MOAPA VALLEY NATIONAL WILDLIFE REFUGE
MOAPA DACE DEFERRED MAINTENANCE PROJECT:
RESTORING CONNECTIVITY TO PEDERSEN STREAM

DRAFT ENVIRONMENTAL ASSESSMENT

MOAPA VALLEY NATIONAL WILDLIFE REFUGE
CLARK COUNTY
NEVADA

U.S. FISH & WILDLIFE SERVICE

PREPARED BY:

KELLY DOUGLAS, WILDLIFE BIOLOGIST
U.S. FISH AND WILDLIFE SERVICE

For

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE
DESERT NATIONAL WILDLIFE REFUGE COMPLEX
4701 N. Torrey Pines Drive
Las Vegas, NV 89130

May 2020
Moapa Valley National Wildlife Refuge

Environmental Assessment

TABLE OF CONTENTS

I. PURPOSE AND NEED .............................................................................................................................................. 3
   Introduction ......................................................................................................................................................... 3
   Purpose and Need for Action .......................................................................................................................... 3
   Background ....................................................................................................................................................... 4

II. ALTERNATIVES ................................................................................................................................................ 6
   Alternative A – Proposed ............................................................................................................................... 6
   Alternative B – No Action .............................................................................................................................. 8

III. AFFECTED ENVIRONMENT ...................................................................................................................... 8
   Introduction ...................................................................................................................................................... 8
   General Description ......................................................................................................................................... 9
      Air Quality .................................................................................................................................................. 11
      Cultural Resources .................................................................................................................................. 12
      Soils .............................................................................................................................................................. 13
      Vegetation ................................................................................................................................................... 13
      Threatened and Endangered Species ........................................................................................................ 13
      Wildlife and Special Status Species ........................................................................................................... 14
      Migratory Birds ......................................................................................................................................... 17
      Noxious Weeds .......................................................................................................................................... 18
      Water Quality ............................................................................................................................................. 18

IV. ENVIRONMENTAL CONSEQUENCES ...................................................................................................... 19
   Alternative A – Proposed Action .................................................................................................................. 19
   Alternative B – No Action .............................................................................................................................. 21
   Proposed Mitigation, Alternative A – Proposed Alternative ........................................................................ 21
   Proposed Mitigation, Alternative B – No Action Alternative ........................................................................ 23
   Residual Impacts .......................................................................................................................................... 24

V. COORDINATION WITH OTHERS AND ENVIRONMENTAL COMPLIANCE ............................................. 25
Moapa Valley National Wildlife Refuge

Tribal and Agency Consultation .................................................................................................................. 26

VII. REFERENCES ....................................................................................................................................... 27

APPENDIX A. Moapa Valley NWR Project Location .................................................................................. 28

APPENDIX B. Moapa Valley NWR Proposed Project Area – Proposed New Channel ................................. 29

APPENDIX C. Existing Age Culvert Barrier – Warm Springs Road ............................................................. 30

APPENDIX D. Existing USGS Stream Gage Barrier .................................................................................. 31

APPENDIX E. Existing Waterfall Barrier .................................................................................................. 32

LIST OF TABLES

Table 1. Potential Plant Species for re-vegetation...................................................................................... 7

Table 2. Elements of Human Environment and Associated Action Affects Per Alternative ..................... 9

Table 3. Specs of Concern, Federally Listed Species, MSHCP Covered & Evaluation Species, and NNHP “At-Risk” Clark County Species Possibly Present – Upper Muddy River Ecosystem ......................... 15

Table 4. Bat Species Located in Upper Muddy River Ecosystem and Meadow Valley Wash.................... 16

Moapa Valley NWR Pederson Stream Deferred Maintenance
CHAPTER 1.0
INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION
The U.S. Fish and Wildlife Service (Service) proposes to rehabilitate and restore connectivity of the Pedersen Stream channel along with its associated native vegetation that can be found within the Pedersen Management Unit of the Moapa Valley National Wildlife Refuge (Refuge, Moapa Valley NWR), Clark County, Nevada (See Appendix A).

1.2 PURPOSE AND NEED FOR ACTION
The purpose of this project is to implement recovery actions for the federally endangered Moapa dace (*Moapa coriacea*) which utilize thermal spring sources and outflows required for spawning and foraging. The Refuge springs and their associated stream channels are the only place in the world Moapa dace are found. Additionally, the implemented action will initiate the fulfillment of a primary refuge goal: to rehabilitate and improve habitat on the refuge for the Moapa dace.

Through the established U.S. Fish and Wildlife Services Deferred Maintenance Program, this project intends to restore connectivity between Moapa Dace breeding habitat located in the Pederson stream springhead on the Moapa Valley NWR, and downstream dace habitat on the privately-owned Warm Springs Natural Area (Southern Nevada Water Authority). Restoring connectivity will enable the dace to access breeding habitat through installation of a reinforced concrete box culvert, relocation of an existing US Geological Survey stream gauge, and...
excavation of new stream channel to re-route a portion of the stream.

The need for action will provide stream connectivity that allows additional spawning and foraging habitat for this endangered fish, with a goal of down-listing the species. The proposed improvements will also benefit a variety of other endemic species including the Moapa White River spring fish and the Warm Spring riffle beetle. The rehabilitation effort will attempt to re-establish a pre-development hydraulic system and restore native plant communities.

1.3 BACKGROUND

The Pedersen spring and stream system represents a small portion of a larger aquatic system (over 25 springs) collectively known as Warm Springs, whose flows from the regional carbonate aquifer coalesce over a short distance to create the main stem Muddy River (The Nature Conservancy, 1998). Many endemic, thermophilic species occur in the Warm Springs area including the monotypic Moapa dace (*Moapa coriacea*), which was originally listed as an Endangered Species in 1967 and subsequently designated with a recovery priority of 1 (highest priority) in the Endangered Species Act of 1973. Other species include the Moapa White River springfish, Moapa pebblesnail, grated tryonia, Moapa water strider, Moapa turban snail, Moapa Warm Springs riffle beetle, and Amargosa and Moapa naucorids.

Prior to the refuge being established in 1979, the Pedersen Management Unit had been anthropogenically influenced and used as an operating resort. The warm waters (86-89°F) emitting from the spring sources were impounded in order to form artificial pools that provided the ideal recreational swimming and relaxing locale. Following acquisition by the Service, the
“Playboy Pool,” within the Pedersen Management Unit, was filled in with waste rocks and plant material. Non-native fan palm trees (*Washingtonia filifera*) had also been previously introduced to the valley that have since impacted habitat for the federally endangered Moapa dace by clogging streams with their root systems and shading out the sun which is important for algae production. Palm trees changed the nutrient dynamics of the system. Native trees to the valley are deciduous, but the palms are evergreen. Leaf litter, important foraging material for the dace, has been virtually eliminated from deposition in the stream channel. Dead palm tree fronds have also created a fire hazard. A wildfire in 1994 swept through the former resort and decimated the Moapa dace population within the stream system. Soot and charred debris fell into the stream suffocating dace and obliterating habitat.

The proposed action is part of a larger long-term refuge habitat improvement effort to rehabilitate spring systems that were drastically altered in the past; improve spring-stream outflow channels; divert water to their original channels; replace non-native plant communities with native plant communities; re-contour the surrounding landscape to pre-development conditions; and stabilize adjacent upland soils. These actions are consistent with the *Recovery Plan for the Rare Aquatic Species of the Muddy River Ecosystem* (USFWS, 1996).
CHAPTER 2.0

ALTERNATIVES INCLUDING PROPOSED ACTION

2.1 ALTERNATIVE A - PROPOSED ACTION

The proposed action is to rehabilitate the currently altered and degraded Pedersen Stream within the Pedersen Management Unit of the Moapa Valley NWR with the intent to restore fish passage and connectivity for the Moapa dace (See Appendix B). In order to achieve this action, removal of existing barriers and stream reconstruction is expected to occur.

Currently, there are three barriers that limit or prevent fish passage. This includes an aged culvert, existing stream gauge, and waterfall (See Appendix C-E). It is anticipated that each of these barriers will be removed. The aged culvert, located under West Warm Springs Road, will be replaced with a box culvert designed to allow 3.3 cubic feet/second flow base. This action would also include road re-paving where the culvert replacement takes place. A new U.S. Geological Survey stream gauge will be installed upstream and run concurrently with the existing stream gauge. After operating concurrently for a sufficient time to allow correlation between the existing gauge measurements and the newly installed upstream gauge, the existing gauge will be removed. The waterfall will then be addressed through stream reconstruction.

The design and construction of approximately 500 feet of stream channel will also occur in order to achieve stream connectivity. It is anticipated that the design of the stream will simulate
optimal hydraulic conditions based on known Moapa dace habitat requirements. Actions will include excavation of a new stream channel with use of rocks, cobble, gravel and logs to recreate hydraulic conditions preferred by Moapa dace. To achieve a naturalized state, meanders will be designed within the stream that increase the streams hydraulic diversity and ability to better negotiate the gradient of the landscape. Upon channel completion, existing stream flows will be introduced. When all flows have been diverted into the new channel, the old channel will then be backfilled.

Finally, revegetation of the construction site will take place. Once stream channel excavation is complete, the stream bank will be graded to prepare for planting. Seeds and cuttings for revegetation will be locally sourced (Clark County) and grown out by a local nursery. All plant materials will be grown according to USFWS standards. Planting of native grass, forbs, shrubs, and tree seedlings will then be implemented (See Table 1 below for a list of approved species). Revegetation will include installation of a temporary irrigation system that will withstand harsh desert environment for the duration of vegetation establishment.

Table 1. Potential plant species that may be used for re-vegetation include:

<table>
<thead>
<tr>
<th>Overstory Trees</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Velvet ash</td>
<td>Fraxinus velutina</td>
</tr>
<tr>
<td>Goodings willow</td>
<td>Salix gooddingii</td>
</tr>
<tr>
<td>Coyote willow</td>
<td>Salix exigua</td>
</tr>
<tr>
<td>Fremont cottonwood</td>
<td>Populus fremontii</td>
</tr>
<tr>
<td>Honey mesquite</td>
<td>Prosopis glandulosa</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shrubs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Emory’s seepwillow</td>
<td>Baccharis emoryi</td>
</tr>
<tr>
<td>Wolfberry</td>
<td>Lycium torreyi</td>
</tr>
<tr>
<td>Arrowweed</td>
<td>Pluchea sericea</td>
</tr>
<tr>
<td>Quailbush</td>
<td>Atriplex lentiformis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Understory</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yerba mansa</td>
<td>Anemopsis californica</td>
</tr>
<tr>
<td>Bushy bluestem</td>
<td>Andropogon glomeratus</td>
</tr>
</tbody>
</table>
2.2 ALTERNATIVE B - NO ACTION

This alternative would maintain the status quo. The endangered status of the dace will most likely not improve due to continued habitat degradation and lack of fish passage or stream connectivity. The goal of down listing the dace cannot be achieved without habitat enhancement and restoration projects.

CHAPTER 3.0

AFFECTED ENVIRONMENT

3.1 INTRODUCTION

Elements of the human environment that may or may not be affected by the proposed action and “no action” alternative have been identified (See Table 2 below). Those elements affected are noted by a “Yes” and those elements not affected are noted by a “No”, within the coinciding table. Those elements affected by the proposed action and/or “no action” alternative will be addressed in this environmental assessment.
Table 2. Elements of the human environment and associated action affects per alternative.

<table>
<thead>
<tr>
<th>Elements of the Human Environment</th>
<th>Proposed Action Affects</th>
<th>No Action Alternative Affects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Quality</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Cultural Resources</td>
<td>Yes - Potential</td>
<td>No</td>
</tr>
<tr>
<td>Farmlands, Prime/Unique</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Flood plain</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Environmental Justice</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Socioeconomics</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Wastes, Hazard/Solid</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Water Quality</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Wetlands/Riparian Zones</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Wild &amp; Scenic Rivers</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Soils</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Vegetation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Threatened &amp; Endangered Species</td>
<td>Yes - potential</td>
<td>Yes</td>
</tr>
<tr>
<td>Migratory Birds</td>
<td>Yes - potential</td>
<td>No</td>
</tr>
<tr>
<td>Wildlife</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Wilderness/Wilderness Study Area</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Noxious Weeds</td>
<td>Yes - potential</td>
<td>No</td>
</tr>
</tbody>
</table>

### 3.2 AFFECTED ELEMENTS

#### 3.2.1 General Description

The proposed action lies within the Moapa Valley National NWR which is located near the confluence of Battleship Wash and the Muddy River, approximately three miles southeast of the
head of the Muddy River. The springs within the refuge contribute to the Muddy River flow. Coordinates for the project are the NE 1/4 of the NE 1/4 of Section 21, T14 South, R65 East, Mount Diablo Meridian.

Moapa Valley lies in the southeastern corner of the Great Basin portion of the Basin and Range Physiographic Province which is typified by mountain ranges that are isolated, relatively parallel to each other, and separated by broad, flat valleys filled with alluvium. Moapa Valley is approximately 25 miles in length (of which the Moapa Valley National Wildlife Refuge lies near the beginning of the valley), trending in a northwest to southeast direction. The head of the valley, at an elevation of approximately 1,800 feet, is in the vicinity of Arrow Canyon, about five miles north of the White Narrows. The terminus of the valley, at an elevation of 1250 feet, is at the northern part of Lake Mead. The floor of the valley varies in width from 2,000 to nearly 10,000 feet.

The Valley is located in the Northeastern Mojave Desert and has an arid climate with abundant sunshine. Summers are long and hot, with temperatures exceeding 110° F in July and August. Winters are short and mild, with modestly cool day time temperatures in the high 40s to low 60s and night time temperatures near freezing. Evaporation rates are high and humidity is usually quite low. Precipitation is sporadic, occurring in the form of intense, localized summer thunderstorms or widespread winter rains. The average rainfall is about five inches a year.
Moapa Valley is underlain by a relatively thick layer of Paleozoic rock, much of which is carbonate and includes dolomite and limestone. Deposited over this formation is valley fill, generally composed of unconsolidated to partly consolidated silt, sand, gravel, clay and some rocks of volcanic origin. The Valley is deeply cut into old alluvial fans and sediments which form bench lands on both sides. Bottom lands are relatively level. Uplands consist of gently to moderately sloping alluvial fans or terraces and steep rocky mountains.

The Muddy River originates from the discharge of more than 25 thermal springs, known collectively as Warm Springs, near the head of the Valley. The thermal springs range from 86°F to 89°F and flow clear at their discharge. Discharge from the springs is nearly constant with an average annual discharge of 36,000 ac. ft. (The Nature Conservancy, 1999). However, flow in the main stem river varies with precipitation events, seasonal water diversions, groundwater recharge, vegetation transpiration, evaporation, and irrigation return flows. River waters are diverted for agriculture, domestic and industrial uses.

3.2.2 Air Quality

Air quality in the Moapa Valley is relatively good due to the small number of inhabitants, lack of development, and comparative isolation from any metropolitan area. It is not located within a non-attainment area. Any actions taken will maintain compliance with the Clark County, Nevada, Department of Environment and Sustainability air quality regulations.
3.2.3 Cultural Resources

In 2002, under the U.S. Fish and Wildlife Service’s Moapa Valley National Wildlife Refuge Spring Head Restoration (Phase I) Environmental Assessment, proposed actions had been considered under Section 106 of the National Historic Preservation Act (NHPA). During the Environmental Assessment process, it was recognized that a professional archaeological inventory for a small housing project on the refuge close to the proposed spring restoration project had been conducted in 1998 (Speulda 1998). This inventory included a record and archival search for previously recorded cultural resources and surveys throughout the refuges. No previously recorded cultural resources occurred within the Spring Head Restoration area. Nor were any cultural resources identified near the springs during Speulda’s survey. During the 2002 project, Moapa Tribal Chairman Swain inspected the proposed restoration project area. He identified no cultural resource sites or issues for the project. The spring restoration project area had been significantly altered over the previous 50 years by the construction of spring pools, stream channelization, landscaping, and resort facilities. If cultural resources, such as archaeological sites, had existed in the project area they were determined to be obscured and unrecognizable at the surface. While the 2002 project area encompasses the currently proposed Moapa dace fish passage project area, it is possible that intact buried cultural resources still exist within the proposed project area. Accordingly, the FWS will monitor construction of the proposed project with a professional archaeologist to identify and protect such resources if they are encountered.

Given the foregoing, the FWS has determined that the Pedersen stream fish passage restoration project will have no effect on cultural resources. The NHPA Section 106 compliance
summarized here follows the procedure outlined in the Programmatic Agreement between the FWS, Nevada State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation (ACHP), and is sufficient for the present NEPA compliance. A full accounting of the FWS Section 106 NHPA compliance will be included in its annual report to the Nevada SHPO and ACHP in December 2020.

3.2.4 Soils

Soils in Moapa Valley are alluvial. In the bottom lands of arable areas this alluvium is a mixture of limestone, sandstone, shale, quartzite and igneous rock fragments. Drainage is poor, causing variable concentrations of soluble salts in upper soil levels.

3.2.5 Vegetation

The fan palm tree is the most dominant plant on the landscape and grows primarily in groves. It is the primary over story plant. A few honey mesquite (Prosopis glandulosa), screwbean mesquite (Prosopis pubescens), catclaw (Acacia sp.), and cottonwoods (Populus sp.) have also become established in the project area. Arrow weed (Pluchea sericea) is abundant in the upper tributary channels. Salt grass (Distichlis spicata), sunflower (Helianthus annuus), Australian saltbush (Atriplex semibaccata), and Bermuda grass (Cynodon dactylon) are common groundcover plants. The latter two are introduced species.

3.2.6 Threatened and Endangered Species

The Moapa dace is the only federally listed species located at the project site and is endemic to the upper Muddy River and tributary thermal spring systems within the Warm Springs area.
was listed as endangered in 1967. The adults primarily use the river but must use the thermal spring tributaries to spawn, which occurs year-round but most frequently in the spring (USFWS, 1996).

3.2.7 Wildlife and Special Status Species

A variety of wildlife species may occur within or near the proposed project area. Wildlife species that are under consideration for the proposed project include: the U.S. Fish and Wildlife Service “Species of Concern”; the covered or evaluation species identified in the Clark County Multiple Species Habitat Conservation Plan (MSHCP) (Clark County, 2000); and the Nevada Heritage Program (NNHP) “At-Risk” species of Clark County (NNHP, 2020), that occur at or near the project area or in similar habitats in southern Nevada.

After review, a list of vertebrate species has been developed (See Table 4 below) for consideration that includes the Moapa White River spring fish and Townsend’s big-eared bat. Though the phainopepla has been documented as occurring on the refuge, it primarily uses the mesquite bosques along the Muddy River and is therefore considered an occasional visitor. While a riparian species, the yellow-billed cuckoo has not been officially documented as occurring within the Moapa Valley NWR. In the 2002 Moapa Valley NWR Spring Head Restoration (Phase I) EA, approximately 65 birds had been acknowledged as within or soaring over the Refuge. Five of these species were anticipated to nest within the project area including: the ash-throated flycatcher, black-chinned hummingbird, marsh wren, house finch, and hooded oriole. The latter two species have been recognized to nest in the palm trees. This species
evaluation is applicable to the currently proposed project. There are no special status plant species in the project area.

Table 3. Species of Concern, Federally listed species, MSHCP covered & evaluation species, and NNHP “At-Risk” Clark County species that may occur in the Upper Muddy River ecosystem

<table>
<thead>
<tr>
<th>Species</th>
<th>Fed. Status</th>
<th>HCP Status</th>
<th>NNHP At-Risk</th>
<th>Ecosystem Found In</th>
<th>Observed at the MVNWFCovered Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver-haired bat</td>
<td>SOC</td>
<td>X</td>
<td>X</td>
<td>DR, S</td>
<td></td>
</tr>
<tr>
<td>Long-eared myotis</td>
<td>SOC</td>
<td>X</td>
<td>X</td>
<td>DR, S</td>
<td></td>
</tr>
<tr>
<td>Townsend’s big-eared bat</td>
<td>SOC</td>
<td>X</td>
<td>X</td>
<td>DR</td>
<td>X</td>
</tr>
<tr>
<td>Long-legged myotis</td>
<td>SOC</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kit fox</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phainopepla</td>
<td>SOC</td>
<td>X</td>
<td></td>
<td>DR</td>
<td></td>
</tr>
<tr>
<td>Vermilion flycatcher</td>
<td>SOC</td>
<td>X</td>
<td></td>
<td>DR</td>
<td></td>
</tr>
<tr>
<td>Southwestern willow flycatcher</td>
<td>SOC</td>
<td></td>
<td>X</td>
<td>DR</td>
<td></td>
</tr>
<tr>
<td>Summer tanager</td>
<td>SOC</td>
<td>X</td>
<td></td>
<td>DR</td>
<td></td>
</tr>
<tr>
<td>Blue grosbeak</td>
<td>SOC</td>
<td>X</td>
<td></td>
<td>DR</td>
<td></td>
</tr>
<tr>
<td>Yellow billed-cuckoo</td>
<td>SOC</td>
<td>X</td>
<td>X</td>
<td>DR</td>
<td></td>
</tr>
<tr>
<td>Arizona Bell’s vireo</td>
<td>SOC</td>
<td>X</td>
<td></td>
<td>DR</td>
<td></td>
</tr>
<tr>
<td>Banded gecko</td>
<td></td>
<td>X</td>
<td></td>
<td>DR</td>
<td></td>
</tr>
<tr>
<td>Desert iguana</td>
<td></td>
<td>X</td>
<td></td>
<td>DR</td>
<td></td>
</tr>
<tr>
<td>Great Basin collared lizard</td>
<td></td>
<td>X</td>
<td></td>
<td>DR</td>
<td></td>
</tr>
<tr>
<td>Western red-tailed skink</td>
<td></td>
<td>X</td>
<td></td>
<td>DR</td>
<td></td>
</tr>
<tr>
<td>Banded Gila monster</td>
<td>SOC</td>
<td>X</td>
<td>X</td>
<td>DR</td>
<td></td>
</tr>
<tr>
<td>Arizona (southwestern) toad</td>
<td>SOC</td>
<td>X</td>
<td>X</td>
<td>DR, S</td>
<td></td>
</tr>
<tr>
<td>Moapa White River springfish</td>
<td>SOC</td>
<td>X</td>
<td>X</td>
<td>S</td>
<td>X</td>
</tr>
<tr>
<td>Moapa Dace</td>
<td>SOC</td>
<td>X</td>
<td>X</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>Moapa speckled dace</td>
<td>SOC</td>
<td>X</td>
<td>X</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>Grated tryonia</td>
<td>SOC</td>
<td>X</td>
<td>X</td>
<td>S</td>
<td>X</td>
</tr>
</tbody>
</table>

1SOC = species of concern. DR = desert riparian ecosystem, S = spring ecosystem.
An additional list has been composed regarding the consideration to sensitive bat species (See Table 4 below). This includes bat species captured or acoustically detected within the Upper Muddy River ecosystem, the Moapa Valley NWR, and the Meadow Valley Wash (Williams, 2000). Of these species, the Townsend’s big-eared bat is the only special status bat species documented in or near the project area. Four other bat species have been captured in the project area and within either the Pedersen or Plummer management units. The yellow bat has been documented in both the Upper Muddy River ecosystem and the Plummer management unit of the Moapa Valley NWR. This is the only known occurrence of this species in Nevada and is considered a range extension. Each of these bats have been strongly correlated to the presence of palm trees.

Table 4 - Bat species located in Upper Muddy River ecosystem (LDS Ranch) and Meadow Valley Wash (Stuart Ranch) (Williams 2000)

<table>
<thead>
<tr>
<th>Species</th>
<th>Captured At Stuart Ranch (SR) or LDS Ranch (LDS)</th>
<th>Acoustically Determined</th>
<th>Captured at Moapa Valley National Wildlife Refuge</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PHYLLOSTOMIDAE - Leaf-Nosed Bats</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>California leaf-nosed bat (Macrotus californicus)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>VESPERTILIONIDAE - Evening Bats</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>California myotis (Myotis californicus)</td>
<td>SR</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Yuma myotis (Myotis yumanensis)</td>
<td>LDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fringed myotis (Myotis thysanodes)</td>
<td>LDS</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Canyon bat (Parastrellus hesperus)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Big brown bat (Eptesicus fuscus)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red bat (Lasiurus blossevillii)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow bat (Lasiurus xanthinus)²</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Hoary bat (Lasiurus cinereus)</td>
<td>SR</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

² The only documented occurrence in Nevada.
Silver-haired bat (*Lasionycteris noctivagans*) | X
---|---
Pallid bat (*Antrozous pallidus*) | X | X
Townsend’s big-eared bat (*Corynorhinus townsendii*) | X | X
Spotted bat (*Euderma maculatum*) | LDS | X

**MOLLISIDAE - Free-tailed bats**

Brazilian free-tailed bat (*Tadarida brasiliensis*) | SR | X
Big free-tailed bat (*Nyctinomops macrotis*) | X

Through comprehensive review it has been determined that the ring-tailed cat, deer mouse, Western harvest mouse, pocket gopher, antelope ground squirrel, and desert cottontail may occur within the project area. The long-tailed pocket mouse, kangaroo rat, and desert woodrat have been documented on the desert hills near the project area. Reptiles known to occur within or near the project area include the red racer, California king snake, sidewinder, great basin whiptail, spiny desert lizard, red-spotted toad, woodhouse toad, Pacific tree frog, and bullfrog (an exotic species).

### 3.2.8 Migratory Birds

The Migratory Bird Treaty Act (MBTA) protects migratory birds and their active nests from “take”, which is defined as “to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt” those things (50 CFR. 10.12). The only bird species that have been documented nesting in or near the project area are the hooded oriole and house finch, which nest in dead palm fronds. Other species that may potentially nest in or near the project area include the: Gambel’s quail, killdeer, mourning dove, great horned owl, Northern mockingbird, verdin, and Abert’s towhee. While several of these potential nesting species are residents, not migratory, MBTA regulations must be adhered to; measures will be implemented to avoid a “taking” violation.
3.2.9 Noxious Weeds

Noxious weeds are invasive non-native plant species that are detrimental to the State’s economy or environment. Nevada Revised Statutes (NRS 555) has identified 39 species as noxious weeds and established responsibilities for their control and elimination. Native species are often outcompeted by noxious weeds. This results in the degradation of the invaded environment by replacing native species and thus reducing the biodiversity of the affected site. Noxious weeds that may potentially affect the project area include the spotted knapweed (*Centaurea maculosa*). The yellow starthistle (*Centaurea solstitialis*), and whitetop (*Cardaria draba*) are other noxious weeds that occur in Clark County. Invasive plant species occurring in Clark County include: red brome (*Bromus rubens*), Russian thistle (*Salsola iberica*), heron’s bill (*Erodium cicutarium*), fiddleneck (*Amsinkia tessellata*), Mediterranean grass (*Schismus barbata*), and salt cedar (*Tamarix spp.*). Invasive species documented within or near the project area include salt cedar, Mediterranean grass, Russian thistle, fiddleneck, and heron’s bill.

3.2.10 Water Quality

The U.S. Fish and Wildlife Service’s recovery plan for aquatic species of the Muddy River ecosystem (USFWS, 1996) and the studies by La Rivers (1962), Deacon and Bradley (1972), and Scoppettone et al (1992), documented that: turbidity is highly variable and increases with distance from the springs; temperatures vary from 67 - 89.6°F (the latter attributed to the spring sources); the dissolved oxygen is 3.4-8.4 parts per million; total dissolved solids consist of 606-867 parts per million; and pH 7.1-7.9. Any ground disturbance that may occur during proposed project actions will be in compliant of the Clean Water Act (1972) with corresponding preventative and mitigation measures applied.
CHAPTER 4.0

ENVIRONMENTAL CONSEQUENCES & MITIGATION

4.1 ENVIRONMENTAL CONSEQUENCES

4.1.1 Environmental Impacts of Alternative A, the Proposed Action

- An unknown number of reptiles and small mammals (including those on the Special Status Species list) will be displaced, with a possibility of a few killed, through construction activity.
- Some invertebrates will be temporarily impacted from increased water turbidity as a result of sediment runoff from construction activity during removal and replacement of the proposed culvert and stream gauge within the Pedersen stream channel.
- Some migratory bird nests could be destroyed or abandoned due to the construction activity. However, the proposed action should take place outside of active nesting season.
- Some migratory bird breeding habitat would be temporarily impacted during construction activity. Improvement to habitat will occur once native trees are established.
- The Moapa dace spawning habitat could be temporarily impacted as the result of increased sediment discharge into the spring-stream channels and tributaries that result in increased water turbidity.
- Visual resources will be altered due to the loss of the palm trees and planting of native vegetation.
- Equipment brought into the construction site may carry noxious weed seeds in their undercarriage or tires thus introducing or spreading noxious weeds into the project area. Inspection and mitigation measures would be necessary to ensure clean equipment.
- Hazardous wastes such as fuel oil could be inadvertently spilled during construction activities. Spill kits and hazardous waste removal may be required.
- Water quality will be temporarily impacted with an increase in sediments generated from the construction activity.
- Hydraulics will be improved through the construction and enhancement of the newly designed channel, thus improving Moapa dace habitat.
- The re-establishment of native vegetation including the replacement of the palm trees with native trees will improve overall habitat for native wildlife species.
- Any additional establishment of mesquite trees will improve habitat for the phainopepla (a Species of Concern).

4.1.2 Environmental Impacts of Alternative B, No Action Alternative

- The palm trees will continue to thrive and expand, choking the spring outflow channels, thus degrading Moapa dace habitat.
• The palm trees will continue to shade the spring sources and outflow channels, thus reducing the sunlight which is necessary for algae production - a key food source for invertebrates and Moapa dace.

• The palm trees will continue to be highly susceptible to fires which will kill Moapa dace (soot and burned debris fall into the streams), and other vegetative resources, the loss of which will cause an increase in sediment runoff into Refuge waters.

• The hydraulics of the tributary systems will continue to be impacted by the palm tree root systems.

• The Pederson stream channel and habitat resources, as now constructed, in many cases will continue to be unavailable to the Moapa dace.

4.2 PROPOSED MITIGATION

The following mitigation measures are proposed to reduce or mitigate those impacts listed above under the two alternatives.

4.2.1 Alternative A, Proposed Alternative

Proposed project actions will be implemented in a multi-phase approach to reduce environmental impacts.

• Where feasible, small sediment collection pools would be constructed below the work area to trap sediment and reduce sediment movement through the system.
• Place hay bales intermittently within the stream channel to further reduce turbidity downstream of construction

• Where feasible, direct flows around the work area to reduce turbidity

• Where flows cannot be directed around the work area, limit the size of the area that is disturbed so that only a small amount of sediment is added to the flows.

• Where sediment discharge into the flows cannot be avoided, or reduced to negligible levels, survey the affected area for Moapa dace and avoid large congregations of fish.

• Block nets will be placed up and downstream of the project action area (in the existing stream) to prevent fish movement within the project area and reduce affects to Moapa dace.

• Fish trapping will take place in the area between block nets prior to actions within the existing stream channel to ensure removal and relocation of any Moapa dace that may occur within the area.

• Vehicles and equipment used on the project should have their undercarriage and tires washed with high pressure sprayers to dislodge any potential noxious weed seeds prior to accessing the project area.

• Hazardous material or substances (i.e. petroleum products) will be used and stored on site; Best Management Practices will be implemented during transfer of these products within the project area.

• All transfer of petroleum products must occur a minimum of 100 feet from stream channels to avoid contamination.
• If a release of hazardous substances occurs, the project manager will immediately notify the Service.

• The construction crew shall collect, remove, and dispose of all trash, garbage, debris, used oil, and other waste materials in an approved licensed disposal area.

• Operations will immediately cease and the Service will be notified of any cultural or paleontological resources discovered. Such discoveries shall be left intact until/unless otherwise authorized.

• Palm trees will not be removed if such trees contain active nests. All trees will be surveyed prior to removal to determine if an active nest exists.

4.2.2 Alternative B, No Action Alternative

Under the No Action Alternative, no mitigation will be required. No habitat enhancement will occur.
4.3 RESIDUAL IMPACTS

The following residual impacts will remain after implementation of the above mitigation measures:

- An unknown number of reptiles and small mammals (including those on the Special Status Species list) may be displaced or killed through construction activity.

- A small amount of sediment will enter the Pedersen channel thus increasing water turbidity temporarily. Some macroinvertebrates may be impacted by the increased water turbidity during construction activities but habitat is expected to improve over the long term.

- Spawning habitat for the Moapa dace could be slightly impacted at specific locations due to increased water turbidity during construction activities but will be improved over the long-term.

- Some migratory bird breeding habitat would be temporarily impacted until native trees are established.

- Visual resources (aesthetics) will be changed due to the removal of the palm trees that are replaced with native vegetation.

- Hydraulics will be improved through the construction and enhancement of the Pedersen stream channel and connectivity of fish habitat will occur, thus improving Moapa dace habitat.
• The re-establishment of native vegetation, including the replacement of the palm trees with native trees, will improve overall habitat for native wildlife species.

• The establishment of mesquite trees will improve habitat for the phainopepla (a Species of Concern), as well as add detritus to the streams for invertebrate production, resulting in additional fish forage.

CHAPTER 5.0

CONSULTATION AND COORDINATION

5.1 CONSULTATION AND COORDINATION

U.S Fish and Wildlife Service

Glen Knowles, Field Supervisor, Southern Nevada Ecological Services Office

Michael Schwemm, Senior Fish Biologist, Southern Nevada Ecological Services Office

U.S. Geological Survey

Megan Poff, Supervisory Hydrologist

Nevada Division of Wildlife

Brandon Senger, Supervising Fisheries Biologist, Southern Nevada
Moapa Valley National Wildlife Refuge

Environmental Assessment

Moapa Valley Water District
Joe Davis, General Manager

Southern Nevada Water Authority
Zane Marshall, Facility Manager

Coyote Springs Investment, LLC
Emilia Cargill, COO/Senior VP/General Council

Nuwuvi Working Group
Jeremy Spoon, Nuwuvi Working Group Facilitator
REFERENCES:


Nevada Department of Agriculture. Noxious weeds: how do they affect you, pamphlet.


Appendix A. Moapa Valley National Wildlife Refuge Project Location
Appendix B. Moapa Valley NWR Proposed Project Area, Proposed new channel
Appendix C. Existing aged culvert barrier located under West Warm Springs Road

Appendix D. Existing USGS stream gauge barrier
Appendix E. Existing waterfall barrier