rinsing the gear with unchlorinated water; and air drying the equipment in the sun for at least 2 hours before being used at sites occupied by the Mohave tui chub. The disinfection protocol will be completed at a location that eliminates the potential that chlorinated water could enter aquatic habitat occupied by or about to be occupied by the Mohave tui chub.
- The length of time that an individual Mohave tui chub will be removed from the water for the purposes of fin clipping, weighing, and/or measuring a Mohave tui chub will not exceed 45 seconds. The length of time an individual Mohave tui chub will be removed from the water to insert a passive integrated transponder (PIT) tag or other tag will not exceed 45 seconds.

- All personnel handling Mohave tui chubs must be trained and must implement handling procedures that are designed to minimize stress, injury, and death to the species, and avoid the accidental transmission of pathogens (e.g., disease, parasites, etc.) between one population of Mohave tui chubs and another.
- Personnel will anesthetize the Mohave tui chub to reduce stress during measure, weigh, and mark activities. They will use an anesthetic certified for use on fish species and the amount of anesthetic used will conform to the manufacturer's instructions.

This protocol would be used to establish additional populations and to monitor the status of the populations (see Population Monitoring below).

For post-introduction activities, we would:

- conduct systematic monitoring of the introduced populations;
- monitor the habitat;
- implement adaptive management as needed, including restocking and/or habitat management, if warranted;
- determine the cause(s) of failure if an introduction fails; and
- document the findings and conclusion of the post-introduction process.

Population Monitoring

Population monitoring would occur by implementing the standard protocol for trapping Mohave tui chubs (see Measures to Avoid and/or Minimize Adverse Effects above). There would be 1 year of semi-annual monitoring for collecting baseline information on the each population and aquatic habitat (e.g., water quality, water depth, surface area, substrate, cover, invasive species, etc.). This information will allow accurate assessment of future trends in Mohave tui chub population structure. After the initial year, post-release population monitoring will be conducted a minimum of once per year in coordination with the Service and CDFG. Monitoring activities may be conducted by entities authorized under the issued permit or other authorities including other Federal agencies, CDFG (under section 6 of the ESA), and educational institutions. The Service would provide training in habitat monitoring and fish sampling techniques as needed.

Adaptive Management

As stated in the Recovery Plan, the Service and cooperating agencies will periodically review, evaluate, and revise research, monitoring, and management activities to ensure progress toward recovery of the Mohave tui chub. Monitoring will determine the success and future direction of the proposed action to establish additional populations. As phases of the project are completed or relevant findings verified, new information may identify additional or alternative methods, research, or recovery actions that may be needed.

The Lark Seep complex, Camp Cady, and Soda Springs populations have been identified as source populations because they currently contain the greatest genetic diversity of the existing populations of Mohave tui chubs. Once established, additional populations of the Mohave tui chub may be used as source populations. The 500+ introduced Mohave tui chubs would help ensure maximum diversity of alleles in the new population's gene pool. Mohave tui chubs would usually be trapped in the spring or late summer/fall to maximize capture of young fish and avoid the breeding season so breeding activity would not be affected.

Two general types of aquatic habitats would be considered as receiving sites; lentic or ponded habitats and flowing or riverine habitats. Examples of lentic habitats include Morning Star Mine Pond at Mojave National Preserve and ponds on golf courses and school campuses (e.g., the golf course pond at Edwards Air Force Base (EAFB) and Victor Valley College pond). Examples of flowing or lotic habitats include Deep Creek and Holcomb Creek in the San Bernardino National Forest and the Mojave River at the Mojave Narrows. The receiving sites will be analyzed and selected based on the Mitigation Measures listed above.

Existing aquatic habitat would be identified and evaluated for consideration for establishing additional populations of Mohave tui chubs. In addition, we may create new aquatic habitats or modifying existing aquatic habitats, and then establish additional populations of Mohave tui chubs at these sites. The evaluation process includes meeting or being able to meet several criteria among which are providing the physical, chemical, and ecological needs of the Mohave tui chub; and obtaining the permission of the land owner (see Measures to Avoid and/or Minimize Adverse Effects above). Currently identified existing aquatic sites include Morning Star Mine Pond, the golf course pond at EAFB, and small pond at Victor Valley College for lentic habitat, and Deep Creek and Holcomb Creek for lotic habitat. Other existing sites may receive Mohave tui chubs if they meet the physical, chemical, and ecological needs of the species and the effects of establishing a new population were analyzed in the EA.

If a site does not meet these criteria, it would not be selected. If a site does meet these criteria, and after Mohave tui chubs have been introduced the receiving site no longer meets these criteria, we would implement the fewest actions necessary to provide for the physical, chemical, and ecological needs of the species (i.e., adaptive management) to modify the site to meet these criteria. Such actions may include removing non-native species, removing emergent vegetation (e.g., cattails (*Typha* spp.) and detritus that clog the aquatic habitat, deepening aquatic habitat to provide for protection from thermal extremes for the Mohave tui chubs, restoring aquatic habitat that is converting to wetland/ upland habitat from sedimentation (an erosion source elsewhere) or other forms of deposition, and modifying a small portion of the habitat so other necessary or already permitted activities may occur/continue with negligible to no impact to the Mohave tui chub or its habitat (e.g., temporary removal of water at the aquatic habitat to fight wild fires, use of aquatic habitat for livestock grazing, etc.).

Actions taken to avoid or minimize adverse effect to the human environment include surveying the proposed project site(s) and access road(s) to determine if Federal or State listed, proposed, candidate, or special status species or cultural resources are present or would be affected. If they are, we would move the site to avoid impacting these resources, if possible. If not possible and

the impacts would require analysis in a separate environmental document under the National Environmental Policy Act, the appropriate site specific documents would be prepared to comply with the National Environmental Policy Act and other applicable environmental laws.

For specific locations identified in the environmental assessment, the following information describes activities that would take place at each site to create and/or improve aquatic habitat and manage this habitat to meet the physical, chemical, and ecological requirements of the Mohave tui chub.

Coxey Pond: The footprint of Coxey Pond (the lower pond) and the dam that forms Coxey Pond would not be altered. Coxey Pond's aquatic habitat would be improved by removing some of the cattails and deepening the pond. A back hoe or similar equipment would be transported to Coxey Pond on existing roads and placed near the bank. The backhoe would remove many of the cattail root wads and muck from the bottom of Coxey Pond, deepening the pond in some locations and providing more open water or lacustrine habitat for the Mohave tui chub. Deepening the pond would also deter the re-establishment of cattails in Coxey Pond. Coxey Pond would continue to support emergent vegetation. The removed muck or detritus and cattail leaves would be hauled to a nearby upland location to naturally decompose. The location would be such that future runoff from rain and snow would not wash the material into Coxey Pond or other aquatic habitat.

Piute Ponds: One or more of the existing ponds at Piute Ponds, located on EAFB, would be modified to help regulate water quality and quantity to the pond(s) and manage the occurrence of non-native species. Lining the pond(s) would not be necessary because of the layer of clay located below the soil's surface. Heavy equipment would use existing roads to create new berms and control structures to regulate the flow from one pond to the next. The water supply would continue from the wastewater treatment plant in Lancaster, which is operated by Los Angeles County.

New Pond at Camp Cady: The CDFG may construct a new lined pond at the Camp Cady Wildlife Area (CCWA). The New Pond would be located about a mile downstream and northeast from the East Pond on the north side of the Mojave River. The pond would be less than 2 acres. Existing dirt roads would be used to access the pond site. The pond would be excavated using heavy equipment, and the excavated material would be used to create a berm around the perimeter of the pond. The New Pond at Camp Cady would be lined, similar to West and East Ponds at the CCWA. Water from an existing artesian water source at the site would be improved and piped into the New Pond. The CDFG has an existing water right.

New Pond at Victor Valley College/Mojave River Fish Hatchery: Specific information on the size and location of the pond is not available but the lined pond would be less than 2 acres. It would be located north of the existing small pond on campus in an area previously disturbed by grading and/or off-road vehicle use, or it may be northwest of the raceways at the Mojave River Fish Hatchery in an area previously cleared of vegetation. The hatchery is immediately north of the college campus. If located north of the existing small pond, it may be adjacent to the outflow

channel from the fish hatchery. The material excavated to create the pond would be used to form a low berm around the edge of the pond. The berm would prevent runoff from adjacent areas from entering the pond. Heavy equipment would access the pond site using existing roads or previously landscaped areas (e.g., lawns). Excess excavated material, if any, would be hauled to an approved disposal site.

If the new pond is located on the hatchery grounds, the water would be supplied by an existing water right to the CDFG. If the pond is located on the Victor Valley College campus, the water source for the pond would likely be the same.

New Pond on the Bascom Property: The Bascom property is located in Victorville on the west side of the Mojave River immediately upstream from the Mojave Narrows. It is directly across from the Lewis Center. The pond would be created by deepening an existing low area that intermittently receives subsurface water during rising water levels in the nearby Mojave River. The low area or ephemeral pond would be deepened and the footprint expanded slightly to increase the current maximum area of surface water from 0.38 acre to 0.5 acre. The pond would be lined and an auxiliary water supply would be from a nearby well to ensure a perennial supply of water to the pond. Most of the site would be fenced to prevent livestock from entering that portion of the pond, or the entire pond would be fenced and a nearby trough supplying water via a short pipeline would provide water to livestock but exclude them from the pond.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

Section 7(a)(2) of the Endangered Species Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. “Jeopardize the continued existence of” means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 Code of Federal Regulations 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the *Status of the Species*, which describes the range-wide condition of the Mohave tui chub, the factors responsible for that condition, and their survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the condition of the Mohave tui chub in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the Mojave desert tortoise and Mohave ground squirrel; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the Mohave tui chub; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the Mohave tui chub.

STATUS OF THE SPECIES

The following section summarizes the status of the Mohave tui chub, which includes information on its ecology, legal status, threats, recovery, and status of the four populations of the species.

Basic Ecology of the Mohave Tui Chub

The Mohave tui chub, a member of the minnow family (Cyprinidae) (Miller 1969), is the only fish endemic to the Mojave River in San Bernardino and Kern Counties, California. It occurred historically in the Mojave River and tributaries from the north slope of the San Bernardino Mountains to its terminus at Soda Dry Lake. It is a stocky, large-scaled fish with a small, terminal mouth. This subspecies has a dark-olive-to-bright-brown back with a silver-to-bluish-white belly. The average size of an adult is 4 to 6 inches (10 to 15 centimeters (cm)) in length with the upper range reaching 9 inches (23 cm). Mohave tui chubs forage on insect larvae, small fish, and detritus. Spawning season is from March or April to October. Females deposit adhesive eggs over aquatic vegetation; each female produces from 4,000 to 50,000 eggs per breeding season (March or April to October). Upon hatching, the fry school in shallows; chubs 1 to 3 inches (2.5 to 7.6 cm) in length school in water 1 to 2 inches (2.5 to 5.1 cm) deep. Large chubs are found in deeper water and are typically solitary.

The habitat requirements for the Mohave tui chub include configuration, ecology, and water quality (Archbold 1996).

Configuration: In lacustrine situations, the physical parameters of a pond or pool should have a minimum water depth of 4 feet (1.2 meters) to reduce cattail invasion and stabilize dissolved oxygen and temperature fluctuation. Because of high evaporation rates that occur in the Mojave River drainage and subsequent concentration of salts, which can be lethal to fish, fresh water flow into the pool or pond is necessary.

Ecology: Aquatic plants provide habitat for a variety of native, aquatic invertebrates, a primary food source for the Mohave tui chub. They also provide a substrate for fish egg attachment. Limited amounts of riparian or wetland vegetation are necessary to provide shade from sunlight and intense temperatures. A moderate amount of aquatic and wetland vegetation is needed to prevent excessive aerobic digestion of detritus and nocturnal plant respiration, which can produce anoxic conditions.

Because the Mohave tui chub is the only fish native to the Mojave River (USFWS 1984), it evolved without aquatic competitors or predators. The pool or pond should be free of excessive predation from aquatic predatory species.

Water Quality: Water should be free of toxic substances or the threat of toxic substance spills. Parameters such as temperature, dissolved oxygen, salinity, and pH should be within the long-term tolerable ranges for the Mohave tui chub. Mohave tui chub tolerances for certain water quality parameters range from 3 to 36 degrees C (37 to 97 degrees F) for temperature (Feldmeth et al. 1985, Archbold 1996), dissolved oxygen greater than 2 parts per million, and 40-323 milliosmols/liter for salinity (McClanahan et al. 1986). Archbold (1996) described a pH of 10 as the upper range tolerated by Mohave tui chubs, at least for a short time.

Legal Status of and Threats to the Mohave Tui Chub

The Mohave tui chub was listed as endangered by the USFWS in 1970 (35 *FR* 16047). According to the listing rule, the Mohave tui chub had apparently been extirpated from its historical habitat, the Mojave River drainage, when it was listed as endangered in 1970. A major factor for the extirpation was cited as competition and possible hybridization with the arroyo chub (*Gila orcutti*), a species native to the Los Angeles Basin but introduced illegally in the Mojave River in the 1930s as a baitfish (CDFG 1990). Other factors contributing to the extirpation of the Mohave tui chub include introduction of other non-native, competitive, and predatory aquatic species to its historical habitat (e.g., bass (*Micropterus* spp.), catfish (*Ictalurus* spp.), trout (*Oncorhynchus* spp.), bullfrog (*Rana catesbeiana*), and crayfish (*Procambarus clarki*) (Miller 1969); habitat alteration; water diversion; and pollution (35 *FR* 16047). In the Five-Year Status Review, the Service identified parasitism by the Asian tapeworm as a new threat to the Mohave tui chub (USFWS 2009). Asian tapeworms cause a marked enlargement of the Mohave tui chub's abdomen with severe hemorrhagic enteritis and intestinal blockage. Initially, the Asian tapeworm had a deleterious effect on the Mohave tui chub population at Soda Springs (Lake Tuendae) but its prevalence appeared to decline within a few years after the initial infection (Archdeacon 2007).

Recovery Plan for the Mohave Tui Chub

The Service issued a Recovery Plan for the Mohave Tui Chub in 1984. The primary objective of the Recovery Plan is to delist the Mohave tui chub through successful establishment of viable chub populations in the majority of its historic habitat in the Mojave River. This effort requires focusing on removal of non-native faunal species that compete, hybridize with, and prey on the Mohave tui chub. The interim objective of the Recovery Plan is to downlist the chub to threatened status.

To downlist the Mohave tui chub from endangered to threatened, the Recovery Plan states that three more populations (for a total of six) need to be established, with a minimum population of 500 fish at each location. These populations should be located adjacent to the Mojave River to be within or along the historical habitat of the Mohave tui chub. All six populations need to remain free of any threats to their integrity for 5 consecutive years and the populations should have been exposed to and survived a flood before reclassifying to threatened.

To delist the Mohave tui chub, the subspecies needs to be successfully re-established in a majority of its historical habitat in the Mojave River. Re-establishment means that the populations of Mohave tui chub are viable. Specific tasks to achieve delisting were not presented in the Recovery Plan but are to be developed pending evaluation of results on experimental reintroductions.

Status of the Mohave Tui Chub

Although all existing populations are introductions outside the historical range with the exception of the MC (Mohave Chub) Spring subpopulation, attempts to introduce or transplant Mohave tui chubs have generally not been successful. At the time of listing, only four populations were known to exist, Piute Creek, Two Hole Spring, and Soda Spring, San Bernardino County, California, and Paradise Spa, Las Vegas, Nevada. Piute Creek, Two Hole Spring, and Paradise Spa were introductions. In 1984, when the Recovery Plan was published, the Mohave tui chub had been introduced and persisted at Soda Springs near Zzyzx (MC Spring, Lake Tuendae, and Three Bats Pond), and the Desert Research Station in San Bernardino County and Lark Seep in Kern County.

Since 1939, one or more attempts have been made to introduce Mohave tui chubs to the following 17 locations: San Felipe Creek, Imperial County; Lark Seep, Kern County; South Coast Botanical Garden, Eaton Canyon Nature Center, and Busch Gardens, Los Angeles County; Dos Palmas Spring and Lake Norconian, Riverside County; Piute Creek, Two Hole Spring, Barstow Way Station, Lake Tuendae, Three Bats Pond (Soda Springs), Camp Cady, Deppe Pond/Tui Slough at the Lewis Center (Apple Valley), and Desert Research Station, San Bernardino County; Lion Country Safari, Orange County, California; Paradise Spa, Las Vegas, Nevada; and Rio San Tomas, Baja California. All attempts failed except for four.

Currently, the four populations of Mohave tui chubs, all of which are in California are:

San Bernardino County

- Soda Springs (Lake Tuendae and MC Spring) – Soda Springs, a research facility located on Mojave National Preserve near Zzyzx, has two bodies of water. Lake Tuendae is a man-made pond with a waterfall and pump to maintain water levels, and MC Spring is a small, isolated spring on the edge of Soda Lake, a dry lakebed and terminus of the Mojave River. Mohave tui chubs at Lake Tuendae were introduced after 1945 when the lake was excavated. At MC Spring, the Mohave tui chub is either a relict population from the Mojave River or was introduced prior to the 1930s from the adjacent Mojave River terminus of Soda Lake.
- Camp Cady Wildlife Area - Mohave tui chubs were introduced and in 1987 at the Camp Cady Wildlife Area. The current population is at West Pond. The Mohave tui chub at the Camp Cady Wildlife Area, a CDFG facility located immediately south of the Mojave River channel, is in a man-made, lined pond with water supplied by a pump.
- Deppe Pond/Tui Slough – Located on the campus of the Lewis Center, Deppe Pond and Tui Slough are man-made lined ponds adjacent to the Mojave River in Apple Valley. Tui Slough is immediately downstream from Deppe Pond. This population was established in October 2008.

Kern County

- Lark Seep Complex at China Lake Naval Air Weapons Station (NAWS), Kern County - Mohave tui chubs were introduced in 1972 and 1976 at the Lark Seep Complex. The Lark Seep Complex population has three subpopulations: North Channel, George Channel, and G1 Channel. The Lark Seep Complex is a perennial body of water supplied by a wastewater treatment facility in Ridgecrest, California.

All populations occur in small, man-made and/or man-maintained lacustrine habitats. All four populations are isolated from each other and the Mojave River.

Recent population estimates for extant Mohave tui chub populations are:

- Soda Springs = 1,573 [Lake Tuendae = 1,318 fish(a reduction of about 50 percent from the October 2005 population estimate (Henkanththegedara and Stockwell 2007) and MC Spring = 255 fish (S. Parmenter, California Department of Fish and Game, personal communication 2008)];
- Camp Cady = 3,607 fish (Henkanththegedara and Stockwell 2007);
- Lark Seep Complex = 6,000 fish (Penix 2003); and
- Deppe Pond/Tui Slough = 548 fish (Parmenter 2008 *in litt.*).

ENVIRONMENTAL BASELINE

Action Area

The implementing regulations for section 7(a)(2) of the Act define the “action area” as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 *Code of Federal Regulations* 402.02). For the purposes of this biological opinion, we consider the action area to include the specific locations identified in the proposed action, other areas with aquatic habitat in the Mojave Desert under 6,600 feet elevation, and a 300-foot buffer around these aquatic habitats to consider the potential effects of using vehicles and heavy equipment to access an aquatic site to enhance its lentic habitat.

Habitat Characteristics in the Action Area

The environmental assessment (USFWS 2011) provides a description of the action area. The habitat characteristics of the specific locations of aquatic habitat identified are as follows:

Lark Seep Complex

The Lark Seep Complex is a series of man-made channels and ponds on NAWS. There are three main channels, North Channel, George Channel, and G1 Channel with shallow ephemeral ponds near the ends of the channels. The channels, which range in length from 400 to 700 feet, were constructed in the 1960s to drain ground water which was elevated from seepage from the City of Ridgecrest’s wastewater treatment ponds (USFWS 1997). Each channel is bordered by a dirt access road. The channels were excavated to prevent damage to Navy facilities from rising ground water (Feldmeth 1984). The Mohave tui chub was introduced into the channels in 1971 as part of a transplant effort by the CDFG. As water levels rose through the years, the Mohave tui chub population increased and expanded at NAWS. The channels and ponds support extensive stands of cattails which periodically are cleared using manual or mechanical methods to ensure water flow through the channel system and maintain habitat for the Mohave tui chub. Population estimates for the Mohave tui chub at the Lark Seep Complex are greater than 5,000 and are based on adding the results of the annual sequential sampling efforts at each of the three channels. The Mohave tui chub shares the Lark Seep Complex with the non-native mosquitofish (*Gambusia affinis*), from the southeastern U.S. Mosquitofish have traditionally been introduced to control mosquitoes but they also consume the eggs and larvae of Mohave tui chubs, while larger chubs feed on mosquitofish.

Lake Tuendae

Lake Tuendae is an artificial pond about 125 wide by 500 feet long and within Mojave national Preserve. Constructed in the 1940s, the lake has a surface area of 1.4 acres and maximum depth of 3.3 feet (prior to dredging the westerly end in 2001). The Lake is ringed with a dirt access road and earthen launch ramp at one end. Lake Tuendae lies about four feet above the dry surface of Soda Lake and is surrounded by California and Mexican fan palms. A fountain in the middle of the lake runs when groundwater is being pumped into the lake. Lake Tuendae is connected to the Soda Lake aquifer by seepage, which has probably prevented a long-term buildup of salinity. It gradually fills in with sediments and cattails that must be dredged about every 10 years. Recently, the Mojave National Preserve, in coordination with the CDFG, removed most of the cattails manually thus reducing the cattail growth and deposition and reducing the frequency to dredge Lake Tuendae. The Mohave tui chub shares Lake Tuendae with the Saratoga Springs pupfish (*Cyprinodon nevadensis nevadensis*) and the non-native mosquitofish (Hughson and Woo 2004).

Camp Cady

In the 1980s, the CDFG excavated two ponds at the Camp Cady Wildlife Area, East Pond and West Pond, to a maximum depth of 2.75 meters, lined them with clay, and stocked them with Mohave tui chubs. The ponds are about 0.6 acre each and are bermed on all sides with dirt roads access on two or more sides of each pond. The East Pond suffered water loss problems and was eventually drained and lined with plastic in 1991. In 2003, the water supply to the East Pond failed and the pond dried out. There is now only one pond with Mohave tui chubs at Camp Cady and its water level is maintained by pumping water to the pond. The CDFG has refurbished East Pond and plans to stock it with Mohave tui chubs in the next few months. Both pond areas are surrounded with native sedges and contain cattails. Non-native bullfrogs also occur at the ponds.

Deppe Pond and Tui Slough (Lewis Center for Academic Excellence)

Deppe Pond and Tui Slough are located on the west side of the developed portion of the Lewis Center's campus, which is managed by the High Desert Partnership in Academic Excellence Foundation. Total area of the two ponds is about 0.4 acre and elevation is 2,472 feet above mean sea level. Each of the two aquatic habitats is a man-made, lined pond adjacent to the Mojave River with no connection to the river. Its water supply is periodically supplemented with water from a well located on campus and near the ponds. Located on the western border of Apple Valley, Tui Slough is immediately downstream from Deppe Pond. This population of Mohave tui chubs was established in October 2008. Both Deppe Pond and Tui Slough have emergent vegetation (sedges and some cattails) and a few willow trees. Mosquitofish are present.

Morning Star Mine Pond

The Morning Star Mine is a former gold and silver mine located on approximately 1,130 acres of unpatented mining claims in the Ivanpah Valley in eastern San Bernardino County. The mine is within the Mojave National Preserve and is about 4,500 feet above mean sea level. The open pit mine at the top is approximately 800 feet square and 150 feet deep with surface water present (the pond) at the bottom of the pit 15 to 20 feet deep. The site has shallow soils with exposed rock in the mine pit area. Access to the pond is via a dirt road within the pit to the water's edge. Water at Morning Star Mine Pond is from natural ground water. Water quality is good based on samples tested by the Mojave National Preserve and the CDFG. Biological resources at the pond are limited. There are no known vertebrate species that occupy the pond. A few tamarisk are growing at the water's edge. The area around the mine site is a transitional zone between Joshua Tree Woodland with the Creosote plant community at lower elevations (NPS 2002). Much of the mine site and specifically the mine pit that surrounds and forms the pond consists of exposed rocky surfaces and is devoid of vegetation.

Golf Course Pond (EAFB)

The Muroc Lake Golf Course is located in the southwest portion of the cantonment area at EAFB. It has a man-made pond surrounded by manicured greens and fairways. The 0.34-acre pond is within the 185-acre golf course. Access to the pond is by driving the golf cart road or overland on the grass between fairways. The pond receives a combination of tertiary treated waste water from EAFB's Waste Water Treatment Facility and well water. The water flows through the golf course pond via an underground pipe. The opening of the outflow and inflow pipes may be modified to prevent the Mohave tui chub from leaving the pond. The pond has submergent vegetation and limited emergent vegetation (cattails and rushes). It is surrounded by a lawn of non-native sod grass. The pond is used by non-native mosquitofish, waterfowl, and other migratory birds.

Victor Valley College Pond

The Victor Valley College Pond is an existing pond about 0.75 acre in size. The college campus is managed by the Victor Valley Community College District. The pond is located on the east side of the 253-acre Victor Valley College campus and is bordered by a building and parking lot on the west, a baseball field on the north, a cleared area on the east, and a cleared area and irrigated lawn on the south. It is circled by a dirt access road. The perennial pond is several feet deep and is supplied with well water and some runoff during high rainfall events. The water is used to irrigate nearby playing fields on the campus. No information is available on the presence of aquatic species.

Coxey Pond

The Coxey pond site has two ponds; these ponds are located at the headwaters of Coxey Creek, a tributary of Deep Creek and the Mojave River in the San Bernardino National Forest. The ponds are at the downslope edge of Coxey Meadow, an open grassy meadow less than 10 acres in area. The man-made ponds were formed from construction of two small earthen dams several decades

ago. The dams impound the water from the spring or seep and any runoff from the meadow. The upper dam is about 150 feet long and releases overflow through one standpipe. The upper dam periodically fills with water after large precipitation events, but as a perennial water source it is a shallow and unreliable pond. The lower earthen dam was built at the lower end of the meadow. It is about 250 feet long and releases overflow through two six foot diameter corrugated metal standpipes into Coxey Creek. Access to the site is via Coxey Road, a designated Forest Service road from the community of Fawnskin.

Lower Coxey Pond is a perennial pond with water depths of at least 3 feet in the late summer. Upper and Lower Coxey Ponds are each less than 1 acre in surface area. Over time, much of the footprint of Lower Coxey Pond has been invaded by cattails. The leaves or debris from the cattails has fallen into the pond decreasing both the depth and aquatic area of the pond. Because of the encroachment by cattails and recent nearby fires upslope from Coxey Pond, the pond has been impacted from deposition of cattails and recent accumulations of eroded soils, which is converting Coxey Pond from lacustrine habitat to upland habitat. Currently about 50 percent of the lower pond is covered with dense stands of cattails with some bulrush. The lower pond is periodically used by the San Bernardino National Forest as a water source to fight fires in the area. Fire crews have deepened the pond to maintain an adequate source and depth of water to use in fire-fighting efforts. The pond is used by quail, migratory waterfowl, and introduced goldfish.

Piute Ponds

Piute Ponds are located in the southwest corner of EAFB in Kern County. The ponds are southwest of and adjacent to Rosamond Dry Lake, which is downslope of Piute Ponds. The surface soils at Piute Ponds are a sandy loam with an underlayment of clay, which keeps the surface water from percolating into the ground. Located near the terminus of Amargosa Creek, the ponds are a series of interconnected man-made impoundments constructed in 1961 to evaporate effluent discharged from the Lancaster Water Reclamation Plant (LWRP) operated by the Los Angeles County Sanitation District (EAFB 2008b). Currently Piute Ponds is composed of several ponds of varying sizes (Piute Ponds 2011). Piute Ponds currently receive more than 2,400 million gallons of treated waste water from the LWRP each year. Effluent from the LWRP enters at the southwest corner of the ponds and flows northeast, eventually overflowing on to Rosamond Dry Lake located immediately northeast of the ponds. Additional water flows intermittently to Piute Ponds from the Amargosa and other creeks in the area (EAFB 2008). The existing infrastructure includes culverts, spillways, and unpaved roads that allow access to the ponds. The large berms that impound the water are topped with dirt roads, which provide access to all of the ponds.

The footprint of the ponds varies from 200 to 800+ acres, depending on the volume of waste water discharged from the wastewater treatment facility and the rate of evaporation. Currently the Los Angeles County Sanitation District releases secondary treated effluent into Piute Ponds. This water contains high levels of nitrogen, which may not provide suitable habitat for the Mohave tui chub. The LWRP is upgrading its facility to discharge tertiary treated water as

required by Federal and State regulations. This additional treatment would improve water quality and reduce the nitrogen levels in the water discharged to Piute Ponds.

Although a man-made feature, Piute Ponds is the largest freshwater marsh in Los Angeles County. Some of the ponds support native emergent vegetation (cattails and rushes) (wetland habitat). Some of the berms contain native riparian vegetation (willows and cottonwoods) and non-native tamarisk (Piute Ponds 2011). Non-native African clawed frogs (*Xenopus laevis*) are present

New Pond at Camp Cady Wildlife Area

The 1,870-acre Camp Cady Wildlife Area (CCWA) is located on the Mojave River about 20 miles east of Barstow and 5 miles northeast of Newberry Springs, San Bernardino County. The primary goal of the CCWA is to preserve, protect, and enhance desert-riparian habitat and wildlife species associated with the habitat type. Elevation ranges from 1,680 to 1,760 feet (CDFG 2011 website). The CCWA is located within and north of the Mojave River floodplain. It includes approximately 4 miles of riverbed, adjacent floodplains and terrace bluffs that support more than 600 acres of desert riparian forest habitat (CDFG 2005). The adjacent uplands rise 20 to 50 feet higher than the floodplain.

Habitat at the Camp Cady Wildlife Area includes Mojave desertscrub habitat, consisting of saltbush and creosote-bursage, and riparian habitat, consisting of honey and screwbean mesquite, willow, and cottonwood trees, non-native tamarisk, saltgrass, saltbush, and cattails. The riparian habitat occurs along the Mojave River, which passes through the center of the CCWA. In the higher elevation areas of the CCWA, creosote bush grows co-dominantly with shadscale and along with occasional cacti, desert tea, and numerous native annual herbs.

The proposed pond site is on the north side of the Mojave River and about 0.8 mile downstream from the East Pond. The less than 2-acre site is north of the current river channel by about 0.2 mile and about 20 feet higher in elevation. Water would be supplied from a nearby artesian well. The vegetation is sparse with large open areas of sandy loam soils with a low density and cover of four-wing saltbush, live mesquite, and numerous mesquite snags. Creosote bush vegetation is located nearby north of the site. The nearest stand of riparian vegetation is a thin ribbon of mesquite along the north bank of the Mojave River channel, about 850 feet south. Existing dirt roads lead up to the site.

New Pond at Victor Valley College/CDFG Hatchery

The size of the pond would be less than 2 acres. Specific information on the location of the pond is not available. However, the new pond would likely be located within the 20.5-acre area on the northeast side of the campus. The area is highly disturbed open land. It is located in an urban setting in the City of Victorville. There is an outflow channel from the CDFG's Mojave Fish Hatchery and a housing development north of the site; a baseball field, campus buildings, and a parking lot to the south; houses and a road to the west; and the west bank levee of the Mojave River to the east. If located on the grounds of the CDFG hatchery, the pond would likely be

placed in the 1.3-acre cleared area northwest of the raceways. Water would be provided to the pond from the same source as water to the Mojave River Fish Hatchery. An outflow structure from the pond, if needed, would connect to the existing outflow channel from the hatchery. The outflow channel from the hatchery to the Mojave River is a 150-foot lined channel, then a 1200-foot long earthen channel with runs and pools, eventually discharging into the Mojave River. South of the outflow channel, the area appears to have been previously bladed or crisscrossed with tracks from off-road vehicle use. When viewing aerial photography of the site, parallel lines in the soil are visible indicating the site may have been used previously for farming or was graded. Native flora at the site is minimal to absent.

New Pond on the Bascom Property

This new lined perennial pond would be located on private land along the eastern edge of Victorville. The site is part of the historic Bascom Ranch. Cattle grazing occurs on this remnant parcel of open space within the Victorville city limits. The pond is the downstream portion of an oxbow that has been cut off from direct flows from the Mojave River. It is bounded on the north by the rocky outcrop of the Mojave Narrows, the railroad track and Mojave River to the east, and previously cleared land to the south and west. Access to the site is by a dirt road off of 11th Street and C Street. A few mature cottonwood trees remain along the edge of the semi-circular oxbow west of the pond site. The rest of the area is devoid of perennial woody vegetation. The Mojave River was cut off from direct access to this former oxbow by the construction of the railroad track that now forms the western boundary of the Mojave River. The tracks are elevated on a berm which narrowed and now delineates the edge of the floodplain.

Deep Creek

Deep Creek is on the north slope of the San Bernardino Mountains about 60 miles east of Los Angeles in the San Bernardino National Forest. Originating at approximately 6,200 feet, this perennial stream drops about 3,000 feet in its 22-mile course before flowing into the East Fork of the Mojave River. Deep Creek has reaches of remote stream and deep pools with boulder strewn reaches. Aquatic species include two non-native species, rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*).

Holcomb Creek

Holcomb Creek is a tributary to Deep Creek and northwest of Big Bear Lake in the San Bernardino National Forest. It is about 16 miles long and located on the north side of the San Bernardino Mountains. Similar to Deep Creek, there are reaches of this stream that are perennial. Willows and sage line the banks.

Status of the Mohave Tui Chub in the Action Area

In the following paragraphs, we have provided information on the status of the Mohave tui chub, habitat/land status, and previous consultations in the action area. Unless otherwise cited, the

following discussion is based on aerial photographs of the action area, land management plans, site visits, information provided by resource agencies, and general knowledge of Service staff.

Abundance of Mohave tui chubs

The Mohave tui chub currently occurs only at Lark Seep Complex, Lake Tuendae, MC Spring, CCWA, and the Lewis Center. Information on the status of the Mohave tui chub is provided in the section above on Status of the Mohave Tui Chub which includes population information and habitat information in Status of the Mohave Tui Chub and Habitat Characteristics of the Action Area. The Mohave tui chub does not occur at any of the proposed new locations specifically identified in the action area. These locations include: Morning Star Mine Pond, New Pond at Camp Cady, Coxe Pond, Piute Ponds, Golf Course Pond at EAFB, Victor Valley College Pond, New Pond at Victor Valley College/California Department of Fish and Game Hatchery, or New Pond on the Bascom Property. In addition, the Mohave tui chub is not known to occur in Deep Creek or Holcomb Creek.

Previous Consultations in the Action Area

The Service has previously issued biological opinions to NAWS regarding the management of habitat for the Mohave tui chub at the Lark Seep Complex. On October 20, 1982, the Service issued a biological opinion to NAWS for the aquatic vegetation maintenance program at the Lark seep Complex. Another biological opinion was issued on July 24, 1990 to clear about 600 feet of channel of emergent vegetation. The Service issued a third biological opinion on May 2, 1997, to NAWS to deepen and widen the North Channel to improve water flow and habitat conditions for the Mohave tui chub. On August 7, 1997, a biological opinion was issued to NAWS to expand the scope of past emergent vegetation clearing activity for 2 miles of channels at NAWS.

EFFECTS OF THE ACTION

Effects of the Action on the Mohave Tui Chub

Capturing, Transporting, and Releasing Mohave Tui Chubs within the Action Area

During the purposeful capture, transport, and release of Mohave tui chubs, individual chubs may be injured or killed as a result of these activities. If traps are placed during the time of year with low dissolved oxygen or placed at locations with low dissolved oxygen, fish may suffocate. If traps are not retrieved and the fish processed within a day of traps being set, fish may struggle to get free and injure themselves or larger fish may begin feeding on smaller fish. Fish may also die from sudden changes in temperature or other water quality parameters when being transferred from the tank to the release site. However, measures previously described in the Measures to Avoid and/or Minimize Adverse Effects section would avoid or minimize the likelihood of injury or mortality from capture, transport, and release activities. We do not know the exact number of Mohave tui chubs that would be captured, transported, and released in the action area, but we estimate the number would be between 500 to 600 individuals per source site for each capture bout. There would be one capture bout per year per source site to translocate

Mohave tui chubs. We know that from past population sampling and release activities, less than 0.3 percent of the Mohave tui chubs captured would be injured or killed. In addition, the loss of 500 to 600 Mohave tui chubs from each source population would be replaced during the next breeding season because during the annual spawning season (from March or April to October) and each female produces from 4,000 to 50,000 eggs.

Monitoring Mohave Tui Chubs at Population Sites in the Action Area

Monitoring populations of Mohave tui chubs requires trapping; handling the captured fish to measure, weigh, and mark them; placing them in a holding tank until all traps have been processed; and releasing them at the site of capture. An anesthetic drug may be administered to the Mohave tui chubs prior to handling them to reduce stress to the individuals and to facilitate measuring, weighing, and marking them. Handling Mohave tui chubs may result in stress which can cause death, or may result in dropping a fish which could result in injury or death. The activities and effects from capture and release of individual Mohave tui chubs are described above. However, measures previously described in the Measures to Avoid and/or Minimize Adverse Effects section would avoid or minimize the likelihood of injury or mortality from monitoring activities. We do not know the exact number of Mohave tui chubs that would be captured, transported, and released in the action area for monitoring. We know from past population sampling and release activities that less than 0.1 percent of the Mohave tui chubs captured would be injured or killed. Monitoring Mohave tui chub populations benefits the species as it provides timely information on the trend of the population so timely management actions can be implemented if the population trend is declining. The loss of 0.1 percent of Mohave tui chubs from monitoring activities at the source and recipient populations would be negligible because the spawning season is from March or April to October and each female produces from 4,000 to 50,000 eggs per breeding season.

Managing Mohave Tui Chub Habitat in the Action Area

Managing Mohave tui chub habitat would use a variety of approaches. These include removing non-native or invasive species, modifying water quality parameters, changing the physical characteristics of the aquatic habitat (e.g., deepening the aquatic habitat, etc.), establishing native or cover or substrate, and other activities. These approaches use mechanical or manual methods and/or may dewater a portion of the lacustrine habitat at each site for a short period of time to improve the habitat for the Mohave tui chub. These approaches are currently used at the locations of the four populations of Mohave tui chubs. Implementation of these approaches would result in the loss of or degradation to some of the habitat at each site but these occurrences would be infrequent, of short duration, and affect only a small portion of the habitat at each site.

Mohave tui chubs could be injured or killed during mechanical or manual habitat management. Increased turbidity in the aquatic habitat from the implementation of mechanical or manual methods could impair an individual Mohave tui chub's ability to breathe or see an approaching predator. Stress caused by these mechanical or manual methods could result in an individual Mohave tui chub being more susceptible to disease. However, it is unlikely that Mohave tui

chubs would remain at the location where mechanical or manual habitat management methods are occurring if there are other areas nearby where they could “escape” and find cover. An unknown number of Mohave tui chubs would be subject to these approaches and an unknown number would be killed, injured, harmed or harassed. The introduction of hydrocarbon pollutants into the aquatic habitat from implementation of mechanical methods may result in injury or mortality but are not likely to occur because standard spill prevention and response measures would be implemented to prevent potential pollutants (e.g., fuel, oil, transmission fluid, hydraulic fluid) from entering the aquatic habitat.

The Service has proposed measures that would minimize the likelihood of injury or death of Mohave tui chubs during implementation of this action (see Measures to Avoid and/or Minimize Adverse Effects). Although the action may result in take and would adversely affect the Mohave tui chub through habitat alteration, the effects would be temporary. Ultimately, the management of the aquatic habitat for the Mohave tui chub would benefit the species. The proposed action is consistent with the Recovery Plan as it implements Task 2 of the stepdown outline in the Recovery Plan, which is to establish and protect Mohave tui chub populations in suitable new or restored habitats. Despite the potential adverse effects from the proposed action, the ultimate effect is to promote the conservation of the Mohave tui chub.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Because the National Park Service, U.S. Forest Service, Edwards Air Force Base, and Bureau of Land Management manage much of the land in the action area, any future action would require consultation with us, pursuant to section 7(a)(2) of the Endangered Species Act. Land ownership on other lands in the action area is mostly private or managed by State or local agencies. We are not aware of any other non-Federal actions that are reasonably certain to occur in the action area that have not been addressed in this biological opinion. Consequently, we do not anticipate any effects that are cumulative to those associated with the proposed action.

CONCLUSION

After reviewing the species’ current status, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service’s biological opinion that establishing additional populations of the Mohave tui chub in the Mojave Desert in California is not likely to jeopardize the continued existence of the Mohave tui chub. We have reached this conclusion for the following reasons:

1. This project will result in an increase in the number of Mohave tui chubs and the number of populations of Mohave tui chubs.

2. Project activities are likely to directly kill or injure few Mohave tui chubs because the Service will implement numerous measures to avoid or reduce the potential that Mohave tui chubs will be killed or injured during capture, transport, release, and monitoring of the species.
3. Habitat management activities at the Mohave tui chub population sites may result in the injury or death of individual Mohave tui chubs or degradation to/loss of some of the habitat, but such occurrences would be infrequent and minimal, and the habitat effects temporary.
4. The purpose of the habitat management activities at the Mohave tui chub population sites is to enhance the habitat for the Mohave tui chub resulting in a long-term benefit for the conservation of the species.
5. The Service, in coordination with other agencies and organizations, will monitor the status of the populations and associated aquatic habitat, and implement adaptive management if monitoring indicates a decline in the population trend or degradation of aquatic habitat.

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 by annoying it to such an extent as to significantly disrupt normal behavioral 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 an incidental take statement.

The Service's evaluation of the effects of the proposed action includes consideration of the measures to minimize the adverse effects of the proposed action on the Mohave tui chub that were developed by the Service in coordination with various cooperating agencies (see USFWS 2011). Any subsequent changes in these measures proposed by the Service may constitute a modification of the proposed actions and may warrant re-initiation of formal consultation, as specified at 50 CFR 402.16.

Up to 600 Mohave tui chubs at each source site within the action area may be subject to take in the form of capture and translocation during implementation of each capture bout to implement the proposed action; up to 2 Mohave tui chubs or 0.3 percent of the captured animals during each capture

bout per source site may be subject to take in the form of injury or mortality. However, the EA and proposed action contains measures to avoid/minimize take in the form of injury or mortality so we anticipate that fewer Mohave tui chubs will be injured or killed. We cannot determine the precise number of Mohave tui chubs that may be killed or injured as a result of the proposed action; however, it is likely to be low due to the numerous measures that will be implemented to avoid or reduce this type of take and the history of using these measures in the past that has resulted in negligible to no mortality or injury during previous capture and translocation activities.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

The EA and associated documents identify anticipated impacts to the Mohave tui chub likely to result from the proposed action and the measures to minimize and mitigate those impacts. All conservation measures described in the EA are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this Incidental Take Statement pursuant to 50 CFR 402.14 (i). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 7(0)(2) of the Act to apply. Failure to adhere to these terms and conditions may mean that the protective coverage of section 7(0)(2) may lapse.

REPORTING REQUIREMENTS

By January 31 of each year, the Service will compile information on the activities that occurred the previous year regarding the capture, transport, release, monitoring, and adaptive management activities undertaken to establish additional populations of Mohave tui chubs and manage the sites for the species and its habitat. This information will include details on the effects of the action on the Mohave tui chub including a complete overview of the amount of habitat disturbed during monitor and management activities and the number of Mohave tui chubs that were taken. These reports must include information on any instances when Mohave tui chubs were killed or injured, the circumstances of such incidents, and any recommendations made/actions undertaken to prevent similar instances from re-occurring.

DISPOSITION OF DEAD OR INJURED SPECIMENS

Within 3 days of locating any dead or injured Mohave tui chubs, the Service will document the occurrence in writing and include the date, time, and location of the occurrence, a photograph, cause of death, if known, and any other pertinent information.

Dead Mohave tui chubs will be offered to museums for repository beginning with the Los Angeles County Museum of Natural History.

REINITIATION NOTICE

This concludes formal consultation on the Service's proposal to establish additional populations of Mohave tui chubs in the Mojave Desert in California. 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 adversely affect listed species or critical habitat in a manner or to an extent not considered in this biological opinion; 3) the agency action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this biological opinion; or 4) a new species is listed or critical habitat designated that may be affected by this action (50 CFR 402.16). In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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