



SOUTHERN NEVADA WATER AUTHORITY®

Muddy River Riparian Corridor Improvements at Warm Springs Natural Area (*\$743,329*)

WaterSMART Environmental Water Resource Projects for Fiscal Year 2023

Notice of Funding Opportunity No. R22AS00089

Category A Applicant

March 28, 2023

Applicant:

Southern Nevada Water Authority

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1. Technical Proposal: Executive Summary

Date: March 28, 2023

Applicant: Southern Nevada Water Authority (Category A Applicant)

Location: 1001 South Valley View Boulevard, Las Vegas, Nevada 89153 (Clark County)

Project Summary

As severe and sustained drought conditions in the lower Colorado River basin and climate change results in the aridification of the southwest United States, restoration projects that provide habitat for our most vulnerable species are crucial to protecting ecosystems. The Southern Nevada Water Authority (SNWA) will restore 12 acres and protect additional downstream habitat from drought impacts at Warm Springs Natural Area (WSNA), a 1,250-acre property located approximately seven miles northwest from the town of Moapa, Nevada. The property is regionally significant as it contains more than 20 perennial springs that form the headwaters of the Muddy River and numerous landscape types. These resources provide habitat for several protected and sensitive species, including the endangered Moapa dace (US Fish and Wildlife Service (USFWS) estimates that nearly 80 percent of its remaining habitat is found on the property), endangered southwestern willow flycatcher, and threatened yellow-billed cuckoo. WSNA also supports other native birds and important wildlife populations, as well as diverse plant communities. The proposed project, Muddy River Riparian Corridor Improvements at WSNA, will widen existing riparian corridors adjacent to deeply incised streams and expand tree zones, restore native riparian vegetation within the flood plain, and enhance mesquite bosques. These actions will increase habitat for listed species, improve hydrologic conditions, lessen wildfire risk, and reduce erosion and sedimentation during flood events. Non-native vegetation will be removed and replaced with native vegetation to restore the area to the natural habitat that existed before the area was converted for agricultural purposes. The project is supported by SNWA's Water Resource Plan and the WSNA Stewardship Plan.

Length of Time and Estimated Completion Date

The proposed project encompasses activity from January 2024 through December 2026. All project work will be completed by December 2026.

Federal Facilities

The proposed project is not located on a federal facility.

2. Technical Proposal: Project Location

The proposed Muddy River Riparian Corridor Improvements project is located Clark County, Nevada, approximately seven miles northwest from the town of Moapa, Nevada, at 36° 42' 42" N, 114° 42' 47" W.

A map of the proposed project area is included as Figure 1 in Appendix A. A map of the watershed is included as Figure 2 in Appendix A.

3. Technical Proposal: Technical Project Description

Beginning in the 1860s, a series of events impacted the Muddy River and its tributaries. To maximize agricultural production in the area, the river was moved and straightened, which increased the slope and stream velocities, leading to channel incision and the upstream migration

of head cutting. This incising began in the mainstream of the Muddy River and moved upstream into the tributaries. Currently, the Muddy River is entrenched approximately 15 feet below the surface of the floodplain (see Figure 3, Appendix A).

The entrenchment of the Muddy River drastically changed the hydrology of the floodplain. Before entrenchment, the river meandered through the floodplain and periodic flooding deposited fresh sediment. The water table was near the land surface and supported marshes, expansive alkali meadows, mesquite woodlands, and riparian tree corridors near the river. As entrenchment progressed, the water table dropped, so plants along the streams and floodplain could no longer access the groundwater needed for survival.

Currently, the near-vertical riverbanks (see Figures 3 and 4, Appendix A) are devoid of vegetation in many areas and unstable, with portions of the bank sloughing off into the river, especially during flood events, which can cause severe bank erosion, adding to the sediment load in the river. Most vegetation along the river in WSNA was destroyed during a wildfire in July 2010. Since the fire, tamarisk and palm trees have replaced desirable vegetation, increasing fuel loading for future wildfires.

SNWA purchased the WSNA property in 2007 and operates it largely as a nature preserve. Management is guided by the [WSNA Stewardship Plan \(https://warmspringsnv.org/wp-content/uploads/2018/03/wsna_stewardship_plan_full.pdf\)](https://warmspringsnv.org/wp-content/uploads/2018/03/wsna_stewardship_plan_full.pdf). The property contains more than 20 perennial springs that form the headwaters of the Muddy River, as well as numerous habitat types. The proposed project will increase and protect riparian and mesquite bosque habitats at WSNA to make these habitats and the wildlife they support more resilient to drought. The increase will be accomplished by widening riparian corridors along 0.3 miles of the mainstem of the Muddy River, and by establishing mesquite bosques along riparian corridors, resulting in the creation of 12 acres of new habitat.

Widening Riparian Corridors along Streams

Due to the steep banks, riparian habitat along the streams is currently less than three feet wide in most areas and mostly devoid of trees. To increase the area of this habitat, the banks will be excavated back from the stream edge approximately 12 feet and down to the water table. This effort will increase the width of riparian corridor habitat from almost none to up to 30 feet. Trees and understory vegetation will then be established. Existing vegetation consisting mostly of upland species will be removed and disposed. The soil will be excavated with a large excavator, placed in dump trucks, and hauled to other locations on WSNA. Some of the soil may be spread in place near the project site. The trees (mostly velvet ash [*Fraxinus velutina*] with some cottonwood [*Populus fremontii*] and Goodding's willow [*Salix gooddingii*]) will be installed as one or five-gallon propagated plants or poles or cuttings in the newly excavated area. Propagated plants will be grown in the WSNA nursery or grown by other local nurseries using local seed. Poles and cuttings will be obtained at WSNA or nearby properties.

Plants will be enclosed with hardware-cloth cages and surrounded with weed-barrier fabric to slow the spread of weeds. Understory plants such as yerba mansa (*Anemopsis californica*), alkali sacaton (*Sporobolus airoides*), saltgrass (*Distichlis spicata*), scratchgrass (*Muhlenbergia asperifolia*), and limewater brookweed (*Samolus ebracteatus*) will be installed around the trees

and on the water edge. No irrigation will be required because all plants will be installed in water-saturated soil. Plantings will be kept free of weeds, and regular monitoring will determine success and the need for additional maintenance.

Establishing Mesquite Bosques

Western honey and screwbean mesquite (*Prosopis glandulosa* var *torreyana* and *P. pubescens*) and associated understory plants will be installed in soil laydown. Propagated plants will be grown using local seed. Trees will be installed in augered holes and enclosed in cages fabricated from hardware cloth. Each tree will be surrounded with weed-barrier fabric. A temporary drip-irrigation system will be installed to provide water for the trees during the first two to three years. Additional plants will be installed between the trees and sustained with irrigation. Plantings will be kept free of weeds, and regular monitoring will determine success and the need for additional maintenance.

4. Technical Proposal: Applicant Category and Eligibility

Applicant Category: SNWA is a Category A applicant.

Eligibility of Applicant: SNWA meets eligibility requirements as it is a regional wholesale water provider in Southern Nevada. The organization is responsible for water treatment and delivery for the Las Vegas Valley, as well as acquiring and managing long-term water resources. SNWA is composed of seven member agencies, including Big Bend Water District, the City of Boulder City, Clark County Water Reclamation, the City of Henderson, the City of Las Vegas, the Las Vegas Valley Water District, and the City of North Las Vegas, which together deliver drinking water to more than 2.3 million residents and 40 million annual visitors. SNWA diverts 90 percent of its water supply from the Reclamation-managed Colorado River system. SNWA receives delivery of Colorado River water from Reclamation under several contracts held by SNWA or its member agencies, as listed below:

SNWA Contracts:

- Contract Number 2-07-30-W0266, Amendment Number 1, Amended and Restated Contract with the Southern Nevada Water Authority, for the Delivery of Colorado River Water
- Contract Number 7-07-30-W0004, Amendatory and Supplemental Contract between the United States and the State of Nevada for the Delivery of Water and Construction of Project Works

SNWA Member Agency Contracts:

- Contract Number 14-06-300-978, “Boulder Canyon Project Arizona-California-Nevada Contract for the Delivery of Water,” City of Boulder City
- Contract Number 0-07-30-W0246, Contract for Delivery of Water to City of Henderson
- Contract Number 14-06-300-2130, “Boulder Canyon Project Contract for Delivery of Water to Las Vegas Valley Water District”
- Contract Number 2-07-30-W0269, “Boulder Canyon Project Contract with the Big Bend Water District, Nevada, for the Delivery of Colorado River Water”

The water delivered by SNWA under these contracts is diverted at Reclamation-approved diversion points in the Colorado River at Lake Mead and below Hoover Dam. This includes delivery of water through the Robert B. Griffith Water Project (formerly the Southern Nevada Water Project) constructed by Reclamation, as authorized by an Act of the United States Congress.

5. Technical Proposal: Performance Measures

Since it can take several years for riparian habitat to mature and be utilized by wildlife, the benefits of this project will not be fully realized in the three-year project period. Thus, performance measures will occur in two timeframes and across two categories. The first will occur in the three-year project period and measure planting success and other site criteria. The second will be conducted during the project period but then will continue for five years afterwards and measure benefits to wildlife.

1. Measures of Planting Success and Other Site Criteria

- ***Survival Data. Propagated Plants.*** Survival data will be reported as the percent of living plants of the total number installed in a project site. ***Poles and cuttings.*** Data will be reported as the approximate percentage of installed poles or cuttings still alive at the end of the first growing season.
- ***Species Richness.*** Species richness is the number of species (native and non-native) at the site(s). These data will be compared to the species richness prior to the planting performed as part of this project.
- ***Photo Points.*** Photo points will be established at the project site before any work is initiated, and then photos will be taken after various treatments such as ground preparation and planting have been implemented.
- ***Soil Erosion.*** Soils exposed by project actions will be susceptible to erosion by water or wind. Straw wattles will be installed next to streams to protect them from sediment during rain events. Qualitative measurements of erosion (soil and plant litter deposits, breaches, pedestalling, and rilling) will be taken after storms.
- ***Irrigation.*** Trees and understory plants not planted in wet soils must be irrigated until established. Irrigation will be monitored and repaired routinely to maximize survival.

2. Measures of Benefits to Wildlife

- ***Biological Surveys.*** The true measure of project benefits will be use of the new riparian and mesquite vegetation by the targeted species, especially the southwestern willow flycatcher (riparian) and yellow-billed cuckoo (both). Surveys are conducted in the breeding season using federal protocols. For the flycatcher, standard measurements are number of territories, pairs, nests, and fledged young. For the cuckoo, results are measured in detections and then in detections across survey periods, yielding possible, probable, or confirmed breeding territory designations. Results will be analyzed at the property level for overall increases, and new sites will be compared against existing sites.

6. Technical Proposal: Evaluation Criteria

E.1.1. Evaluation Criterion A: Project Benefits

E.1.1.1 Subcriterion A.1: Project Benefits

E.1.1.1.1 General Project Benefits

Please explain how the project will benefit ecological values that have a nexus to water resources or water resources management, including benefits to plant and animal species, fish and wildlife habitat, riparian areas, and ecosystems that are supported by rivers, streams, and other water sources, or that are directly influenced by water resources management.

Riparian and wetland areas in Southern Nevada are both limited and fragmented. This makes them and the wildlife that rely on them especially susceptible to drought impacts. This natural susceptibility is further impacted by non-native plant species replacing native species and erosion reducing flood plains and the area in which native wetland and riparian species can survive. This project aims to replace non-native species with native species along the Muddy River as well as in the upland areas that surround and protect these sensitive zones. Riparian areas provide important functions in watersheds. Enhancing and expanding the riparian corridor and increasing patch sizes will help increase flood water retention and groundwater recharge. Many native riparian trees can develop vast root systems that are resilient to drought and will live for many decades, sometimes over 80 years. With large enough populations, it is expected that they will be able to reproduce in a way that makes the habitat sustainable without human intervention.

Please also explain whether the project will increase water supply reliability for ecological values by improving the timing or quantity of water available; improving water quality and temperature; or improving stream or riparian conditions for the benefit of plant and animal species, fish and wildlife habitat, riparian areas, and ecosystems, or through similar approaches.

This project will improve the stream and riparian conditions for the benefit of plant and animal species. By expanding the riparian corridor, flood events will no longer have as dramatic of an erosion impact on the Muddy River's banks and will instead flow into these riparian areas, adding water and nutrients to the plants and recharging the local groundwater aquifer. The plants to be installed in the riparian area were once numerous; their reduction has allowed non-native species to encroach into this sensitive habitat. Re-establishment of the native riparian habitat along the Muddy River will expand the potential habitat for various species of wildlife including the endangered southwestern willow flycatcher and threatened yellow-billed cuckoo. WSNA is also home to the majority of endangered Moapa dace that once abundantly filled this portion of the river. The proposed project will improve the flow dynamics of the river and protect the waterway from flood and erosion impacts, further improving the limited habitat of this fish species.

Will the project improve watershed health in a river basin that is adversely impacted by a Reclamation water project?

No, the proposed project will not improve watershed health in a river basin that is adversely impacted by a Reclamation water project.

Is the project for the purpose of meeting existing environmental mitigation or compliance obligations under Federal or State law?

No, the proposed project is not for the purpose described above.

If the project will benefit aquatic or riparian ecosystems within the watershed, explain the extent of those benefits. Estimate expected project benefits to ecosystems and provide documentation and support for this estimate, including a detailed explanation of how the estimate was determined.

The proposed project will establish 12 acres of riparian and mesquite bosque habitat along the Muddy River by excavating entrenched streambanks away from the river and down to the water table. In addition to the new habitat being created, the removal of the steep banks will reduce the amount of erosion that continually takes place in this stretch of the river, thereby protecting the habitat adjacent to the project as well as all downstream portions of the river. The excavation areas are currently densely vegetated with non-native species which will be removed. The new riparian habitat will expand the potential habitat for federally listed birds found at WSNA such as the southwestern willow flycatcher and yellow-billed cuckoo as well as many other wildlife species. The reduced erosion will improve water quality of the Muddy River and therefore improve the habitat quality for the endangered Moapa dace as well as numerous endemic invertebrates. In 2020, turbidity (measured in nephelometric turbidity units [NTU]) just downstream of the proposed project location ranged from 4.35 to 11.8 with most readings under 10. It is expected that proposed project will result in lower average readings.

If the project will benefit specific species and habitats, describe the species and/or type of habitat that will benefit and the status of the species or habitat. Describe the extent (i.e., magnitude and geographic extent) to which the project will benefit the species or habitat, including an estimate of expected project benefits and documentation and support for the estimate.

The proposed project will improve aquatic habitat for the federally endangered Moapa dace (USFWS estimates that nearly 80 percent of its remaining habitat is found on the property) and other native fishes by removing non-native plants that cause stream shading and replacing them with deciduous native plants that allow more sunlight to reach the stream and increase nutrient-rich leaf fall into the stream. Other native fish that may benefit from this project are the Moapa White River springfish and Moapa speckled dace, which are both critically imperiled in the state of Nevada. Four rare endemic and four rare non-endemic invertebrates found in the area will also benefit from improved water habitat. The project will increase the amount of potentially suitable nesting habitat for two federally listed bird species (the southwestern willow flycatcher and yellow-billed cuckoo), as well as for dozens of other bird species including many that are conservation priorities due to various regional initiatives. The project will also reduce wildfire risk by removing fire-adapted non-native vegetation.

While the most significant improvements to the habitat will take place at the proposed project location along the approximately 2,000 feet of Muddy River, there will be additional benefits outside the project area. [The Moapa dace travels upstream and downstream the Muddy River and its tributaries throughout its lifetime](#); ensuring the entire habitat range is protected improves the likelihood that Moapa dace can inhabit their entire historical range (<https://www.fws.gov/species/moapa-dace-moapa-coriacea>).

Additionally, the erosion that currently takes place impacts water downstream. The proposed project will improve this water quality parameter. Regular water monitoring of TSS downstream of the project will quantify these improvements.

If the proposed project will benefit federally listed threatened or endangered species, address the following:

Is the species subject to a recovery plan or conservation plan under the ESA?

The proposed project will increase the amount of potentially suitable nesting habitat for two federally listed bird species, the endangered southwestern willow flycatcher and the threatened yellow-billed cuckoo. It will also improve habitat for the federally endangered Moapa dace.

USFWS issued a final recovery plan for the southwestern willow flycatcher in 2002. The proposed project area is in the Middle Colorado Management Unit of the Lower Colorado Recovery Unit. Within the Management Unit, the minimum number of territories that need to be reached for reclassification is 25 across the two reaches identified, neither of which is in Nevada. While the upper Muddy River is not specifically identified, the plan states that “[a]dditional reaches may also contribute to recovery goals.” The recovery goal to delist the species is 1,950 territories, geographically distributed, with protection from threats and of the needed habitat to adequately support the population. In 2012 (the latest year for which data has been compiled), the range-wide population was estimated at 1,629 territories, and just one territory was reported in the Middle Colorado River Management Unit.

No recovery plan or conservation plan has been established for the yellow-billed cuckoo.

The Moapa dace is included in the USFWS “Recovery Plan for the Rare Aquatic Species of the Muddy River Ecosystem” published in 1996. The plan calls for the species to remain under federal protection until at least 75 percent of its habitat has been secured and its population in the wild reaches 6,000 fish.

What is the relationship of the species to water supply?

Southwestern willow flycatcher and yellow-billed cuckoo are riparian dependent species during migration and nesting. Important riparian species along the Muddy River and its tributaries are velvet ash, Fremont’s cottonwood, and sandbar and Goodding’s willows, which require consistent access to water. The foliage in these trees provides a healthy insect community for feeding, cover from predation, and some relief from high summer temperatures.

The Moapa dace is an endemic species found only in the Muddy River and uses the warm waters of the spring-fed headwaters to reproduce. Historically, adult Moapa dace would be found

throughout the mainstem of the Muddy River. They are currently only found on the WSNA property and the USFWS National Wildlife Refuge adjacent to WSNA.

What is the extent of the proposed project that would reduce the likelihood of listing or would otherwise improve the status of the species?

The proposed project would contribute towards the expansion of available habitat for the endangered southwestern willow flycatcher, as well as threatened yellow-billed cuckoo.

In 2022, field staff identified five southwestern willow flycatcher territories at WSNA, all occupied by pairs that made at least one nest attempt. Of the seven total attempts, two were confirmed to successfully fledge at least five young (three visually confirmed, two aurally confirmed). Staff made no cuckoo detections, a first since 2014. WSNA continues to recover from the 2010 fire that devastated riparian and mesquite habitat on property, and survey results for the flycatcher and cuckoo (in recent years) indicate that the species are responding. However, flycatcher results also indicate that differences in habitat quality across and within sites may be impacting distribution.

An expansion of appropriate habitat along the Muddy River within WSNA could play an important role in expanding successful and recurring breeding locations for these at-risk species, as well as other bird species that benefit from riparian vegetation zones in the Mojave Desert.

Habitat for Moapa dace will be improved by removing non-native palms and tamarisk from the banks and replacing them with native deciduous vegetation, allowing for additional sunlight to reach the water during winter months, as well as deposit nutrients in leaf fall. Reduced erosion events will also protect the limited habitat of the dace and provide for an increase in numbers in downstream locations.

Is the species adversely affected by a Reclamation project?

No, the species is not adversely affected by a Reclamation project.

Will the project address drought conditions or drought-related impacts on water supplies, habitat, species, or the ecosystem as a whole? If yes, describe past and current drought conditions and impacts and forecasted drought conditions and anticipated impacts. How will this project help build resilience to drought?

Yes, riparian and wetland areas in Southern Nevada are both limited and fragmented. This makes them and the wildlife that rely on them especially susceptible to drought impacts. This natural susceptibility is further impacted by non-native plant species replacing native species and erosion reducing flood plains and the area in which native wetland and riparian species can survive. This project aims to replace non-native species with native species along the Muddy River and protect these sensitive zones. Riparian areas provide important functions in watersheds. Enhancing and expanding the riparian corridor and increasing patch sizes will help increase flood water retention and groundwater recharge. Many native riparian trees can develop vast root systems that are resilient to drought and will live for many decades, sometimes over 80 years. With large enough populations, it is expected that they will be able to reproduce in a way that makes the habitat sustainable without human intervention.

If the project will result in long-term improvements to water quality, explain the extent of those benefits. Estimate the expected project benefits to water quality and provide documentation and support for this estimate, including a detailed explanation of how the estimate was determined.

The Muddy River headwaters are made up of six major springs and dozens of smaller springs that are connected to deep aquifers. This water has historically been very low in TSS with high water clarity. The endangered Moapa dace and other endemic aquatic species are adapted to this water. The higher TSS and lower water clarity in recent years is due to past agricultural uses and the subsequent erosion.

The proposed project will result in long-term improvements to water quality by mitigating drought and flood impacts, decreasing erosion, and reducing TSS. SNWA performs quarterly monitoring of multiple water quality parameters including TSS along the Muddy River immediately downstream of this project location. Future monitoring will allow for pre- and post-project comparisons to determine actual improvements to the system. Qualitative assessments can also be made after storm events to visually observe differences in water clarity.

In 2020, turbidity (measured in nephelometric turbidity units [NTU]) just downstream of the proposed project location ranged from 4.35 to 11.8 with most readings under 10. Lower average readings are expected upon completion of the proposed project.

The non-native vegetation currently dominating the banks of the Muddy River in the proposed project area shade the stream and provide less leaf fall than native species. Leaf fall from native species such as velvet ash, Fremont's cottonwood, and willows provides valuable nutrients to the system. The Moapa dace's primary diet is algae, and both the quantity and quality of this algae is directly related to the input of nutrients into the water, which occurs when deciduous vegetation leaves drop into the water.

Are there project benefits not addressed in the preceding questions?

The soil to be removed from the riverbanks will be deposited in two adjacent locations that were used for agriculture throughout much of the 20th century where the soils are compacted and nutrient deficient. The added soil will make restoration of these upland sites easier and create a buffer for the newly restored riparian areas. Buffers like this are important to filter sediments and debris entering the waterways during flood events, and further reduce erosion.

E.1.1.1.2 Water Conservation and Efficiency Project Benefits

This project is not expected to produce quantifiable water savings, so benefits for this project type are not included in the proposal.

E. 1.1.1.3 Water Management and Infrastructure Improvements Benefits

This project is not anticipated to make more water available or make water available at a more advantageous time or location, so benefits for this project type are not included in the proposal.

E.1.1.1.4 Restoration Project Benefits

Invasive Species – Vegetation: For projects that include removal of invasive vegetation, will the project include revegetation with native species at the removal site? In addition, describe how removal of invasive vegetation will benefit water resources or water resource management. Provide references and citations.

The proposed project does include removal of invasive vegetation, including the California Fan Palm (Palms) and tamarisk, also known as salt cedar, the two primary plant species found in the project area. These two invasive species are issues throughout Southern Nevada—both are listed on the [Lake Mead Top Invasive Species List](#) by the National Park Service’s Invasive Plant Management Team (<https://www.nps.gov/lake/learn/nature/ipmt.htm>). Revegetation with native species at the removal site, including velvet ash, Fremont’s cottonwood, Goodding’s willow, and sandbar willow, will expand and improve the potential nesting habitat for many native bird species including those that area federally listed.

Removal of Palms and tamarisk will benefit water resources in several ways. Consider that Palms are evergreen and shade the river. The Muddy River is fed by warm springs (over 90 degrees at the mouth of the springs), so aquatic wildlife has adapted to the warmer water. Shade from the Palms, especially in winter months, negatively affects aquatic wildlife. SNWA staff has observed palm roots growing together and damming flows, which impedes fish passage. Of note, Moapa dace are impacted by this as they move upstream to spawn in the warm headwaters. Palms are also poor habitat for most native bird species since they have little structure to build nests and mature palms are too high off the ground to serve as perches while preying on insects.

The Nevada Department of Agriculture lists [Tamarisk \(salt cedar\)](#) ([https://agri.nv.gov/Plant/Noxious_Weeds/WeedList/Saltcedar_\(Tamarix_spp_\)/](https://agri.nv.gov/Plant/Noxious_Weeds/WeedList/Saltcedar_(Tamarix_spp_)/)) as a [noxious weed](#) (https://agri.nv.gov/Plant/Noxious_Weeds/Noxious_Weed_List/). It generally provides poor habitat for native wildlife. The endangered southwestern willow flycatcher has been known to nest in tamarisk. However, the introduction of a biocontrol agent, tamarisk leaf beetle (*Diorhabda carinulata*), has resulted in defoliation of this shrub in the middle of nesting season for the bird species, often resulting in failed nesting attempts.

Invasive Species – Other Taxa: For projects that include removal of non-vegetation invasive species, explain what measures will be used to prevent reintroduction and why.

The proposed project does not include removal of non-vegetation invasive species.

Forest Fuels Management Activities: For projects that include fuels management activities to reduce the risk of severe wildland fire, describe the current conditions of the forest, the likelihood of a severe wildland fire, and risks to water quality, water supply infrastructure, aquatic and riparian ecosystem health, and watershed health.

Palms were the main fuel source for the devastating fire at WNSA in 2010. Tamarisk is also a known high fuel load species that often grows in dense patches. As previously described, these invasive species provide poor habitat for native animal species, in addition to being risks for future fires that could destroy additional habitat at WNSA and surrounding areas. In addition to the removal of the non-native species that have high fire risk, the native species being proposed

to replace these non-native plants will be installed at or near the water surface elevation thus making them less susceptible to the impacts of wildfire.

Post-Wildland Fire Sediment Removal: For projects that include post-wildland fire sediment removal, address the following: Has the rate of sedimentation changed due to a wildland fire event? Describe and quantify the rate of sedimentation pre- and post-fire.

WSNA has experienced fires in 1987, 1994, 2004, 2008, and 2010, with the most recent fire burning a devastating 610 acres on the property. While there was likely an increase in sedimentation for several months following the 2010 fire, natural vegetation recovery along the streams helped sedimentation slow to normal levels within two years of the fire. Sediment removal in the proposed project will reduce the potential and/or intensity of future fires.

How is the post-fire sedimentation impacting, or anticipated to impact, water quality, water supply infrastructure, aquatic and riparian ecosystem health, and watershed health?

Since established stands of native vegetation were ruined by the 2010 fire, there were serious impacts to the ecosystem. In particular, the reduction in riparian vegetation negatively impacted water quality, as there were no longer filters or tree roots to stabilize the soil. The proposed project will create new riparian vegetation to stabilize soils and reduce future erosion.

E.1.1.2. Sub-Criterion A.2: Multiple Benefits

If the project will benefit multiple water uses, explain how and to what extent the project will benefit multiple water uses.

To complement the proposed projects benefits to ecological values, the project also benefits other water uses, including municipal, recreational, and Tribal users. The Muddy River feeds into Lake Mead, so water quality benefits on the Muddy River also benefit Lake Mead and its users. Lake Mead is the primary source of drinking water for 2.3 million people in Southern Nevada, as well as home to the Lake Mead Recreation Area, where boating, fishing, and swimming are common recreation activities. Tribal water users in the Lower Colorado River Basin, including the Paiute Tribe, Fort Mojave Indian Tribe, Colorado River Indian Tribes, Chemehuevi Indian Tribe, Quechan Indian Tribe, and Cocopah Indian Tribe will also benefit downstream from water quality improvements.

If the project will provide multiple restoration benefits (e.g., benefits to ecological values or watershed health; fish and wildlife habitat; protection against invasive species; enhancement to commercial, recreational, subsistence, or Tribal ceremonial fishing; enhancement of river-based recreation), explain how.

The proposed project will have substantial benefits for species and habitats. It will increase riparian habitat by approximately 12 acres. To date, 216 species of birds have been identified at the WSNA. Riparian habitats are critical to nearly all species of bird at some point in their life cycle. In addition, a variety of reptiles, including various lizards and snakes, have been detected in riparian areas of WSNA, as well as amphibian species. Many mammals such as bats, the western harvest mouse, coyote, and gray fox utilize riparian habitat along the Muddy River. The monarch butterfly, a candidate species for listing under the ESA, has also been observed in riparian areas along the Muddy River.

In addition to general habitat improvements for the variety of species that use riparian habitats in the region, the project will increase the amount of potentially suitable nesting habitat for two federally listed bird species, the southwestern willow flycatcher and the threatened yellow-billed cuckoo. While no critical habitat is designated in the project area, the southwestern willow flycatcher and yellow-billed cuckoo are riparian obligates. Since 2000, there have been a total of 58 documented territories and 34 nests identified at WSNA for the southwestern willow flycatcher with five territories and seven nests documented in 2022. Although multiple locations are monitored and known to previously host flycatcher territories, only one location was used for all five territories in 2022. Since 2000, there have been a total of 54 individual yellow-billed cuckoos identified at WSNA. Only four nests have been identified in the same period. For the first time since 2014, there were no individuals identified at WSNA in 2022.

Suitable habitat for the southwestern willow flycatcher and yellow-billed cuckoo, as well as other riparian obligate species, is generally rare and fragmented in the southwestern United States. This fragmentation is more prevalent in Southern Nevada. The proposed project will connect, enhance, and expand the riparian habitat found on the Muddy River, which offers potentially suitable nesting habitat and could become an important resource for food for these sensitive species.

The monarch butterfly, a candidate species for listing under the ESA, has been found in and near the project area on multiple occasions. Individuals are likely utilizing the shade of the large riparian trees to cool down during their migratory journey through the desert Southwest. Successful reproduction has taken place in nearby areas restored with milkweed, which is the only host plant on which monarchs lay eggs, so riparian milkweed species will be included in the project. By increasing suitable habitat for the monarch, it will benefit the species, which can be found throughout the western United States.

Will the project reduce water conflicts within the watershed? If so, explain how.

Projects such as the proposed project, that maintain and improve water quality, as well as benefit multiple uses, are helpful in reducing water conflicts in the Watershed.

E.1.2. Evaluation Criterion B: Collaborative Project Planning

Strategy or Plan: Is your proposed project supported by a specific strategy or planning document? If so, identify the strategy or planning document by name and address the following questions:

When was the plan or strategy prepared and for what purpose?

To support its water planning and management responsibilities, SNWA develops and maintains a Water Resource Plan (Resource Plan). The Resource Plan projects demand and identifies a portfolio of existing and planned water supply options available to meet demands over time. First developed in 1996, the Resource Plan is reviewed annually and updated as needed. As demonstrated in previous revisions, adjustments to the Resource Plan are made to account for uncertainties such as drought, conservation achievements, resource availability, and changes in population and demand projections.

Additionally, the proposed project is supported by the WSNA Stewardship Plan (Stewardship Plan). After acquiring the property, SNWA pledged to work with stakeholders to develop a long-term stewardship plan for the property. The core team of stakeholders met from 2007 through 2010 in a series of workshops to develop the Stewardship Plan, which was published in 2011. The Stewardship Plan established a framework for appropriate land uses to maintain the integrity of the natural resources and plan for management of water resources of the valley.

What types of issues are addressed in the plan? For example, does the plan address water quantity issues, water quality issues, and/or issues related to ecosystem and watershed health or the health of species and habitat within the watershed?

The [2023 SNWA Water Resource Plan](https://www.snwa.com/assets/pdf/water-resource-plan-2023-printable.pdf) provides an overview of resource planning efforts, the current planning environment, the water resource portfolio, strategies to meet future demands, and stewardship efforts to protect the environment (<https://www.snwa.com/assets/pdf/water-resource-plan-2023-printable.pdf>).

The [Stewardship Plan](https://warmspringsnv.org/wp-content/uploads/2018/03/wsna_stewardship_plan_full.pdf) consists of an introduction and four sections, including Grounding, Biological Resources and Management, Special Management, and Implementation and Next Steps (https://warmspringsnv.org/wp-content/uploads/2018/03/wsna_stewardship_plan_full.pdf). The Grounding section addresses the history, cultural resources, hydrology and water development, and facilities management of the property. The Biological Resources and Management section covers the biodiversity of WSNA, including 28 sensitive species. This section explores the ecological and aquatic assemblages on the property, as well as riparian species, mesquite bosque, and other plant communities' management. The next section, Special Management, addresses management strategies to for the benefit and recovery of the Moapa dace and other protected species on-site. Fire management, invasive species management, and cultural resources management are also found in this section. The final section, Implementation and Next Steps, sets management priorities.

Is one of the purposes of the strategy or plan to increase the reliability of a water supply for ecological values?

SNWA proactively integrates environmental stewardship into its resource planning. The Resource Plan discusses SNWA's commitment to increase the reliability of water resources for ecological values, including planning, monitoring, and mitigation to minimize its footprint and protect water supplies, and meeting the community's current and long-term water resource needs whilst promoting conservation, renewable resources, and maintain water quality with minimal impact to the environment.

One of the main objectives of the Stewardship Plan is to ensure that management actions are consistent with the Muddy River Recovery Implementation Program (RIP). RIP's overall goal is to implement actions to promote recovery and conservation in the Muddy River ecosystem, while allowing for mitigation and minimization of potential effects affiliated with the development and use of water supplies and other activities that affect the system.

Strategy or Plan Development: Was the strategy or plan developed through a collaborative process?

The Resource Plan is prepared with collaboration from the seven SNWA member agencies, including the Big Bend Water District, the City of Boulder City, Clark County Water Reclamation, the City of Henderson, the City of Las Vegas, the Las Vegas Valley Water District, and the City of North Las Vegas.

The Stewardship Plan was developed through a collaborative process. The core team of stakeholders included SNWA, USFWS, the Nature Conservancy, and the Nevada Department of Wildlife (NDOW).

Was the strategy or plan developed as part of a collaborative process by: A watershed group, as defined in Section 6001(6) of the Cooperative Watershed Management Act? OR A water user and one or more stakeholders with diverse interests (e.g., stakeholders representing different water use sectors such as agriculture, municipal, Tribal, recreational, or environmental)?

The Resource Plan was developed with collaboration from the above-mentioned member agencies, who represent the local water and wastewater agencies in Southern Nevada.

The Stewardship Plan was developed with collaboration from the above-mentioned core team. The core team was identified by members of the RIP's Biological Advisory Committee. Biological Advisory Committee members include USFWS, NDOW, US Geological Survey, Bureau of Land Management, SNWA, Moapa Valley Water District, Coyote Springs Investment, Moapa Band of Paiutes, the Nature Conservancy, and Clark County.

Describe who was involved in preparing the plan and whether the plan was prepared with input from stakeholders with diverse interests (e.g., water, land, or forest management interests; and agricultural, municipal, Tribal, environmental, and recreation uses)?

As the wholesale water provider for Southern Nevada, SNWA takes the lead in preparing the Resource Plan. During the technical review period, member agencies provide input.

The core team of stakeholders for the Stewardship Plan included SNWA, USFWS, the Nature Conservancy, and NDOW.

Describe the process used for interested stakeholders to provide input during the development of the strategy or plan.

When the Resource Plan is ready for review and possible approval by the organization's board of directors, it is posted with the meeting agenda and all members of the public can make public comment during the meeting.

Stakeholders in the RIP provided input during the development of the Stewardship Plan, which was ultimately approved by RIP's Biological Advisory Committee.

If the strategy or plan was prepared by an entity other than the applicant, explain why it is applicable to the proposed project. Describe whether and how the applicant was involved

in the development of the strategy or plan. If the applicant was not involved in the development, explain why.

Not applicable as the Resource Plan preparation was led by the applicant.

Not applicable as the Stewardship Plan preparation was led by the applicant.

For Tribal strategies or plans that were developed collaboratively with multiple Tribal interests, but did not include collaboration with external entities, provide an explanation as to why collaboration with entities external to the Tribe were not involved in the development of the strategy or plan.

Not applicable as the applicant is not a Tribe.

Strategy or Plan Support for Project: Describe how the plan or strategy provides support for your proposed project. Does the proposed project implement a goal or need identified in the plan?

Chapter 5 of the 2023 Resource Plan, “Protecting the Environment,” describes SNWA’s stewardship efforts to conserve resources and protect the environment while minimizing conflicts with resource management.

Section 3, “Biological Resources and Management,” of the Stewardship Plan discusses biological resources management in WSNA.

Describe how the proposed project is prioritized in the referenced plan or strategy.

Chapter 5 of the Resource Plan discusses SNWA’s participation in species recovery and habitat conservation and protection. Environmental studies, including population and habitat surveys along the Muddy River and its tributaries and springs are priorities, specifically at WSNA. The proposed project at WSNA demonstrates a Resource Plan priority to for restoration at the site, including habitat for threatened and endangered species, control and eradication of invasive species, and fire prevention.

Section 3 of the Stewardship Plan explains the importance of riparian management, such as protecting existing habitat from fire and exotic plant invasion, as well as restoring riparian area along the stream to provide habitat for bird and bat species and protections for aquatic species.

E.1.3. Evaluation Criterion C: Stakeholder Support for Proposed Project

Please describe the level of stakeholder support for the proposed project. Are letters of support from stakeholders provided? Are any stakeholders providing support for the project through cost-share contributions, or through other types of contributions to the project?

Organizations that own neighboring properties have traditionally supported SNWA’s restoration projects. Letters of support (Appendix C) are provided from Clark County and USFWS. Stakeholders will not be providing cost-share; SNWA will provide all non-Federal cost-share funds.

Explain whether the project is supported by a diverse set of stakeholders, as appropriate, given the types of interested stakeholders within the project area and the scale, type, and complexity of the proposed project.

The stakeholders who provided letters of support represent municipal, environmental, and recreation uses. Additionally, the Bureau of Land Management (BLM), supports SNWA restoration projects like the proposed project. All three mentioned stakeholders are neighboring property owners to WSNA, with FWS upstream and Clark County and BLM downstream. Both stakeholders downstream are in the process of completing similar restoration projects. Also downstream is the Paiute Indian Reservation, who have historically supported these types of restoration projects.

Additional recreational beneficiaries of the proposed project in the immediate WSNA land area include the Church of Jesus Christ of Latter-day Saints Recreation Area and the Palm Creek Recreational Vehicle Park.

Is the project supported by entities responsible for the management of land, water, fish and wildlife, recreation, or forestry within the project area? Is the project consistent with the policies of those agencies?

WSNA is protected under BLM's [Southern Nevada Public Land Management Act](#) and is owned and operated by SNWA

(www.blm.gov/sites/blm.gov/files/documents/files/SNPLMA_New%20About%20Page.pdf).

SNWA also partners with NDOW on the property for various management purposes. The proposed project is consistent with applicant and stakeholder policies.

Is there opposition to the proposed project? If so, describe the opposition and explain how it will be addressed. Opposition will not necessarily result in fewer points.

There is not any known opposition to the proposed project.

E.1.4. Evaluation Criterion D: Readiness to Proceed

Describe the implementation plan for the proposed project. Include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates. This may include, but is not limited to, design, environmental and cultural resources compliance, permitting, and construction/installation.

This project will increase the size of existing riparian habitat along the Muddy River by planting approximately 12 acres with riparian species. Riparian trees to be planted include Ash, Fremont's cottonwood, Goodding's willow, and sandbar willow. The trees will be planted using propagated plants, poles, and cuttings. The vegetation will be installed in areas near surface water or high-water tables. Poles and cuttings will be collected from nearby sites. Plant materials will be inserted along the edges of the holes to the appropriate depth. Native seeds will be collected and propagated to produce Ash trees and other species. Invasive and noxious weeds will be removed and monitored to allow optimum conditions for the native trees and shrubs to survive. Weeds will be removed from the site by manual, mechanical, and chemical methods.

Table 1. Project Schedule

Milestone / Task / Activity	Planned Start Date	Planned Completion Date
Grant awarded and work on agreement Complete necessary Environmental Compliance Prepare and finalize plans for implementation Apply for necessary permits and obtain landowner approval Identify plant-material providers Procure contracts (excavation and labor contractors and plant nurseries) Procure plants Conduct biological surveys	Pre-award (Sept. 2023)	August 2024
Finalize agreement	September 2023	December 2023
Procure construction contractor Procure restoration contractor Remove invasive weeds Conduct biological surveys Complete interim financial and progress reports	January 2024	May 2024
Harvest tree poles and cuttings and prepare for planting Prepare planting areas for potted plants and seeds Conduct biological surveys Complete interim financial and progress reports	December 2024	March 2025
Install tree poles and cuttings Install potted plants Conduct biological surveys Complete interim financial and progress reports	March 2025	October 2025
Control weeds in all areas Monitor vegetation Conduct biological surveys Complete interim financial and progress reports	March 2025	October 2026
Complete final financial and progress report	December 2026	Post-performance period
Complete biological surveys	Ongoing post-award	Ongoing post-award

Describe any permits and agency approvals that will be required, along with the process and timeframe for obtaining such permits or approvals.

SNWA’s Project Manager will obtain necessary permits with assistance from one of the Environmental Biologists working on the project.

Identify and describe any engineering or design work performed specifically in support of the proposed project. If additional design is required, describe the planned process and timeline for completing the design. Priority will be given to projects that are further along in the design process and ready for implementation.

Preliminary design work has been completed internally (see Figure 1, Appendix A). SNWA has completed similar projects at WSNA in the past on smaller tributaries of the Muddy River upstream of the proposed project location. This has allowed internal SNWA staff to take previous experience and upscale the design for this proposed project. It also allows for implementation to begin immediately once contracts are in place. Additional modifications may be made in cooperation with the contractor(s) selected for the job to ensure efficiency and success. However, modifications are expected to be minor. Staff will procure a small engineering design contract for guidance on excavation and drainage.

Does the applicant have access to the land or water source where the project is located? Has the applicant obtained any easements that are required for the project? If so, please provide documentation. If the applicant does not yet have permission to access the project location, please describe the process and timeframe for obtaining such permission.

Yes, the applicant has access to the proposed project area as SNWA owns the land on which the proposed project will take place and operates WSNA.

Identify whether the applicant has contacted the local Reclamation office to discuss the potential environmental and cultural resource compliance requirements for the project and the associated costs. Has a line item been included in the budget for costs associated with compliance? If a contractor will need to complete some of the compliance activities, separate line items should be included in the budget for Reclamation's costs and the contractor's costs. Describe any new policies or administrative actions required to implement the project.

Staff contacted the local Reclamation office to discuss a baseline for potential costs associated with environmental and cultural compliance. The proposed budget contains a line item for \$20,000 for associated costs. SNWA does not anticipate any new policies or administrative action required to implement the project.

Is the project completely or partially located on Federal land or at a Federal facility?

No, the proposed project is not completely or partially located on Federal land or at a Federal facility.

E.1.5. Evaluation Criterion E: Performance Measures

Please describe the performance measures that will be used to quantitatively or qualitatively define actual project benefits upon completion of the project. Include support for why the specific performance measures were chosen. All applicants are required to include information about plans to monitor improved streamflows, aquatic habit, or other expected project benefits. Describe the plan to monitor the benefits over a 5-year period once the project has been completed. Provide details on the steps to be taken to carry out the plan.

As stated in Section 5, Technical Performance Measures, it can take several years for riparian habitat to mature and be utilized by wildlife, so the benefits of this project will not be fully realized in the three-year project period. Thus, performance measures will occur in two timeframes and across two categories. The first will occur in the three-year project period and measure planting success and other site criteria. The second will be conducted during the project period but then will continue for five years afterwards and measure benefits to wildlife.

1. Measures of Planting Success and Other Site Criteria

- **Survival Data. Propagated Plants.** Survival data will be reported as the percent of living plants of the total number installed in the project site(s). *Poles and cuttings.* Data will be reported as the approximate percentage of installed poles or cuttings still alive at the end of the first growing season.
- **Species Richness.** Species richness is the number of species (native and non-native) at the site(s). These data will be compared to the species richness prior to the planting performed as part of this project.
- **Photo Points.** Photo points will be established at the project site(s) before any work is initiated, and then photos will be taken after various treatments such as ground preparation and planting have been implemented.
- **Soil Erosion.** Soils exposed by project actions will be susceptible to erosion by water or wind. Straw wattles will be installed next to streams to protect them from sediment during rain events. Qualitative measurements of erosion (soil and plant litter deposits, breaches, pedestalling, and rilling) will be taken after storms.
- **Irrigation.** Trees and understory plants not planted in wet soils must be irrigated until established. Irrigation will be monitored and repaired routinely to maximize survival.

2. Measures of Benefits to Wildlife

- **Biological Surveys.** The true measure of project benefits will be use of the new riparian and mesquite vegetation by the targeted species, especially the southwestern willow flycatcher (riparian) and yellow-billed cuckoo (both). Surveys are conducted in the breeding season using federal protocols. For the flycatcher, standard measurements are number of territories, pairs, nests, and fledged young. For the cuckoo, results are measured in detections and then in detections across survey periods, yielding possible, probable, or confirmed breeding territory designations. Results will be analyzed at the property level for overall increases, and new sites will be compared against existing sites.

E.1.6. Evaluation Criterion F: Presidential and Department of Interior Priorities

E.1.6.1 Subcriterion No. E1: Climate Change

Climate Change: E.O. 14008 emphasizes the need to prioritize and take robust actions to reduce climate pollution; increase resilience to the impacts of climate change; protect public health; and conserve our lands, waters, oceans, and biodiversity.

How will the project build long-term resilience to drought? How many years will the project continue to provide benefits? Please estimate the extent to which the project will build resilience to drought and provide support for your estimate.

Riparian areas perform vital functions in watersheds. Enhancing and expanding these corridors will help increase flood water retention and groundwater recharge, helping to reduce drought impacts. Additionally, by excavating and planting native species close to the water table and increasing patch sizes, the proposed project will help increase the drought resiliency of these important habitat types and the wildlife that relies on them. The riparian species proposed to be planted in this project (Ash, Goodding's willow, sandbar willow, and Fremont's cottonwood) have lifespans of up to 50 years or more, so it is expected that the benefits will last at least this long. Natural reproduction of these species may extend the timeframe of these benefits even longer.

In addition to drought resiliency measures, does the proposed project include other natural hazard risk reductions for hazards such as wildfires or floods?

Restoration projects support the watershed by reducing flooding and erosion. The proposed project will also include the removal of non-native, and dead and diseased vegetation within the project area, which will reduce the chances of wildfires in the area.

Will the proposed project establish and use a renewable energy source?

The proposed project will not establish and use a renewable energy source. Applicant SNWA is committed to conserving energy and utilizing renewable resources, when possible, to ensure energy is available to meet southern Nevada's security and economic needs. SNWA voluntarily committed to meet 50 percent of its energy needs through renewable resources by 2030, which parallels Nevada's recently revised Renewable Energy Portfolio Standards. The savings generated by the proposed project will allow the SNWA to further reduce its non-renewable market purchases, increasing the emphasis on renewable energy.

Will the proposed project reduce greenhouse gas emissions by sequestering carbon in soils, grasses, trees, and other vegetation?

New trees, shrubs, and other plants will be planted, all of which perform some level of carbon sequestration.

Does the proposed project include green or sustainable infrastructure to improve community climate resilience such as reducing the urban heat island effect, lowering building energy demands, or reducing the energy needed to manage water? Does this infrastructure complement other green solutions being implemented throughout the region or watershed?

The proposed project builds on the past progress of SNWA which has restored 57 acres of upland, riparian, and wetland habitat at WSNA. These areas have been transformed from being dominated by invasive species and degraded by erosion, to providing habitat to a variety of native wildlife species.

Does the proposed project seek to reduce or mitigate climate pollutions such as air or water pollution?

The riparian plantings will assist in the uptake of nutrients and metals from the Muddy River, as well as stabilize the banks of the channel. This will reduce erosion and the amount of TSS flowing downstream into Lake Mead, the primary drinking water supply for southern Nevada.

Does the proposed project have a conservation or management component that will promote healthy lands and soils or serve to protect water supplies and its associated uses?

Excavating streambanks will prevent banks from caving into the river and increasing sediment load. Revegetating the banks with native vegetation will reduce sediment from flowing into the river.

E.1.6. 2 Subcriterion No. E2: Disadvantaged or Underserved Communities

Disadvantaged or Underserved Communities: E.O. 14008 and E.O. 13985 affirm the advancement of environmental justice and equity for all through the development and funding of programs to invest in disadvantaged or underserved communities.

Will the proposed project serve or benefit a disadvantaged or historically underserved community? Benefits can include, but are not limited to, public health and safety through water quality improvements, new water supplies, or economic growth opportunities.

Although the proposed project does not directly benefit a specific disadvantaged or historically underserved community, it does indirectly benefit these communities due to the water quality benefits downstream.

Describe, in detail, how the community is disadvantaged based on a combination of variables that may include the following: The [Nevada median household income is \\$65,686](https://www.census.gov/quickfacts/NV) in 2021 dollars, per the U.S. Census Bureau (<https://www.census.gov/quickfacts/NV>). In looking at a breakdown of median household income by race in Las Vegas and surrounding cities or areas of unincorporated Clark County in the SNWA service area and Moapa, it can be surmised that households earning less than 100 percent of the statewide median household income will indirectly benefit from the proposed project. Table 2 below outlines the median household income by race.

Table 2. Median Household Income by Race: Cities in Las Vegas MSA and Moapa

	Las Vegas	Henderson	North Las Vegas	Enterprise	Spring Valley	Sunrise Manor	Moapa
American Indian or Alaska Native	\$36,574	\$58,953	\$58,333	\$61,596	\$86,484	\$48,221	\$47,888
Asian	\$67,142	\$76,006	\$82,302	\$83,644	\$65,949	\$66,250	
Black or African American	\$36,153	\$53,828	\$49,414	\$62,698	\$48,701	\$28,837	
Hispanic or Latino	\$50,111	\$70,451	\$56,034	\$78,213	\$57,189	\$48,332	\$65,655
Native Hawaiian or Pacific Islander	\$53,000	\$57,083	\$63,750	\$108,160	\$72,054	\$43,704	
White	\$65,875	\$78,371	\$65,606	\$83,429	\$61,417	\$45,170	\$66,184

Groups highlighted in yellow have a median household income below Nevada’s state median household income. City median household data from Data Commons for [cities near Las Vegas](https://datacommons.org/place/geoId/3240000) and [Moapa](https://datacommons.org/place/geoId/3247840?category=Equity) utilizing U.S. Census data (<https://datacommons.org/place/geoId/3240000> and <https://datacommons.org/place/geoId/3247840?category=Equity>).

If the proposed project is providing benefits to an underserved community, provide sufficient information to demonstrate that the community meets the underserved definition in E.O. 13985, which includes populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life.

To see which underserved communities will indirectly benefit from the proposed project, consider a snapshot of population demographics in the county. Table 3 below outlines these demographics. Additionally, 32.3 percent of residents in Clark County identify as Hispanic or Latino. ([U.S. Census Bureau Quick Facts, Clark County, Nevada](https://www.census.gov/quickfacts/fact/table/clarkcountynevada/RHI225219#RHI225219) <https://www.census.gov/quickfacts/fact/table/clarkcountynevada/RHI225219#RHI225219>).

Table 3. Underserved Populations by Race, Percentage of Clark County Population

Black or African American, alone	13.6%
American Indian and Alaska Native, alone	1.3%
Asian, alone	10.9%
Native Hawaiian or Other Pacific Islander, alone	1.0%
Two or More Races	5.3%

E.1.6.3 Subcriterion No. E.3: Tribal Benefits

Tribal Benefits: The Department of the Interior is committed to strengthening tribal sovereignty and the fulfillment of Federal Tribal trust responsibilities. The President’s memorandum, Tribal Consultation and Strengthening Nation-to Nation Relationships, asserts the importance of honoring the Federal government’s commitments to Tribal Nations.

Does the proposed project directly serve and/or benefit a Tribe? Will the project improve water management for an Indian Tribe? Due to the water quality benefits, the project also benefits downstream Tribal water users in the Lower Basin, including the Fort Mojave Indian Tribe, Colorado River Indian Tribes, Chemehuevi Indian Tribe, Quechan Indian Tribe, and Cocopah Indian Tribe. Additionally, the Southern Paiute Tribe will indirectly benefit as the nation is in the SNWA service area.

Does the proposed project support Reclamation’s Tribal trust responsibilities or a Reclamation activity with a Tribe?

Due to the water quality benefits, the proposed project supports Reclamation’s Tribal trust responsibilities with downstream Tribal water users in the Lower Basin.

Does the proposed project support Tribal resilience to climate change and drought impacts or provide other Tribal benefits, such as improved public health and safety, by addressing water quality, new water supplies, or economic growth opportunities?

The proposed project provides indirect public health benefits due to improved water quality.

7. Project Budget: Funding Plan

SNWA as an organization is funded by diverse sources, including a quarter-cent sales tax, connection fees, commodity fees, and reliability charges. These revenue sources provide the organization with a mix of funding sources, which help ensure the financial stability and capacity of the organization. Funding for it work at WSNA is provided by an expansion bond, which ensures the financial stability of the work conducted at the site and several other SNWA properties. Matching funds for this project will be provided by SNWA. Since no non-federal cost share will be provided by a source other than the applicant, no letters of commitment are required. The value of third-party contributions noted in Tables 4 and 5 is in the form of in-kind contributions of volunteer labor and is described in the Budget Narrative section.

8. Project Budget: Budget Proposal

Table 4. Summary of Non-Federal and Federal Funding Sources Table

FUNDING SOURCES	AMOUNT
Non-Federal Entities	
1 SNWA	\$205,306
2 Third-party contributions (volunteer labor/trees)	\$42,470
Non-Federal Subtotal	\$247,776
REQUESTED RECLAMATION FUNDING	\$743,329

Table 5. Total Project Cost Table

SOURCE	AMOUNT
Costs to be reimbursed with the requested Federal funding	\$743,329
Costs to be paid by the applicant	\$205,306
Value of third-party contributions (volunteer labor/trees)	\$42,470
TOTAL PROJECT COST	\$991,105

Table 6. Budget Proposal

Summary			
6. Budget Object Category	Total Cost	Federal Estimated Amount	Non-Federal Estimated Amount
a. Personnel	\$122,367		
b. Fringe Benefits	\$73,091		
c. Travel	\$5,985		
d. Equipment	\$31,250		
e. Supplies	\$38,012		
f. Contractual	\$420,430		
g. Construction	\$237,500		
h. Other Direct Costs	\$62,470		
i. Total Direct Costs	\$991,105		
i. Indirect Charges	\$0		
Total Costs	\$991,105	\$743,329	\$247,776
Cost Share Percentage		75%	25%

9. Project Budget: Budget Narrative

All costs are direct and necessary for program implementation. The non-federal contribution is 25 percent; the federal contribution is 75 percent.

Salaries and Wages

The Preserve Restoration Ecologist will serve as Project Manager. He will develop and implement the project plan and oversee contract development. He will purchase supplies, assist with propagation, and coordinate and manage contractor efforts. The Project Manager will also recruit and organize volunteers for the proposed project, as well as conduct site and plant monitoring to ensure success. He will spend an estimated 560 hours on the proposed project; his current wage is \$69/hour. The Engineering Division Manager will assist procuring the engineering contract for final design. He will spend an estimated 40 hours on the proposed project; his current wage is \$102/hour. SNWA’s Archaeologist will conduct all cultural resource compliance work needed for the proposed project, spending an estimated 120 hours at a rate of \$57/hour. Warm Springs Maintenance Coordinator will assist with contractor and volunteer training and oversight. He will spend an estimated 240 hours on the proposed project; his rate is

\$41/hour. Five biologists will assist with the proposed project with total estimated hours of 960. Biologists will assist with contractor and volunteer communication, supply acquisition, and plant monitoring and animal surveys. The average hourly rate for a Biologist II is \$66/hour, while the average rate for a Biologist I is \$54/hour.

Fringe Benefits

58.63 percent SNWA benefits for permanent, full-time employees. The breakdown is provided in Table 7.

Table 7. Fringe Benefit Breakdown

OPEB Expense	1.45%
FICA	8.49%
Unemployment Premium	.11%
Group Health Insurance	13.71%
Retirement	34.87%
Total	58.63%

Travel

Most staff that will work on this project are based in SNWA's Las Vegas office, and WSNA is approximately 60 miles away, or 120 miles roundtrip. Staff members will make 75 trips to the property for this project for a total of 10,000 miles at the federal rate (2023) of \$0.665. These trips will be conducted to propagate plants in the greenhouse; oversee site preparation; conduct cultural resource and other needed clearance surveys; perform contractor oversight; coordinate planting events; and soil, site, and plant monitoring.

Equipment

Dumpster rental is necessary throughout the proposed project for proper removal of vegetation from the worksites. An estimated 50 dumpsters will be rented over the course of the proposed project. Each rental is \$625, which includes delivery and takeaway. An invoice from a previous project is included in Appendix D.

Supplies and Materials

The supply budget is estimated at \$28,012. Estimated staff purchases include:

- Various propagation materials (pots, trays, soil) costing an estimated \$3,000 to grow plants for the project.
- 4,000 linear feet of fencing fabric to construct cages for tree protection at \$0.99/foot for a total cost of \$3,960.
- 1,400 fence posts at \$4.45 each for plant cages for a total cost of \$6,230.
- 6,000 linear feet of weed barrier fabric at a cost of \$0.35/foot to protect areas from weeds for a total cost of \$2,100.
- 5,000 steel staples for weed barrier fabric at a cost of .10/each for a total cost of \$500.
- 120 rolls of straw wattles to prevent sediment from entering the river for \$33.43 each for a total cost of \$4,012.
- 16 bundles of stakes to secure straw wattles for \$53.63 each for a total cost of \$810.
- Three irrigation pumps at a cost of \$800 each for a total cost of \$2,400.

- Irrigation tubing at a cost of \$5,000 to construct irrigation systems.
- Irrigation fittings, emitters, and glue at a cost of \$5,000 to construct irrigation systems.
- Miscellaneous irrigation materials at a cost of \$5,000 to construct irrigation systems.

Costs were calculated from receipt and invoices (provided in Appendix D), as well as the Project Manager's experience with previous projects.

Contractual

Several contracts are required for the proposed project. An engineering contract, \$50,000, to provide guidance on the final design aspects for excavation and drainage will be procured through the organization's standard RFP process. The cost of this contract is based on internal engineering estimates.

A contract with the Nevada Division of Forestry (or equivalent) will be necessary to grow and supply plant materials for the proposed project. There are only two nurseries in the area with the ability to supply the required native plants. This contract is estimated at \$28,000 and the cost estimate was generated from the contractor's invoice on a previous project.

A labor contract with Soil-Tech (or equivalent) will be required for site preparation, weed removal, and irrigation installation for an estimated \$342,000. The cost estimate is based on the current contract in place through July 2023 (low bid) and a similar project with average costs for this contractor at \$19,000/month. This contractor would work on-site for a total of 18 months during six planting seasons.

An additional labor contact with the Nevada Division of Forestry Conservation Camp Crew would be required. An estimated 50 days of work at \$1,008.60/day for a crew of 10 workers and a supervisor will be required, for a total contracted amount of \$50,430. SNWA has a cooperative agreement in place with DOF for Conservation Camp Crews through June 2024 for the daily rate, which includes transportation of the crew.

Please see Appendix D for cost support.

Construction - Contract

A construction contract, Big Horn (or equivalent), will be required for excavating stream banks and transporting soil to various parts of the property. The contractor will use a mid-sized excavator (track hoe) and a dump truck. This contract is estimated to be \$237,500 and will be procured through a formal bidding process. An invoice from a smaller project with Big Horn is included in Appendix D as cost support.

Other Direct Costs

- **Third-Party In-Kind Contributions**
 - **Volunteer Labor:** A portion of the labor to complete this project will be provided in-kind through volunteer hours. Volunteers will plant vegetation associated with this project, including container plants and poles, and may assist with propagation. Based on previous restoration efforts that used volunteer labor, it is

anticipated that 200 volunteers (16 years or older) will donate 1500 hours. [Independent Sector's Nevada Volunteer Hourly Rate is \\$26.18](#), providing an in-kind match of \$39,270 (<https://independentsector.org/resource/value-of-volunteer-time/>). The Project Manager has recruited volunteer groups for previous planting events at WSNA, so he will draw on his connections in the area.

- **Tree Donation:** [Ecoculture](#), an environmental organization, based out of Flagstaff, AZ, has pledged to donate 4,000 trees to the proposed project (<https://ecoculture.us/>). Ecoculture's Ecologist, Jacob Cowan, has provided a letter of commitment valuing the trees at \$3,200. The letter is included in Appendix C.
- **Environmental and Regulatory Compliance Costs**
Please review responses in the Environmental and Cultural Resources section. Staff discussed the proposed project generally with a representative from the local Reclamation office to set a baseline for possible environmental compliance costs. The proposed project budget includes \$20,000 to cover possible costs associated with environmental and cultural resource compliance.

Total Direct Costs

Reclamation is requested to contribute \$743,329 toward direct costs. SNWA will provide a matching contribution of \$247,776, with third-party volunteer contributions as noted above.

Indirect Costs

Not applicable. All direct costs align with eligible categories. SNWA does not have a federally negotiated indirect cost rate agreement. No funds are requested for indirect costs.

10. Environmental and Cultural Resources Compliance

Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.

The proposed project would revegetate and restore approximately 12 acres of riparian corridors along the Muddy River within WSNA. The WSNA contains more than 20 perennial springs that form the headwaters of the Muddy River and provide habitat for several federally protected and sensitive species. Currently, the near vertical riverbanks are almost entirely devoid of desirable trees and other vegetation in many areas and are unstable with portions of the bank sloughing off into the Muddy River. The proposed project would widen the riparian corridor from a current width of three feet to up to 30 feet along both sides of the deeply incised Muddy River main channel, stabilize the riverbanks, expand the tree zone within the excavated area, and restore native riparian trees and other vegetation.

The Muddy River riparian corridor improvements and restoration would involve earth-disturbing work including first removing non-native vegetation, then excavating the steep banks to widen

the riparian corridor along both sides of an approximate one-third mile length of the Muddy River, and finally revegetating the excavated area with native trees and other vegetation (Figure 4 Appendix A (streambank improvement steps)). The first step would be the removal of existing vegetation including palm trees, tamarisk trees, and some desirable plants. These trees and other vegetation would be grubbed out or cut down, placed in a dump truck, and then delivered to a dumpster on the WSNA. The contents of the dumpster would be disposed of at an authorized landfill. Some of the plant material may be processed through a chipper-shredder machine and the processed material utilized as mulch on the property. The next step would be the excavation of the steep banks with a tracked excavator. All excavated soil would be deposited into dump trucks and transported to nearby abandoned farm fields (two sites) on the WSNA where the soil would be spread out and later revegetated. Trees and understory vegetation would then be established in the excavated area and bare slopes. Revegetation would include the excavation of holes for various sizes of propagated plants, poles, and cuttings. The holes would be excavated using power augers or hand shovels. Trees and other plants installed on the newly excavated benches along the river in moist soil from ground water would not require irrigation. The bare slopes and soil laydown areas would be revegetated with native plants that will be irrigated until established. Small to medium sized equipment, including tracked excavators (large and mini), water trucks, backhoes, dump trucks, front-end loaders, skid-steer loaders, chipper-shredders, power augers, chainsaws, and other hand tools would be used at the site, as appropriate.

Soils exposed by project activities would be susceptible to wind and water erosion. Water would be used to control dust during earth-disturbing activities. Rice straw wattles (weed-free) would be installed next to the Muddy River to prevent soil sediment from entering the water. Impacts to soil and air quality would be minimal and temporary. The long-term impacts to water quality would be beneficial due to expanded riparian corridors that would reduce erosion, improve water quality, and provide wildlife habitat. Onsite water would be used for dust control and for irrigation so there would be minimal impacts to water quantity. The proposed project would temporarily increase ambient noise levels during restoration activities, but no long-term impacts are expected. To reduce short-term impacts on bird species, earth-disturbing work would either be conducted outside the nesting season and/or a biologist would conduct clearance surveys prior to the work and establish a buffer if a nest was found. While some of the restoration work may have negative impacts in the short-term, the long-term impacts would be positive. Following proposed project revegetation, the riparian corridor areas would expand potentially suitable nesting habitat, connect adjacent patches of riparian vegetation, and improve habitat quality of these stands for bird species, including the federally endangered southwestern willow flycatcher and the threatened yellow billed cuckoo. Replacing non-native vegetation with native vegetation would increase sunlight along the river and thus primary productivity (e.g., increase nutrient input by leaf fall), which would in turn increase food supplies for the endangered Moapa dace that are endemic to the WSNA thermal springs, streams, and the Muddy River. A Secretary of Interior-qualified cultural resources specialist would monitor earth disturbing activities.

Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?

Three federally threatened or endangered species have been documented within the proposed project: the federally endangered southwestern willow flycatcher, threatened yellow-billed

cuckoo, and endangered Moapa dace. Both birds have been documented as nesting within the WSNA; however, there is no designated critical habitat for either species in the project area. The endangered Moapa dace occurs within the proposed project area in the thermal springs and streams that form the headwaters of the Muddy River. Although the USFWS has not designated critical habitat for the Moapa dace, any proposed project activities that may impact Moapa dace or its aquatic habitat must be conducted in compliance with the USFWS's *Recovery Plan for the Rare Aquatic Species of the Muddy River Ecosystem*.

With its focus on restoration, the proposed project would benefit both bird species by increasing the amount and quality of potentially suitable nesting habitat within the WSNA. To minimize short-term disturbances, earth-disturbing work will occur outside of the breeding season and/or a biologist will conduct clearance surveys and buffers would be established around nests.

The proposed project activities would avoid direct impacts to aquatic habitat of the Moapa dace. However, the riparian restoration work would improve Moapa dace habitat by replacing non-native and invasive vegetation with native vegetation that would increase sunlight and thus primary productivity (e.g., increase nutrient input by native tree leaf fall), which would in turn increase food supplies for the endangered Moapa dace and reduce wildfire risk and impacts.

Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as “Waters of the United States?” If so, please describe and estimate any impacts the proposed project may have.

The proposed project area contains thermal springs, streams (that are tributaries to the Muddy River), and the Muddy River that are “Waters of the United States.” However, the riparian corridor improvements would not directly impact these waters. Additionally, the proposed project activities would not discharge dredged or fill material into any “Waters of the United States.”

When was the water delivery system constructed?

Analysis of historic plat maps and water rights filings indicates that concrete irrigation ditches across the site were constructed after 1948 to deliver water. However, the proposed work would not impact those ditches.

Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)?

The proposed project would not result in the modification of an irrigation system.

Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places?

Fifteen cultural sites within the WSNA are eligible for listing on the National Register of Historic Places. No cultural sites are located within the proposed riparian corridor improvement area or the two laydown areas for excavated soil.

Are there any known archeological sites in the proposed project area?

There are no known archaeological sites in the proposed project area.

Will the proposed project have a disproportionately high and adverse effect on low income and minority populations?

The proposed project would not have a disproportionately high and adverse effect on low income and minority populations.

Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts to tribal lands?

The proposed project would not limit access to and ceremonial use of Indian sacred sites and would not result in any adverse impacts on tribal lands.

Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?

The proposed project would remove noxious weeds and non-native invasive species and would reduce seed sources for noxious weeds and non-native invasive species in the riparian project area at WSNA. Equipment would be free of noxious weeds and non-native invasive species prior to arriving at the proposed project area and prior to departing. Therefore, the proposed project would not contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species.

11. Required Permits or Approvals

As discussed in Evaluation Criterion D, SNWA's Project Manager will obtain necessary permits with assistance from one of the Environmental Biologists working on the project.

12. Overlap or Duplication of Effort Statement

There is no known overlap between the proposed project and any other active or anticipated proposals or projects. This project proposal has not been submitted for funding consideration to any other potential funding source.

13. Conflict of Interest Disclosure

To the best of our knowledge, no actual or potential conflict of interest exists at the time of submission. If awarded, SNWA will disclose, in writing, any conflicts of interest that may arise during the life of the award.

14. Uniform Audit Reporting Statement

SNWA was required to complete a Single Audit for the fiscal year ending June 30, 2021. SNWA's EIN is 88-0278492 and the report is available through the Federal Audit Clearinghouse website.

15. Letters of Support

Attached in Appendix C.

16. Official Resolution

An official resolution authorizing the submission of this proposal and confirming the subject matching requirements will go before the SNWA Board of Directors at its May 18, 2023, meeting. A copy will be forwarded to Reclamation at that time, as communicated to the Program Coordinator.

17. Unique Entity Identifier

SNWA maintains an active registration in SAM.gov. Its Cage Code is 3NRT9. SNWA's SAM Unique Identifier is SM1CPB4X7E88.

18. Supporting Documents: Appendices A-D

All appendices are included as attachments via grants.gov.

Appendix C
Letters of Support

Southern Nevada Water Authority
Muddy River Riparian Corridor Improvements at Warm Springs Natural Area

WaterSMART Environmental Water Resources Projects for Fiscal Year 2023 Application



DES
**DEPARTMENT OF ENVIRONMENT
AND SUSTAINABILITY**



4701 W. Russell Road 2nd Floor
Las Vegas, NV 89118-2231
Phone: (702) 455-5942 • Fax: (702) 383-9994
Marci Henson, Director

March 22, 2023

Robin Graber
Bureau of Reclamation
Water Resources and Planning Office
PO Box 25007, MS 86-69200
Denver, CO 80225

Sent via email to: rgraber@usbr.gov

Re: Southern Nevada Water Authority Restoration Grant Application

Dear Ms. Graber:

I am pleased to provide this letter to express our support for the Southern Nevada Water Authority's (SNW A) restoration grant application to conduct riparian and mesquite bosque habitat restoration at the Warm Springs Natural Area.

The Warm Springs Natural Area is located along the Muddy River in southern Nevada, a very rare riparian ecosystem that provides an oasis for species amidst an otherwise harsh desert environment. Native trees along the Muddy River provide important nesting habitat for birds including the endangered southwestern willow flycatcher and the threatened, yellow-billed cuckoo, while providing shade and mitigating water temperatures for native stream and river species. However, riparian habitat along the Muddy River has been significantly reduced over the last century due to development, agriculture, fire, and the lowering of the regional aquifer. This loss of desert riparian habitat has impacted many bird and fish species native to the region.

SNW A, Clark County, and the Bureau of Land Management all administer lands along the Muddy River and management of these lands is for the benefit of native bird and fish species. SNWA's proposed restoration efforts would complement ongoing work conducted by SNWA, Clark County, and the Bureau of Land Management. These agencies have a history of working together to collaboratively restore habitat along the Muddy River and enhance conditions for native species and the SNWA's proposed restoration work would expand on and further enhance these efforts.

Clark County encourages you to move this proposal forward for funding. Please feel free to contact me at 702-455-3118 should you have any questions or need additional information.

Sincerely,

Marci D. Henson, Director



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Southern Nevada Fish and Wildlife Office
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130



March 27, 2023

Memorandum

To: Robin Graber
Water Resources and Planning Office
Bureau of Reclamation
Denver, Colorado

From: Field Supervisor
Southern Nevada Fish and Wildlife Office
Las Vegas, Nevada

Subject: Memorandum of Support for the Southern Nevada Water Authority Grant
Application to Restore Riparian Habitat of the Muddy River

**GLEN
KNOWLES**

Digitally signed by GLEN
KNOWLES
Date: 2023.03.27 17:53:05
-07'00'

This memorandum is provided on behalf of the Southern Nevada Water Authority (SNWA) in support of their 2023 grant application to restore riparian habitat along the Muddy River in Clark County, Nevada. The habitat of significant restoration need occurs in the mainstem Muddy River (e.g., South Fork, North Fork, among other areas) where thermal, headwater springs support a suite of endemic water-dependent invertebrate and vertebrate taxa, including the endangered Moapa dace (*Moapa coriacea*) and Southwestern willow flycatcher (*Empidonax traillii extimus*).

Significant and similar restoration of habitat has already occurred on adjacent lands managed by the U.S. Fish and Wildlife Service on the Moapa Valley National Wildlife Refuge. Recent acquisitions of riparian habitats by SNWA affords an excellent opportunity to restore, almost completely, the headwaters of the Muddy River. Riparian restoration in this system is especially important given the extreme local endemism, and the importance of riparian vegetation in maintaining ecological interactions and suitable water quality parameters associated with the thermal streams.

The Southern Nevada Water Authority plans to focus on restoration of riparian habitat along the mainstream Muddy River, an area of significant need, in which invasive vegetation negatively impacts native species, and limits recovery of listed species. We believe the project would accelerate recovery of the Muddy River species by expanding the previously restored habitats on the Moapa Valley National Wildlife Refuge.

We fully support the subject proposal and look forward to coordinating with the Southern Nevada Water Authority, a longstanding partner, on these critical recovery efforts. Please contact Michael Schwemm of our office if you have questions or need additional information at (702) 515-5079 or via email at Michael_Schwemm@fws.gov.



To: Bureau of Reclamation
From: EcoCulture
Date: Mar 24, 2023

Hello,

This letter is to confirm commitment to support the Southern NV Water Authority in their restoration project at Warm Spring Natural Area. EcoCulture will provide 4,000 trees of six riparian species at no cost. The trees will be grown for 6-9 months in the NAU Research Greenhouse. The total value of the trees is \$3,200 at \$0.80 per tree. The trees will be delivered to WSNA in the Spring of 2024, exact dates to be determined.

Thank you,

A handwritten signature in black ink, appearing to read "Jacob Cowan", is placed over a light gray rectangular background.

Jacob Cowan, Ph.D.

Ecologist, EcoCulture: The Restoration Network

(916) 300-9847

jacob.cowan@ecoculture.us