



R & E Grant Application 23-25 Biennium

Project #: 23-013
Amendment #: 1

Poison Creek Reservoir Aeration System

Project Information

Requested Cycle: 23-1
R&E Project Request: \$12,488
Other Funding: \$4,833
Total Project: \$17,321
Spending Start Date: 7/1/2023
Spending End Date: 10/1/2023
Project Start Date: 7/1/2023
Project End Date: 10/1/2023
Organization: Oregon Department of Fish and Wildlife

Applicant Information

Name: Kirk Handley
Address: PO Box 8
Hines, OR 97738
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Email: Kirk.a.handley@odfw.oregon.gov

Past Recommended or Completed Projects

This applicant has no previous projects that match criteria.

Authorized Agent

Name: Dave Banks
Address: 237 Hyw 20 South
Hines, OR 97738
Telephone: 541-573-6582
Telephone 2: 541-589-1905
Email: david.t.banks@odfw.oregon.gov

Location Information

Where is it?

The project will occur on public land owned or managed by another party

Landowner Information

Name: Burns District Bureau of Land Management
Address: 28910 US-20
Hines, OR, 97738
Phone: 541-573-4400
Fax: 541-573-4411

Site Description

Street Address, nearest intersection, or other descriptive location.

Poison Creek Reservoir is located approximately 30 miles North of Burns Oregon in the Silvies Valley near the Southern Border of Grant County. Latitude 44.01342, Longitude -118.91518

Directions to the site from the nearest highway junction.

From Burns Oregon travel North toward John Day Canyon City about 30 miles on HWY 395, turn right on the Silvies Hopper Ranch Road for .5 miles, turn left at sign to Poison Creek Reservoir and drive about .2 miles to the reservoir.

Following project completion, public anglers will be allowed the following level of access to the project site:

Full access

Please describe what leases, easements, agreements are in place to ensure angler access to the project site, and what is the length of each agreement.

This reservoir is on public land, the site has been improved for angler access and has a cement pit toilet maintained by Burns BLM, a gravel road to the reservoir, and a parking area.

Dominant Land Use Type:

Range/pasture

Project Location

General Project Location.

County: Grant
Town/City: Silvies Valley
ODFW Dist: Malheur Fish District
Stream/Lake/Estuary Name: Poison Creek Reservoir
Sub-basin: 1712, Malheur Lake
Tributary of: Silvies River

Specific Project Location.

Latitude	Longitude
44.01342	44.01342

Project Summary

Project Summary

Please provide a couple sentence summary of the proposal.

Poison Creek Reservoir suffers from occasional fish kills due to low oxygen levels in the winter. An aeration system will reduce aquatic macrophyte growth during summer and provide an oxygen source during ice up during the winter.

Overall Project Goals

Describe the primary goals or outcomes of the entire project, including elements not requesting funding from R&E.

Stocked Rainbow Trout fingerlings grow rapidly in Poison Creek Reservoir because of an abundance of food. This project will allow Rainbow Trout to reach trophy sizes by improving overwinter survival for multiple years.

Primary objectives of R&E funding

Please describe the measurable objectives for the R&E portion of the funding request.

Improve overwinter survival of Rainbow Trout Fingerlings

Provide a reliable trophy trout fishery for anglers two years post implementation

Evaluate the effectiveness of aeration systems in reducing aquatic macrophytes by quantify areas with occupied by aquatic macrophytes pre- and post-treatment

Evaluate the change in dissolved oxygen before and after implementation throughout the year

Improve fishing experience for bank anglers by reducing aquatic vegetation that affects their experience.

Current Situation/Justification

Please describe the current situation and explain why this funding is needed.

Poison Creek Reservoir has experienced more frequent fish kills in the past ten years due to anoxic conditions over winter. As a result this fishery has become less reliable for local anglers and does not consistently produce trophy rainbow trout like it once did. Pond aeration will reduce aquatic macrophyte growth over summer and reduce decomposition of dead vegetation throughout winter that causes anoxic conditions. Aeration through winter will also provide a localized refuge from anoxic conditions if macrophyte production is not adequately reduced.

Recreation and Commercial Benefit

This project will provide benefits to:

Recreational fisheries

Explain how this project will contribute to current (and/or potential) fishing opportunities, access, or fisheries management.

This project will improve fishing for a holdover trophy Rainbow Trout that this fishery was once known for. Anglers have mentioned aquatic vegetation has deterred them from visiting this waterbody because it makes it difficult to fish from shore. Angler activity seems to have declined in recent years because of the decline in holdover trout and macrophyte production.

Sampling found stocked fingerlings did not survive through winter on a consistent basis making management more difficult. The cause of overwinter mortality was evaluated in 2021 and 2022 using a dissolved oxygen logger and spring sampling that showed trout survival was related to dissolved oxygen in winter. This fishery performs best as a trophy trout fishery when managed as a put grow and take fishery rather than a put and take fishery. Anglers have expressed a preference for larger holdover trout rather than higher catch rates and smaller trout present after stocking legal Rainbow Trout. Improving overwinter survival will allow us to meet our management objectives.

Percent benefit split between Commercial and Recreational anglers:

0 % Commercial
100 % Recreational

Please explain, or justify, how the percentage split was determined:

There is no commercial fishery at this location. This has been a popular recreational fishery in the past.

This project has been identified as an ODFW priority for:

Local/watershed

Does this project directly support implementation of the ODFW Strategic Plan and/or current Fish Division priorities?

Unknown

Please briefly explain when this was identified as a priority and what process or workgroup was used to identify this as an ODFW priority.

Dave Banks and Kirk Handley, both fish biologists that manage fisheries in the Malheur Fish District, have monitored and discussed options to maintain and enhance recreational fisheries in the Malheur Fish District. We speak regularly about options to achieve our management objectives including those for Poison Creek Reservoir.

Identify any plan or other document that identifies this priority.

Is this project part of an approved Salmon-Trout Enhancement Program (STEP) activity?

No

This project is intended to benefit the following species:

Rainbow Trout

This project will benefit anglers or fishery by providing:

Angling Opportunity
Monitoring/Research

Angling Opportunity

This project will:

Improve the opportunity for anglers to catch fish (better stocked fish, trapping)
Restore a degraded fishery
Improve the angling experience for bank anglers.

Monitoring/Research

This project will be used to evaluate:

Population composition (i.e age, species, survival, size, or genetics)
Methods for improving fish habitat in lakes and reservoir to improve the angling experience for

bank anglers.

Habitat (i.e structure, passage, water quality)

Has this project been reviewed or developed by an individual with appropriate qualifications (i.e ODFW biometrician, research professor)?

No

Another aeration system has been used by ODFW in Taylor Lake in the Lower Deschutes District and has shown a reduction in aquatic macrophytes and improved water quality.

Is this study critical to fishery management decisions?

Yes

Will installing an aeration system reduce aquatic macrophyte coverage, improve dissolved oxygen levels, improve the angling experience for bank anglers and restore a trophy trout fishery in a small reservoir?

Yes

Anoxic conditions exist in other locations within our district that could potentially be eliminated through use of this type of system. This equipment will be used on an experimental basis at this location. If this system is effective at improving winter survival of trout, increasing dissolved oxygen, and reducing aquatic macrophytes we hope to implement this system at other locations.

Is there a plan to repeat this monitoring or research in the future?

No

Will the data be reported or published?

Yes

We have monitored dissolved oxygen and fish survival in this pond last year and monitoring is ongoing this winter. We will evaluate the changes to dissolved oxygen and fish survival post implementation and provide a write up on the results.

Project Description

Schedule

Activity	Date	RE Funding
quantify aquatic macrophytes pre implementation at random locations	7/2023	No
Purchase aeration system	7/2023	Yes
Install aeration system	7/2023	No
Post implementation oxygen monitoring using continuous DO sensor	2023-2024	No
Aquatic macrophyte quantification at random locations	7/2024	No

Permits

Permit	Secured?	Date Expected
	No	

Project Design and Description

Please describe in detail the methods or approach that will be used to achieve the project objectives.

The primary objective is to improve survival of stocked Rainbow Trout through the winter when the reservoir is iced covered. The current cause of mortality occurs from the decomposition of dead plants and organic material accumulated during the growing season. We hope to evaluate changes in vegetation coverage in the reservoir through sampling random locations pre- and post-treatment. This will help inform future use of aeration systems to reduce vegetation in

small ponds and reservoirs. We will monitor dissolved oxygen pre and post treatment using a continuous dissolved oxygen (DO) logger. Results from DO monitoring will help us determine if improvements to water quality are a result of a reduction in vegetation or direct oxygenation from the aeration system. In addition to continuous monitoring using the DO logger we will evaluate dissolved oxygen at different locations throughout the pond under the ice to determine if DO conditions vary throughout the reservoir. Trout will be sampled in the fall and spring to evaluate overwinter survival of Rainbow Trout.

Engineering

Does the project involve capital improvement, engineering, site grading or other construction?

No

Project Management and Maintenance

What is the life expectancy of R&E funded construction, structures, equipment, supplies, data or fishery?

Life expectancy of aeration equipment is anticipated to be several years. This project will rely on solar power supplied by an array of solar panels which will need replacement at some point but life expectancy is anticipated to be at least ten years.

Who is responsible for long term management, maintenance, and oversight of the project beyond what is funded by R&E.

ODFW fish biologists at the Hines District office will maintain or replace equipment as needed. Equipment will be checked weekly for the first month after installation then monthly for the first year. Then a long term maintenance plan where this system is checked less frequently will be used. We anticipate checking this system three or four times a year after that.

Will the project require ongoing maintenance?

No

Is there a plan to collect baseline data and to conduct monitoring efforts to measure the effectiveness of the project?

Yes

We hope to evaluate changes in vegetation coverage in the reservoir through sampling random locations pre and post treatment. This will help inform future use of aeration systems to reduce vegetation in small ponds and reservoirs. We will monitor dissolved oxygen pre and post treatment using a continuous dissolved oxygen (DO) logger. Results from DO monitoring will help us determine if improvements to water quality are a result of a reduction in vegetation or direct oxygenation from the aeration system. In addition to continuous monitoring using the DO logger we will evaluate dissolved oxygen at different locations throughout the pond under the ice to determine if DO conditions vary throughout the reservoir. Trout will be sampled in the fall and spring to evaluate overwinter survival of Rainbow Trout.

Project Funding

Funding

Have you applied for OWEB funding for this project?

No

Has this proposal, or similar proposal for this project location, previously been denied by OWEB or

other funding source?

No

Other Funding Source	Type	Secured	Dollar Value	Comments
ODFW Hines district time and equipment for monitoring	In-Kind	Secured	4833	ODFW will use continuous DO logger, water quality multimeter, vehicle, fish
		Total	4833	

Budget

Item	Unit Number	Unit Cost	In-kind or non-cash contributions	Funding from other sources	R&E Funds	Total Costs
PROJECT MANAGEMENT						
Kirk Handley	0	0.00	0	0	0	0
		SUBTOTAL	0	0	0	0
IN-HOUSE PERSONNEL						
Kirk Handley	48	58.02	2785	0	0	2785
Dave Banks	24	68.55	1645	0	0	1645
		SUBTOTAL	4430	0	0	4430
CONTRACTED SERVICES						
			0	0	0	0
		SUBTOTAL	0	0	0	0
TRAVEL						
fuel to travel to location	60	3.85	231	0	0	231
motor pool lease	12	14.26	172	0	0	172
		SUBTOTAL	403	0	0	403
SUPPLIES/MATERIALS						
Steel poles for mounting solar panels	0	0.00	0	0	592	592
concrete for anchoring mounting poles and cabinet	0	0.00	0	0	300	300
dissolved oxygen probe replacement sensor	2	148.55	0	0	278	278
250 feet of electrical wire	1	218.56	0	0	197	197
piston maintenance kit	0	0.00	0	0	187	187
six pack of replacement air filters	0	0.00	0	0	88	88
mounting hardware	0	0.00	0	0	50	50
supplies and fittings for connecting hose and securing solar panels	0	143.00	0	0	0	0
		SUBTOTAL	0	0	1692	1692
EDUCATION/OUTREACH						
sign explaining project on site	0	0.00	0	0	200	200
		SUBTOTAL	0	0	200	200
EQUIPMENT						
Ultimate DW 9 Solar Pond Aerator Kit	1	9695.95	0	0	9696	9696
500 feet of weighted airline	1	900.00	0	0	900	900
		SUBTOTAL	0	0	10596	10596
FISCAL ADMINISTRATION						
			0	0	0	0
		SUBTOTAL	0	0	0	0
		BUDGET TOTAL	4833	0	12488	17321

Internal Review Results

Review Score: 2 out of 3

(0 = Do Not Fund, 1 = Strengthen Proposal, 2 = Recommend, 3 = Strongly Recommend)

Summary of Review Team Comments

Internal Review Team was concerned about theft and/or vandalism of the solar panels at the site. IRT was supportive of this project and thought it could be used as a pilot project to assess the effectiveness of future solar aerator projects.

Specific Review Team Comments

Could be an efficient way to manage/sustain this fishery.

This is a good pilot project as we have been considering adding more aeration units to other fishing areas to reduce vegetation.

I've seen examples of aeration either reducing or increasing macrophytes. It seems to be related to the morphology of the pond/lake and species. Good to see that this proposal includes monitoring of effectiveness that may be useful in considering how well this may or may not work in other places.

Fairly reasonable cost to help restore a previously great year-round fishery. When trout survival is high, the reservoir produces large and healthy trout that provide fishing for the communities of Burns/Hines and all the way up to John Day. Easy access and a vault toilet help to make the site a great place to fish.

Specific Review Team Questions

How do you plan to secure the solar panels from being stolen?

Vandalism and theft have not been a huge issue here in the past but we will secure the panels to a long stake driven into the ground (think ground rod with an eyelet) we can attach this to panels using locks and chain. All of this stuff will be out of view from the parking area but solar panels will be somewhat visible to anglers walking over the dam.

What is the expected lifespan of the aerator that would be purchased for the reservoir?

The aeration system will require maintenance at least every other year. A rebuild kit is available from the manufacturer, not sure how long the compressor will last but we should be able to replace it completely for a few hundred bucks if it fails. We anticipate the hoses, solar panels, and diffusers will last at least ten years.

Would the aerator eliminate all ice formation at the reservoir and make ice fishing unsafe or would there potentially still be iced over areas that folks could use for fishing in the winter?

Ice conditions will likely (hopefully) be affected near the diffusers. Best case scenario is we will only need to close a portion of the pond to ice fishing near the diffusers by roping it off. If ice is affected everywhere we may have to close the reservoir to ice fishing. We plan to monitor ice conditions the first year and manage it accordingly.

Is this a monitored site? How remote? Real risk of theft/vandalism. Any match available from BLM?

This site is about halfway between John Day and Burns about a half mile off of HWY 395 and not near any homes or buildings. There are some signs, a kiosk, and a pit toilet here that have not ever been vandalized to my knowledge, hopefully that trend continues.

We asked the BLM if they wanted to cost share on this project but they did not express interest in buying materials. BLM seems supportive of this but has not identified a funding source to

help us pay for it. They did agree to conduct an archeological survey for us at the proposed location which could be considered match.

Additional Files

Budget Information

Maps

[Poison Creek Map](#)

shows preferred locations of aeration equipment

Photos

Design Information

Management Plans and Supporting Documents

[aerator specifications](#)

[Poison Creek Plan](#)

Description of problem and documentation

[pump maintenance schedule](#)

[Signature Authorization Page](#)

signed approval from watershed manager

Permits and Reviews

Partnerships

Public Comment

Administrative Documents

Completion Report

Objectives and Accomplishments

Improve overwinter survival of Rainbow Trout Fingerlings

Did you meet the objective? Yes

Aeration system was installed and functional by the time the reservoir began to freeze this winter. Seems to work well.

Provide a reliable trophy trout fishery for anglers two years post implementation

Did you meet the objective? Yes

Dissolved Oxygen levels were well within the tolerance level for rainbow trout when we checked them last. The Reservoir has open water now so fish will survive

Evaluate the effectiveness of aeration systems in reducing aquatic macrophytes by quantify areas with occupied by aquatic macrophytes pre- and post-treatment

Did you meet the objective? No

This reservoir was drawn down significantly last summer which reduced the amount of macrophytes prior to installation of the aerator. Macrophytes were few and far between this summer.

Evaluate the change in dissolved oxygen before and after implementation throughout the year

Did you meet the objective? Yes

We have a continuous DO logger in the reservoir so we are currently collecting those data.

Improve fishing experience for bank anglers by reducing aquatic vegetation that affects their experience.

Did you meet the objective? No

Unknown at this time but will follow up later.

Comments

We will continue to monitor this fishery. It has been a mild winter so it's hard to say if the aeration system was the reason for open water or warmer temperatures. When we compared this reservoir to another pond with chronic problems Poison Creek had much higher DO values when we had good ice coverage in January.

Grantee agreed to forfeit all remaining funds.