



# 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:  
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## 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 also 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 breath or see an approaching predator. Stress caused by these mechanical or manual methods could result in an individual Mohave tui chubs 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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