

WaterSMART

Environmental Water Resources Projects for FY 2022

Funding Opportunity Announcement No. R22AS00026

Category A

Lower Logan River Trapper Park River Restoration Project Logan, Utah



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Technical Proposal and Evaluation Criteria

Executive Summary

Date: December 9, 2021

Applicant: Cache Water District
Logan City, Cache County, Utah
Category A Applicant

Project Title: Lower Logan River Trapper Park River Restoration Project

Project Summary:

This is a collaborative project by several entities that desire to restore approximately 11,000 feet of the Logan River near Trapper Park in Logan City, Cache County, Utah. In addition to benefitting the ecosystem and community as a whole, it would serve as a demonstration project of how river restoration can be accomplished in a mixed development and agricultural area as a joint cooperative effort between agricultural, development, commercial, local water district, state and federal agencies, and special interest groups. Improvements include replacing a diversion structure; piping the existing canal; removing old car bodies, concrete rubble, car tires, etc.; improving ecological conditions on lands in a recently created river corridor conservation easement; and improving in-channel habitats and stabilizing channel banks. The Cache Water District, the project sponsor, is requesting funding to assist in the proposed river restoration project which would restore channel habitats, provide a sustainable riparian habitat, improve water quality, construct a fish-friendly diversion structure in cooperation with Trout Unlimited, provide access for recreation, and conserve water. Other collaborative parties include Logan River Blacksmith Fork Irrigation Company; Willow Lakes Land Holdings, LLC; iFIT Health & Fitness, Inc.; Logan City; US Army Corp of Engineers; and the Utah Division of Water Resources. A technical description of the project is defined below.

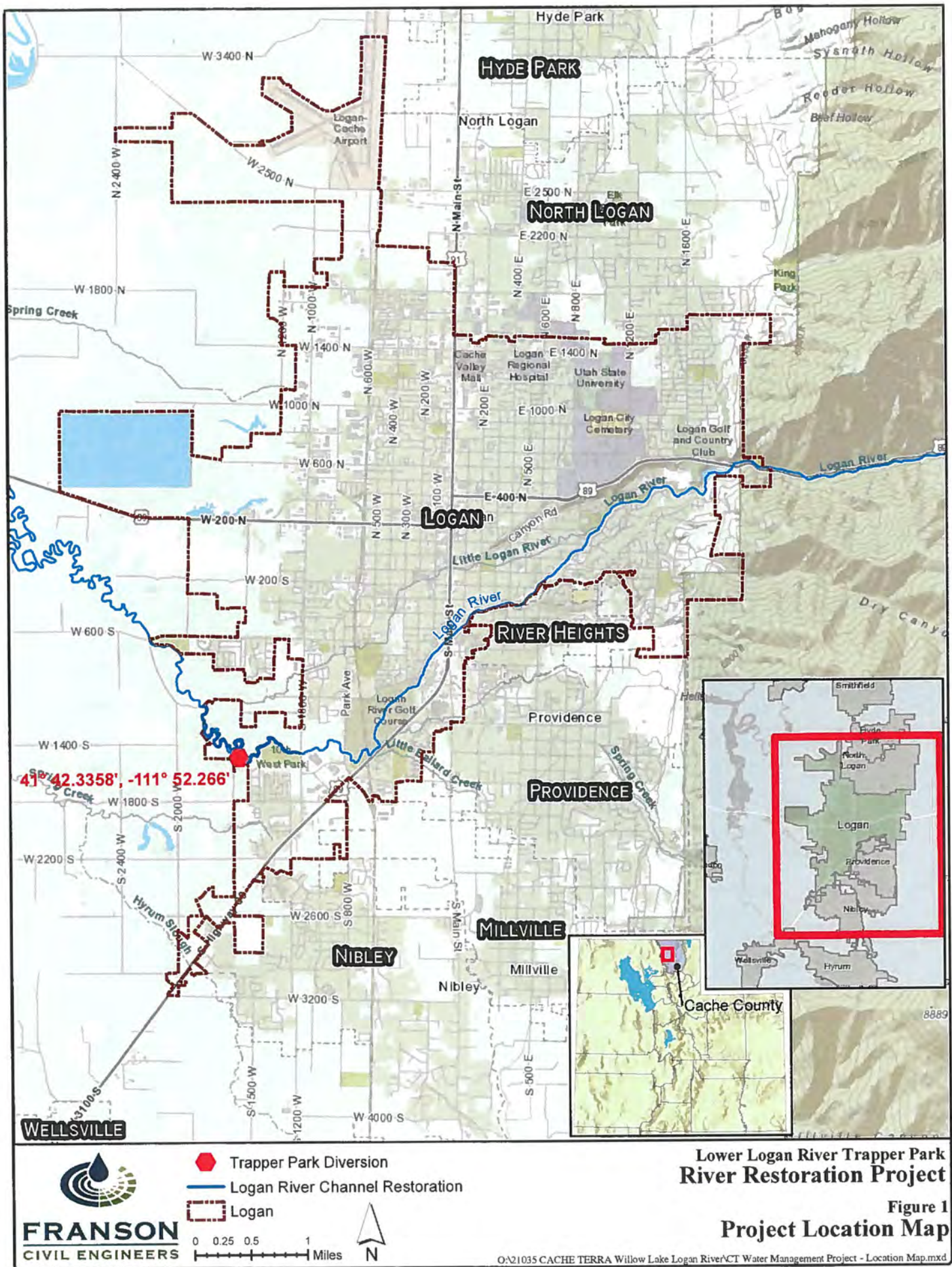
Approximate Length: 18-24 months from award of project

Completion Date: June 2024

Federal Facility: The project is not located on a federal facility.

Project Location

The Lower Logan River Trapper Park River Restoration Project originates on the Logan River in Trapper Park in southwest Logan City, Cache County, Utah, as shown in Figure 1. The project latitude is approximately 41°42.3358' North and longitude is -111°52.266' West.




Technical Project Description

Cache Water District (CWD), along with the Logan River Blacksmith Fork Irrigation Company (LRBFIC); Willow Lakes Land Holdings, LLC; iFIT Health & Fitness, Inc.; Logan City; US Army Corp of Engineers (ACOE); and the Utah Division of Water Resources (UDWRe) are collaborating on this project, which would provide combined benefits to each entity as well as to support CWD's purpose to *"facilitate the long-term conservation, development, protection, distribution, management and stabilization of water rights and water supplies, which also includes the natural stream environment."* Each of these public and private entities have either ownership or jurisdiction over this section of the Logan River and are working jointly to improve the section. This proposed project would be in conjunction with efforts by the CWD and its awarded NRCS PL-566 project, which is in the planning phases of evaluating water management on the Crockett Distribution System. The proposed project would provide additional improvements to this river section and further improve its water quality.

The proposed project would act as a demonstration project by showing how diverse interest groups of agricultural, development, commercial, water district, state and federal agencies, and special interest groups can join together to successfully complete a beneficial project for the common good. The project proposes to restore approximately 11,000 feet on the north side of the Logan River and approximately $\frac{3}{4}$ of that on the south side that has been damaged by years of agricultural encroachment, over grazing, and encroachment by invasive plant species (crack willows <salix fragilis>), which have prevented or eliminated mid-level and ground level vegetation and other native species. Coordinating with the UDWRe and the ACOE, strategic areas focusing on forested wetlands, palustrine wetlands, and potential Ute-ladies'-tresses habitat would be targeted for enhancement. Specific project features and their benefits related to river restoration are identified below as shown in Figure 2:

- Stabilize the LRBFIC's diversion with an approximately 80-foot by 20-foot rock structure to prevent a downstream pool from head cutting further upstream and affecting the natural diversion of the river. This would also allow for the continued free passage of fish and recreationists and enhance habitat for aquatic insects and sculpin in this section of the river by providing further diversification.
- Eliminate the need to access the river with equipment to maintain the diversion of water thereby protecting the channel banks and bed from mechanical damage on a regular basis. Additionally, the use of rocks to stabilize the existing natural flow diversion will create habitat for invertebrates and help restore some of the aquatic diversity disrupted by the removal of the car bodies.
- Cleaning and restoring the river to a more natural condition. Solid debris—including old car bodies, concrete rubble, car tires—and other "manmade bank stabilization efforts" that are failing and environmentally unacceptable would be removed and replaced with a mixture of rock riprap with the voids filled with fines and planted with coyote willows and red dozier dogwoods harvested from native stands, benched and sloped back to restore the flood plain connectivity where possible, and vegetated where velocities are slower using bioengineering methodologies including plantings and root balls to establish vegetation.





FRANSON
CIVIL ENGINEERS


◆ Trapper Park Diversion

◆ Existing Pump Station

● Proposed Little Logan Check Structure

— Logan River Channel Restoration

— Proposed Pipeline



N

0 250 500 1,000
Feet

**Lower Logan River Trapper Park
River Restoration Project**

**Figure 2
Project Map**

O:\21035 CACHE TERRA Willow Lake Logan River\CI Water Management Project - Project Map.mxd

- Benefit: In conjunction with other projects currently underway by the CWD, other canal companies, and neighboring communities, improvements to this section would further reduce turbidity and total phosphorus thereby improving the overall water quality of the river through and below this section. With the improvement of habitat and vegetative diversity over time, the water temperature will also improve, particularly when combined with other projects being evaluated by the CWD. With the habitat restoration, it is expected that the brown trout, sculpin, amphibian, invertebrate, and other aquatic and terrestrial life would flourish as it has done just upstream of this section of the Logan River.
- Restore banks which have been altered by adjacent property owners trying to address debris accumulation, sediment accumulation, and issues associated from years of impact from crack willows choking the channel. Crack willows are the only invasive species that grow into the channel where its roots invade into the channel. Additionally, the extremely fragile nature of the crack willows (thus the scientific part of the name “fragilis”) and the breakage of large and small tree limbs during weather leads to river blockages that cause problems for private property owners. The unstable channel beds created by the “dredging” completed by the previous landowners has caused exposure of blue clay deposits which cause deep channelization and scouring (head cuts) and in other erosive materials that are continuing to incise and erode the channel bed. The blue clay adds substantially to the turbidity of the water and is naturally high in phosphorus and other minerals. By mitigating these areas of exposed blue clay, water quality would be improved. The blue clay would be mitigated by removing a layer of blue clay and replacing it with river cobble material matching the native materials up and downstream. The channel sizing would be determined by the completion of hydraulic shear analysis in a HEC-RAS 2D model and would be include appropriate fine materials to support the aquatic insects associated with the river. Additionally, the head cuts would be stabilized with rock checks to simulate natural river structure and to create fish habitat rather than just energy control structures.
 - Benefit: Water quality would be improved as well as the esthetics of the channel. Additionally, the rock checks would provide additional shelter to the trout, sculpin, white fish, and aquatic insects in this section of the Logan River as well as create turbulence and riffles to improve the dissolved oxygen.
- Mitigate areas of exposed blue clay.
 - Benefit: The Logan River is listed in the Middle Bear River and Cutler Reservoir TMDL is a regulated water body, mitigating these areas of exposed blue clay would improve the water quality by reducing total phosphorus contributions from the environment.
- In coordination with the private property owners (co-sponsors), the Utah Division of Wildlife Resources, Trout Unlimited, ACOE, and the Logan City and Cache County flood plain managers, grade back the banks of the river in areas where the vegetation is limited, or as directed in a careful fashion to incrementally phase out the crack willows, to the 2-year (50 percent) peak water surface elevation as established by historical records, hydraulic modeling, or the mapping of the ordinary high water mark (OHW). This grading would take

place primarily on the north and south sides of the river in the McCaskill Conservation Easement and property owned by Logan City. These graded areas would remove the invasive species and the agriculturally farmed Reed canary grass (<Phalaris arundinacea>) with native species, wetland plantings, riparian planting zones, and a good mix of tall, mid-level, and low-level vegetation to provide a complete ecosystem. The selected planting mix would be coordinated with the Division of Wildlife Resources and ACOE.

- Benefit: Enhancing the functionality of the flood plain within the easement would improve hydraulic functionality, water quality, terrestrial habitat, and wildlife.
- Provide via the river restoration approximately 2 miles of river made available for the proposed blue trail (river trail) for Logan City and its proposed access point at Trapper Park.
 - Benefit: Provide recreation benefits with the continuity of canoe and kayak access from Rendezvous Park to Trapper Park, and from Trapper Park downstream to the 600 South Park in a nearly unobstructed condition.

Another important project component is for the conservation of 1,225 acre-feet of water over the 2,900-foot length of water conveyance by converting an open canal to a gravity fed pipeline. This short section of canal is through a gravelly river alluvium soil that then transitions into Lake Bonneville sediments where the canal loses between 12 percent and 22 percent of its diverted flows depending on the time of year. During the flow measurements of August 2019, this equated to 7.0 cfs of the total diversion of 32.2 cfs, or 22 percent while at lower flows, and lower wetted perimeters in May with a flow of just under 14 cfs it was only losing 12 percent.

- The project proposes to pipe 2,900 feet of existing open channel canal with 48-inch HDPE dual wall pipe with watertight joints.
 - Benefit: Provide water savings of 1,225 acre-feet of water annually based on a detailed water measurement study completed by Franson Civil Engineers, 2019.

Collaborative parties include Trout Unlimited, who is supportive of the new diversion structure which would provide safe fish passage as well as river restoration along both parallel channels.

The following photos show the issues and current status of the project area.



Photo 1: Existing diversion structure looking downstream



Photo 2: Existing diversion structure showing the river to the right without a check and sheet metal to prevent overtopping



Photo 3: Crack willows growing into the channel



Photo 4: Crack willows growing into the channel with concrete piled around it to stop erosion

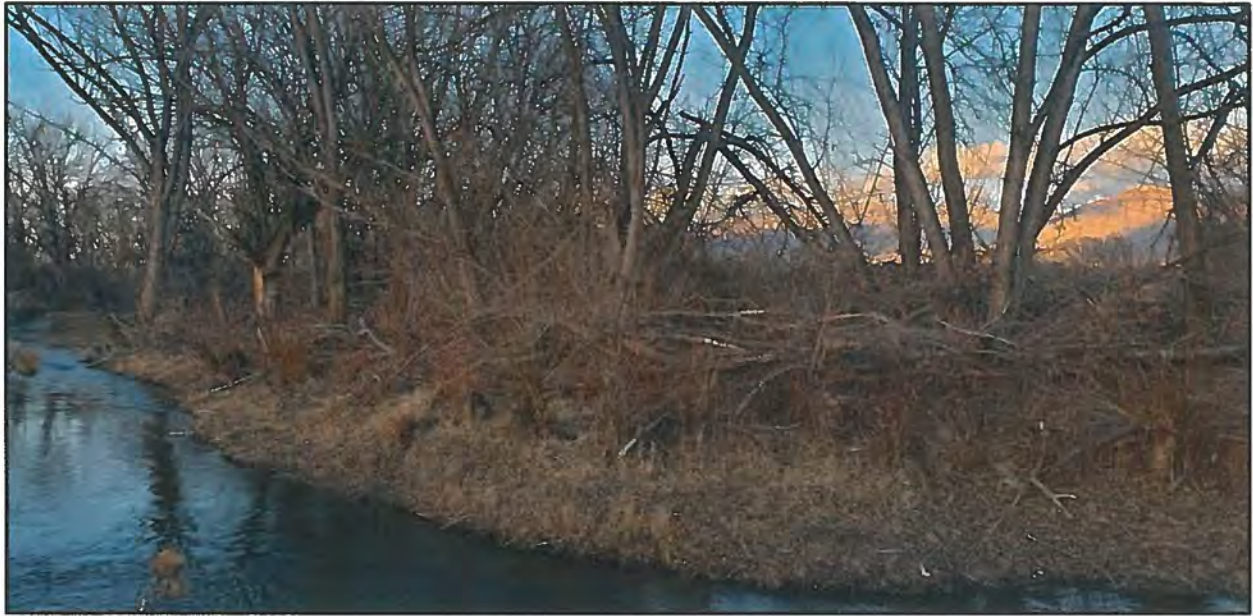


Photo 5: Thicket of Crack willows showing the deadfall under the trees preventing other shrubs and growth



Photo 6: Concrete rubble used to armor banks, cobbles, and gravel common to native stream bed



Photo 7: Part of a car exposed in gravel bar



Photo 8: Looking at multiple cars downstream of the diversion structure



Photo 9: Cars armoring the banks, area of silt accumulation from upstream bank erosion



Photo 10: Concrete debris dumped along channel along slow stretch



Photo 11: Unvegetated riprap bank scar that provides little-to-no habitat



Photo 12. Unprotected gravel dredge material on river bend, sample of gravel accumulation areas



Photo 13. Previous owner dredging scars



Photo 14. Vertical bank resulting from devegetation and over grazing



Photo 15. Blue Clay exposed and being undercut



Photo 16. Existing Canal below existing measurement flume



Photo 17. Existing Canal through Trapper Park

Performance Measures

After the project is constructed, monitoring would be accomplished by drone flights capturing images and data; detailed cross section inspections; habitat inspections with the Utah Division of Water Rights Stream Alterations, Utah Division of Wildlife Resources, and Trout Unlimited; and site inspections by the ACOE. These activities would be in conjunction with the habitat restoration and mitigation program associated with neighboring projects. Results would be documented in the annual mitigation reports with the ACOE documenting vegetative density and restoration success. These results would then be published regularly. The coordinated monitoring effort to measure the enhancement to the riparian and river habitat corridor would last approximately 5 years after construction. Upon request, information would be provided to USBR and other interested parties.

Water conservation benefits would be documented with four measurement flumes that would be installed with the project. The flow data from these flumes are to be recorded and submitted to the Utah Division of Water Resources and Utah Division of Water Rights annually. Upon request, information would be provided to USBR and other interested parties.

Evaluation Criteria

E.1.1. Evaluation Criterion A: Project Benefits

E.1.1.1 Sub-criterion A.1 – Benefits to Ecological Values

The proposed project would restore channel aquatic habitat for both invertebrates and fish, provide a sustainable riparian habitat to provide erosion control and terrestrial habitat, improve overall water quality by filtering suspended sediments during flooding and stabilizing banks from erosion during both flooding and lower flows, construct and maintain a fish-friendly diversion structure, provide access for recreation, and conserve water. Specific project benefits include:

- Eliminate the need to access the river with large maintenance equipment to maintain the diversion of water thereby protecting the channel banks and bed from mechanical damage on a regular basis. Additionally, the use of rocks to stabilize the existing natural flow diversion will create habitat for invertebrates and help restore some of the aquatic diversity disrupted by the removal of the car bodies.
- In conjunction with other projects currently underway by the CWD, other canal companies, and neighboring communities, improvements to this section would further reduce turbidity and total phosphorus thereby improving the overall water quality of the river through and below this section. With the improvement of habitat and vegetative diversity over time, the water temperature will also improve, particularly when combined with other projects being evaluated by the CWD. With the habitat restoration, it is expected that the brown trout, sculpin, amphibian, invertebrate, and other aquatic and terrestrial life would flourish as it has done just upstream of this section of the Logan River.

- The rock checks would provide additional shelter to the trout, sculpin, white fish, and aquatic insects in this section of the Logan River as well as create turbulence and riffles to improve the dissolved oxygen.
- Mitigating the areas of exposed blue clay would help improve the water quality by reducing total phosphorus contributions from the environment.
- The removal of crack willows would reduce the amount of water being consumed along the Logan River. In 2013, crack willows were removed and thinned along a 2.5-mile section from the confluence of the Logan River to 3200 South in Nibley, which usually goes dry annually except in very wet years. It was observed that from 2013 to 2021, it only went dry once, in the extreme drought of 2021. While detailed verification has not been generated, correlative evidence suggests that similar to the removal of tamarisk, the removal of invasive crack willows and the restoration of more native species will help restore more natural flows in this section of the river. This will continue efforts being implemented in coordination with the ACOE just east of this project and upstream on several restoration projects for the same reason.
- Enhancing the functionality of the flood plain within the easement would improve hydraulic functionality, water quality, terrestrial habitat, and wildlife.
- Provide recreation benefits with the continuity of canoe and kayak access from Rendezvous Park to Trapper Park, and from Trapper Park downstream to the 600 South Park in an unobstructed condition.

If the project will benefit multiple water uses (i.e., benefits to ecological values AND benefits to other water uses, e.g., municipal, agricultural, or tribal water uses), please explain how the project benefits other water uses.

The proposed project would provide water savings of 1,225 acre-feet of water annually to the LRBFC, which would allow for better water management of its system. Additional benefits to LRBFC are a stabilized diversion structure, measuring equipment, and reduced maintenance required.

E.1.1.2 Sub-criterion A.2 – Quantification of Specific Project Benefits by Project Type

Explain the extent of project benefits. Please respond to the following questions for each project type included in your application (i.e., please only respond to the section(s) of this sub-criterion that are relevant to your project).

The proposed project would provide water savings of 1,225 acre-feet of water annually to the LRBFC. The lost water currently is from seepage going into the ground and used by downstream users and is not available to the LRBFC water users. Conserved water would be used to supplement water needed to stabilize the agricultural production. Additional water would be saved by the removal of crack willows, of which savings below the LRBFC diversion would stay in the river and savings above the diversion would help fulfill LRBFC's water rights.

The environmental benefits of this project are numerous and are summarized in this section:

- 7,000 feet of vertical steep bank and concrete or ear armored bank sloped back and planted with appropriate pole plantings and seeds mixes based on a detailed field survey and the completion of a concept HEC-RAS 2D model based on an in-channel topographic survey.
- 35 acres of riparian and wetland seeding and revegetation removing Reed canary grass and invasive species to benefit many terrestrial species including numerous amphibians and reptiles common in this area as well as restoring potential habitat for the Ute-ladies'-tresses colony (approximately 300 plants) nearby discovered by Willow Lakes Landholding, LLC., who is not protecting this area. This was measured from the McCaskill easement recently created and from the grading plan to restore the flood plain using the HEC-RAS 2D model and removing and thinning the crack willows. By grading this area down to the 2-year flood elevation, it will be closer to the groundwater elevation necessary for many of the plants, but still allow for the design diversity required.
- The improved bank conditions with a combination of channel habitat improvements will create aquatic improvements for brown trout, sculpin, invertebrates, amphibians (there are both leopard frogs and boreal chorus frogs) and reptiles.
- The diversification of the riparian species to a multi-layered ecosystem from a homogeneous crack willow environment will improve the habitat for the endangered, Yellow-billed Cuckoo. This species prefers the healthy cottonwoods multi-layered tree and shrub environments versus the crack willows. Also, the addition of the multi-layered environment will be more supportive of their diet of insects, particularly tent caterpillars and grasshoppers.
- Both the Ute-ladies'-tresses and Yellow-billed Cuckoo have been affected by USBR projects in Utah and other states.
- Both species are dependent upon the water in the Logan River and the associated wetlands and shallow groundwater near the Logan River.
- Though listed as endangered on January 17, 1992, the USFWS has never finished a recovery plan for the Ute-ladies'-tresses.
- There are no current recovery plans for the Yellow-billed Cuckoo.
- This project has been conceptually designed to re-establish a flood plain and restore the 25-year, 50-year, 100-year, and 500-year water surface elevations to the same levels as mapped and established in 2005 prior to the major flood events of 2011 and 2017 and reconstructive efforts by the previous landowner to protect his property. Those previous efforts led to an unintended consequence of raising the 100-year elevation by almost 2 feet in some area. The conceptual design mitigates this with benching and reconnection of the flood plain in the new conservation easement.

With the implementation of this project, approximately 2 miles of river will be easily and safely accessible to fisherman and trail enthusiasts, but aquatic and terrestrial in nature. Canoes, kayaks, and people on tubes are a common occurrence on the Logan River upstream on a hot summer day, and the completion of this project, with the completion of two new access points by Logan City currently planned at Trapper Park and 600 South on the Logan River would ensure that this area would be enjoyed by many of the local residents, especially those nearby in the government subsidized and low-income housing.

E.1.2. Evaluation Criterion B – Collaborative Project Planning

This project plan was prepared under the principles and in cooperation with several members of the Logan River Task Force, particularly the Utah Division of Water Quality, ACOE, the Utah Division of Water Rights—Stream Alterations, Logan City Engineer (Flood Plain Administrator), LRBFC, CWD, the Utah Division of Wildlife Resources, and Trout Unlimited. Many of these agencies and Non-Governmental Organizations (NGO) were part of those who contributed to the creation of the Logan River Conservation Action Plan. This plan involved a large cross section of very diverse interests including:

- State agencies (Divisions of Water Quality, Water Resources, Wildlife Resources, Water Rights, and Stream Alterations)
- NRCS
- Utah Association of Conservation Districts
- Cache Valley Anglers
- Trout Unlimited
- Nature Conservancy District
- Bridgerland Audubon Society
- Cache Valley Wildlife Association
- Utah Water Research Lab
- USU professors from the College of Natural Resources, and College of Engineering
- Logan City Public Works (Flood Plain and Storm Water)
- Irrigation Companies and Board Members
- Cache Water District
- Several recreational groups including kayakers, trail enthusiasts, and those with physical impairments.

The summary of the Conservation Action Plan (CAP) is included in Appendix E. This project is approximately 2 miles of the lower section of the Logan River, which is about 6 miles in total length. Table 1 summarizes the evaluation of the key factors of the CAP in 2016 and the expected results in this area resulting from the proposed project.

Table 1: Evaluation of Key Factors of the 2016 CAP

KEY FACTORS	EXPECTED RESULTS
Indicator	Status resulting from this project
Flood Conveyance Through Channel	Move from Fair to Good or Very Good.
Flood Plain Function	Move from Poor to Good
Instream Habitat	Move from Fair to Good
Water Quality	Move from Fair to Good. There will still be temperature issues associated with low flows until other projects can establish higher instream flows upstream.
Trout Density and Size	Move from Poor to Good or Very Good
Benthic Invertebrates	Move from Poor to Good or Very Good
Riparian Vegetation Condition	Move from Poor to Very Good (after plantings are established)
Cache County Noxious Weeds	Move from Poor to Good
Bird Species Richness and Diversity	Move from Fair to Good by providing variety of multi layered riparian habitat
Amphibians and Reptiles	Move from Poor to Fair by expanding riparian habitat and wetlands along river corridor with native vegetation.
Trail Continuity and Blue Recreation	Both move from Poor to Very Good with this project and working with the landowners through these two miles.

E.1.3. Evaluation Criterion C – Stakeholder Support

The Lower Logan River Restoration Project has widespread diverse support including local cities, state and federal agencies, and local interest groups that support the project for its environmental benefits and have Letters of Support in Appendix A. The following are the entities with their mission, if applicable, and the project benefits they are most interested in:

- U.S. Army Corps of Engineers
 - Proposed project fulfills ACOE’s mission to deliver vital engineering solutions

- Assist with the creation of potential habitats for Ute-ladies'-tresses and Yellow-billed Cuckoo
- Create forested and palustrine wetlands in the flood plain of the conservation easement
- Utah Division of Water Rights—Stream Alterations
 - Proposed project fulfills the division mission that is tasked with planning, conserving, developing, and protecting Utah’s water resources.
- Utah Division of Water Quality
 - Proposed project fulfills division’s mission to safeguard and improve Utah’s air, land, and water.
 - Protect water quality by reducing sediment loading and nutrient loading—particularly phosphorus— and filter sediments and phosphorus bound to sediments.
 - Reduce water temperatures as vegetation matures.
- Utah Division of Water Resources
 - Proposed project fulfills division’s mission to plan, conserve, develop, and protect Utah’s water resources. Water conservation for agriculture and the environment are both part of the State Water Plan (September 29, 2021).
- Utah Division of Wildlife Resources
 - Proposed project fulfills division’s mission to serve the people of Utah as trustee and guardian of the state’s wildlife by improving habitat for both game and non-game species. Both aquatic and terrestrial enhancements would help this riverine ecosystem thrive, even in the urban environment.
- Cache County
 - Recreational opportunities for river trail as planned by Cache County and Logan City.
 - Provide sustainable riparian habitat with a multi-layered higher density ecosystem which would help long-term air quality, water quality, and general health of the community.
 - Support the creation of a high-quality fishery through the heart of the valley.
- Logan River Blacksmith Fork Irrigation Company
 - Improve agricultural system by including diversion structure with fish bypass and by piping a portion of the canal to conserve water. This would save water that would help increase the long-term drought resiliency and sustainability of agriculture in this area.
- Logan City
 - Protect and improve water quality of the Logan River, helping meet the water quality requirements of the total maximum discharge limits set on the Logan River for phosphorus.
 - Restore native vegetation along the river corridor, improving the bio-diversity and creating a haven for birds, butterflies, insects, fish, amphibians, and reptiles.
 - Successful completion of restoration projects upstream has been a great benefit to Logan City. This project fits into this ongoing effort that started with the Conservation Action Plan funded by Logan City in 2016.
 - Support Logan City’s trail and parks initiative to extend and interconnect trails, both aquatic and terrestrial.
 - Provide access to the river for fishing and recreation.

- Trout Unlimited
 - Proposed project fulfills Trout Unlimited’s mission to bring together diverse interests to care for and recover rivers and streams so future generations can experience the joy of wild and native trout and salmon.
 - Diversion structure with free fish passage.
 - Protect and improve water quality.
 - Diversification of habitat to improve the benthic invertebrates’ populations, sculpin population, and ultimately the trout population and sizes.
- Willow Lake Land Holdings
 - Adjacent corporate landowner developing their property.
 - Negotiate a McCaskill Grant Easement with Logan City that protects the Logan River with a permanent perpetual conservation easement at their suggestion.
 - Create a calming and natural environment for the community.
 - Improves the health of the local fishery and expands the aquatic and terrestrial trails system.
 - Improves water quality and the riparian corridor.
 - Diversifies the bird populations and species.
- iFIT Health and Fitness
 - Adjacent corporate landowner.
 - Partner with Logan City providing recreational access and connectivity from Rendezvous Park to Trapper Park.
 - Cultivate working relationship with Paul Burnett of Trout Unlimited and the Utah Division of Wildlife Resources on other restoration projects.
 - Improve channel corridor to improve riparian and wetland habitat, and fishery.
 - Improves and increases the diversity of birds, insects, and amphibians in the area.

Cost Share: Most of the sponsor’s cost share would come from the private corporate property owners (iFIT and Willow Lake Land Holdings), with Logan City and LRBFC providing the remaining amount. LRBFC is also working with NRCS related to agricultural management improvement funds and the sponsor, Cache Water District, to help with its cost share. The specifics are outlined in the *Funding Plan and Letters of Commitment* section below.

Federal Facility: The project is not located on federal land or a federal facility.

Known Opposition: There is no known opposition to the proposed project.

E.1.4. Evaluation Criterion D – Readiness to Proceed

The proposed project is ready to begin as soon as the financial assistance agreement with USBR is signed. The timing is dependent upon the USBR’s award schedule and process to obtain a signed agreement. The project assumes that an Environmental Assessment and a FONSI would be required for NEPA compliance. The applicant is ready and eager to begin this project. Table 2 shows the proposed project schedule with milestones.

Table 2: Proposed Project Schedule

TASK	START DATE	DURATION
Finalize contract with Reclamation	April 2022	2 months
NEPA Compliance	September 2022	6 months
Engineering design	September 2022	6 months
Permit acquisition: Stream Alteration Permit, National Permit, CLOMAR	January 2023	4 months
Prepare bid documents and specifications	January 2023	1.5 months
Project bid and award	March 2023	2 months
Order materials	April 2023	4 months
Project construction	August 2023	6 months
Prepare O&M manual, record drawings	March 2024	1 month
Prepare USBR Final Report	May 2024	1 month
Project completion/closeout	June 2024	1 month

Other project details are:

- **Design:** Concept design has been completed to determine feasibility and preliminary impacts on this project and to facilitate the evaluation.
- **Permit:** A Stream Alteration Permit from the Utah Division of Water Rights and a Nationwide Permit from the ACOE would be required for this project. A conditional letter of map amendment (CLOMAR) is also required. These permits are being drafted and evaluated to facilitate the submittal process and to ensure the field work is ready to be completed as necessary in the spring and early summer of 2022. No other permits are known to be needed at this time.
- **Equipment:** It is anticipated that the following equipment would be needed to construct the project: excavators, screen, loader, concrete trucks, concrete pump truck, various compaction equipment, and other miscellaneous heavy equipment.
- **Access/Easements:** Access to the project site would be from 1000 West and along the Logan River. Permission from adjacent landowners, who are co-sponsors, would be required for staging areas and some construction activities. Willow Lakes Land Holdings and iFIT would provide easements as they are supporters of this project.
- **Construction Timing:** Construction would occur during the summer, fall, and winter when river flows are less and outside of the Yellow-billed Cuckoo nesting period which starts in June and ends in approximately the end of August.
- **NEPA Compliance:** The local USBR office in Provo, Utah, was contacted. It is anticipated that an Environmental Assessment would be completed for the proposed project. Budgetary costs have been included for USBR and a consultant to assist with this work. It

is important to note that the wetlands have been delineated and approved by the ACOE and one year of Ute-ladies'-tresses and potential habitat screening has been completed and approved by the ACOE. The ACOE has stated that with grading improvements to remove historical dredge piles and crack willows, that the areas "may become" potential Ute-ladies'-tresses habitat. A second survey is scheduled in August of 2022. The survey work would help facilitate the preparation of the EA.

E.1.5. Evaluation Criterion E – Performance Measures

After the project is constructed, monitoring would be accomplished by drone flights capturing images and data; detailed cross section inspections; habitat inspections with the Utah Division of Water Rights Stream Alterations, Utah Division of Wildlife Resources, and Trout Unlimited; and site inspections by the ACOE. These activities would be in conjunction with the habitat restoration and mitigation program associated with neighboring projects per the requirements of the nationwide permit the ACOE would require. Results would be documented in the annual mitigation reports with the ACOE documenting vegetative density and restoration success. These results are then published regularly. The coordinated monitoring effort to measure the enhancement to the riparian and river habitat corridor would last approximately 5 years after construction. Upon request, information would be provided to USBR and other interested parties. Key elements of this implementation include:

- The drone flights would be scheduled within the same two-week period of every summer during the same time of the day so that vegetative cover and solar angle are approximately the same to support an equivalent comparison of the data.
- On-site cross sections would be defined in coordination with the agency teams, surveyed and documented, and then evaluated annually during the same two-week period, ideally during the Ute-ladies'-tresses blooming period, to verify habitat diversity success.
- River habitat would be visually inspected during critical flows to evaluate the effects of the habitat improvements and vegetative growth along the river. These inspections should take place in mid-August annually but would need to be coordinated with the agencies.
- Annual wetlands reports would be required by the ACOE and can likewise be provided to the USBR.

Water conservation benefits would be documented with four measurement flumes that would be installed within the project. The flow data from these flumes are to be recorded and submitted to the Utah Division of Water Resources and the Utah Division of Water Rights annually. Upon request, information would be provided to USBR and other interested parties.

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

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.

The proposed project would build long-term resilience to drought by reducing water loss in this canal by an average of 14.9 percent annually. During the August measurements in 2019, the losses were closer to 22 percent, which is also the most critical water demand period for many crops. By piping this canal with HDPE pipe and replacing the concrete diversion structure, the expected life of this project is in excess of 50 years based on published literature, many would say much longer.

By improving the flood plain function and protecting the flood plain from infringement, this project would provide significant hazard protection to both Logan City and Cache County. With the effects of climate change, and the increased intensity of storm events, it is important to note that this project is designed to contain the 500-year event without leaving the flood plain and placing the local community at risk.

Though this project phases out the crack willows, a monolithic layered vegetation, it would create a multi-layered ecosystem consisting of ground cover, shrubs and bushes, mid-level trees, and tall trees. This multi-layer environment would have higher vegetative density, and a significantly increased ability to sequester carbon dioxide.

As discussed extensively, this project has been designed to improve water quality specifically focusing on the recommendations of the Logan River Conservation Action Plan with special emphasis on the reduction of suspended sediments, total phosphorus, increased dissolved oxygen, and ultimately as the native vegetation is re-established, lower water temperatures.

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.

N/A

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.

N/A

Project Budget

Funding Plan and Letters of Commitment

The project is ready to begin and will continue with permitting so that it can move forward as quickly as possible, particularly with the CLOMAR and the nationwide permit. The non-federal share would be provided by third-party contributors as shown in Table 4 below. Letters of support are in Appendix A.

The application does include costs for the permitting that will be spent prior to the award to ensure the project moves forward as quickly as possible.

Budget Proposal

The project's cost proposal information is detailed in the following tables as requested.

Table 3: Total Project Cost Table

FUNDING SOURCES	AMOUNT
Costs to be reimbursed with the requested Federal Funding	\$2,000,000
Costs to be paid by the applicant	\$0
Value of third-party contributions	\$894,000
TOTAL PROJECT COST	\$2,894,000

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

FUNDING SOURCES – Non-Federal Entities	AMOUNT
1. Willow Land Holdings	\$650,000
2. iFIT	\$150,000
3. Logan City	\$50,000
4. Logan Blacksmith Fork Irrigation Company	\$44,000
Non-Federal Subtotal	\$894,000
REQUESTED RECLAMATION FUNDING	\$2,000,000

Table 5: Budget Proposal

BUDGET ITEM DESCRIPTION	DESCRIPTION	TOTAL COST
Legal Services	See Appendix D	\$10,000
Environmental Services	See Appendix D	\$76,000
Engineering Services	See Appendix D	\$125,000
Construction Management	See Appendix D	\$175,000
Construction Contract	See Appendix D	\$2,500,000
Reclamation Reporting	See Appendix D	\$8,000
TOTAL ESTIMATED PROJECT COSTS		\$2,894,000

Budget Narrative

Salaries and Wages

Cache Water District nor the co-sponsors would earn a salary, wages, fringe benefits or reimbursements from funding obtained to implement this project. All contributions would be voluntary.

All wages and salaries would be paid under agreements with contractors.

Fringe Benefits

All fringe benefits would be paid under contractual agreements.

Travel

All travel would be paid under contractual agreements.

Equipment

All equipment would be supplied under contractual agreements.

Materials and Supplies

All materials and supplies would be supplied under contractual agreements.

Contractual

All funding for the project would be used to pay consultants and construction contractors. The contractual cost estimates for engineering, environmental and regulatory compliance, and construction were prepared by a professional engineering firm with experience on other WaterSMART pipeline and diversion projects. The cost estimates including engineering, environmental, construction management, and construction and related source references are attached in Appendix D.

Third-Party In-Kind Contributions

Third-party (co-sponsor) monetary contributions are shown in Table 3 above. There are not anticipated to be any in-kind contributions.

Environmental and Regulatory Compliance Costs

Environmental and regulatory compliance costs were provided by a professional engineering firm with experience on other similar projects and based on coordination with the USBR Provo office environmental group. It is anticipated that an Environmental Assessment would be prepared for this project. These costs are presented in Appendix D. These costs came from other environmental and regulatory costs on other WaterSMART projects including Hobbie Creek Piping Project and St. John's Irrigation Company Piping Project.

Other Expenses

No other expenses are expected for this project.

Indirect Costs

No indirect costs are expected as part of the project.

Environmental and Cultural Resource 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.

There would be temporary disturbance during the project construction including earth-moving activities to move soil for the construction of the diversion structure and pipeline. This would occur in the fall/winter when the stream flows are low and best management practices would be implemented to have minimal effect on the water quality. Any animal habitat in the area would temporarily be disturbed due to noise and would relocate if present. Best management practices would be taken to minimize disturbance to the surrounding areas.

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?

A U.S. Fish and Wildlife Service (USFWS) IPAC report indicates the following species and their status:

- Yellow-billed Cuckoo (*Coccyzus americanus*) – Threatened
 - The Yellow-billed Cuckoo likes riparian areas with dense willows combined with mature cottonwoods. The USFWS has identified final critical habitat for this species. It is not anticipated that there would be any effect to the species due to the project’s short-term construction period, which is after breeding and fledging seasons. The revegetation in the spring and early summer would likely occur rapidly which would minimize the disruption of the habitat. Coordination with the USFWS has been occurring to verify that the construction plan would not be an issue with the potential habitat. While this is not great habitat, the high-density crack willows are a potential and is being treated in a manner of potential habitat.
- Monarch Butterfly (*Danaus plexippus*) – Candidate
 - No critical habitat has been designated for the Monarch Butterfly.
- Ute-ladies’-tresses (*Spiranthes diluvialis*) – Threatened
 - During preliminary surveys in August of 2021, a colony of approximately 300 plants was found on the parcel of land north of the conservation easement. A detailed inspection at that time did not find any other plants of potential habitat in the existing conservation easement. The ACOE has stated that with grading improvements to remove historical dredge piles and crack willows, that the areas “may become” potential Ute-ladies’-tresses habitat. A second survey is scheduled in August of 2022.

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.

According to the National Wetlands Inventory (fws.gov/wetlands/data/mapper.html, accessed on 12/3/2021), there are freshwater emergent wetlands and freshwater forested/shrub wetlands along the proposed project alignment. However, Willow Lake Landholdings, LLC had a detailed wetlands survey completed of this entire corridor and has coordinated it with the ACOE and submitted that report which has now been approved. That report would be made available to the USBR upon request.

When was the water delivery system constructed?

The existing diversion structure was constructed well over 50 years ago and would need to be addressed accordingly.

Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously:

The existing diversion structure would be replaced with a new structure at the same location, which would provide free fish passage. Approximately 2,900 feet of canal would be replaced with a gravity fed 48-inch pipeline.

Figure 3: National Wetlands Inventory Map



Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.

The existing diversion structure may be eligible. A cultural resources specialist would conduct a survey to determine if any structures or features are historical and eligible for listing.

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

No

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

No

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

No

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?

No, best management practices would be employed.

Required Permits or Approvals

A Stream Alteration Permit would be required due to work in the Logan River channel. An application including design drawings would be submitted to the Utah Division of Water Rights, who would process the application and circulate to the required agencies for comment and evaluation to determine possible impacts to the stream being altered.

An ACOE Nationwide Permit would be required for the project. This permit will be prepared and submitted and will likely require a 60-day comment period prior to being approved.

A FEMA Conditional Letter of Map Revision (CLOMR) would be required prior to the start of construction. This would require the approval of the flood plain administrator (Logan City Engineer) and then the Federal Emergency Management Agency (FEMA). FEMA's review period would be 90 days but have been taking longer during COVID 19. As a result, the sponsors have decided to continue moving forward with the design process sufficient to initiate a CLOMR so this process does not cause a significant lag in the final project. After the completion of the project, a Letter of Map Revision (LOMR) would be submitted.

Letters of Support and Letters of Partnership

Letters of Support are included in Appendix A.

Official Resolution

The official resolution will be submitted prior to January 8, 2022, after Cache Water District's board meeting to be held on January 3, 2022.

Unique Entity Identifier and System for Award Management

Cache Water District has an active registration in SAM. The CAGE number is 81EJ3.

Appendix A

Letters of Support and Partnership

December 2, 2021

Bureau of Reclamation
Denver Federal Center
Bldg. 67, Rm. 152
6th Avenue and Kipling Street
Denver, CO 80225

Re: R22AS00026 – Lower Logan River Trapper Park River Restoration Project

Dear Bureau of Reclamation:

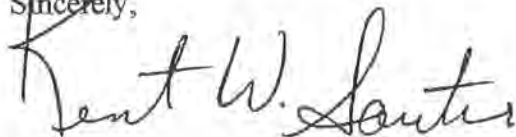
On behalf of Logan River Blacksmith Fork Irrigation Company, I would like to express support of the Lower Logan River Trapper Park River Restoration Project, which proposes to improve the Logan River near Trapper Park in Logan City and conserve water in our conveyance system.

The Logan River Blacksmith Fork Irrigation Company is very interested in and supportive of the proposed project as it will improve our conveyance system by piping a portion of our canal to conserve water and replace our diversion structure with one that would include a fish bypass, as well as restore channel habitat, provide a sustainable riparian habitat, and improve water quality.

This Project is an important improvement that will be of great benefit to not only Cache Water District but also our irrigation company and the community as a whole. We hope that this valuable project will receive grant funding assistance and we reiterate our expression of support. If you would like to discuss our interest and support of this project, please contact me.

Kent Souter
435-770-1166

Sincerely,

A handwritten signature in black ink that reads "Kent W. Souter". The signature is written in a cursive style with a large initial "K".

December 3, 2021

Bureau of Reclamation
Denver Federal Center
Bldg. 67, Rm. 152
6th Avenue and Kipling Street
Denver, CO 80225

Re: R22AS00026 – Lower Logan River Trapper Park River Restoration Project

Dear Bureau of Reclamation:

On behalf of Willow Lakes Land Holdings, I would like to express support of the Lower Logan River Trapper Park River Restoration Project, which proposes to improve the Logan River near Trapper Park in Logan City and conserve water.

We own land adjacent to this stretch of the Logan River. As part of our ongoing efforts and development, we have negotiated a McCaskill Grant Easement with Logan City that perpetually protects the Logan River for the full length of this project from future encroachment. This project will improve this corridor by removing old cars, concrete debris and rubble and improve the vegetative and river habitat along the entire corridor. The teamwork with the State, Federal, and Local agencies and the working relationship established with Trout Unlimited and local landowners make this project a pattern for future successful restoration efforts.

We ask that this project be funded, and we reiterate our expression of support. If you would like to discuss our interest and support of this project, please contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'M. Brett Jensen', followed by a long horizontal flourish.

M. Brett Jensen
Managing Partner



December 3, 1021

Bureau of Reclamation
Denver Federal Center
Bldg. 67, Rm. 152
6th Avenue and Kipling Street
Denver, CO 80225

Re: R22AS00026 – Lower Logan River Trapper Park River Restoration Project

Dear Bureau of Reclamation:

On behalf of **iFIT Health & Fitness, Inc.**, I would like to express support of the Lower Logan River Trapper Park River Restoration Project, which proposes to improve the Logan River near Trapper Park in Logan City and conserve water.

iFit owns land adjacent to this stretch of the Logan River. iFIT has long been a partner with Logan City in providing recreational access and easements along the over $\frac{3}{4}$ of a mile of river trail that provides connectivity from the City's Rendezvous Park to Trapper Park. Additionally, the Watterson Family, major owners in iFIT, have a long working relationship working with Paul Burnett of Trout Unlimited and the Utah Division of Wildlife Resources on restoration projects in Morgan County and look forward to working with those agencies and organizations again on this important project. The section upstream of this corridor is an excellent brown trout fishery due to the habitat restoration work done by Logan City in the last several years. By restoring the downstream corridor through two miles downstream of SR-252 (1000 West), we would expect the success to carry downward and the fishery to improve there as well. This project will improve a $\frac{1}{2}$ mile of corridor along iFIT's property by removing concrete debris and rubble, improving in-channel habitat and bank habitat, and improving the riparian habitat and wetland habitat in the flood plain. All of this will improve the aquatic and terrestrial health of the ecosystem that we all enjoy.

We ask that this project be funded, and we reiterate our expression of support. If you would like to discuss our interest and support for this project, please contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Jon White".

Jon White
Facilities and Real Estate Project Manager
jon.white@ifit.com
435-757-7062

December 6, 2021

Bureau of Reclamation
Denver Federal Center
Bldg. 67, Rm. 152
6th Avenue and Kipling Street
Denver, CO 80225

Re: R22AS00026 – Lower Logan River Trapper Park River Restoration Project

Dear Bureau of Reclamation:

On behalf of Cache County, I would like to express support of the Lower Logan River Trapper Park River Restoration Project, which proposes to improve the Logan River near Trapper Park in Logan City.

Cache County is interested in and supportive of the proposed project as it will restore channel habitat, provide a sustainable riparian habitat, improve water quality, construct a fish friendly diversion structure in cooperation with Trout Unlimited, provide access for recreation, improve the flood plain function, provide improved aquatic and terrestrial trail access, and conserve water. This project is in-line with the goals and objectives of Cache County's Logan River Blue Trail Master Plan.

This Project is an important improvement that will be of great benefit to not only Cache Water District and its partners, but also adjacent landowners and the community as a whole. We hope that this important project will receive grant funding assistance and we reiterate our expression of support. If you would like to discuss our interest and support of this project, please contact me.

Sincerely,



David Zook
County Executive



GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES

BRIAN C. STEED
Executive Director

Division of Wildlife Resources
MICHAL D. FOWLKS
Division Director

December 3, 2021

Bureau of Reclamation
Denver Federal Center
Bldg. 67, Rm. 152
6th Avenue and Kipling Street
Denver, CO 80225

Re: R22AS00026 – Lower Logan River Trapper Park River Restoration Project

Dear Bureau of Reclamation:

The Utah Division of Wildlife Resources (UDWR) understands that the Cache Water District is seeking federal funds to replace an existing diversion structure with a fish friendly diversion structure, pipe a portion of an irrigation canal, and other project features that would restore channel, bank, and riparian habitat and improve water quality, through the Bureau of Reclamation’s WaterSMART grant program.

As an agency, our mission is to serve the people of Utah as trustee and guardian of the state’s wildlife. This project fits into our mission perfectly as it would improve the Blacksmith Fork River and its ecosystem. The State of Utah has funds to help water providers pay for a portion of these types of projects through low interest loans. We support this project and recommend that the Bureau of Reclamation helps to fund this project to ensure its success. Please contact me if you have any questions.

Respectfully,

Clint Brunson
Aquatics Habitat Restoration Biologist
Utah Division of Wildlife Resources





State of Utah

SPENCER J. COX
Governor

DEIDRE M. HENDERSON
Lieutenant Governor

Department of Natural Resources

BRIAN C. STEED
Executive Director

Division of Water Resources

CANDICE A. HASENYAGER
Division Director

December 6, 2021

US Bureau of Reclamation
Denver Federal Center
Bldg. 67, Rm. 152
6th Avenue and Kipling Street
Denver, CO 80225

RE: R22AS00026 - Letter of Support for Lower Logan River Trapper Park River Restoration

To Whom It May Concern:

The Utah Division of Water Resources understands that Cache Water District is seeking federal funds for a project to replace an existing diversion structure with a fish-friendly one, pipe a portion of irrigation canal, and construct other features that would restore channel habitat and improve water quality.

As an agency, our mission is to plan, conserve, develop and protect Utah's water resources. Through revolving funds overseen by the Utah Board of Water Resources, the division is able to provide financial assistance to help construct projects that further this mission. The board has provided funding for numerous projects like this in the past, and has adequate funds currently to fund additional projects.

Therefore, the Utah Division of Water Resources wishes to express its strong support of this project, and encourage the Bureau to provide WaterSMART funds to ensure its success. Please contact me at 801-652-1668 if you have any questions.

Sincerely,

Shalaine DeBernardi, P.E.
Project Funding Manager

cc: Lance Houser, Franson Civil Engineers (via email)





State of Utah

SPENCER J. COX
Governor

DEIDRE HENDERSON
Lieutenant Governor

Department of
Environmental Quality

Kimberly D. Shelley
Executive Director

DIVISION OF WATER QUALITY
Erica Brown Gaddis, PhD
Director

December 6, 2021

Bureau of Reclamation
Denver Federal Center
Bldg. 67, Rm. 152
6th Avenue and Kipling Street
Denver, CO 80225

Re: R22AS00026 – Lower Logan River Trapper Park River Restoration Project

Dear Bureau of Reclamation:

The Utah Division of Water Quality understands that the Cache Water District is seeking federal funds to replace an existing diversion structure with a fish friendly diversion structure, pipe a portion of an irrigation canal, and other project features that would restore channel habitat and improve water quality, through the Bureau of Reclamation's WaterSMART grant program.

As an agency, our mission is to safeguard and improve Utah's water. This project fits with our mission very well. The State of Utah has funds to help water providers pay for a portion of these types of projects through low interest loans. This project continues the efforts of Logan City and many stakeholders to protect the water quality in the Logan River and to restore the native vegetation along the river corridor that has previously been funded by our Division. They have a track record of successfully completing these restoration projects and we look forward to working with the Bureau of Reclamation to complete this one. We support this project and recommend that the Bureau of Reclamation help fund this project to ensure its success. Please contact me if you have any questions.

Respectfully,

Michael D. Allred
Environmental Scientist/Watershed Coordinator
Watershed Protection Section
Utah Division of Water Quality/Department of Environmental Quality

Key Attribute	Indicator	Reach	Current Rating	Desired Rating	Attribute Rationale	Issues/Concerns/Threats	Strategic Actions
Riparian Ecology	Riparian Vegetation Condition	Upper	Bad	Fair	Natural riparian vegetation provides a variety of important riverine functions	1) Channelization and unnatural bank stabilization practices 2) Loss and fragmentation of native, multi-layered riparian vegetation	1) Educate citizens regarding best management practices within floodplain (for example, by distributing the Riparian Planting Guide and workshops) 2) Promote native vegetation planting program on all properties to transition vegetation towards native species 3) Provide stream channel and floodplain guidance (best management practices) for property owners and municipalities 4) Increase public awareness and enforcement of Logan City floodplain and riparian vegetation ordinances 5) Control undesirable and non-native vegetation (beyond official noxious weeds list)
		Middle	Bad	Good			
		Lower	Bad	Good			
Riparian Ecology	Cache County Noxious Weeds	Upper	Good	Good	Noxious weeds compete with native vegetation and reduce habitat for native animals	1) Upstream and within watershed noxious weed seed sources 2) Lack of funding	1) Promote weed control within river corridor and watershed 2) Encourage native vegetation planting along river corridor 3) Education citizens regarding noxious weeds and treatment (distribute Riparian Planting Guide, workshops) 4) Provide environmental education along river trails
		Middle	Bad	Good			
		Lower	Bad	Good			
Terrestrial Biology	Bird Species Richness and Diversity	Upper	Fair	Good	Birds are an important aesthetic component of the Logan River and indicator of ecosystem health. Birders contribute to local economies by feeding birds, buying equipment, and purchasing travel-related items.	1) Loss and fragmentation of native, multi-layered riparian vegetation 2) Lack of invertebrate food source	1) Promote native vegetation planting program on all properties to transition vegetation towards native species 2) Construct and maintain diverse instream habitat, including stable woody materials 3) Conserve important nesting/foraging features of diverse riparian habitat (e.g. snags) 4) Develop diversity/richness monitoring strategy
		Middle	Fair	Good			
		Lower	Fair	Good			
Terrestrial Biology	Amphibians and Reptiles	Upper	Fair	Good	Amphibians and reptiles are an important aesthetic component of the Logan River and indicator of ecosystem health.	1) Destruction of hibernation sites 2) Erosion and sedimentation 3) Loss of riparian habitat to development and river channelization 4) Poor water quality 5) Predation by bullfrogs	1) Maintain or improve riparian habitat and wetlands 2) Encourage homeowners to create habitat, such as fishless ponds with native vegetation 3) Encourage homeowners to tolerate snakes on their property
		Middle	Fair	Good			
		Lower	Bad	Fair			
Recreation	Trail Continuity	Upper	Good	Good	Even small breaks in trail systems can prevent widespread trail use and/or have potential for injury to trail users and to cause trespass	1) Lack of public space for river access 2) Lack of funding	1) Work with Logan Parks and Recreation Advisory Board 2) Identify gaps in existing trail system 3) Determine best opportunity to connect existing trail system 4) Enable trail connectivity through ordinance, easements, or acquisition 5) Construct new trail segments 6) Remove barriers to existing trails connectivity 7) Determine and provide a Main Street crossing (pedestrian crossing light, bridge, underpass, etc.)
		Middle	Bad	Good			
		Lower	Bad	Good			
Recreation	Blue Recreation (tubing, kayaking, canoeing, paddle boarding)	Upper	Bad	Good	Navigability of the Logan River is an important safety consideration (hazards that may exist on the bed, banks, and across the river.	1) Legal authority and accessibility to remove hazards 2) Lack of funding	1) Incorporate evaluation of hazards into annual street dept. evaluation of river hazards.
		Middle	Good	Good			
		Lower	Bad	Good			

Key Attribute	Indicator	Reach	Current Rating	Desired Rating	Attribute Rationale	Issues/Concerns/Threats	Strategic Actions
Recreation	Legal Access To River Bed (wading)	Upper	Good	Good	1) River access is important for public uses of river 2) Help prevent private property impacts such as trespass	1) Legal riverbed access may change due to state law (Public Trust Doctrine) 2) Poor etiquette (noise, trash, trespass, etc.) 3) Future urban development and enclosure of riverway	1) Develop appropriate facilities (parking especially) to support public access 2) Acquire property or easements for access 3) Provide public education, such as legal access map and appropriate river behavior
		Middle	Good	Good			
		Lower	Good	Good			
Recreation	Legal Access To River Bank (above high-water line)	Upper	Good	Fair	1) River access is important for public uses of river 2) Help prevent private property impacts such as trespass	1) Lack of public space for river access 2) Poor etiquette (noise, trash, trespass, etc.) 3) Future urban development and enclosure of riverway	1) Work with city and county to build or improve facilities to enable public use of the river 2) Enable river access through ordinance, easements, or acquisition 3) Provide public education, such as legal access map and appropriate river etiquette
		Middle	Good	Fair			
		Lower	Good	Fair			
Recreation	Access facilities (pedestrian/ADA access points, parking, boat launches, desirable river features for kayaking, tubing, canoeing)	Upper	Good	Good	Logan River is a public amenity and should have appropriate facilities to enable access and use	1) Lack of public space for river access 2) Landowner opposition to new public facilities 3) Potential for recreation user conflicts to arise as accessibility and use increases 4) Safety hazards to river users, including concrete and metal debris (addressed under the Blue Trails indicator)	1) Work with city and county to build or improve facilities to enable public use of river 2) Create appropriate access points and exits for kayaking and tubing. Identify these on signage and maps including information about rules and regulations, river ratings (whitewater classifications), etc. 3) In designing river restoration projects, incorporate water features that enhance boating access and experience, particularly for kayaking. 4) Maintain and improve the navigability of the river for kayaking and tubing, including access/exit locations, river features that enhance the boating experience (kayak waves), and that address safety concerns 5) Address private property concerns (see strategic actions for adverse impacts to private property from public recreation)
		Middle	Fair	Good			
		Lower	Good	Good			
Recreation	Fishing success/catch rate of Salmonids (Brown Trout and Whitefish)	Upper	Fair	Good	Fishing success/catch rates are important for the angler experience	1) Lack of diverse habitat for desired species 2) Low summer flows 3) Poor water quality	1) Construct and maintain diverse instream habitat, including stable woody materials 2) Ensure sufficient summer base flow for desired species survival 3) Ensure water quality is sufficient for fish survival 4) Oppose damaging sediment releases from First Dam maintenance operations
		Middle	Fair	Good			
		Lower	Good	Good			
Recreation	Blue Ribbon Fishery (BRF) Status	Upper	Fair	Good	High-quality fishing experiences are important to residents and visitors	1) Lack of public space for river access 2) Lack of diverse habitat for desired species 3) Low summer flows 4) Poor water quality	1) Construct and maintain diverse instream habitat, including stable woody materials 2) Ensure sufficient summer base flow for desired species survival 3) Ensure water quality is sufficient for fish survival 4) Work with city and county to build or improve facilities to enable public use of the river 5) Enable river access through ordinance, easements, or acquisition
		Middle	Good	Good			
		Lower	Good	Good			

Key Attribute	Indicator	Reach	Current Rating	Desired Rating	Attribute Rationale	Issues/Concerns/Threats	Strategic Actions
Private Property	Adverse Impacts to Private Property from Public Recreation	Upper	Fair	Good	Acknowledging private property along river channel is a top priority	1) Lack of public space for river access 2) Poor etiquette (noise, trash, trespass, etc.)	1) Include facilities (i.e. designated access locations, parking, signage, fences, law enforcement) which reduce incidence of property trespass 2) Provide and maintain trash collection facilities and public education to reduce litter 3) Local government to work with landowners and state agencies to implement a coordinated walk-in access program 4) Provide public education, such as legal access map and appropriate river etiquette
		Middle	Fair	Good			
		Lower	Fair	Good			
Private Property	Adverse Impacts to Private Property from River Restoration Actions	Upper	Fair	Good	Changes to flood conveyance and the riparian corridor could have anticipated or unanticipated consequences for adjacent private properties	1) Unintended consequences from actions 2) Lack of funding	1) Facilitate early public involvement in river restoration projects 2) Implement well-designed river restoration projects based on the CAP 3) Conduct follow-up public involvement to evaluate project success, identify issues that warrant resolution, and improve future projects
		Middle	Fair	Good			
		Lower	Fair	Good			