Environmental Assessment for the Mason Valley Wildlife Management Area Pilot Channel Restoration Project

Prepared For

U.S. Fish & Wildlife Service
Lahontan National Fish Hatchery Complex
710 Highway 395
Gardnerville, NV 89410

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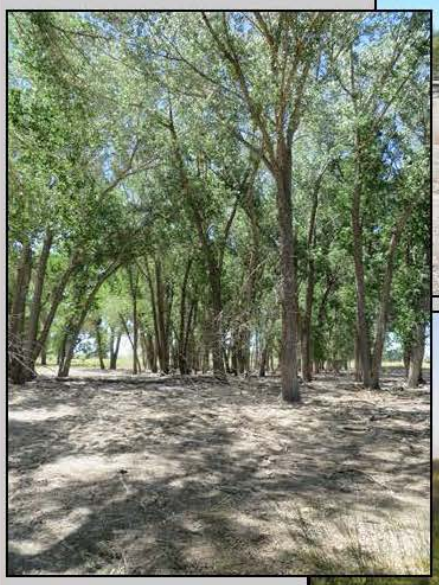
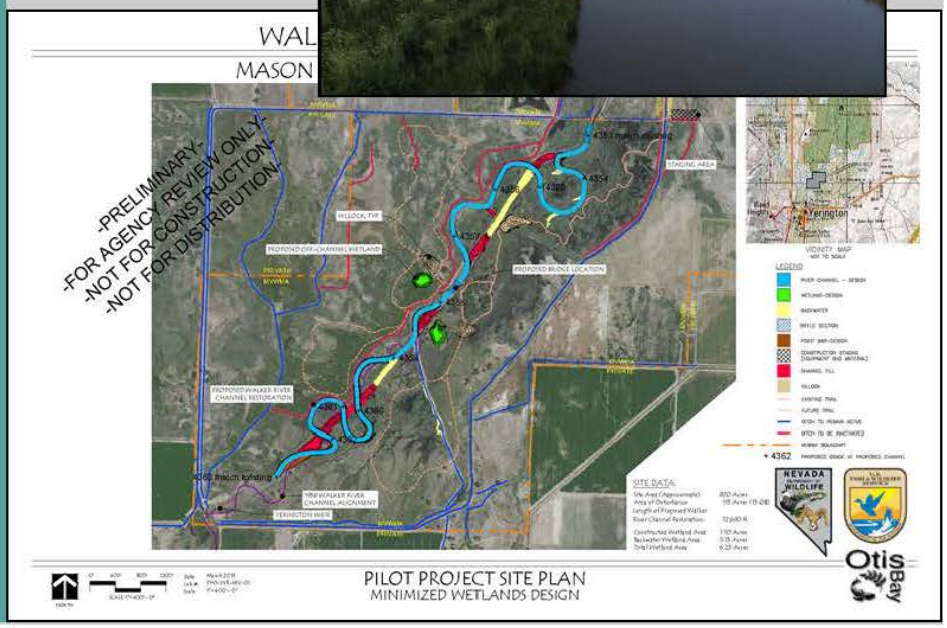
Prepared By

Otis Bay, Inc.
Ecological Consultants
PO Box 919
Verdi, NV 89439
Phone: (775) 345-9960
Fax: (775) 345-9963
www.otisbay.com





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1 PURPOSE AND NEED FOR ACTION

1.1 Background

The U.S. Fish and Wildlife Service (FWS) and Nevada Department of Wildlife (NDOW) are working together to enhance the ecological function of the river corridor on a portion of the Mason Valley Wildlife Management Area (MVWMA). The 13,375-acre wildlife area has been managed by NDOW since 1955 and contains a range of habitats, from the river corridor and riparian vegetation, to desert shrublands and wet meadows. These diverse habitats support an abundance of fish and wildlife that contribute significantly to the biological diversity of western Nevada.

The Walker River floodplain meanders through the MVWMA, providing food, cover and water for abundant wildlife. Alkali desert scrub, an upland plant community, covers an extensive area on MVWMA and gives shelter to many mammals and birds. Birders can observe a wide array of species including the great horned owl, Swainson's hawk, and an abundance of songbirds. Turkey, quail and deer utilize the upland plant community and can be hunted on the management area. The Walker River is part of the ancestral range of the threatened Lahontan cutthroat trout, which were extirpated in the late 1930's and listed as threatened in 1975. The 1995 Lahontan cutthroat trout recovery plan and the 2003 Short-Term Action Plan include riverine habitat restoration as a key component for recovery of the species.

In December 2010, the National Fish and Wildlife Foundation (NFWF) purchased the 600-acre Sciarani property (hereafter referred to as MV South), located adjacent to the MVWMA, and donated it to NDOW as part of the Walker Basin Restoration Program. Within MV South, the Walker River has been previously channelized and leveed, creating separation from the floodplain and a decline in riparian vegetation communities. Without natural channel form, sediment deposition has degraded the river aquatic habitat. Restoration of this site, through returning the Walker River to its former meandering channel, would restore ecosystem function and improve wildlife habitat and water quality.

1.2 Project Purpose and Need

The purpose of the proposed Walker River Channel Pilot Restoration Project is established by Public Law 109-103, which allocates specific funds for implementation of conservation and habitat restoration projects in the Walker Basin through the Desert Terminal Lakes Program. Specifically, funds are allocated for "riparian area restoration, and channel restoration" within the Walker Basin. The Pilot Restoration Project would support the goals of the Desert Terminal Lakes Program by repairing an area of degraded riparian and river channel habitat within the Walker Basin, thus contributing to efforts to restore and maintain the health of the Walker River, Walker Lake, and its watershed.

The proposed project would restore the physical and biological functions through MV South in a manner that would maximize benefits to the Walker Basin ecosystem. The Pilot Restoration Project proposed by the USFWS and NDOW would restore the Walker River channel to a natural state and reverse human alterations to the river channel that have contributed to ecological habitat degradation. The proposed action would reconnect the river to its floodplain on MV South to restore hydrologic processes and sustain riparian habitats. This project would confer a variety of benefits in terms of improved water quality, removal of sediment from the river channel through increased overbank sediment deposition, enhanced habitats for native plants and animals including at-risk species, increased biological productivity and diversity, invasive plant control, recreational opportunities, and economic development.

As a pilot effort, this restoration project may serve as a template for future Walker River restoration and habitat improvement projects that would also benefit the goals set forth in Walker Basin conservation efforts.

2 Proposed No Action Alternative

The FWS would take no action to improve riparian and watershed resources at this site (Figure 3-1). The straightened and channelized reach of Walker River that passes through MV South would not be returned to its historical channel, and natural processes of overbank inundation and riparian tree recruitment would continue to be hindered by the levees that disconnect the river from its floodplain. Sand would remain in the channel instead of washing out over the bank, and water quality would not be improved. No in-channel riffles would be added, leaving a sandy river bottom and lower oxygenated water conditions that would continue to limit aquatic macroinvertebrate and fish species abundance and diversity. Vegetation would not be enhanced along the existing riparian corridor, and as a result, invasive weeds would continue to proliferate while already mature, native trees may senesce and die. Additional recreational trails or public access amenities would not be constructed, limiting ease of public access to fully utilize this area. Wildlife habitat would not be enhanced and would degrade over time, thus also decreasing recreational value. Hunting or fishing revenue would not likely increase in an area with limited public access and declining habitat for wildlife.

3 Proposed Action Alternative

Under the proposed action, the FWS, in cooperation with NDOW, would implement a river restoration project along the Walker River on the MVWMA to enhance 150 acres of riverine, wetland, riparian and upland shrub habitat for use by birds, fish, and other wildlife. The proposed restoration project site is located approximately 2 miles north of Yerington, Nevada, and immediately downstream from the Yerington Weir, along a low gradient reach of the Walker River (Figure 3-1). The project site lies at the upstream end of MVWMA, on the MV South parcel.

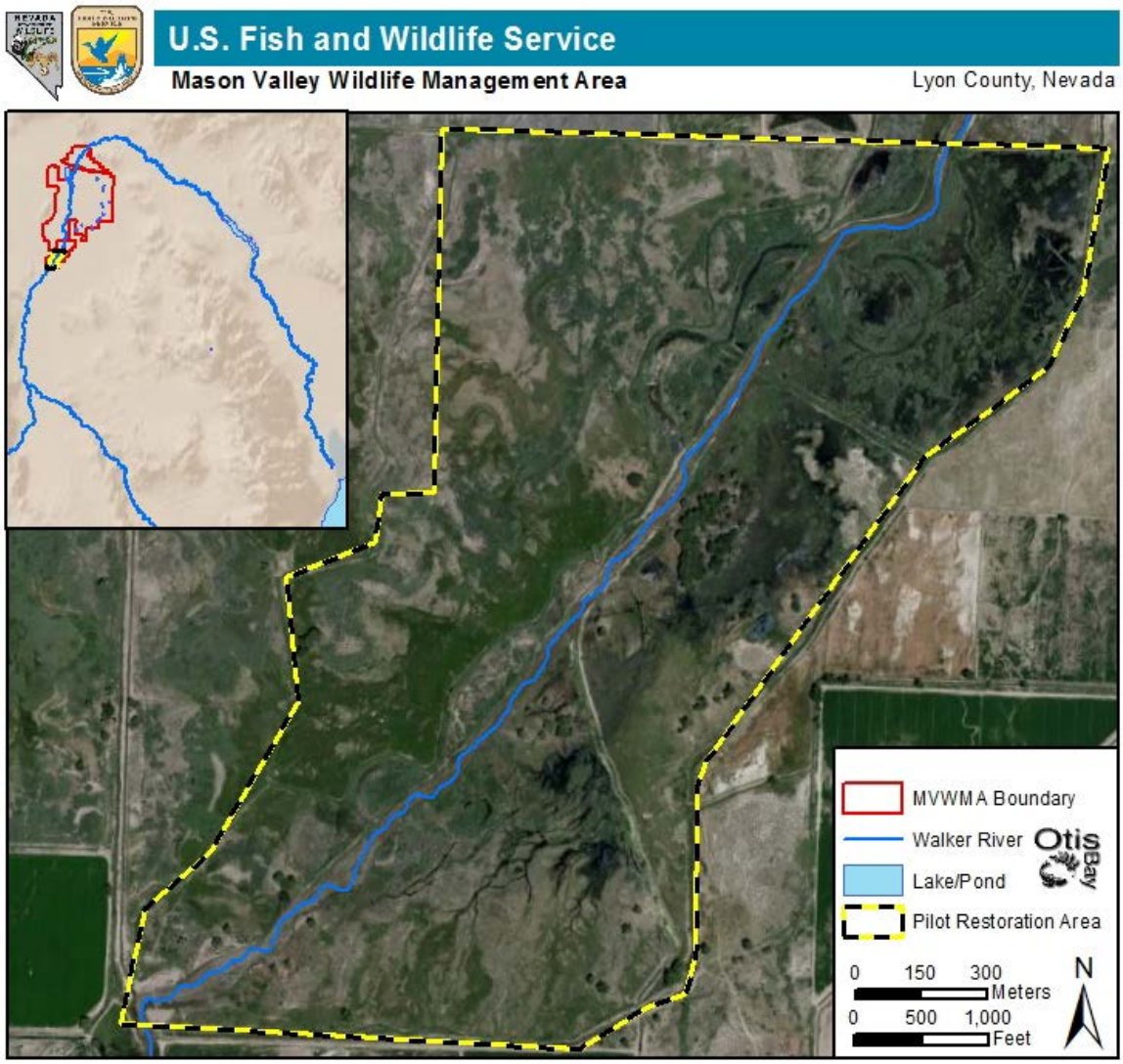


Figure 3-1. Location of the proposed Walker River Channel Pilot Restoration Project on MV South within the Mason Valley Wildlife Management Area.

The FWS and NDOW would take an active management approach and make a comprehensive and integrated effort to improve riparian and watershed resources in the MV South restoration site. The restoration design includes multiple components:

1) **Construction of 9 river meanders**
   The project would return 1.5 miles of a channelized reach of the Walker River to its natural meandering form of 2.5 miles by restoring and returning the river to the relict channel (as shown in 1938 aerial imagery). To do this, the natural, pre-channelization meanders would be excavated and would form the restored river channel, and parts of the existing channel would be plugged and filled in with 54,000 cubic yards of soil generated from new river meander excavation (Figure 3-2). As a result of channel restoration and topography, two backwater areas connected to the river and one

backwater area connected to an existing ditch would be passively formed. Backwater areas could be variably wet or dry, depending on seasonal climate conditions.

2) **Creation of in-channel riffle, run, and pool sequences including point bar features**
Two rock riffles would be added to the restored river channel to prevent down-cutting and to increase the complexity of in-stream aquatic habitat. Two point bars would be created along river bends as depicted in Figure 3-2.

3) **Removal of noxious weeds within the construction footprint**
Noxious weeds such as tamarisk and Russian olive located within active construction areas, including new river meanders would be mechanically removed by construction machinery at the time of restoration implementation.

4) **Restoration and enhancement of native riparian and upland vegetation**
Habitat diversity would be enhanced by planting patches of native riparian shrubland, woodland, emergent wetland, and marsh vegetation in the riparian zone along disturbed construction areas as well as throughout the project area (Figure 3-3). The total proposed planting area (the sum of acreage of all small patches scattered through the project area) is approximately 20 acres. Native willows, cottonwoods, and buffaloberry would be planted, as well as seeds of native grasses and herbaceous vegetation. Table 3-1 lists species that would be planted. Native plants within the construction footprint would be salvaged for replanting, and, if possible, native genotypes would be used for revegetation.

5) **Installation of wire baskets**
Survival of plantings would be ensured by installing wire basket exclosures around trees and shrubs to protect them from animal grazing.

6) **Construction of nature trail**
Recreation opportunities would be added to the project site by constructing up to 3 additional miles of recreational trails. A weed barrier would be installed on the trail. Four inches of compacted base would be covered with three inches of a compacted, decorative finish layer. The trail would be created according to the alignment shown on the designs (Figure 3-2).

7) **Construction of a pedestrian bridge**
Construction of a wooden pedestrian bridge supported by steel cables, spanning the river as shown in Figure 3-4, would be considered, pending funding availability. Rock riprap would be placed to stabilize river banks under the bridge. Ten ft of compacted structural fill would be used for bridge foundations on either side of the river, and concrete pedestals buried within these foundations would anchor steel cables to support the bridge. The 5.5 ft wide, steel cable suspension pedestrian bridge would span approximately 100 ft, at a height of 10 ft above the top of river bank. Side railings would be constructed to assist pedestrian passage and prevent falling hazards.

Figure 3-2 shows major restoration activities that would occur at MV South, including channel modifications, construction access roads, a staging area, potential pedestrian bridge location, and recreational trails. All work would follow Best Management Practices (BMPs) to minimize environmental impacts due to construction.

Earthmoving would occur as early as the summer of 2015, and the river would be relocated into this new channel as early as the fall of 2015. It is expected that the project would be completed in late fall of 2015.

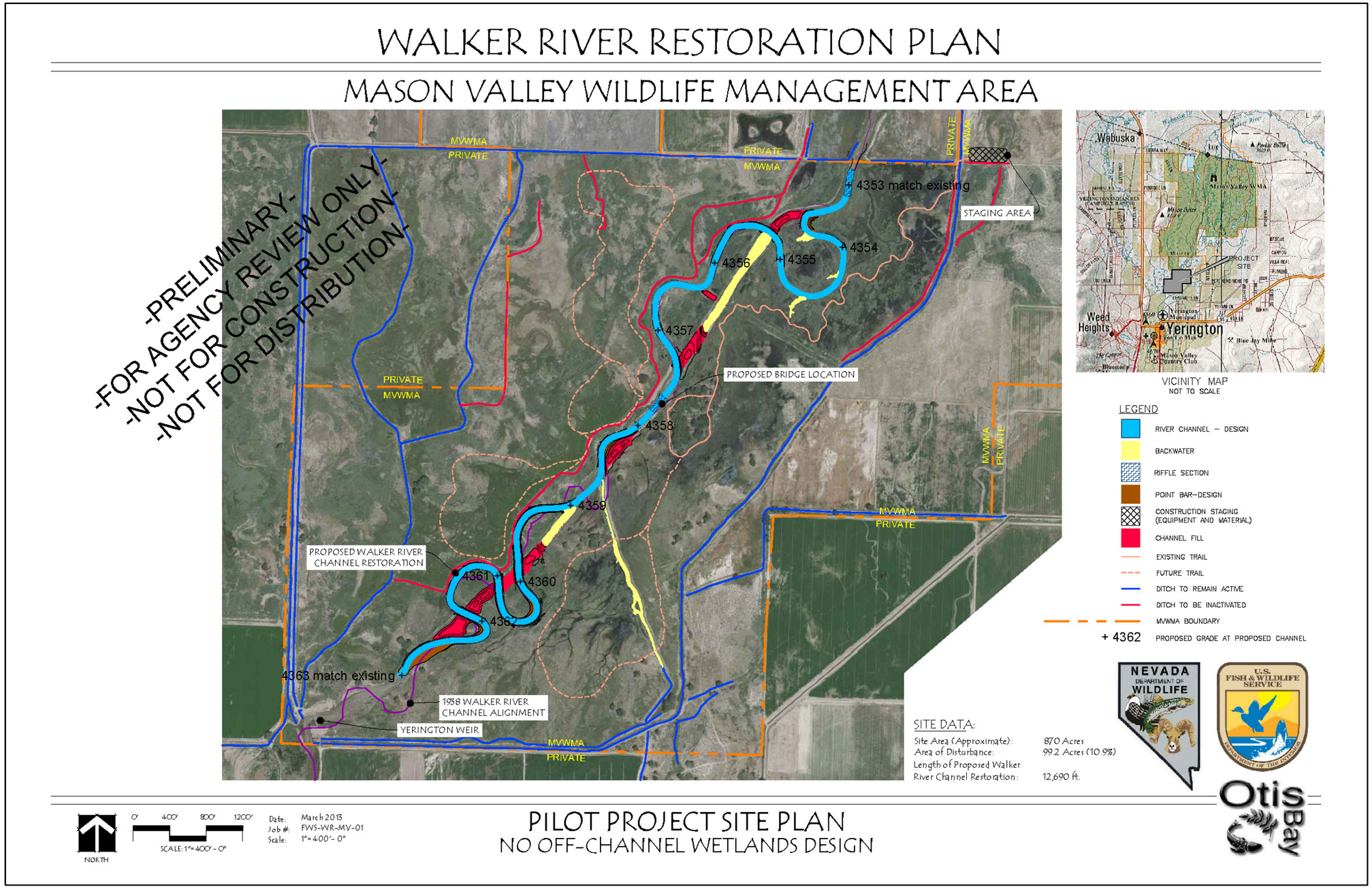
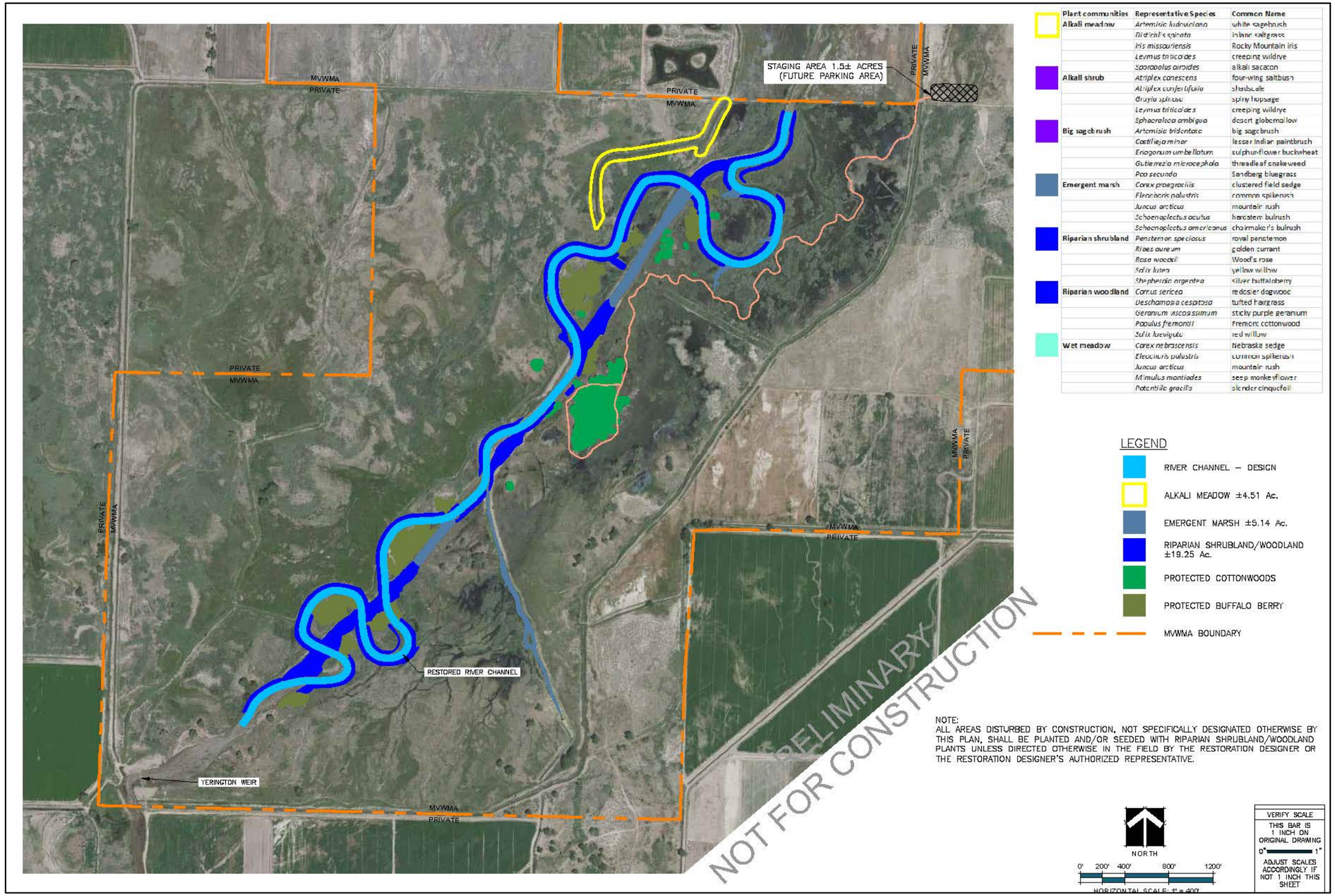


Figure 3-2. Restoration design including channel meanders, staging area, recreational trail, and optional pedestrian bridge location.



Plant communities	Representative Species	Common Name
Alkali meadow	*Artemisia ludoviciana*	white sagebrush
	Distichlis spicata	inland saltgrass
	Iris missouriensis	Rocky Mountain iris
	Leymus triticoides	creeping wildrye
	Sporobolus airoides	alkali sacaton
Alkali shrub	*Atriplex canescens*	four-wing saltbush
	Atriplex confertifolia	shadscale
	Grayia spinosa	spiny hopsage
	Leymus triticoides	creeping wildrye
	Sphaeralcea ambigua	desert globemallow
Big sagebrush	*Artemisia tridentata*	big sagebrush
	Castilleja minor	lesser Indian paintbrush
	Eriogonum umbellatum	sulphur-flower buckwheat
	Gutierrezia microcephala	threadleaf snakeweed
	Poa secunda	Sandberg bluegrass
Emergent marsh	*Carex praegracilis*	clustered field sedge
	Eleocharis palustris	common spikerush
	Juncus arcticus	mountain rush
	Schoenoplectus acutus	hardstem bulrush
	Schoenoplectus americanus	chairmaker's bulrush
Riparian shrubland	*Penstemon speciosus*	royal penstemon
	Ribes aureum	golden currant
	Rosa woodsii	Woods rose
	Salix lutea	yellow willow
	Shepherdia argentea	silver buffaloberry
Riparian woodland	*Cornus sericea*	redosier dogwood
	Deschampsia cespitosa	tufted hairgrass
	Geranium viscosissimum	sticky purple geranium
	Populus fremontii	Fremont cottonwood
	Salix lucida	red willow
Wet meadow	*Carex nebrascensis*	Nebraska sedge
	Eleocharis palustris	common spikerush
	Juncus arcticus	mountain rush
	Mimulus moniliodes	seep monkeyflower
	Potentilla gracilis	slender cinquefoil

Figure 3-3. Zones for protection and revegetation of plant communities within Pilot Project construction area.

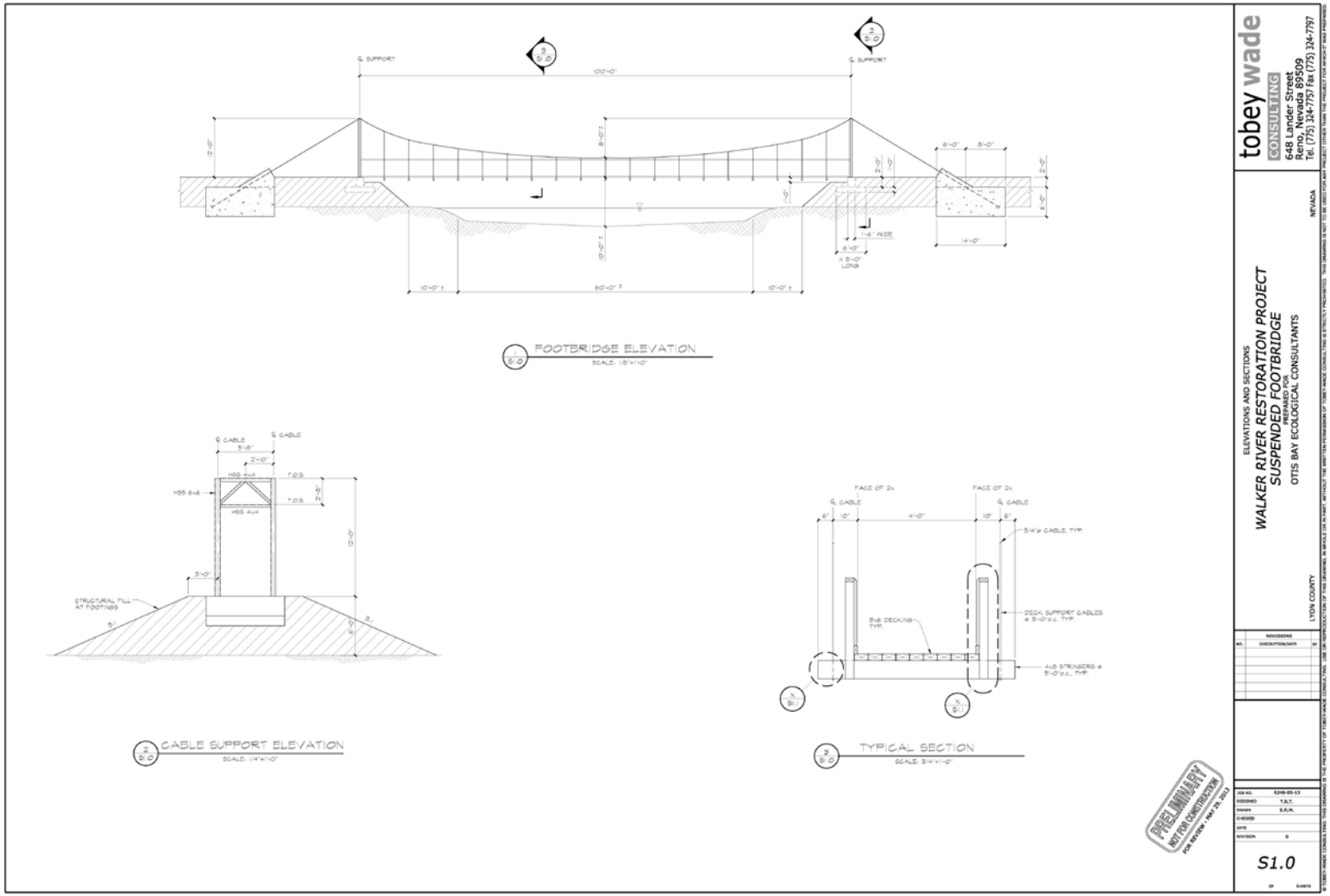


Figure 3-4. Potential pedestrian bridge design drawings.

Table 3-1. Pilot Restoration Project revegetation potential plant list.

Common Name	Scientific Name	Common Name	Scientific Name
Indian ricegrass	*Achnatherum hymenoides*	Torrey's rush	*Juncus torreyi*
white sagebrush	*Artemisia ludoviciana*	Great Basin wildrye	*Leymus cinereus*
big sagebrush	*Artemisia tridentata*	creeping wildrye	*Leymus triticoides*
narrowleaved milkweed	*Asclepias fascicularis*	royal penstemon	*Penstemon speciosus*
showy milkweed	*Asclepias speciosa*	Sandberg bluegrass	*Poa secunda* spp. *sandbergii*
four-wing saltbush	*Atriplex canescens*	bluebunch wheatgrass	*Pseudoroegneria spicata*
shadscale	*Atriplex confertifolia*	yellow willow	*Salix lutea*
Torrey's saltbush	*Atriplex torreyi*	coyote willow	*Salix exigua*
water sedge	*Carex aquatilis*	Pacific willow	*Salix lucida*
Nebraska sedge	*Carex nebrascensis*	red willow	*Salix laevigata*
clustered field sedge	*Carex praegracilis*	arroyo willow	*Salix lasiolepis*
lesser Indian paintbrush	*Castilleja minor* spp. *minor*	peachleaf willow	*Salix amygdaloides*
redosier dogwood	*Cornus sericea* ssp. *sericea*	bulrush	*Schoenoplectus acutus* var. *occidentalis*
tufted hairgrass	*Deschampsia cespitosa*	desert globemallow	*Sphaeralcea ambigua*
inland saltgrass	*Distichlis spicata*	alkali sacaton	*Sporobolus airoides*
common spikerush	*Eleocharis palustris*	sand dropseed	*Sporobolus cryptandrus*
sticky purple geranium	*Geranium viscosissimum*	Fremont cottonwood	*Populus fremontii*
American mannagrass	*Glyceria grandis* var. *grandis*	golden currant	*Ribes aureum*
spiny hopsage	*Grayia spinosa*	Wood's rose	*Rosa woodsii*
Rocky Mountain iris	*Iris missouriensis*	silver buffaloberry	*Shepherdia argentea*
mountain rush	*Juncus arcticus* ssp. *littoralis*		

4 Comparison of Alternatives

Alternative Consequences	Proposed Action	No Action
River-floodplain connection	+	-
Flow attenuation	+	-
Instream habitat complexity	+	-
Weed control	+	-
Native plant diversity	+	-
Wildlife habitat quality	+	-
Sand removal from channel	+	-
Water quality	+	-
Recreational opportunity	+	-
Summary	Multiple environmental benefits would be gained with some construction disturbance that would be minimized through permit requirements, BMPs, and revegetation of construction disturbance areas. Recreational opportunities would be increased as riparian areas/wildlife habitats improve over time. Riparian corridor recovery would be achieved.	No action would be taken and no environmental benefits would likely be gained. Habitats would likely degrade over time, decreasing potential for wildlife conservation and recreation. Riparian corridor recovery would not be achieved.

(+) signifies a gain or environmental benefit
(-) signifies a loss or no added environmental benefit

5 Affected Environment

5.1 Plant Communities

Restoration activities would occur along the current and historical channel on MV South. The area is dominated by riparian and wetland habitat types along with upland shrub communities. Existing vegetation types were mapped on MV South between February and March 2013 by Otis Bay, Inc. (Figure 5-1). The vegetation types currently growing where restoration activities would occur are provided in Table 5-1. The acreage of riparian shrublands in the restoration footprint is by far greater than other vegetation types, and coyote willow currently dominates riparian shrublands due to its ability to reproduce clonally.

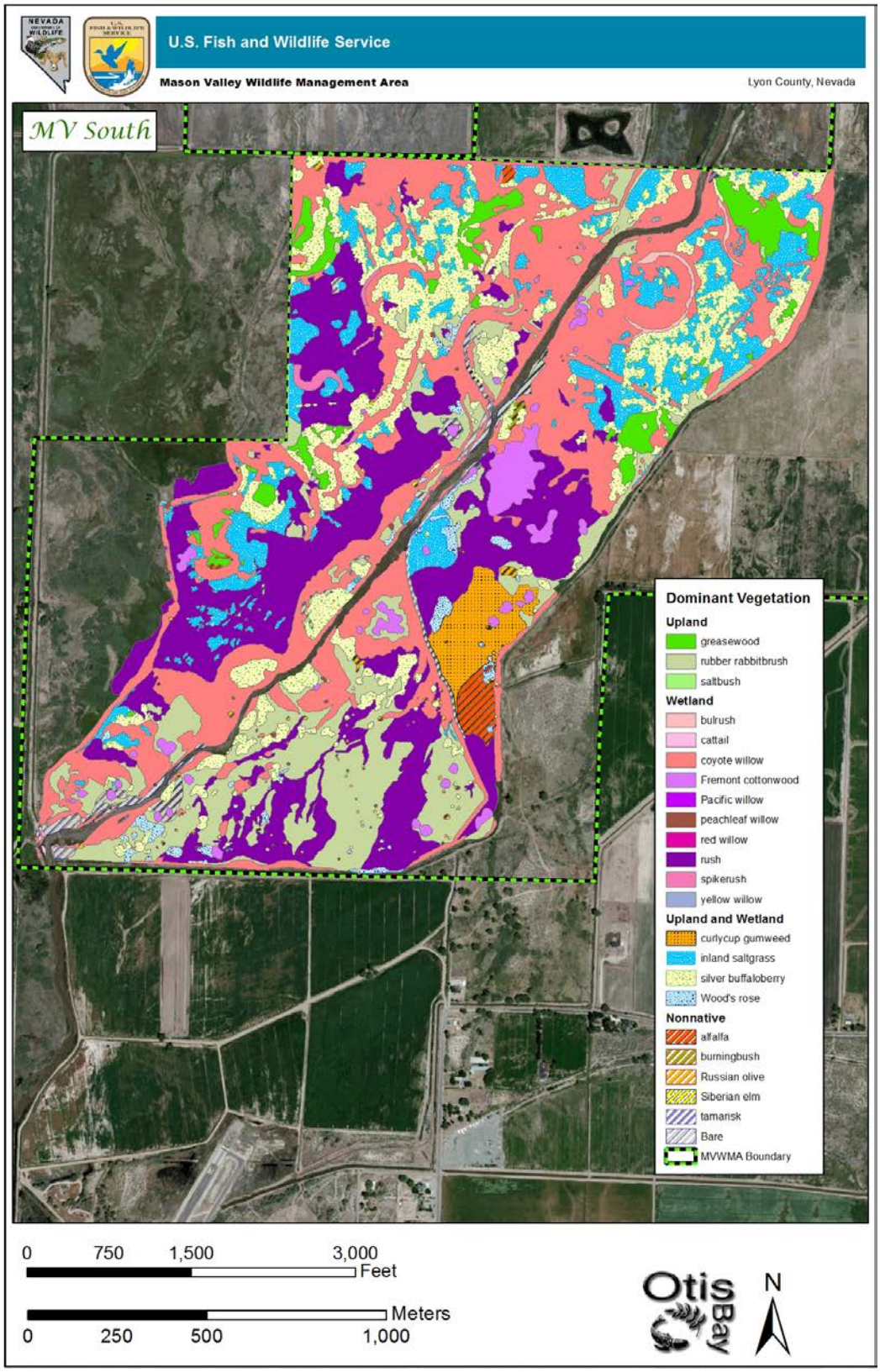


Figure 5-1. Existing vegetation on MV South

5.1.1 *Special Status Plants*

Based on a search of the Nevada Natural Heritage Program database and Otis Bay 2013 vegetation surveys, no special-status plant species occurred in the project area. One at-risk plant, the Wassuk beardtongue (*Penstemon rubicundus*) occurs downstream of MVWMA on the lower Walker River. This plant is associated with rocky to gravelly soils not found in the proposed action area. Soils on MV South are generally composed of clay, loam, and sand (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx; accessed 11/20/2014).

5.1.2 *Invasive Plants*

Small patches of tamarisk and Russian olive occur within the construction footprint. Tamarisk, also known as salt cedar, is a noxious weed of high concern in riparian habitats of the southwestern U.S., including the Walker basin. Concurrent tamarisk control efforts (e.g. the introduction of the tamarisk beetle on the Walker River Paiute Reservation) have been and continue to be implemented along other sections of the Walker River to reduce this weed's spread. The tolerance of tamarisk to a range of environmental conditions allows the plant to out-compete native shrubs and form monocultures. Although not a noxious weed, non-native Russian olive trees can be weedy in riparian areas, often forming monoculture stands and hence, this species should be controlled to limit its spread.

Table 5-1. Existing vegetation types where restoration activities would occur. The acreage of vegetation that would be disturbed during river channel and trail construction is provided.

Existing Vegetation	Channel	Trail
alfalfa	0.0	0.1
alkali meadow	0.8	1.5
bare ground	1.2	0.0
marsh	0.5	0.0
non-native shrubs	0.2	0.0
rabbitbrush	2.5	0.4
riparian shrubs	17.2	1.0
riparian trees	0.2	0.0
upland shrub	0.0	0.1
TOTAL	22.5	3.2

5.2 Walker River Flows

The Walker River has a complex interrelationship of inflow gains and losses that affect water supplies in the Walker River Basin. Water resources on MV South come from the Walker River, precipitation events, and groundwater. Water losses on MV South are due to evapotranspiration and infiltration.

The most important water source for MVWMA is the Walker River. Walker River flows are influenced primarily by snowmelt in the Sierra Nevada. Because precipitation and snowpack vary greatly from year to year, annual flows in the Walker River are highly variable, and the amount of water passing through the MVWMA varies considerably.

The natural hydrologic regime of the main-stem Walker River in Mason Valley has been altered by water storage reservoirs, irrigation diversions, and groundwater use. The closest USGS stream gages to MV South are Walker RV NR Mason, NV #10300600, Miller Ln NR Yerington, NV #10301120, and Walker RV NR Wabuska, NV #10301500. Flows have ranged from a minimum of less than 100 cfs to a maximum of greater than 3,000 cfs during the period of record for this area of the Walker River (Table 5-2), with a mean daily discharge of less than 500 cfs (USGS, 2013).

Table 5-2. Daily discharge statistics for the Walker River at USGS gaging stations located near the proposed project site, in cubic feet per second (cfs).

Gage ID	Min cfs (year)	Mean cfs	Max cfs (year)	Period of record
#10300600 Walker RV NR Mason, NV	24 (1978)	328	2,790 (1983)	1974-2012
#10301120 Miller Ln NR Yerington	32 (2012)	225	2,320 (2011)	2010-2012
#10301500 Walker RV NR Wabuska	0 (1924/32)	165	3,280 (1906)	1902-2012

Source: (USGS, 2013)

A hydraulic analysis was conducted in order to assess the existing conditions and predict the possible effects of restoration work on hydraulic conditions of the Walker River through Mason Valley. HEC-RAS software was used to compute hydraulic conditions before and after restoration. In order to evaluate the existing and proposed conditions, one dimensional steady state computations were performed over a range of flows between 26 cfs (low flow) and 3,280 cfs (flood of record [FOR]), based on hydrologic data obtained from stream flow gages managed by USGS. The results suggest that floodplain inundation occurs rarely through MV South under existing conditions, especially at flows less than 1,500 cfs (Figure 5-2). Currently, manmade levees and channelization of river do not allow the channel to connect with the floodplain. Any overbank flow that occurs through the MV South reach typically remains outside the levees and cannot easily return to the channel.

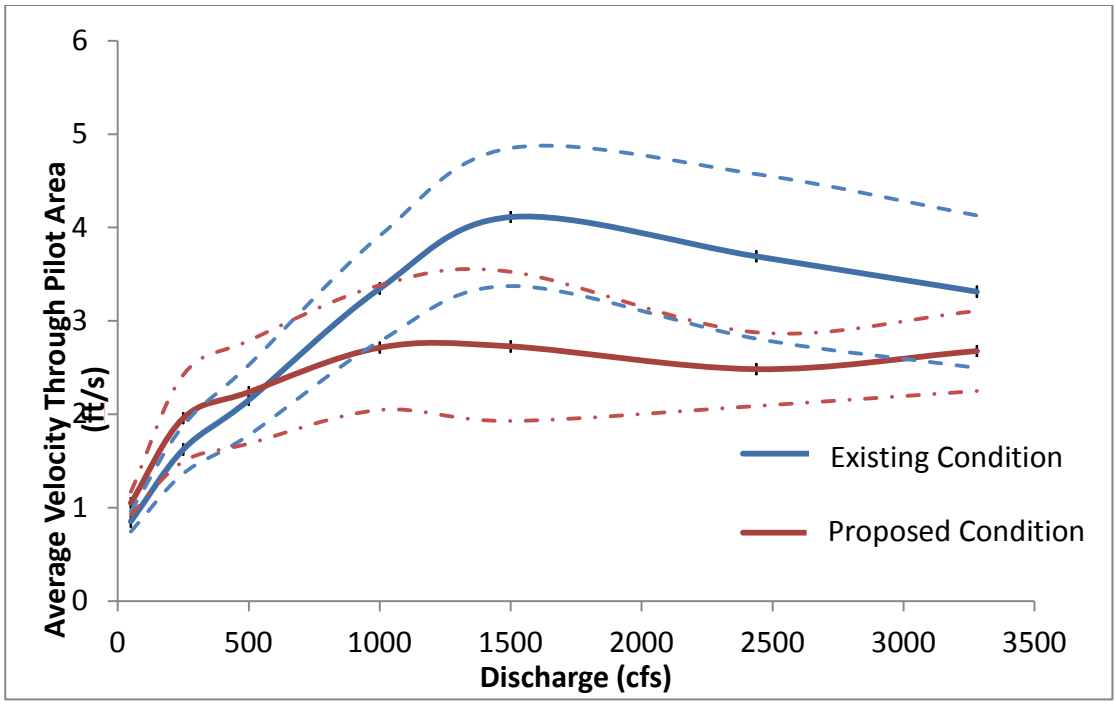


Figure 5-2. Modeled average stream velocities and 95% confidence intervals in the existing and proposed channels through the pilot area during flows from 50 to 3,280 cfs.

5.3 Aquatic Stream Habitat

On the Walker River, excess sediment in the channel is a concern for land managers because of decreased habitat quality for aquatic organisms, accumulation of sand in irrigation ditches, and increased flood risk in urban centers. Walker Canyon, on the upper West Walker River, is a major source of sediment input to the river system, especially during powerful flood events such as the one that occurred in the winter of 1997, because large amounts of erosion can occur in a relatively short amount of time. River transport of deposited sediment takes much longer, and in a naturally meandering stream with unaltered flows, streambed sediment would be washed overbank to build adjacent channel floodplains over time. Current Walker River flows, however, have been altered by dams and stream diversions, primarily for agriculture, resulting in reduced streamflow magnitudes and reduced occurrences of flows that are large enough to effectively move sediment. With decreased flows, sediment is transported downstream more slowly and in many places, lower magnitude flows may not effectively wash sediment out of the channel and onto the floodplain, especially in areas where banks have been modified by levee construction such as on MV South. As a result, sediment containing mostly sand-sized particles becomes constrained within the river channel and forms a sand bed.

5.4 Water as a Limited Resource

Water resource allocation is a management focus for environmental groups working in the Walker Basin due to declines in the surface elevation of Walker Lake over the past century that have caused noticeable changes in the lake's chemistry and biota. Because the volume of Walker Lake depends largely on water inflow from the Walker River, water managers account for all water use in the Walker Basin in efforts to balance the need between water consumption and ecosystem recovery. The restoration site is located immediately downstream from the final water diversion (the Yerington Weir) prior to the river entering the Walker River Paiute Tribe Reservation.

5.5 Animals of Conservation Concern

MVWMA provides habitat for numerous species of birds, amphibians, reptiles, mammals, fish, and invertebrates. Otis Bay, Inc. submitted a data request to The Nevada Natural Heritage Program (2013) for any recorded At-Risk (including Threatened and Endangered) plant and animal species for the proposed project area. Figure 5-3 shows the results of this query. Based on data from the Nevada Natural Heritage database, as well as additional records from surveys completed by NDOW, FWS, GBBO, and Otis Bay, Inc., no federally listed wildlife species are known to occur on MV South. Four species recorded on MV South are on the Nevada Natural Heritage Program At-Risk Tracking List. Although none of the species discussed below are federally listed, global and state ranks otherwise indicate some level of imperilment. Similarly, nine birds of conservation priority or with special status, as listed in the Nevada Bird Conservation Plan (Great Basin Bird Observatory, 2010), have been observed on MV South and MVWMA. These birds are of conservation concern due to population declines and habitat degradation within their known distribution ranges.

Because no known threatened or endangered species occur on MV South, Section 7 consultation by the FWS is not required, but a discussion of other known sensitive species that occur on the proposed project area is presented below.

The Nevada Natural Heritage Program database includes a record for the western small-footed myotis near MV South (Figure 5-3). The western small-footed myotis is identified as a Nevada special status species and was last observed in 1969. These bats inhabit deserts, semi-deserts, and desert mountains. Daytime roosts may be in crevices and cracks in canyon walls, caves, mine tunnels, behind loose tree bark, or abandoned houses. Western small-footed myotis may feed over water and near the ground over desert chaparral vegetation. These bats hibernate in caves or mine tunnels within range of summer occupancy.

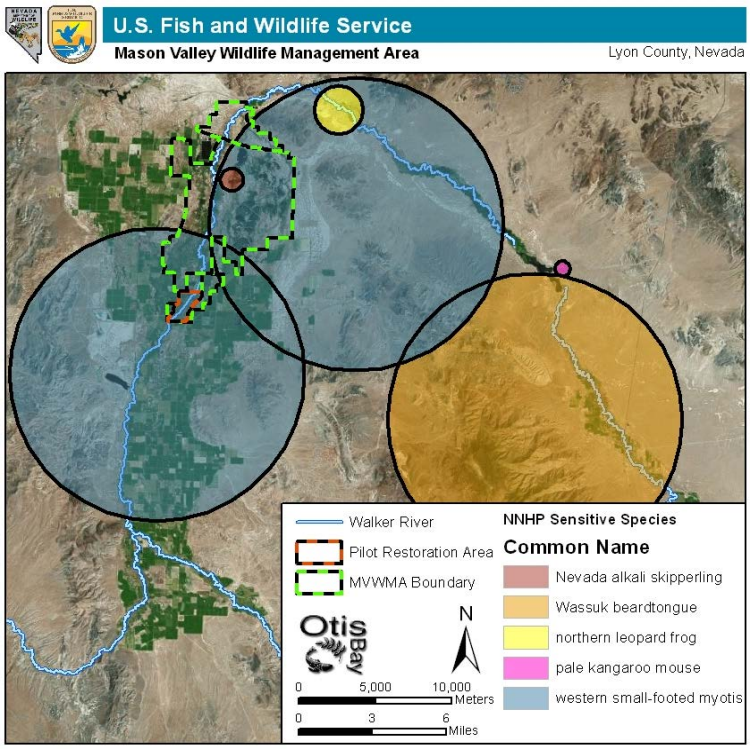


Figure 5-3. At-Risk or Watch List species observed on the lower Walker River (Nevada Natural Heritage Program, 2013).

Nevada Natural Heritage records also report the presence of the Nevada alkali skipperling (*Pseudocopaeodes eunus flavus*) on the MVWMA, north of the proposed project area. Little information is available on this species and observation records suggest this species may occur in localized habitats. The Nevada alkali skipperling is associated with alkali flats and desert seeps, and desert saltgrass (*Distichlis spicata*) is an important food source for larvae. Adults typically disperse from May to September, feeding on nectar sources. Although this species was not recorded on MV South, the proposed project area contains habitat that may be suitable for the Nevada alkali skipperling.

Two other at-risk species from the Nevada Natural Heritage database, the northern leopard frog (*Lithobates pipiens*) and the pale kangaroo mouse (*Microdipodops pallidus*) occur well outside of the proposed project area and likely do not occur there. Northern leopard frogs are inhabitants of oxbow ponds with emergent vegetation and connected meadows, but the population on the lower Walker River downstream of MVWMA may be isolated from the wetlands on the WMA. Northern leopard frogs are vocal in spring and relatively easy to identify, thus a lack of records of this species on MVWMA suggests that this species does not occur there. The pale kangaroo mouse inhabits desert shrub areas dominated by shadscale (*Atriplex confertifolia*) and big sagebrush (*Artemisia tridentata*), a habitat that would lie outside of the construction footprint of the proposed action.

Nevada birds of conservation priority that have been observed along the riparian corridor on MVWMA, including MV South, include American white pelican, snowy egret, white-faced ibis, Swainson's hawk, ferruginous hawk, white-throated swift, and olive-sided flycatcher. Bald eagles and peregrine falcons are special status species due to their relatively recent federal recovery status.

American white pelicans (*Pelicanus erythrorhynchos*) nest on Pyramid Lake's Anaho Island at the terminus of the Truckee River, but fly to adjacent watersheds, including the Walker River Basin, to forage for relatively large-sized fish. These birds are threatened by local lake declines and associated declines in local fish populations. During summer breeding bird surveys, this species was observed flying over MV South, and pelicans likely use MVWMA ponds and the Walker River as forage sites.

Snowy egrets (*Egretta thula*) were also incidentally observed on breeding bird surveys on MV South in the summer of 2013. This species occurs in marsh habitats where it forages for a variety of small aquatic prey. Proximity to lowland riparian areas that provide cottonwood trees for nesting is an important habitat component for this bird, and this species would likely benefit from restoration practices that recover riparian areas in wetland mosaics containing stands of emergent vegetation.

White-faced ibis (*Plegadis chihi*) flocks were observed passing over MV South on recent breeding bird surveys. These birds commonly occur in marshes, wet meadows, and flooded agricultural fields in northern Nevada, including MVWMA. White-faced ibis populations are threatened by loss of natural wetland and marsh complexes and can be susceptible to reproductive failure from some pesticides.

Swainson's hawks (*Buteo swainsoni*) were also recently observed on MV South, and these birds are also relatively common along low-elevation riparian corridors, where isolated cottonwood trees provide nest sites, and adjacent meadows, agricultural fields, and shrublands provide abundant rodent prey. A bird of open fields, this species is threatened by the development of croplands and degradation of native shrublands that affect rodent populations.

Ferruginous hawks (*Buteo regalis*) are also occasional visitors to MVWMA, typically on migration and in winter. Ferruginous Hawks in Nevada prefer landscapes where human presence is minimal. The highest densities of ferruginous hawks in Nevada have been reported in relatively remote valleys where native vegetation is mostly intact (GBBO 2010).

White-throated swifts (*Aeronautes saxatalis*) likely breed in nearby cliffs and were observed flying over the river corridor on MV South in the summer of 2013. The river and wetlands supply important insect food resources for this species. This bird is threatened by loss of riparian habitat and may be susceptible to bioaccumulation of pesticide in agricultural areas.

Olive-sided flycatchers (*Contopus cooperi*) migrate through lowland riparian zones in the spring and fall. This species was observed in riparian woodland habitat on MV South as well as other

areas of the lower Walker River on recent breeding bird surveys in late spring. This species has also been recorded on fall surveys on nearby watersheds, so the olive-sided flycatcher likely occurs on MV South in the fall as well. Riparian zones in the arid Great Basin provide important migratory corridors for this and many other birds, providing needed insect resources to fuel long-distance flights.

Bald eagles *(Haleaeetus leucocephalus)* primarily occupy areas located near lakes or reservoirs; however eagles will forgo proximity to water in exchange for roost sites offering protection from harsh weather. According to NDOW records, the bald eagle is an occasional winter visitor to MVWMA.

The peregrine falcon (*Falco peregrinus*), occasionally observed on MVWMA, has been delisted from endangered and is now listed as a Nevada at-risk species. Marshes and nearby uplands throughout Nevada are used as foraging sites by migrating falcons. The species is closely monitored and many measures are in place for species protection.

The Great Basin Bird Observatory (GBBO) is under contract with the FWS to conduct bird surveys throughout the Walker Basin. These surveys track changes in the bird community, including the possible addition of listed species. The yellow-billed cuckoo (*Coccyzus americanus)* has not been observed in any of these surveys, including a survey of the MVWMA in 2013.

Historically, the mainstem Walker River was part of the migratory corridor for Lahontan cutthroat trout (LCT – *Oncorhynchus clarkii henshawi*), a federally threatened species; however, the mainstem Walker River no longer provides appropriate habitat for LCT. Fish surveys completed by FWS in 2010-2011 resulted in no captures of LCT in Mason Valley; thus the proposed action would not disturb or impact this species.

5.6 Air Quality

The major air quality issue related to the proposed action would be dust generated by traffic and construction activities associated with creation of the new river channel and trail. Windblown dust in the Walker River Basin is a primary air pollution concern. The Walker River Basin produces little precipitation especially at lower elevations. Warm to hot temperatures, along with low precipitation and high winds, create dry soil surfaces that can raise dust and affect air quality when disturbed.

5.7 Cultural Resources

A cultural resources investigation was conducted for the proposed action area and a report submitted to the Nevada State Historic Preservation Office (SHPO).

The National Historic Preservation Act (NHPA) of 1966 protects archaeological sites and other US historical resources. Section 106 of the NHPA requires all federally funded projects to

conduct an evaluation of the impacts of a proposed project on a site's historical resources. This may include consultations with the State Historic Preservation Office (SHPO) or a Tribal Historic Preservation Office (THPO). Any man-made object over 50 years of age is considered a part of the National Register, and an archaeological resource. Coordination for the Section 106 consultation is the responsibility of the FWS.

6 Environmental Consequences of No Action

6.1 Plant Communities

Under the no action alternative, wetland and riparian communities along the river on MV South would be expected to continue to decline due to the disconnection between the river and its floodplain in this area. Coyote willow would continue to dominate the riparian zone. Upland vegetation communities would not change from baseline conditions, and noxious weed invasion of riparian habitat would likely increase.

6.2 Walker River Flows

Under the no action alternative, water would only overtop the river banks on MV South during rare, high flow events, and if this happens, water would not be able to return to the channel because of existing levees and current topography sloping away from the river. In this scenario, some water would be lost from the river and Walker Lake through the evaporation process because water would be trapped outside of the river channel. Currently water is mostly conveyed through the straightened channel with no overbank flow. Generally, stream velocity is greater in straightened stream sections, especially during high flow events. As a consequence, at a given discharge, downstream areas of straightened stream sections may experience higher erosion rates or a higher chance of damage to structures in the stream (e.g., bridges) because of faster moving water.

6.3 Aquatic Stream Habitat

Under the no action alternative, water quality and aquatic stream habitat would be unlikely to improve or may become worse over time because the river would remain disconnected from the floodplain and sediment would continue to be constrained within the river channel. Sand that is slowly migrating downstream would continue to cover channel sediments, reducing substrate heterogeneity, thus restricting aquatic invertebrate and fish assemblages on MV South. As discussed in the previous section, the straightened river channel would support faster stream velocities during high flows that could cause higher rates of bank erosion and degraded stream quality in reaches downstream of MV South. This scenario may occur with increased water acquisitions allotted for Walker Lake recovery that may increase flows.

6.4 Water as a Limited Resource

With no action, current evapotranspiration rates are not expected to change. Over time, however, a decrease in tree canopy would likely occur as older trees senesce and die because of low river to floodplain connectivity. With decreased canopy cover evaporative water loss would increase in river stretches without shade. Also, during high flow events, water escaping the river channel would be lost to the system because existing levees and a sloped topography leading away from the river would trap water outside of the channel where it could evaporate or infiltrate soils outside of the river channel. River banks would likely become more incised over time, causing the river to further disconnect from the floodplain and reduce groundwater recharge, thus reducing the amount of water available to the river and lake.

6.5 Animals of Conservation Concern

Under the no action alternative, wildlife species and their habitats would remain unchanged or possibly decline as riparian vegetation diminishes and invasive plants spread. With no improvement in river-floodplain connection, sand would continue to be constrained in the channel, choking interstitial gravel spaces that could otherwise provide habitat for aquatic invertebrates and spawning fish, important prey for the American white pelican. Disconnection of the river and floodplain would also restrict or impede natural riparian forest recruitment. Because water rights associated with MV South will be allocated for Walker Lake recovery, wet meadows would also likely decline over time. Loss of trees would decrease potential habitat for the bark-roosting western small-footed myotis, and special status or conservation priority raptors, which use cottonwoods for perching and nesting. The snowy egret, which also uses riparian trees for nesting, would not benefit from a loss of this habitat component. A decrease in meadows would likely decrease important invertebrate and small mammal prey eaten by multiple at-risk or sensitive species of birds and bats. The at-risk and conservation priority species discussed here are generally experiencing population declines throughout their known habitat ranges. Further habitat loss could potentially cause local extirpations or dispersal of species to other areas, further fragmenting existing populations.

6.6 Air Quality

Under the no action alternative, no earthwork or restoration activities would occur and therefore no heavy equipment would generate air pollutants. Some bare areas that have been overgrazed may generate dust.

6.7 Cultural Resources

Under the No Action Alternative, cultural resources, including historic and archeological sites, Indian trust assets, and Native American concerns would remain unchanged. Restoration activities would not occur; therefore there would be no potential impacts to any known or undiscovered archeological sites.

7 ENVIRONMENTAL CONSEQUENCES OF PROPOSED ACTION ALTERNATIVE

7.1 Plant Communities

Potential land disturbance actions in the proposed action alternative include construction associated with the creation of river meanders, in-channel habitats, a recreational trail, potential pedestrian bridge, and invasive plant removal within the construction footprint. River meander construction would remove some existing emergent and riparian vegetation within the construction footprint (Table 3-1), and replace these existing vegetated areas with river habitat. Areas disturbed on the banks of the restored river would be planted or seeded with a diversity of native riparian plants (Table 3-1), and trail construction would permanently remove some vegetation. Native vegetation restoration and installation of wire baskets on the Pilot Restoration Project would enhance native plant recovery providing net gain in diversity and abundance of MVWMA's native vegetative communities. The removal of non-native plants such as tamarisk and Russian olive within the construction footprint would lower the risk of wildfire spread.

Soil disturbances may create areas for weeds to infest, however these disturbances would be temporary because the majority of disturbed soils associated with the proposed action would be seeded or planted with native vegetation. Trail areas would contain a weed barrier to prevent weed growth. Although construction equipment can transport weeds, established BMPs include pressure washing of all equipment to prevent the potential spread of weeds onto or off of the project site. Straw mulch used in revegetated areas would be certified weed-free to avoid potential introduction of unwanted plants. If a pedestrian bridge is included in the final restoration implementation plan, compacted soil areas used for bridge foundations would form elevated areas on either side of the river that would likely remain mostly barren or containing some alkali shrub community plants.

Construction activities associated with the proposed action would result in short-term, temporary disturbances to some vegetation, but no permanent impacts are anticipated because the project is designed to increase plant diversity and promote long-term riparian habitat recovery.

7.2 Walker River Flows

A hydraulic analysis was completed to determine how channel restoration activities, specifically meander construction and in-channel riffle, run, and pool sequence construction, could potentially affect stream behavior on MV South and in downstream areas that run through private property and the MVWMA. After running the analysis, no impacts due to changed channel configurations are expected; however the results of the analysis are presented here to demonstrate consideration of potential action consequences.

On MV South, channel meander restoration would re-connect the river to floodplain areas and overbank flow would occur at approximately 800 cfs. Although mean annual discharge rates of the Walker River near MV South are currently well below 500 cfs (Table 5-2), bank full flows on MV South may be achieved in the future because mean daily stream discharges would likely increase with ongoing NFWF water acquisitions for Walker Lake recovery. Because MV South would be maintained as a natural area, no buildings or structures would be affected by increased overbank flow. In addition, the proposed channel geometry was iteratively altered during the design process, to produce a channel design that would not impact water surface elevations, especially near bridges and roadways located upstream and downstream of MV South. The addition of channel meanders and point bars would improve flow attenuation, and decrease stream energy in downstream areas; thus proposed channel construction on MV South would not be expected to cause a detrimental increase in overbank flows or erosion potential downstream of the Pilot Restoration Project site. The 20 ft elevation difference between the project site and the City of Yerington would prevent restoration activities from influencing Walker River flows upstream in Yerington. During extreme high flow events when flooding may occur, the proposed action would not increase chances of flooding.

Off-channel actions such as the installation of wire baskets and trail building would not affect stream flows or velocity. Native revegetation of restored streambanks would also further attenuate occasional overland flow.

7.3 Aquatic Stream Habitat

The proposed action alternative would remove sand from the channel bed on MV South over time because the creation of river meander lobes would improve river to floodplain connection and facilitate overbank sediment deposition at bank full stage flows. The proposed action would also add in-stream aquatic habitat complexity with the addition of riffle, run and pool sequences. Some temporary environmental disturbances due to construction activities associated with channel and trail building would occur, however.

Modeling results of the proposed condition indicate that removal of levees and addition of channel meanders would reconnect the channel with the floodplain, allowing some overbank flow at approximately 800 cfs, without significantly impacting the hydraulic properties in downstream sections through the MVWMA. Channel velocities would be reduced in critical areas, thus reducing the overall potential for unwanted erosion during high flow events. Downstream of MV South, water surface elevations and stream velocities would remain consistent with the existing conditions, and would not negatively affect the Walker River or the surrounding areas.

Construction activities that loosen soils in or adjacent to the restored river channel and removal of existing vegetation within the construction footprint could cause some erosion that could affect stream quality or increase inputs of smaller sized sediment into the channel, but these issues would be minimized through implementation of construction BMPs. These BMPs

include: 1) using silt fencing or straw wattles to protect unwanted sediment migration into the channel; 2) applying certified weed-free straw mulch to revegetated areas; 3) reclaiming all disturbed areas with seed mix that contains a mixture of native grasses and shrubs; 4) ripping or disking all areas of restoration disturbance after final grading is complete; 5) pressure washing and cleaning all equipment prior to mobilization and demobilization to prevent spread of weeds; and 6) operating water trucks in a sufficient manner to control wind-borne particulates. Also, construction of the restored channel would be completed in dry conditions to avoid excess pollution of loose soils into the river. Water would only be turned into the restored channel after construction of meanders is complete. Revegetation of soils disturbed by construction would further prevent erosion or addition of sediment into the restored channel.

Average local stream velocities on MV South through the proposed new channel meanders would be lower than average stream velocities in the existing channel at all flow levels greater than 500 cfs, therefore the proposed channel restoration should not increase bank erosion rates above the existing condition (Figure 5-2). Below 500 cfs, stream velocities in the existing and proposed channel would be similar. Slightly higher local stream velocities in the proposed channel meanders at discharge levels below 500 cfs would not cause excessive erosion on MV South and constructed rock riffles would also prevent channel down-cutting. Downstream of MV South, erosion rates would not increase due to the proposed action alternative because stream velocities at higher discharge levels would be similar to stream velocities in the existing channel.

Likewise, trail construction would temporarily loosen soil, but this soil would be compacted during the construction process to prevent erosion. Construction would also occur during non-rainy conditions to prevent washing of temporarily disturbed trail soils into the river.

Revegetation efforts and the installation of wire baskets to protect plants from herbivory would not have any harmful effects on aquatic stream habitat.

7.4 Water as a Limited Resource

The proposed action would result in changes in acreages of certain landscape features on MV South that are associated with the river channel and riparian corridor. Some landtypes would have increased evapotranspiration rates and others would have lower evapotranspiration rates. An evapotranspiration analysis was used to determine if the balance of potential water loss due to evapotranspiration would increase significantly with the proposed action over time. Table 7-1 summarizes the estimated net effect of evapotranspiration rate changes associated with various proposed action landscape features, based on previously reported evapotranspiration rates of Walker River Basin vegetation (Allander, et al., 2009). Expected vegetation type transitions and construction of new river channel meanders associated with the proposed action would result in slightly diminished evapotranspiration rates, a net increase of 0.7 acre ft / yr (AFY), lost to evapotranspiration when compared to existing conditions, throughout MV

South. These changes are deemed insignificant in comparison with the outflows of Mason Valley that average 123,700 AFY (Carroll et al, 2014).

Channel construction would create channel meanders, lengthening the existing river channel from 1.5 to 2.5 miles of open water habitat. Hydraulic modeling results were interpreted for low flows to determine how the increased channel length might influence downstream water delivery during the driest times of the year (Figure 7-1). The proposed action will include construction of a narrower low flow channel that will increase velocity at flows below 200 cfs. At a flow of 26 cfs (which is allocated to the Walker River Paiute Tribe downstream of the project area), the proposed river channel will flow at an average velocity of 0.8 ft/sec. With the proposed addition of 4,776 ft of river channel, this will result in a 1.7 hr increase in travel time for a water molecule to flow through the project site. Compared with the 48 hours of travel time required for water to flow from Topaz Lake to Wabuska during low flows, this increase is insignificant and would not affect daily water delivery requirements below the project site. To ensure that water deliveries for the Walker River Paiute Tribe are not affected during construction, the river will be routed through the newly restored meanders after the irrigation season, and the Walker River Paiute Tribe will be notified of this action by the contractor, prior to initiating flows through the restored channel.

The new river channel is designed to facilitate overbank inundation with streamflows at about 800 cfs. Water washing over the bank would infiltrate the soil and return to the system through groundwater flow. Some water that infiltrates the soil may be used by existing and new vegetation planted as part of the proposed action. As plants become established and mature, however, trees and taller shrubs provide shade that reduces evapotranspiration loss in the long term. The use of wire baskets for revegetated areas should not cause an increase in evapotranspiration water loss.

The proposed action would not reduce water delivery downstream or cause significant water loss to Walker Lake through the proposed habitat features.

Table 7-1. Net effect of proposed action and vegetation transitions on evapotranspiration.

Proposed Construction Action	**Vegetation Type Transition**	**Net Effect on Evapotranspiration (AFY)**
River Channel (6.6 acres)	Riparian/Grassland/Rabbitbrush to Water	9.9 increase
Backwater (2.2 acres)	Riparian/Grassland to Flooded Fields	1.2 decrease
Trail (3.2 acres)	Riparian/Grassland/Rabbitbrush to Trail	8.0 decrease
Sum of Actions		**0.7 increase**

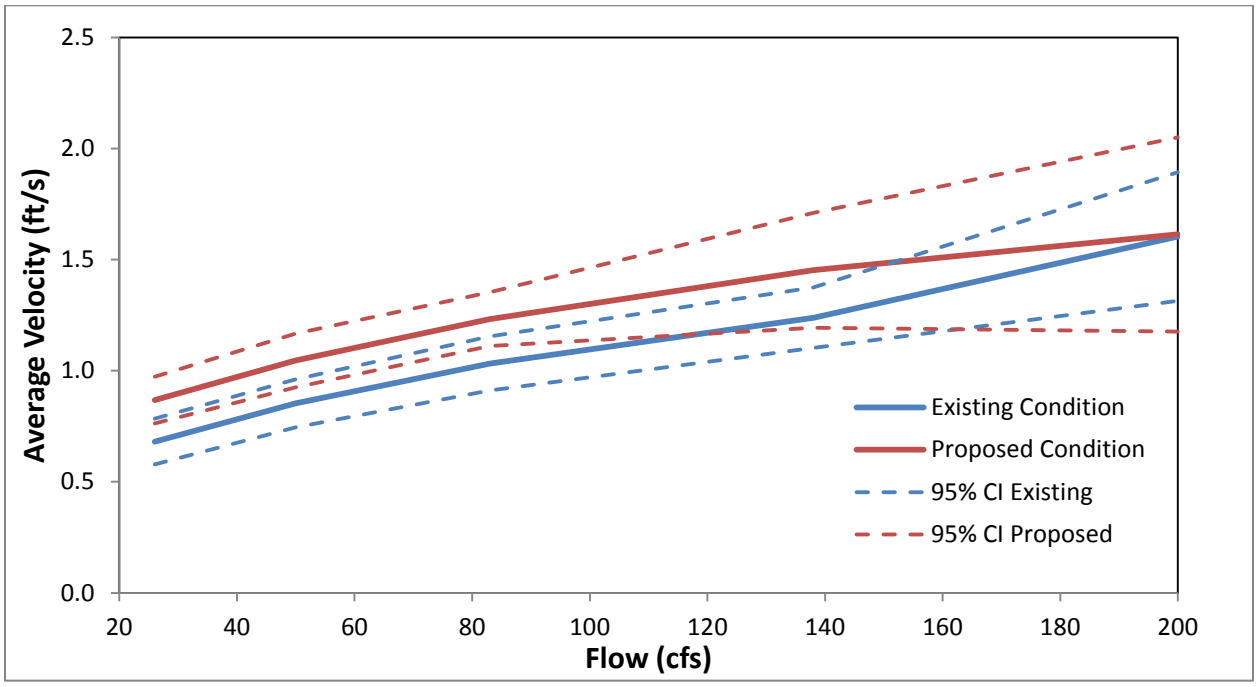


Figure 7-1. Modeled average stream velocities and 95% confidence intervals in the existing and proposed channels during flows from 26 to 200 cfs.

7.5 Animals of Conservation Concern

The proposed action would temporarily disturb wildlife by noise and activity associated with restoration activities. Wildlife, specifically birds, may be displaced during channel construction, particularly if construction commences during the spring breeding season. Disturbance created by restoration activities could potentially destroy nests or cause abandonment and loss of young or eggs of non-special status bird species; however, loss of individual nests or young is not expected to have a long-term adverse effect on populations of non-special status species. Recovering riparian vegetation and an enhanced riparian zone would likely boost populations of many birds and other animals over time.

Construction activities associated with the proposed action (i.e., channel and trail construction) could also potentially affect local Nevada alkali skipperling populations if areas containing inland saltgrass are disturbed during the larval season. Like riparian birds, potential impacts to the skipper would be minimized if construction is timed to occur in late summer or fall, when adults, if present, can disperse to adjacent areas away from construction activity.

Installation of wire baskets should not have any impacts to the at-risk or conservation priority species discussed. Wire baskets would prevent herbivory by mammals.

The bald eagle, peregrine falcon, and ferruginous hawk are listed as at-risk species that are occasionally observed primarily during the winter months on MVWMA and would not be affected by activities associated with the proposed action because construction would not occur in winter. Migratory birds use the area, primarily during the spring and fall, which will be generally outside the projected construction period. The Great Basin Bird Observatory will be involved to ensure that the project will have no negative effect upon birds. Overall, the project will result in a net gain in bird habitat.

7.6 Air Quality

Traffic and construction activities associated with the proposed action would temporarily disturb soil and raise dust in the project area. To minimize dust generated from restoration activities, water trucks would be used on site to reduce airborne dust. Site conditions would be monitored, and water truck use would be adjusted accordingly to assure that air quality regulations are maintained. Over the long term, revegetation and vegetation enhancement of the site would reduce dust abundance.

Construction activities associated with the proposed action would also generate emissions from diesel and gasoline-powered equipment. Operation of equipment during restoration work would cause a minimal increase in airborne pollutants; however emissions associated with the proposed action would be short in duration, and air quality would return to normal following restoration activities.

The addition of dust and volatile emissions associated with construction in the proposed action would be relatively minor in comparison with cumulative dust and other emissions created from daily ranching and mining activity in the local region.

Revegetation activities and installation of wire baskets may raise a minor amount of dust associated with foot traffic, but should not reduce air quality.

7.7 Cultural Resources

Ground-disturbing activities associated with the proposed project could potentially contribute to impacts of cultural resources. The proposed project is required to comply with Section 106 of the NHPA and in accordance to the definition of 40 CFR Part 1508.27(b)(8). Any potential adverse impacts on cultural resources would be mitigated to less than significant levels using the Section 106 process.

The Section 106 U.S. Fish and Wildlife Service Archaeological and Historical Resources Identification Report states, "No cultural resources were identified during the survey. The survey area has been heavily altered by efforts to channelize and control the meandering path of the Walker River. Remnants of the levees constructed in the 1968-1972 period of channelization were observed, but are less than 50 years old. The Joggles Ditch and Yerington Diversion structure are outside of the APE."

8 Permits Needed Prior to Implementation

A number of environmental protection measures and BMPs have been incorporated into the proposed action to minimize environmental impacts of construction in or near bodies of water. Construction-related permits and authorizations from the U.S. Army Corps of Engineers (USACE) and Nevada Department of Environmental Protection (NDEP) are anticipated that would require similar and/or additional protective measures for implementation of the proposed action. Permits that would be required include:

1) USACE Section 404 Permit – Nationwide 27, Wetland and Riparian Restoration

2) NDEP 401 Water Quality Certification

3) NDEP Temporary Permit for Working in Waterways

4) NDEP Construction Stormwater Permit.

9 Additional Mitigation Measures and Monitoring

No additional mitigation measures are proposed for the Walker River Channel Pilot Restoration Project. Construction permits required for the proposed action establish protocols, BMPs, monitoring, records management, and reporting to ensure that potential damaging effects associated with operating construction machinery in waterways is minimized. If the proposed action is approved and implemented, environmental monitoring that tracks trends in vegetation growth, species diversity, species populations, water quality, hydrology, and sediment transport is recommended to determine the trajectory of restoration actions over time. Monitoring should accompany enhancement and restoration projects to extract maximum benefit from these costly activities. As new knowledge is obtained through management treatments and improved climate change predictions, future management plans can be adjusted.

10 AGENCY COORDINATION

FWS and NDOW have actively coordinated on the proposed action. FWS coordinated with NDOW, GBBO, and the Nevada Natural Heritage program through exchanges of information and data on fish and wildlife occurring in the proposed action area.

11 LAWS AND REGULATIONS

- National Environmental Policy Act (NEPA) – The EA is in compliance with NEPA.
- Endangered Species Act (ESA) – The proposed actions would have no effect on any endangered, threatened, or candidate species.
- National Historical Preservation Act – The Service would comply with all applicable cultural resource regulations and policies prior to advancing funds, issuing a permit, or implementing ground disturbing activities.
- Nevada Revised Statues (NRS) 555.150 and 555.208 – The proposed activities are in line with NRS regarding noxious weed eradication.
- Executive Order 11988, Floodplain management – Proposed actions would restore native vegetation within the floodplain. These activities would not impact land use within the flood plain.
- Executive Order 11990, Protection of wetlands – Proposed actions would not impact wetlands and there would be no destruction, loss or degradation of wetlands.

12 LIST OF PREPARERS

12.0 Otis Bay, Inc.

Caroline Kim, Wildlife Biologist
Diane Wong-Kone, Wildlife Biologist
Kelsey McCutcheon, Project Coordinator
Susan Mortenson, Landscape Ecologist

12.1 U.S. Fish and Wildlife Service

Lisa Heki, Lahontan National Fish Hatchery Complex Manager
Derek Bloomquist, Lahontan National Fish Hatchery Complex

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