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In reply refer to:

AESO/SE

02EAAZ00-2014-F-0649

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August 8, 2017

Karla S. Petty, Arizona Division Administrator
U.S. Department of Transportation
Federal Highway Administration
4000 North Central Avenue, Suite 1500
Phoenix, Arizona 85012-3500

RE: I-15 Virgin River Bridge 1 Replacement Project
FHWA File # 015-A(211)T
ADOT File # 015-MO-008-H8760-01L

Dear Ms. Petty:

Thank you for your request for formal and informal consultation and informal conference with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). At issue are effects of a construction project at Bridge 1 on Interstate 15 (I-15), over the Virgin River, in Mohave County, Arizona, proposed by the Federal Highway Administration (FHWA) and Arizona Department of Transportation (ADOT). We received an initial consultation request, dated May 3, 2016, via electronic mail (email) on May 5, 2016. We also received the biological evaluation (BE) for the proposed action, dated April 26, 2016, on May 5, 2016.

At that time, the BE and consultation request were based on rehabilitation (widening) of the Bridge 1 deck and application of scour countermeasures at the base of the bridge's supporting piers. On May 6, 2016, we received an email from ADOT indicating that the Bridge 1 project had been placed on hold. The purpose of the delay was to allow FHWA and ADOT time to consider the alternative of a full bridge replacement.

On May 26, 2016, we received another email from ADOT indicating that we should continue with our consultation on the Bridge 1 project based on the rehabilitation alternative. On September 22, 2016, ADOT notified us by phone that the I-15 bridge rehabilitation and scour retrofit project had been placed on hold, again to allow time to consider bridge replacement as an alternative. On March 23, 2017, we received by email an addendum to the original BE providing a new project description and additional analysis of effects to listed species based on the full-

bridge-replacement alternative. That alternative consists of fully reconstructing in place all parts of Bridge 1.

In your consultation request, dated May 3, 2016, and in the project addendum we received on March 23, 2017, you concluded that the proposed action “may affect, and is likely to adversely affect” the endangered southwestern willow flycatcher (*Empidonax traillii extimus*) (flycatcher), endangered Virgin River chub (*Gila robusta seminuda*) (chub), and endangered woundfin (*Plagopterus argentissimus*) (woundfin), and designated critical habitat for all three of these species. You also concluded that the proposed action “may affect, and is likely to adversely affect” the Virgin spinedace (*Lepidomeda mollispinus mollispinus*), which is not listed under the Act, but has a conservation agreement and strategy signed by FWS in April 1995 and revised in January 2002. In addition, you concluded that the proposed action “may affect, but is not likely to adversely affect” the threatened Distinct Population Segment (DPS) of the western yellow-billed cuckoo (*Coccyzus americanus*) (cuckoo) and the cuckoo’s proposed critical habitat. Finally, you concluded that the proposed action “may affect, but is not likely to adversely affect” the threatened Mojave desert tortoise (*Gopherus agassizii*) (tortoise).

Below we provide a biological opinion (BO) on effects to the flycatcher, chub, woundfin, and designated critical habitat for all three species. We concur with your determination of “may affect, but is not likely to adversely affect” for the cuckoo and its proposed critical habitat, and provide our concurrence and conference report in Appendix A. We also provide our concurrence for the tortoise in Appendix A. There is no requirement to consult with FWS on the Virgin spinedace at this time. Conservation measures in the proposed action that are applied to the woundfin and chub should also minimize effects to the Virgin spinedace. The conservation agreement and strategy mentioned above is available on our website (https://www.fws.gov/southwest/es/arizona/Virgin_Spinedace.htm).

This BO is based on information provided in the April 26, 2016, BE and on the addendum to the BE received on March 23, 2017, and on information in email correspondence, telephone conversations, field investigations, and other sources of information found in the administrative record supporting this BO. Literature cited herein is not a complete bibliography of all literature available on the species of concern, bridge construction projects and their effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office (file number 02EAAZ00-2014-F-0649).

Consultation History

July 10, 2014	We received the scoping letter for this project.
May 5, 2016	We received an initial request for formal and informal consultation along with the final BE for this project, dated April 26, 2016.
May 6, 2016	We received an email from ADOT indicating that the Bridge 1 project had been placed on hold to allow time for FHWA and ADOT to consider the alternative of replacing Bridge 1 rather than doing a bridge rehabilitation (bridge widening and scour retrofit).

- May 26, 2016 We received an email from ADOT indicating that we should proceed with the original consultation request (the bridge replacement alternative).
- June 30, 2016 We sent the FHWA a letter indicating that all information required to initiate consultation was included in the April 26, 2016, BE and May 5, 2016, consultation request.
- September 22, 2016 We received a phone call from ADOT placing the I-15 bridge rehabilitation and scour retrofit project on hold to allow further consideration of the full-bridge-replacement alternative.
- March 23, 2017 We received by email an addendum to the original BE providing a new project description, based on the full-bridge-replacement alternative, and additional analysis of effects to listed species, along with a request for formal and informal consultation and informal conference.
- August 3, 2017 We sent you our draft BO.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The following summary of the proposed action is taken from the BE and the addendum to the BE. Maps, photographs, and diagrams of the action and action area are included in the BE and addendum and are incorporated herein by reference.

Throughout the BE and in this BO, the term “project limits” is used to represent the construction footprint (area of disturbance), while the term “project area” also includes surrounding lands outside but adjacent to the project limits. In the BE, the term “project vicinity” is used to denote a more expansive landscape context. However, in this BO, we do not use the term “project vicinity.” Instead we use the term “action area” in a similar context, as defined below.

I-15 spans 29.4 miles across the northwestern corner of Arizona and includes seven bridges within Arizona, all constructed in the 1960s and 1970s. Bridge 1 was constructed in 1964 and is located near the unincorporated community of Littlefield, Arizona at milepost (MP) 9.55. The project would begin at MP 8.63 and end at MP 9.84, a total of 1.21 miles (mi).

Within the project limits, I-15 has four 12-foot (ft)-wide travel lanes (two northbound and two southbound) with shoulders of varying widths. This stretch of I-15 carries a high level of truck traffic that has increased deterioration rates on the pavement and bridge infrastructure. In addition, the outside shoulders within the project limits are as narrow as four feet and do not allow room for trucks or other vehicles to pull off the road. The purpose of the project is to maintain I-15 as a safe regional transportation corridor.

An itemized summary of construction activities involved in replacing Bridge 1 is presented below. Expanded descriptions of each activity follow.

- Investigate geotechnical conditions;
- Establish temporary access to the river bottom by:
 - Using one or more of four existing dirt roads, three on the north side of the existing bridge, and one southwest of the bridge;
 - Creating consistent road widths and conditions for cranes and other construction equipment by clearing, grading, and widening access roads and by adding base material and temporary fill if necessary.
 - Constructing work areas within portions of the Virgin River 100-year floodplain (the area with a one percent likelihood of flooding during any given year), which may require grading and filling portions of the floodplain;
 - Constructing temporary crane pads beneath the existing bridge;
 - Constructing a temporary bridge across the Virgin River low-flow channel to allow construction personnel and equipment to cross the river;
- Remove and replace existing bridge deck, girders, median, and exterior barriers;
- Construct four new bridge piers to replace the existing four bridge piers;
- Add new girders to support a wider bridge deck;
- Widen the bridge deck to provide 4 12-ft-wide travel lanes and shoulders that meet current design criteria (6-ft-wide inside and 12-ft-wide outside);
- Construct new bridge abutments as necessary;
- Widen the I-15 roadway approaches to match the new bridge width;
- Demolish existing piers and remove the material from the project area;
- Construct a new bridge containment system that would include:
 - Collection of storm water from the bridge deck via pipes located under the deck on each side of the bridge;
 - Construction of a pipe under I-15 to convey water from the bridge to a roadside ditch on the south side of the bridge;
- Sign and stripe the bridge and roadway as necessary.

The current bridge design would require less maintenance and would have a longer structural life than the rehabilitation design analyzed in the original BE because the entire bridge would be replaced and the existing piers would not be reused. The change in project design would not affect the project limits as described in the original BE. The replacement bridge would be constructed of weathered steel and concrete and would blend with the colors of the landscape.

Project construction would still occur over a period of about two years and would be limited to daylight hours, except for setting the girders and pouring the deck, which may require temporary night work. No blasting would be required for the project. The following discussions of activities are accurate according to what is currently anticipated for the project and should be assumed as likely to occur. Construction is anticipated to begin in FY 2019.

Geotechnical Investigation

Prior to bridge construction, a geotechnical investigation would be needed to support engineering recommendations for new pier construction and widening of the new bridge. Geotechnical activities are likely to start in 2019, would last one month, and are likely to include:

- Drilling of up to 35 test borings with casing-advancer methods in soil, and triple-tube-coring in rock, to depths of 10-80 ft below existing site grades;
- Plugging test holes with native materials or a cement/bentonite mixture and capping of holes with small amounts of concrete.

Geotechnical activities would require a track-mounted drill rig to access and maneuver around boring locations under the bridge. Borings would occur no more than 30 ft from existing bridge piers. The drill rig would be placed on rubber mats for any borings done within wetland areas or adjacent to streams. Geotechnical activities would avoid springs, seeps, and the low-flow channel. Assuming an 8-inch boring diameter and 35 borings plugged and capped, approximately 12 square ft of permanent impacts are expected.

Access and Equipment in the Floodplain

All equipment needed for geotechnical work and construction (e.g., drill rig, cranes, excavators, hoe-rams, trucks, and hydraulic lifts) would take advantage of existing dirt roads for access to work areas. In addition, equipment would operate and maneuver in all four quadrants below Bridge 1 to access the existing piers and new pier sites.

The temporary bridge allowing personnel and equipment to cross the river during construction would sit above the river channel. Fill (such as rip-rap) would be placed on both sides of the low-flow channel as part of the temporary bridge abutments. Abutments would need to be constructed within the low-flow channel and would require drilled shafts up to 20 ft deep to remain stable. Two temporary piers would also be required within the channel. Any abutments or piers within the low-flow channel would be sufficiently reinforced to prevent the temporary bridge from washing out during a high flow event. The temporary bridge would be constructed so that it could be picked up and moved by a crane. Abutments would remain in place until the bridge is no longer needed. Cofferdams or other water exclusion devices or methods would be used in the low-flow channel to provide a dry work area, as described below.

Piers

The existing bridge is supported by four piers running west (from Pier 1) to east (to Pier 4), all four of which lie in the 100-year floodplain. The low flow channel is between Piers 3 and 4 but is closest to Pier 3.

With the full bridge replacement alternative, new piers consisting of two support columns each would be constructed to replace each of the existing four piers, and would be offset approximately 20 ft from the current piers. New pier caps would be wider than the current structures to accommodate a wider bridge; however, the new piers would be similar in thickness or slightly narrower at the base. None of the new piers would be placed in the low flow channel.

Existing piers would be demolished and all above grade materials from these piers would be removed from the construction site. Pier foundations below grade would be left in place and would be covered by material from the river channel so that nothing would be visible from the surface.

Foundation work for the new piers would extend out 30 ft in all directions from existing piers and would require use of track-excavators and possibly backhoe-mounted hoe-rams. Rock removal may be required to construct the additional columns at Piers 1 and 4. Jackhammers or drills may be used for rock removal in these locations. If the foundation area requires additional anchoring, anchors would be drilled into the rock and tied to the foundations to secure the footings.

At Piers 2 and 3, it is likely that drilled shaft supports, extending beneath the river bed up to 70 ft to bedrock and connecting to rock sockets drilled approximately 10 ft into the bedrock, would be required for each new column. As a scour countermeasure, a concrete curtain wall connecting the columns at Piers 2 and 3 would likely be constructed to stabilize the new piers. The new sections of the curtain wall would be constructed above the low-flow elevation to reduce the deflection of streamflow.

Cofferdams and Dewatering

Temporary bridge construction and drilling of pier shafts for Piers 3 and 4 would require a dry work area requiring the use of cofferdams to divert flows around new pier sites. L-panels may also be required to further constrain and direct flows appropriately. Cofferdams would be constructed as a roughly 20-ft wide perimeter around the north, east, and south sides of the new pier footprints for Piers 3 and 4. River water would be screened and filtered as it is pumped out of the work area and then returned to the river channel downstream of the diversion. Because the dams would leak to some degree and groundwater could infiltrate the dry work area, dewatering would occur throughout the period that water diversions are used. Construction within the low-flow channel would require approximately three months.

Fish Capture and Translocation

Before dewatering of the work area, fish and native frogs would be removed and translocated following a fish salvage protocol developed for this project (ADOT 2017) and as outlined in the conservation measures for the chub and woundfin listed below. The salvage protocol and conservation measures present a generalized set of procedures for chub and woundfin capture and translocation. These procedures include 1) installation of fish exclusion materials, such as barrier nets, around the area to be dewatered; 2) removal of as many fish as possible before dewatering, using a combination of block nets, baited minnow traps, electrofishing, or dip nets and hand removal; and 3) during dewatering, salvage of fish that were not captured earlier by fitting pumps with fish screens of an appropriate mesh size.

Staging Areas

Six potential staging areas have been proposed for the project. All are within the defined project limits but all are above the 100-year floodplain. All staging areas would be considered part of the regulated work area and, therefore, would be subject to containment systems, dust and spill controls, erosion control measures, and other conservation measures, as described below.

Ground Disturbance and Vegetation Removal

Roughly 17 acres (ac) within the 100-year floodplain would be graded or otherwise temporarily disturbed during construction to accommodate improvements to access roads, geotechnical work, and construction activities. Removal of riparian habitat, including Fremont cottonwood (*Populus fremontii*), Goodding's willow (*Salix gooddingii*), narrowleaf willow (*Salix exigua*), and tamarisk (*Tamarix* spp.), also called saltcedar, would occur within those 17 ac (see details below).

Action Area

FWS defines the action area as all areas to be affected directly or indirectly by the proposed action, and not merely the immediate area involved in the action (50 CFR § 402.02). In delineating the action area, we evaluated the farthest reaching physical, chemical, and biotic effects of the action on the environment, focusing on, but not exclusive to, the I-15 crossing of the Virgin River, and the project limits, as described above.

Conservation Measures

Conservation measures are those outlined on pages 69-73 of the BE as "Mitigation Measures." Those that are relevant to this BO are as follows:

General Measures

- ADOT would arrange for preconstruction environmental awareness training for all contractors and all personnel working at the site. Training would include information on the flycatcher, chub, woundfin, and their habitats (see Appendix A for training procedures on the cuckoo, its habitat, and the tortoise).
- A Storm Water Pollution Prevention Plan and Spill Prevention and Pollution Plan would be prepared prior to construction to prevent adverse effects of the planned action on soils and water quality. In addition, containment systems to minimize chemicals, dust, oils, construction materials, and debris from falling or flowing into the low-flow channel or the 100-year floodplain during construction would be implemented.
- Erosion control best management practices (BMPs), e.g., construction of a temporary sediment basin and use of hay bales, silt fences, and other methods of erosion control would be applied to prevent soils exposed during construction from entering the river. Regular inspection of sediment control measures would also occur to assure proper function.

- To further assure water quality, all concrete would be poured in dry conditions or within confined waters not being returned to surface waters of the Virgin River. Concrete would be allowed to cure for at least 24 hours before contact with surface water is allowed.
- After construction, all temporary structures (e.g., the temporary bridge and its supports) and excess materials resulting from construction would be removed from the floodplain.
- All disturbed areas within the project limits would be restored to as near their original conditions as possible by re-contouring and seeding, hydroseeding, planting, or transplanting native plant species. Revegetation would include the planting of nursery stock or tall pot trees or shrubs, and chemical or natural fertilizers may be used during revegetation efforts. Water quality measures as described above would remain in effect to limit chemicals from entering the river.

Southwestern Willow Flycatcher

- No vegetation clearing would occur during the flycatcher's migration and breeding period (April 15-September 30).

Virgin River Chub and Woundfin

- No work would be allowed in flowing surface water unless fish salvage measures are being implemented.
- Before and during dewatering of the work area, fish salvage activities would be performed under the direction of a biologist holding a section 10 permit for recovery of Virgin River chub and woundfin. Native fish and frogs would be relocated per provisions outlined in ADOT's fish salvage plan. Non-native species would be humanely euthanized.
- The contractor would stop work immediately if surface flows enter the dewatered work area. Work would not commence again until dewatering and fish and native frog exclusion and relocation activities have occurred.

STATUS OF THE SPECIES AND DESIGNATED CRITICAL HABITATS

Southwestern Willow Flycatcher

The flycatcher was listed as endangered without critical habitat on February 27, 1995 (60 FR 10694). Critical habitat was designated on July 22, 1995 (62 CFR 39129) and was revised on January 2, 2013 (78 CFR 344). A recovery plan for the species was completed in 2002 (U.S. Fish and Wildlife Service [USFWS] 2002), and a 5-year review was done in 2014 (USFWS 2014). The 5-year review determined that no change was needed to the species' classification as endangered.

The southwestern willow flycatcher is one of four currently recognized subspecies of the willow flycatcher, a neotropical migrant and spring/summer resident of North America (Unitt 1987, Browning 1993). This subspecies breeds in the southwestern U.S. and winters in Mexico, Central America, and possibly northern South America (Phillips 1948, Stiles and Skutch 1989, Peterson 1990, Ridgely and Tudor 1994, Howell and Webb 1995). Population stability of the subspecies

in Arizona currently depends on two large populations at Roosevelt Lake and the confluence of the San Pedro and Gila Rivers. However, catastrophic events and losses of birds within these populations could alter the status of the subspecies quickly and significantly. Conversely, expansion into new habitats or discovery of other populations would improve the bird's known status.

The flycatcher is a riparian obligate species. Flycatchers are typically found along rivers, lakesides, and other wetlands with dense riparian habitat consisting of multi-layered tree canopies of varying sizes and age classes. Occupied flycatcher territories are usually located near or over surface water or saturated soils in habitat patches at least 33 ft in diameter. In the Southwest, flycatchers arrive on territories in late April or early May, and nest building begins in mid-May. Flycatchers are insectivores, foraging in dense shrub and tree vegetation along rivers, streams, and other wetlands.

In Arizona, nesting flycatchers occur within two distinct habitat types: 1) mixed riparian/tamarisk habitats below 4,000 ft in elevation; and 2) willow (*Salix* spp.) thickets in broad, flat drainages above 7,000 ft. Historical egg/nest collections and species descriptions throughout its range describe the flycatcher's widespread use of willow for nesting (Phillips 1948, Phillips et al. 1964, Hubbard 1987, Unitt 1987). The subspecies also nests in boxelder (*Acer negundo*), tamarisk, Russian olive (*Elaeagnus angustifolio*), and live oak (*Quercus agrifolia*).

Tamarisk, a non-native species, is an important component of this flycatcher's nesting and foraging habitats. In 2001, 323 of the 404 known flycatcher nests in Arizona (80 percent) were in tamarisk (Smith et al. 2002). Tamarisk had been thought to represent poorer flycatcher habitat; however, comparison of reproductive performance, prey populations, and physiological condition of flycatchers breeding in native and exotic vegetation showed no differences (Durst 2004, Owen and Sogge 2002, Sogge et al. 2005, Sogge et al. 2008, USFWS 2002).

Flycatcher habitat is dynamic and can change rapidly (Finch and Stoleson 2000). Tamarisk can develop from seed to suitability in 4-5 years. Heavy flooding can eliminate or reduce the quality of habitat in a day. Flycatcher use of habitat in different successional stages may also be dynamic. Over-mature or developing riparian vegetation not suitable for nest placement can be occupied and used for foraging and shelter by migrating, breeding, dispersing, or non-territorial flycatchers (McLeod et al. 2008, Cardinal and Paxton 2005).

The flycatcher is endangered primarily because land and water management actions associated with agriculture and urban development have reduced, degraded, and eliminated much of its riparian habitats. Other threats include human recreation along rivers and streams, livestock grazing, predation, brood parasitism by brown-headed cowbirds (*Molothrus ater*), invasion of the tamarisk-eating leaf beetle (*Diorhabda carinulata*), and wildfires that have become more frequent and destructive as a result of the proliferation of exotic vegetation and degraded watersheds. Nestling predation and cowbird parasitism are the most common forms of direct mortality. Tamarisk often flourishes in areas where native trees are unable to grow due to water regulation and groundwater pumping; thus, loss of tamarisk without replacement by native trees will likely impact flycatchers wherever their range overlaps with the tamarisk leaf beetle. All

existing threats are compounded by the risk of stochastic events because flycatcher habitats are fragmented and because populations occur at low numbers.

Southwestern Willow Flycatcher Designated Critical Habitat

The revised critical habitat designation in 2013 (78 CFR 344) reduced designated critical habitat from 1,556 stream mi to approximately 1,227 stream mi. The revised rule designated 208,973 ac of critical habitat for the flycatcher in 24 management units in six states, including Arizona. FWS proposed the following primary constituent elements (PCEs) for flycatcher critical habitat based on riparian plant species, structure and quality of habitat, and insects for prey:

1. Primary Constituent Element 1—*Riparian vegetation*. Riparian habitat along a dynamic river or lakeside, in a natural or manmade successional environment (for nesting, foraging, migration, dispersal, and shelter) that is comprised of trees and shrubs (that can include Gooddings willow, coyote willow, Geyer's willow, arroyo willow, red willow, yewleaf willow, pacific willow, boxelder, tamarisk, Russian olive, buttonbush, cottonwood, stinging nettle, alder, velvet ash, poison hemlock, blackberry, seep willow, oak, rose, sycamore, false indigo, Pacific poison ivy, grape, Virginia creeper, Siberian elm, and walnut) and some combination of:
 - (a) Dense riparian vegetation with thickets of trees and shrubs that can range in height from about 2 to 30 meters (m) (about 6 to 98 ft). Lower-stature thickets (2 to 4 m or 6 to 13 ft tall) are found at higher elevation riparian forests and tall-stature thickets are found at middle and lower-elevation riparian forests;
 - (b) Areas of dense riparian foliage at least from the ground level up to approximately 4 m (13 ft) above ground or dense foliage only at the shrub or tree level as a low, dense canopy;
 - (c) Sites for nesting that contain a dense (about 50 percent to 100 percent) tree or shrub (or both) canopy (the amount of cover provided by tree and shrub branches measured from the ground);
 - (d) Dense patches of riparian forests that are interspersed with small openings of open water or marsh or areas with shorter and sparser vegetation that creates a variety of habitat that is not uniformly dense. Patch size may be as small as 0.1 hectare (ha) (0.25 ac) or as large as 70 ha (175 ac).
2. Primary Constituent Element 2—*Insect prey population*. A variety of insect prey populations found within or adjacent to riparian floodplains or moist environments, which can include: flying ants, wasps, and bees (*Hymenoptera*); dragonflies (*Odonata*); flies (*Diptera*); true bugs (*Hemiptera*); beetles (*Coleoptera*); butterflies, moths, and caterpillars (*Lepidoptera*); and spittlebugs (*Homoptera*).

Virgin River Chub

The Virgin River chub (*Gila robusta seminuda*) was listed as endangered on August 24, 1989 (54 FR 35305). A recovery plan was approved for the chub and the woundfin in April 1995

(USFWS 1995). Critical habitat for the chub and woundfin was designated on January 25, 2000 (65 FR 4140).

The chub is a silvery medium-sized minnow averaging 8 inches in length, but growing to 18 inches. It is most often associated with run or pool habitats 0.6 to 3.0 ft deep, with slow to moderate velocities (0.0 to 2.5 cubic ft per second[cfs]), over sand substrates with large boulders or instream cover, such as root snags (Hardy et al. 1989). Both adults and juveniles are associated with these habitats; however, the adults are collected most often in deeper pools. Adult temperature preference is approximately 75 degrees Fahrenheit (F) (Schumann 1978, Deacon et al. 1987). The species is omnivorous, showing considerable dietary shifts with age. Young fish feed almost entirely on macroinvertebrates. Adults feed almost exclusively on algae and debris (Greger and Deacon 1988). Cross (1975) reported that up to 90 percent of the diet consists of filamentous algae.

Little is known about the reproductive biology and population dynamics of this fish. Spawning is known to occur in the spring (ripe females have been reported from April-June), and good spawning years for the chub coincide with good spawning years for woundfin (Hickman 1987). Chubs may live for many years, possibly decades, but they mature rapidly and probably spawn in their second or third year (Williams and Deacon 1998).

Presently, the chub occurs within the mainstem of the Virgin River from Pah Tempe Springs, near Hurricane Utah, downstream to at least the Arizona-Nevada border. Anecdotal information suggests that chubs were abundant before the 1900s. Since then, their abundance and range have declined substantially due to impacts from water diversions and the introduction of predatory non-native fish species such as catfish, bass, and particularly the red shiner (*Cyprinella lutrensis*).

The greatest impacts by red shiners have occurred from Lake Mead in Nevada upstream to the Washington Fields Diversion near St. George, Utah. Prior to the red shiner invasion, fish populations in this reach were composed almost exclusively of native fish. For example, at one of the standard recovery team monitoring sites in this reach, Atkinville Wash in Utah, two miles above the Utah/Arizona border, fish composition in September 1984, just prior to discovery of the first red shiner, was woundfin (57%), desert sucker (27%), speckled dace (10%), Virgin River chub (4%), and flannelmouth sucker (2%).

In 1988, attempts to chemically eradicate red shiners began with the treatment of the reach between the Washington Fields Diversion downstream to the Johnson Diversion. Successive treatments focused on additional reaches each year. Salvage operations were conducted prior to all treatments, and native fish were moved to habitats above the Washington Fields Diversion where chub populations have not been impacted by red shiners (shiners were noted there in 2002 but not since). The fish community above Washington Fields is composed primarily of native species (Fridell and Morvilius 2005).

As a result of eradication efforts, red shiners have been eliminated from the Washington Fields Diversion down to the Stateline Fish Barrier. However, chub numbers remain low below Washington Fields due to the overwhelming number of red shiners present before treatments and

to inadvertent chub mortalities that occurred during treatments. In addition, fish kills resulting from flood events and poor water quality have occurred since the treatments.

Chub populations above the Washington Fields Diversion have also been impacted by factors other than red shiners. Chubs in this reach declined in 2002 and 2003 due to low flows, low turbidity, and high water temperatures. Populations rebounded dramatically in 2005 due to higher flow levels and lower water temperatures, but a return to persistent drought conditions in 2006 and 2007 again lowered all native fish populations to critical levels. Lethal dissolved oxygen levels were noted in most portions of the Virgin River above Washington Fields during two back-to-back floods in July and August 2007. Below the Washington Fields Diversion, down to La Verkin Creek, these floods resulted in the loss of nearly 90 percent of remaining native fish populations.

Surveys from 2007-2009 documented low chub numbers from below Washington Fields downstream to the Stateline Fish Barrier (Fridell 2009). Since the floods, chubs and other native species from hatcheries and upstream and off channel areas have been introduced into this reach in the hope of re-establishing a larger, more stable native fish population. Chub populations above Washington Fields improved after the 2007 floods. Full pass sampling from April 5-8, 2010, from Pah Tempe Springs to Washington Fields, documented 880 chubs (731 adults and 149 young-of-the-year). As of 2012, chubs still occurred in the Virgin River in Utah down to the Arizona state line (K. Wilson, Utah Division of Wildlife Resources, pers. comm. to B. Johnson, Jacobs Engineering Group, October 18, 2012).

In Arizona, chubs are found through the Virgin River Gorge downstream to the Arizona/Nevada border (the Gorge begins four mi upstream of Bridge 1 and extends nearly to the Utah border). Unfortunately, non-native fish, including red shiner, largemouth bass, (*Micropterus salmoides*), and channel catfish (*Ictalurus punctatus*) are also present in these reaches.

Woundfin

The woundfin was listed as endangered on October 13, 1970 (35 FR 16047). As mentioned above, a recovery plan was approved for this species and the Virgin River chub in April 1995 (USFWS 1995). Critical habitat for both species was designated on January 25, 2000 (65 FR 4140).

The woundfin is a small silver minnow about 4 inches long with a flat head, fairly large fins and a sharp dorsal fin spine. The woundfin inhabits shallow, warm, turbid, fast-flowing water and is capable of withstanding high salinities and relatively warm water temperatures.

Adult woundfin are often collected from runs and quiet waters adjacent to riffles. Larvae are found in backwaters or slowly moving water along stream margins, and often are associated with dense growths of filamentous algae. Juveniles use habitats that are slower and deeper than those characteristic of adults. Woundfin greater than 1.6 inches total length are collected most frequently at depths between 0.48 and 1.4 ft, in water velocities ranging from 0.78 to 1.6 cfs, over sand and sand-gravel substrate (Hardy et al. 1989). There is some indication that when water clarity is high, adult woundfin move into deeper water. The critical thermal maximum temperature for woundfin in the Virgin River is about 102 degrees F, with mean preferred

temperatures of about 52 to 75 degrees F (Deacon et al. 1987). Woundfin feed on filamentous algae, detrital material, seeds, aquatic insects, and display a seasonal shift in food selectivity. Dietary overlap with introduced red shiners is greatest when food is most abundant. During periods of lower food abundance, woundfin and red shiners may experience greater competition for food, leading to a more pronounced partitioning of the food niche. Woundfin spawning has been documented from April to August (Hickman 1987, Hardy et al. 1989).

The historical range of the woundfin included rivers in Arizona, Nevada, and Utah, extending from near the junction of the Salt and Verde Rivers at Tempe, Arizona, to the mouth of the Gila River at Yuma, Arizona, and the Colorado River from Yuma, Arizona upstream to the Virgin River into Nevada, Arizona, and Utah, and into La Verkin Creek in Utah. Woundfin are extirpated from much of their former range, and are now confined primarily to the mainstem Virgin River from Pah Tempe Springs in Utah to Lake Mead.

Like the Virgin River chub, woundfin abundance has declined significantly due to the introduction of the red shiner. Woundfin were virtually eliminated wherever red shiners became established in Arizona and Nevada, and in Utah up to the Washington Fields Diversion. Prior to 2007, the only viable populations of woundfin were found above the Washington Fields Diversion (Fridell and Morvilius 2005). In 2005, woundfin and Virgin River chub were the most common species above Washington Fields. However, the 2007 flood events discussed for Virgin River chub functionally extirpated woundfin from this portion of the river. Nearly 10,000 woundfin from the Southwestern Native Aquatic Resources and Recovery Center (ARRC, formerly the Dexter National Fish Hatchery and Technology Center in Dexter, New Mexico) were stocked back into this area in autumn 2007 and spring 2008. Woundfin were found below Washington Fields Diversion to the Stateline Fish Barrier in 2009 (Fridell 2009). Surveys in Spring 2010 documented 270 woundfin (110 adults and 117 young-of-the-year) above Washington Fields (Fridell 2010). Very few woundfin are found in the Virgin River in Arizona and Nevada, and any woundfin in those states now are likely those that have moved downstream from Utah.

Virgin River Chub and Woundfin Designated Critical Habitat

The area designated as critical habitat for both the Virgin River chub and woundfin is the mainstem Virgin River and its 100-year floodplain, extending from the confluence of La Verkin Creek in Utah to Halfway Wash in Nevada. The critical habitat designation along the Virgin River for both species is identical and includes 37.3 mi in Utah, 31.6 mi in Arizona, and 18.6 mi in Nevada (a total of 87.5 mi).

Designated critical habitat for the chub represents approximately 65.8 percent of the species' historical habitat within the Virgin River Basin. Designated critical habitat for the woundfin represents approximately 12.5 percent of the species' historical habitat within the Virgin River Basin. All designated critical habitat for the chub and woundfin contains at least one of the primary constituent elements (PCEs) for critical habitat as defined below.

The PCEs of critical habitat determined to be necessary for the survival and recovery of the chub and woundfin are water, physical habitat, and biological environment. The desired conditions for each of these elements are:

Water:

A sufficient quantity and quality of water (i.e., temperature, dissolved oxygen, contaminants, nutrients, turbidity, etc.) that is delivered to a specific location in accordance with a hydrological regime that is identified for the particular life stage for each species. This includes the following:

1. Water quality characterized by naturally seasonally variable temperature, turbidity and conductivity;
2. Hydrologic regime characterized by the duration, magnitude, and frequency of flow events capable of forming and maintaining channel and instream habitat necessary for particular life stages at certain times of the year; and
3. Flood events inundating the floodplain necessary to provide the organic matter that provides or supports the nutrient and food sources of the listed fishes.

Physical Habitat:

Areas of the Virgin River that are inhabited or potentially habitable by a particular life stage for each species, for use in spawning, nursing, feeding, and rearing, or corridors between such areas:

Virgin River Chub:

1. River channels, side channels, secondary channels, backwaters, and springs, and other areas which provide access to these habitats; and
2. Areas with slow to moderate velocities, within deep runs or pools, with predominately sand substrates, particularly habitats which contain boulders or other instream cover.

Woundfin:

1. River channels, side channels, secondary channels, backwaters, and springs, and other areas which provide access to these habitats;
2. Areas inhabited by adult and juvenile woundfin include runs and pools adjacent to riffles that have sand and sand/gravel substrates;
3. Areas inhabited by juvenile woundfin are generally deeper and slower. When turbidity is low, adults also tend to occupy deeper and slower habitats; and
4. Areas inhabited by woundfin larvae include shoreline margins and backwater habitats associated with growths of filamentous algae.

Biological Environment:

Food supply, predation, and competition are important elements of the biological environment and are considered components of this constituent element. Food supply is a function of nutrient supply, productivity, and availability to each life stage. Predation and competition, although considered normal components of this environment, are out of balance due to non-native fish species in many areas. For both species, a properly functioning biological environment contains:

1. Seasonally flooded areas that contribute to the biological productivity of the river system by producing allochthonous organic matter (humus, silt, organic detritus, colloidal matter, and plants and animals produced outside the river and brought into the river), which provides and supports much of the food base of the listed fishes; and

2. Few or no predatory or competitive non-native species in occupied Virgin River fishes' habitats or potential reintroduction sites.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the subspecies and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

Description of the Action Area

The Virgin River's origin is in southwestern Utah north of Zion National Park. It runs generally southwest through the Virgin River Gorge in Arizona and empties into Lake Mead, Nevada. Water in the Virgin River is derived from rainfall, snowmelt, and from groundwater entering via seeps and springs. Snowmelt makes up the largest part of annual flows and usually causes the highest monthly flows each year from March to May. Low flows usually occur from June to October (Glancy and Van Denburgh 1969). However, the river is susceptible to periodic flooding, which typically occurs during the spring runoff and during late summer monsoons.

Within the project limits, the Virgin River is considered perennial (Arizona Department of Water Resources [ADWR] 2014). Flowing water was observed during multiple site visits by ADOT and its contractors from 2012 to 2014, most recently during a site reconnaissance on June 11 and 12, 2014. In 2016, flows at a U.S. Geological Survey gauging station 0.4 mi downstream of Bridge 1 ranged from 25-3,000 cfs (U.S. Geological Survey 2017).

Beaver Dam Wash is the largest tributary in the Virgin River Basin (ADWR 2014) and enters the Virgin River about 0.25 mi upstream (northwest) of Bridge 1 outside the project limits. Beaver Dam Wash is intermittent in upstream reaches but tends to be perennial at its confluence with the Virgin River (ADWR 2014). Contributions to flows in the Virgin River at Bridge 1 also occur as a result of effluent from the wastewater treatment plant at St. George, Utah, 29 mi upstream of Bridge 1.

Two vegetation communities occur in the project limits: 1) Mojave desertscrub; and 2) Mojave Desert riparian habitat (Turner 1982, Brown 1994). Mojave desertscrub occurs in drier upland sites away from the river. Riparian vegetation is diverse and occurs as small and large patches 1) in the river channel in flowing water and on sandbars; 2) on the adjacent floodplain; and 3) above the floodplain in spring and seep areas. Spring and seep areas occur on tall sandstone and limestone bluffs overlooking the river, primarily on its eastern bank. Just below the seep areas, north of the bridge, monotypic patches of canyon grape (*Vitis arizonica*) and common reed (*Phragmites australis*) occur. Bands of narrowleaf willow, a shrub form of willow, southern cattail (*Typha domingensis*), and common reed occur in or adjacent to the low-flow channel throughout the project limits. A 0.9-ac patch of mature tamarisk, approximately 180 ft wide at its widest point, occurs directly north of the bridge.

A thin band of young to mature Fremont cottonwood trees occurs directly underneath the bridge and to the southwest on the western side of the river along with tamarisk, common reed, and an occasional Goodding's willow. Another grove of mature cottonwoods with little understory occurs approximately 0.25 mi southwest of Bridge 1 and adjacent to an access road that would be used during bridge construction. The largest patch of riparian habitat near Bridge 1 is about 0.25 mi northwest of the bridge just north of the Virgin River's confluence with Beaver Dam Wash (outside the project limits). This grove of mature Fremont cottonwood and Goodding's willow has an understory of young tamarisk and a relatively open canopy (less than 70 percent closure). Most vegetation to the east and northeast of the mixed stand is monotypic tamarisk. In total, the area is approximately 30 ac in size.

Status of the Species and Critical Habitat in the Action Area

Southwestern Willow Flycatcher

No flycatcher surveys were done for the purposes of this project. Protocol surveys (Sogge et al. 2010) by Arizona Game and Fish Department occurred in Beaver Dam Wash and along the Virgin River between Littlefield and roughly 0.25 mile north of Bridge 1 from 1994-1998 and from 2000-2006. Flycatchers were observed in four of those years: 1997 (one bird, status unknown); 2001 (one resident adult); 2003 (one migrant); and 2004 (three resident adults, one nesting pair, and two nests) (Ellis et al. 2008).

Flycatcher surveys were also done by the U.S. Bureau of Reclamation (USBR) along the Virgin River downstream of Bridge 1 near Littlefield, and at the confluence of Beaver Dam Wash and the Virgin River, from 2003-2005 and in 2007. Three breeding adults were observed in 2004 and two males were observed in 2005, all of them at or near the confluence (McLeod et al. 2008).

From 2007-2010, USBR flycatcher surveys focused on Beaver Dam Wash upstream of the County Road (CR) 91 Bridge, one mi north of Bridge 1. An unpaired resident male was observed here in 2007; a single adult was seen in 2008; four resident breeding adults were observed in 2009, and three resident breeding adults were observed in 2010 (McLeod and Pellegrini 2013).

Critical Habitat

Designated critical habitat for the flycatcher includes a 94.4-mi segment of the Virgin River, the Virgin Management Unit, extending from Berry Springs in Washington County, Utah downstream to the upper end of Lake Mead. This unit includes 29.5 mi in Utah, 34.8 mi in Arizona, and 30.0 mi in Nevada. Total acreage for the management unit is not provided in the final rule (78 CFR 344), but approximately 25 ac of designated critical habitat are within the project limits.

As detailed above, the PCEs of designated flycatcher critical habitat include (1) dense riparian vegetation with thickets of trees and shrubs, or dense patches of riparian forests that are interspersed with small openings of open water or marsh areas with shorter and sparser vegetation, and (2) habitats that support a high availability of their flying insect prey.

PCE 1 (Riparian Vegetation)

Designated critical habitat within and adjacent to the project limits consists of patches of riparian vegetation of various compositions, heights, and densities interspersed with open water and sandbars. During ADOT site visits in June 2014, riparian vegetation within the project limits, and from 500 to 1,000 ft bordering the project limits, was evaluated for its suitability as flycatcher habitat. The largest patch of potentially suitable breeding habitat was the 30-ac stand of cottonwood, willow, and tamarisk north of the confluence of Beaver Dam Wash and the Virgin River. Breeding flycatchers have not been documented here since 2004 and no flycatchers have been observed since 2005 (Ellis et al. 2008; McLeod et al. 2008). The stand is 0.25 mi from Bridge 1 and 250 ft from the project limits at its closest point.

The patch of monotypic tamarisk just north of Bridge 1, on the river's east bank, is approximately 0.9 ac in extent and represents breeding habitat that lies within the project limits. Scattered patches of cottonwood, willow, and tamarisk underneath the bridge and extending southwest along the western side of the river are insufficient as breeding habitat but could provide migratory stopover and foraging habitat.

PCE 2 (Insect Prey)

We have no data on insect prey populations, but judging from the complex mosaic of habitats in the project limits and action area, including open flowing water, sandbars, reed patches, cattails, grape, multi-layered riparian woodlands, tamarisk, and seeps, we assume that flying insect prey are readily available for flycatchers and are not a limiting factor at this time.

Virgin River Chub

No surveys for the chub (or woundfin) were done for the purposes of this project. Chubs were not documented during August 2010 when surveys occurred at the CR 91 Bridge over Beaver Dam Wash, 0.5 mi west of Bridge 1 (Liebfried 2011). In June 2012, 464 chubs were captured on the Virgin River between the Lower Gorge and Halfway Wash in Nevada, 171 of which were captured at the confluence of Beaver Dam Wash and the Virgin River (Kegeries and Albrecht 2012). In August 2012, 16 chubs were captured: 15 in the Experimental Reach four miles below Bridge 1, and one in the Below Bunkerville Diversion Reach in Nevada five miles below the bridge (B. Wooldridge, USFWS, email to K. Gade, ADOT, October 9, 2012). In May and June 2015, 3,209 chubs were captured between the Gorge and Halfway Wash, 567 of which were captured at the Beaver Dam Wash confluence, but none were captured from the Below Bunkerville Diversion Reach to Halfway Wash the following August (unpublished data provided by B. Wooldridge, July 11, 2016). In May 2016, 153 chubs were captured from the Gorge to Halfway Wash, 68 of which were from the Virgin River at the Beaver Dam Wash confluence. In October 2016, 54 chubs were captured in the same stretches, 15 of which were from the Beaver Dam Wash confluence (BIO-WEST 2016).

Woundfin

Surveys described above for the chub also included sampling for woundfin. No woundfin were captured in 2010 (Liebfried 2011). During the June 2012 sampling effort, 18 woundfin were captured from the Lower Gorge to the Below Bunkerville Diversion Reach, including one at the Beaver Dam Wash confluence (Kegeries and Albrecht 2012). Only one woundfin was captured in August 2012, in the Experimental Reach (B. Wooldridge, USFWS, pers. comm., email to K. Gade, ADOT, October 9, 2012). No woundfin were captured in May and June 2015, August 2015, or May 2016. One woundfin was captured at the mouth of the Gorge and another at the Beaver Dam Wash confluence in October 2016.

Critical Habitat: Virgin River Chub and Woundfin

As we mentioned above, designated critical habitat is the same for the chub and woundfin. Areas of the Virgin River designated as critical habitat consist of the remaining occupied habitat for both species. Approximately 10 ac of designated critical habitat occur within the project limits. Because both species occupy similar habitats, we will consider them together:

PCEs 1 and 2 (Water, Physical Habitat): At the time critical habitat for the chub and woundfin was designated in 2000, PCEs 1 and 2 were identified as not being at optimal levels for either species within the critical habitat unit. Different portions of the reach were considered to be more or less suitable for water and physical habitat. Within the action area, sand to gravelly substrates occur and water is maintained most or all of the year. Perennial pools provide refuges during extremely dry periods and floodplains are periodically inundated. Side channels (e.g., Beaverdam Wash), secondary channels, backwaters, and deep runs are also present. Flows from springs in the Lower Gorge and near Littlefield maintain higher baseflows within the action area than may occur upstream.

PCE 3 (Biological Environment): Given periodic flooding that occurs in the Virgin River, the allochthonous material that provides and supports much of the food base for the chub and woundfin does not appear to be deficient. However, the presence of non-native fish species, particularly the red shiner, continues to compromise the conservation value of designated critical habitat downstream of the Utah/Arizona border; thus, PCE 3 is deficient.

Factors Affecting the Species and Critical Habitats in the Action Area

Southwestern Willow Flycatcher

Flooding and the leaf beetle have affected and could continue to affect flycatchers and their habitat within the action area and project limits. At least three floods have affected flycatcher habitat in or near the project limits since 2004. During the winter of 2004-2005, a flood removed the tamarisk understory at the confluence of Beaver Dam Wash, and other riparian vegetation along the mainstem of the river downstream of Bridge 1. Flooding in 2010 eliminated suitable breeding habitat in Beaver Dam Wash upstream of the CR 91 Bridge. A flood in 2014 disturbed or altered additional tamarisk stands in the project area. Vegetation altered or removed during the floods of 2004-2005 and 2010 have recovered or are recovering. Vegetation affected by the 2014 flood is expected to recover by the time construction on Bridge 1 begins in 2019. In addition,

most tamarisk trees in and near the project limits were defoliated (by the leaf beetle) when ADOT conducted a site visit in June 2012; however, affected tamarisk trees were green and appeared healthy in June 2014.

Virgin River Chub and Woundfin

Chubs and woundfin in the Virgin River have declined in numbers largely due to deterioration or loss of habitat and introduction of non-native fishes, primarily the red shiner. Introduction of red shiners has contributed significantly to the decline of these native species because red shiners compete with natives for food resources and space. Red shiners may also be a predator of the eggs and young of native fishes. Shiners have been eliminated from upstream reaches of the Virgin River in Utah, but are still present and still affect chubs and woundfin in the action area and within the project limits.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, which will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Southwestern Willow Flycatcher and Critical Habitat

Effects of this project to the flycatcher would include disturbance and harassment of flycatchers that arrive in the project area during construction. Under the proposed schedule, construction of the new bridge would involve heavy equipment operations and other construction activity through spring migration, the breeding period, and fall migration for two years. Thus, construction activities, noise, and dust would affect and possibly alter nesting, foraging, and migratory behavior within the project limits and for an unknown distance upstream and downstream of Bridge 1.

Effects to the flycatcher would also include removal of vegetation within the project limits, affecting PCE 1 (riparian vegetation) and PCE 2 (insect prey populations). Access road improvements would involve removal of 0.2 ac of a 1.5-ac stand of mature cottonwoods along an existing dirt road that approaches Bridge 1 from the southwest, and removal of 0.2 ac of a 0.9 ac stand of monotypic tamarisk adjacent to a road that approaches the bridge from the north. Geotechnical work and bridge construction would require removal of 0.9 ac of sparse, scattered young to mature cottonwoods, Goodding's willow, and narrowleaf willow directly below and adjacent to the existing bridge. Removal of riparian vegetation for the project totals about 1.3 ac.

Vegetation removal would not occur during the flycatcher's migration and breeding period in Arizona (April 15-September 30); thus, direct impacts—injuries or fatalities to adults, eggs, or young—that could otherwise result from vegetation removal are not expected to occur.

Impacts to insect prey populations within affected riparian areas would mostly be temporary—the result of dewatering and loss of aquatic larvae, and loss of riparian habitat—and would be expected to return to previous levels after project completion and after revegetation efforts. Overall, features that help develop and maintain prey habitat within the project limits are not expected to change over the long term.

Most designated critical habitat within the project limits consists of open water (the low flow channel), sandbars, and riparian vegetation. The 0.9-ac stand of monotypic tamarisk just north of Bridge 1 represents the only suitable breeding habitat within the project limits. Removal of 0.2 ac of this stand represents a temporary impact. Tamarisk would be expected to recover quickly after completion of the project just as it would from a flood event.

Effects of cottonwood and willow removal along the southwest access route and below the existing bridge represents a reduction of habitat available to migrants and foraging birds over the short term and would be minimized by planned revegetation efforts. Overall, the loss of 1.3 ac of riparian habitat represents a relatively small loss compared to the more extensive and more suitable habitat at the confluence of Beaver Dam Wash and in Beaver Dam Wash upstream of the confluence.

Areas where no regeneration of vegetation would be possible (permanent impacts) include the locations of new bridge piers and abutments and the caps at geotechnical drill locations. In total, these areas represent less than 0.04 ac.

Indirect effects (those later in time) would include fewer nesting attempts and lower productivity resulting from the partial loss of nesting habitat in the tamarisk stand just north of Bridge 1. However, these effects would be temporary, given the relatively rapid recovery of the 0.2 ac of tamarisk removed from this stand.

Virgin River Chub and Woundfin and Critical Habitat

Direct effects to the chub and woundfin would occur during fish capture and translocation efforts in the work area. As many native fish as possible would be captured and relocated out of the work area before dewatering. Efforts to capture fish would continue during dewatering, but fish removal activities would not be expected to be 100 percent successful. Some fish would be killed as dewatering occurs. There is also the potential for fish to be stressed, injured, or to die while they are being captured, temporarily held, and released. Some fish may die after release.

Direct effects to the chub and woundfin could also result from access road improvements, geotechnical work, and activities associated with temporary and new bridge construction, all of which would involve work within the 100-year floodplain, and all of which could cause movement of chemicals, oils, construction materials, fill material, sediments, and debris into the Virgin River, both within and downstream of the project limits. Movement of contaminants, sediments, or debris into the river could cause fatalities or result in impairment of individual fish.

The temporary bridge would preclude the need for construction vehicles to enter the channel when crossing the river. Piers and rip rap for the temporary bridge abutments would be

sufficiently reinforced to prevent the temporary bridge from washing out during a high-flow event and causing injuries or fatalities to fish downstream of the work site. In addition, containment systems and BMPs (see Conservation Measures) would be implemented to reduce the risk of contaminants and debris from entering the river. Clean Water Act Sections 401 and 404 permits would be required for the project and would include provisions for immediate clean-up of any substance in case of a leakage or spill, and would define how each substance would be treated. Erosion resulting from the project would be minimized by construction of a temporary sediment basin or filter, use of sediment fences between disturbed areas and flowing waters, and regular inspection of sediment fences to maintain proper function.

In spite of measures to control erosion, some sediment movement into the low flow channel would occur during the project. Changes to stream morphology would also occur. As a result, the proposed action is expected to have short-term adverse effects to designated chub and woundfin critical habitat (designated critical habitat is the same for both species).

Removal of 1.3 ac of riparian vegetation from the floodplain before geotechnical and construction activities begin may temporarily destabilize stream banks and increase erosion within and downstream of the work area. However, tamarisk would recover relatively quickly after the project and provisions for revegetation would help offset the effects of cottonwood and willow removal over the long term. Revegetation would include the planting of nursery stock or tall pot trees or shrubs, and chemical or natural fertilizers may be used during re-vegetation efforts. These chemicals could enter the Virgin River via runoff and affect water quality. The type of fertilizer would not be known until development of a revegetation plan that would occur during final project design; however, given the small amount of vegetation removal and replacement, we anticipate that the effects of chemical runoff in the Virgin River would be minor and would be outweighed by the benefits of revegetation within the floodplain.

Construction of cofferdams or other stream diversions and dewatering of the work area would also increase downstream turbidity. Cofferdams would extend up to 20 feet into the low-flow channel increasing the velocity of flows around them. This would increase the amount of scouring and downstream sedimentation. Work within the dewatered low flow channel would occur during a short period of the project—about three months. Water in the low-flow channel would continue to flow between Piers 3 and 4 during most construction activities.

Temporary bridge abutments and piers would also result in localized but temporary changes to stream flow, depending on flow volumes. The temporary bridge would impede water or sediment movement during higher flows while it is present. As with the cofferdams, rip rap and piers of the temporary bridge could increase the velocity of flows in the low flow channel, increasing the amount of scouring and sedimentation downstream. Placement of permanent piers for the new bridge would not change the hydrologic dynamics of the river over the long term. All four piers for the new bridge would be above the low flow channel.

Operation of vehicles in the floodplain and in the dry channel would result in soil compaction above the channel and compaction of sand and gravel substrates within the channel. Increased erosion and effects to stream morphology would be temporary, however, and would cease

following completion of the project. Overall, impacts resulting from movement of sediments into the Virgin River would be minor compared to sedimentation resulting from storm events.

In summary, we do not expect the project to have long-term effects on designated critical habitat for the chub and woundfin, and short-term effects are not anticipated to lower the ability of the PCEs of critical habitat to provide for the conservation of either species. Effects to PCE 1 (water) would include increases in turbidity in and downstream of the project limits and possible movement of contaminants into the Virgin River. Sediment flows would be temporary and would dissipate after project completion. Conservation measures and BMPs would prevent or minimize contaminant effects. Effects to physical habitats (PCE 2) would involve primarily compaction of sand and gravel substrates in the dewatered channel. Restoration of flows after cofferdams are removed would restore movement of sand and gravel into and past the work area. Finally, the project would not adversely affect the biological environment (PCE 3). Seasonal and periodic flooding that provides organic materials that support the food base of the chub and woundfin would continue in spite of the proposed action. Fish capture and relocation efforts would provide the opportunity to remove non-native fish, e.g., the red shiner, that represent a limiting factor for the chub and woundfin.

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 and conference 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.

Within the action area, I-15 crosses privately-owned lands and public lands under the jurisdiction of the U.S. Bureau of Land Management (BLM). ADOT holds an easement in areas under BLM jurisdiction and owns the right-of-way (ROW) adjacent to privately-owned land to maintain and operate the interstate. According to the BE for this project, no new ROWs or easements are anticipated within the action area or project limits.

Primary land uses in the action area include residential, commercial, and light industrial developments on private lands and recreation on public lands. The Virgin River drainage is likely to experience additional urbanization in the future, and use of both surface and groundwater to serve this growth is likely to affect flows in the Virgin River. Use of existing dirt roads to access the river for recreation would be temporarily interrupted during construction; however, road improvements may increase use of the Virgin River after construction. This may increase impacts to the flycatcher, chub, and woundfin, and their critical habitats over the long term through increases in habitat fragmentation, fire risk, spread of invasive species, trash deposition, and contamination of surface and groundwater.

CONCLUSIONS

After reviewing the current status of the flycatcher, chub, and woundfin, and their designated critical habitats, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the FWS's biological opinion that the proposed action is not likely to jeopardize the continued existence of the flycatcher, chub, or woundfin, or destroy or adversely modify their critical habitats. We base these conclusions on the following reasons:

Southwestern Willow Flycatcher

- No vegetation clearing would occur during the flycatcher's migration and breeding period (April 15-September 30); thus, vegetation clearing would be unlikely to cause injuries or fatalities to adults, eggs or young.
- Bridge construction would occur during two breeding and migration periods and would be ongoing when flycatchers arrive at the construction site. However, there is suitable habitat adjacent to the project area, and flycatchers would be able to avoid the construction area and move into the available habitat.
- Permanent and temporary effects to PCE 1 (riparian vegetation) and PCE 2 (insect prey populations) of designated critical habitat within 1.3 ac of the project limits would be small compared to designated critical habitat rangewide (208,973 ac) and within the Virgin Management Critical Habitat Unit (94.4 river mi); thus, designated critical habitat would remain functional to serve the intended conservation role for the flycatcher.
- Although some riparian habitat would be removed during the project, riparian habitat is dynamic and conditions in the vicinity of the project would enable it to recover quickly or be restored through re-vegetation efforts.

Virgin River Chub and Woundfin

- The area affected by the proposed action is a minor part of the total habitat area currently supporting the chub and woundfin (87.5 river mi in Utah, Arizona, and Nevada).
- Bridge construction would not result in changes to water flow (PCE 1) or habitat conditions for the chub and woundfin over the long term.
- Construction effects to river channel characteristics (PCE 2) would not be permanent and habitat values would recover after temporary facilities are removed. No permanent structures would be placed in the low flow channel. Critical habitat would remain functional and continue to serve its conservation role for the species.
- Capture and translocation protocols included in the proposed action would minimize the risk of harming individual chubs and woundfin during construction.
- Removal of non-native fish (e.g., red shiner) that prey on and compete with the chub and woundfin would represent a short-term benefit.

The conclusions of this biological opinion are based on full implementation of the project as described in the description of the proposed action above, including any conservation measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations 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 defined (50 CFR 17.3) 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 (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. “Incidental take” is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

AMOUNT OR EXTENT OF TAKE

Southwestern Willow Flycatcher

We do not anticipate that implementation of the proposed action is reasonably certain to result in incidental take of any flycatchers for the reasons stated in our conclusions above. Vegetation clearing will not occur during the flycatcher’s migration or breeding period, so direct effects to adults, eggs, or young will be avoided. Bridge construction would occur during two breeding and migration periods but there is suitable habitat adjacent to the project limits and flycatchers would be able to avoid the construction area. The amount of habitat removed is insignificant and would not alter the use of this habitat by flycatchers for breeding, feeding, or sheltering.

Virgin River Chub and Woundfin

We anticipate that the proposed action is reasonably certain to result in incidental take of the chub and woundfin. The proposed capture and relocation of these fish will harass all individuals involved and may result in harm (injury or fatality) of a portion of those fish, either during capture or while they are held before release. Fish may also die after release due to the stress from handling or predation of weakened individuals. We also anticipate take in the form of injury or death of all chubs and woundfin that are not captured (i.e., are missed) during dewatering of the work area.

We cannot quantify the number of individual chub or woundfin that escape capture or die after release because most of these individuals will be almost impossible to find and would likely be consumed by predators or scavengers. Otherwise, take of chubs and woundfin will be quantifiable.

During survey efforts from 2012-2016 (see discussion above), chub numbers at the confluence of the Virgin River and Beaver Dam Wash varied from 15-567 individuals. Given such a wide

range, we cannot say with certainty how many of these fish will be present at Bridge 1 during dewatering and capture efforts, or how many individuals will be injured or will die during the process. However, incidental take of chubs is expected to be low given that substantial mitigation efforts described in the BE are followed explicitly by the construction contractor and by the fish biologist who implements the fish salvage protocol. Given those mitigation efforts, we anticipate that no more than five percent of Virgin River chubs handled during capture and translocation would be taken as a result of the proposed action.

In contrast, only one woundfin was documented at the Beaver Dam Wash confluence in 2012, and one was found in 2016. The most woundfin documented during fish surveys from 2012-2016, from the Virgin River Gorge to the Bunkerville Diversion in Nevada, was 18 individuals. Given such low numbers of woundfin in and near the project limits, the level of incidental take is expected to be low. We anticipate that no more than five woundfin will be taken as a result of the proposed action.

EFFECT OF THE TAKE

In this biological opinion, the FWS determined that levels of anticipated take are not likely to result in jeopardy to the flycatcher, chub, or woundfin or to result in destruction or adverse modification of critical habitat for the reasons stated in the conclusions section above. Although the proposed action may adversely affect the flycatcher over the short-term, through habitat loss and disturbance, the proposed action would not result in the permanent loss of the species in the action area. Although the proposed action may adversely affect the chub and woundfin, through harassment and the loss of individual fish that cannot be captured, that die after capture and during relocation, or that die after relocation and release, the proposed action would not result in the permanent loss of the chub or woundfin in the action area.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

The conservation measures included in the proposed action are appropriate to minimize take of the flycatcher and reasonable and prudent measures and terms and conditions to address the potential for take are not needed.

For the chub and woundfin, we are including monitoring and reporting requirements as a reasonable and prudent measure to document any take that occurs. In order to be exempt from the prohibitions of section 9 of the Act, the FHWA/ADOT must comply with the following terms and conditions which implement reasonable and prudent measure and outline reporting and monitoring requirements. These terms and conditions are non-discretionary.

1. The FHWA shall monitor incidental take resulting from the proposed action and report to the FWS the findings of that monitoring.
 - a) The FHWA will designate a responsible party to monitor the project area and other areas that could be affected by the proposed action to ascertain take of individuals of Virgin River chub and woundfin. This monitoring will be accomplished by the fisheries biologists designated to implement the fish salvage protocol as described in the conservation measures included in the proposed action.

- i. All native fish species captured before and during dewatering of the work area will be placed downstream of the work area as provided for in the fish salvage protocol. The number of each species captured and moved will be recorded.
 - ii. Any Virgin River chub or woundfin found injured or dead during the project, or that is injured or killed during capture and translocation efforts, will be salvaged and the body placed on ice if available then frozen as soon as possible to preserve the tissues for later research. If any fish is injured or killed, the Arizona Ecological Services Office will be notified immediately for instructions on transport, storage and disposal of specimens.
- b) FHWA/ADOT shall submit a monitoring report to the Arizona Ecological Services Field Office within 90 days after completion of the work within the low-flow channel. This report will briefly document implementation of conservation measures, report on the number of native fish encountered, and document any injuries and fatalities of Virgin River chub or woundfin.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the U.S. Fish and Wildlife Service, Office of Law Enforcement, (Resident Agent in Charge), 4901 Paseo del Norte NE, Suite D, Albuquerque, New Mexico, 87113, telephone: 505/248-7889, within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Office of Law Enforcement, with a copy to this office. Care must be taken in handling sick or injured animals, as described above, to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

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

We have not identified any conservation recommendations for the proposed action.

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in your consultation request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals

effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The FWS appreciates efforts by the FHWA and ADOT to identify and minimize effects to listed species from this project. We encourage you to coordinate the review of this project with AGFD. We also appreciate your ongoing coordination during implementation of this program. In keeping with our trust responsibilities to American Indian Tribes, we are providing copies of this biological and conference opinion to the Bureau of Indian Affairs and are notifying affected Tribes.

For further information please contact Robert Lehman (602) 889-5950 or Brenda Smith at (928) 556-2157. In all future correspondence on this project, please refer to consultation number 02EAAZ00-2014-F-0649.

Sincerely,

/s/ Brenda Smith

Steven L. Spangle
Field Supervisor

cc: (electronic)

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APPENDIX A: CONFERENCE REPORT AND CONCURRENCES

This appendix contains our concurrences with your “may affect, not likely to adversely affect” determinations for the threatened western yellow-billed cuckoo and threatened Mojave desert tortoise.

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is described above in the Biological Opinion and is incorporated herein by reference. The proposed action is to replace the existing Bridge 1 on Interstate 15 (I-15), over the Virgin River, in Mohave County, Arizona.

Western Yellow-billed Cuckoo

Protocol surveys for the cuckoo were not done for the purposes of this project. Two cuckoos were detected in a 30-ac stand of cottonwood, willow, and tamarisk at the Beaver Dam Wash confluence (outside the project limits) in 2000 (Johnson et al. 2008); however, the breeding status of these birds was not determined. No yellow-billed cuckoos were observed during surveys conducted in Beaver Dam Wash by the U.S. Bureau of Reclamation from 2007 to 2010 (McLeod and Pellegrini 2013). The U.S. Bureau of Land Management reported one cuckoo near the confluence of Beaver Dam Wash and the Virgin River in July 2014 (S. Langston, BLM, personal communication to T. McCarthy, Archaeological Consulting Services, August 29, 2014).

Approximately 28 ac of proposed cuckoo critical habitat occur within the project limits; however, vegetation within proposed critical habitat consists of small patches of scattered Fremont cottonwood, Goodding’s, willow, and narrowleaf willow of various heights and densities interspersed with open water and sandbars. Although breeding cuckoos typically use large patches of riparian woodland with greater than 70 percent canopy closure (79 FR 48548), in Arizona they have been recently found breeding in narrow and drier reaches of riparian habitat. However, vegetation inside the project limits is unlikely to be suitable for breeding. Riparian patches within the project limits do represent potential foraging and migration habitat for cuckoos.

Conservation Measures

- ADOT would arrange for preconstruction environmental awareness training for all ADOT and contractor personnel working at the site. The training would include information on the western yellow-billed cuckoo.
- No vegetation clearing would occur during the cuckoo’s migration and breeding period (May 15-September 30).

DETERMINATION OF EFFECTS

We concur with your determination that the proposed action “may affect, but is not likely to adversely affect” the western yellow-billed cuckoo or its proposed critical habitat for the following reasons:

- Habitat within the project limits is considered to be marginally suitable for breeding; thus, any direct or indirect effects to breeding cuckoos are unlikely and discountable.
- Use of the area by migrants and foraging birds would be temporarily disrupted during construction, but cuckoos could move into more suitable habitat within 0.25 mi of the project limits, at the confluence of Beaver Dam Wash.
- The 1.3 ac of cottonwoods, willow, and tamarisk that would be removed during the project would recover naturally or be restored during revegetation efforts after construction, and short-term effects would be insignificant.
- Permanent and temporary effects to 1.3 ac of proposed critical habitat would be small compared to proposed critical habitat rangewide (546,335 ac) and within the Virgin 1 Critical Habitat Unit (11,266 ac); thus, proposed critical habitat would remain functional to serve the intended conservation role for the cuckoo.

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Mojave Desert Tortoise

No formal tortoise surveys were done for the purposes of this project; however, tortoises have been documented on lands outside but adjacent to the project limits (Arizona Game and Fish Department 2014).

Conservation Measures

- All individuals working on Bridge 1 would receive environmental awareness training which would include information about the Mojave desert tortoise.
- Prior to ground disturbances related to access improvements, geotechnical activities, and construction, a biologist holding the proper handling permits from FWS would conduct a survey for the presence of tortoises or active tortoise burrows.
- Staging areas would be fenced in accordance with FWS tortoise exclusionary fencing protocols. The fencing would be inspected and maintained daily.
- Any tortoise encountered during any phase of the project would not be touched, harassed or moved, and would be allowed to leave the area on its own, or an on-call biologist holding the proper FWS permits would be called to assess the situation.
- After project completion, trenches, pits, and other features in which tortoises could be entrapped or entangled, would be filled in, covered, or otherwise modified to eliminate any tortoise hazard.

DETERMINATION OF EFFECTS

We concur with your determination that the proposed action “may affect, but is not likely to adversely affect” the Mojave desert tortoise for the following reasons:

- Conservation and protection measures, including tortoise awareness training, exclusionary fencing, and re-contouring of the construction footprint to prevent tortoise entrapments would assure that any effects to the tortoise are insignificant.

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