



R & E Grant Application 23-25 Biennium

Project #: 23-015

Cottonwood Reservoir Rotenone Treatment

Project Information

Requested Cycle: 23-1
R&E Project Request: \$41,848
Other Funding: \$17,055
Total Project: \$58,903
Spending Start Date: 7/1/2023
Spending End Date: 10/31/2024
Project Start Date: 7/1/2023
Project End Date: 10/31/2024
Organization: Oregon Department of Fish and Wildlife

Applicant Information

Name: Dave Banks
Address: 237 Hyw 20 South
PO Box 8
Hines, OR 97738
Telephone: 541-573-6582
Telephone 2: 541-589-1905
Email: david.t.banks@odfw.oregon.gov

Past Recommended or Completed Projects

This applicant has no previous projects that match criteria.

Authorized Agent

Name: Kirk Handley
Address: PO Box 8
Hines, OR 97738
Telephone: 541-573-6582
Telephone 2: 541-589-5372
Fax: 541-573-5306
Email: Kirk.a.handley@odfw.oregon.gov

Location Information

Where is it?

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

Landowner Information

Name: Burns District BLM
Affiliation: Bureau of Land Management
Address: 28910 Hyw 20
Hines, Oregon, 97738
Phone: 541-573-4400

Name: John Moon
Affiliation: Private Land Owner
Address: 50629 Altnow Beulah Ln
Drewsey, Oregon, 97904
Cell: 541-493-0115

Name: George Wilber
Affiliation: The Cottonwood Legacy
Address: 77 W Adams St.
Burns, Oregon, 97720
Phone: 541-573-3945
Cell: 541-589-6151

Name: Mark Joyce
Affiliation: Joyce Ranch LLC
Address: 2925 Beulah Rd
Juntrua, Oregon, 97911
Phone: 541-277-3495

Name: Terry Williams
Address: 78435 Liberty Rd
Drewsey, Oregon, 97904
Cell: 541-493-2454

Site Description

Street Address, nearest intersection, or other descriptive location.

Cottonwood Reservoir is located 45 air miles northeast of Burn, Or; 47 air miles southeast of John Day, Or; and 9 air miles northeast of Drewsey, Or.

Directions to the site from the nearest highway junction.

From U.S. Highway 20 near where it crosses the Malheur River head north for 2 miles into Drewsey and turn right onto Otis Valley Road. Stay on Otis Valley Road for 4 miles then turn right onto Altnow-Beulah Road. Stay on Altnow-Beulah Road for 3.5 miles then turn left onto

Project Cottonwood Reservoir Road Modified Revised: 2/17/2023 11:24:20 AM

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Cottonwood Reservoir Rotenone Treatment

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.

The land is owned and managed by the Bureau of Land Management and roads are have easements across private property to get to Cottonwood Reservoir. The private property on Cottonwood Creek upstream of Cottonwood Reservoir will not have public access.

Dominant Land Use Type:

Range/pasture

Project Location

General Project Location.

County: Harney
Town/City: Drewsey
ODFW Dist: Malheur Fish District
Stream/Lake/Estuary Name: Cottonwood Creek
Sub-basin: Malheur River
Tributary of: Malheur River

Specific Project Location.

| Latitude | Longitude |
|-----------|--------------|
| 43.928378 | --118.298545 |

Project Summary

Project Summary

Please provide a couple sentence summary of the proposal.

The goal of this project is to eradicate non-native Brown Bullhead Catfish from Cottonwood Reservoir and any streams where they are found upstream of the reservoir to restore a recreational Rainbow Trout fishery and protect native Redband Trout.

Overall Project Goals

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

The goal of this project is to eradicate Brown Bullhead Catfish from Cottonwood Reservoir and streams upstream of the reservoir. This will restore a recreational Rainbow Trout fishery and protect native Redband Trout. Staff will evaluate the potential to establish a Redband Trout fishery supported by natural production.

Primary objectives of R&E funding

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

Evaluate all fish species abundance and distribution in Cottonwood Reservoir.

Evaluate all fish species abundance and distribution in creeks upstream of Cottonwood Reservoir.

Develop a rotenone treatment plan for the project that includes coordination with private land

owners.

Purchase rotenone and implement the project.

Post project sampling and monitoring to determine the success of eradicating Brown Bullhead Catfish.

Restocking the reservoir the following spring with hatchery fingerling Rainbow Trout and create management objectives for the fishery.

Monitoring the fishery variables (e.g. growth, condition, survival) to adjust hatchery stocking numbers.

Evaluate contribution of native Redband Trout to the fishery and determine if a fishery supported wholly by natural production from Redband Trout meet fishery management objectives.

Current Situation/Justification

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

Cottonwood Reservoir was a productive trout fishery capable of producing 14-16" Rainbow Trout prior to the introduction of Brown Bullhead Catfish. Brown Bullhead Catfish were reported to Malheur Fish District staff in 2020 and sampling confirmed their presence there in the fall of that same year. Fish District staff identified species composition and distribution through sampling efforts in 2020 and 2022. Fish species captured (total) in Cottonwood Reservoir in 2020 were Brown Bullhead Catfish (3,252), Rainbow Trout (154) and non-game fish species (41). Sampling in 1981 captured Rainbow Trout (41) and non-game fish species (9). Native Redband Trout are an Oregon Conservation Strategy Species and inhabit Cottonwood Creek and its tributaries upstream of the reservoir. Sampling on public and private land during 2022 confirmed that Redband Trout remain in the watershed.

Malheur Fish District staff have discussed the project with private land owners and secured access to private land. District staff are also coordinating with federal land management agencies regarding the project and they are supportive. District staff need the funding to purchase the rotenone necessary to implement the project, restore the fishery and protect native fishes, particularly Redband Trout.

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.

The eradication of Brown Bullhead Catfish will enable Malheur Fish District staff to fulfill both parts of the Oregon Department of Fish and Wildlife (ODFW) mission by: (1) providing angling opportunity for current Oregonians and (2) conserving native fishes such as Redband Trout for future generations of Oregonian. The stocking of put-grow-and take Rainbow Trout in this reservoir provides a fishery valued by local and regional anglers. Fingerling (3-4") Rainbow Trout will grow to quality (14-16") Rainbow Trout in this reservoir within two years of stocking. Elimination of Brown Bullhead Catfish will provide growth, feeding and over-wintering habitat for Redband Trout, Mountain Sucker and Speckled Dace.

No creel data exists for this reservoir, however anecdotal reports from anglers in Harney and

Grant counties indicate that it is valued and used by local and regional anglers. Conversations with land owners for access to private property upstream of the reservoir confirmed the value and use of the reservoir.

Percent benefit split between Commercial and Recreational anglers:

- 0 % Commercial
- 100 % Recreational

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

No commercial angling exists at this reservoir and all angling is recreational.

This project has been identified as an ODFW priority for:

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

Yes

This supports the mission of ODFW to provide angling opportunity for current Oregonians and conserve native fish populations for future generations.

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

This was identified as a priority at the ODFW Invasive Aquatic Species Team at a meeting on October 4, 2022 and recommended to seek funding from R & E.

Identify any plan or other document that identifies this priority.

Malheur River Basin Plan - 1990

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

No

This project is intended to benefit the following species:

- Other Fish Species
- Redband Trout

This project will benefit anglers or fishery by providing:

Angling Opportunity

Angling Opportunity

This project will:

- Improve the opportunity for anglers to catch fish (better stocked fish, trapping)
- Enhance natural production of fish stocks to levels that allow for recreational fishing opportunities
- Restore a degraded fishery

Project Description

Schedule

| Activity | Date | RE Funding |
|--|--------|------------|
| Evaluate all fish species abundance and distribution in Cottonwood Reservoir | 9/2020 | No |
| Evaluate all fish species abundance and distribution in creeks upstream of Cottonwood Reservoir | 7/2022 | No |
| Develop a rotenone treatment plan that includes public outreach to private land owners, public stakeholders and federal land management agencies | 4/2023 | No |

| | | |
|---|---------|----|
| Purchase rotenone | 8/2023 | No |
| Post project sampling to determine the success of the rotenone project and dissipation of rotenone in the reservoir | 10/2023 | No |
| Restocking of the reservoir with fingerling Rainbow Trout | 4/2024 | No |
| Reservoir monitoring | 10/2024 | No |
| Reservoir monitoring | 10/2025 | No |
| Evaluation of Redband Trout contribution to the fishery | 10/2024 | No |
| Evaluation of Redband Trout contribution to the fishery | 10/2025 | No |
| Consider elimination of hatchery Rainbow Trout stocking based on results from the Redband Trout evaluation | 7/2026 | No |

Permits

| Permit | Secured? | Date Expected |
|---|----------|---------------|
| 2300A General Permit - NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM WASTE DISCHARGE PERMIT | No | |

Project Design and Description

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

This project will be implemented using the Rotenone Standard Operating Procedures manual published by the American Fisheries Society. The manual provides guidance and details related to implementation of rotenone projects. There are 16 SOPs that provide details about public outreach, treatment plan development, project and treatment areas, equipment, bioassays to determine treatment rate, mitigation for non-target species, equipment needs, personal protective equipment (PPE) and post project monitoring. Outreach to private land owners, public stakeholders and federal agencies has already begun and no opposition to the project is expected. Further outreach will occur once a plan is developed and finalized. Rotenone will be applied in both powder and liquid formulations to the reservoir and any sections of the creek known or suspected to contain Brown Bullhead Catfish. Rotenone will be applied at appropriate treatment rates determined by bioassays (pre-tests) with Brown Bullhead Catfish and water from Cottonwood Reservoir. Boats will be used to distribute rotenone in the reservoir while backpack sprayers will be used for any sections of stream requiring rotenone. Post-project monitoring will include sampling using nets and electrofishing equipment as well as water samples to determine exact concentrations of rotenone applied and when rotenone is no longer detectable.

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?
A successful rotenone project will provide 10+ years of a quality Rainbow or Redband Trout fishery, barring any future illegal introductions. This is based on my past successful implementation of the Lofton rotenone projects that are still providing benefits for anglers in Lake and Malheur counties.

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

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

Baseline monitoring has already been implemented with sampling efforts to identify the abundance and distribution of fish species in Cottonwood Reservoir and the creeks upstream of the reservoir. Water chemistry samples still need to be collected in the reservoir prior to implementation of a rotenone project to understand pre-project baseline and how this may affect the degradation of rotenone. No Brown Bullhead Catfish were captured in the creeks upstream of the reservoir in 2022. Final distribution sampling is needed to confirm that fish distribution hasn't changed since the 2022 efforts. Data collection will continue following implementation of the project. Gillnets, trap nets and minnow traps will be deployed in the reservoir to determine if any Brown Bullhead Catfish remain alive. Backpack electrofishing or seines will be used to sample creeks upstream of the reservoir that were treated to determine success. Water chemistry will be collected at the beginning, middle and end of the day on the day the project is implemented. Then daily for the next seven days then weekly for two months, and finally shifting to a monthly sample for four months or until rotenone is no longer detectable. Water sampling will be discontinued earlier if rotenone is no longer detectable. This is necessary for two reasons: First, to determine the exact treatment rate that was achieved and second, to determine when rotenone is no longer detectable in the waterbody and watershed. Sampling in this way provides insights into why a treatment was successful or unsuccessful which is useful in determining if another project should be considered. It is also useful to have data to dispute false accusations of water contamination, property loss (e.g. death of cattle) or environmental damage. Annual sampling in the fall of 2024 and 2025 will occur once Rainbow Trout are restocked into the reservoir. Fin-clipped fingerling Rainbow Trout will be used to evaluate hatchery Rainbow Trout vs native Redband Trout contribution to the fishery. Malheur Fish District staff and volunteers will do the fin clipping.

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 |
|-----------------------------|---------|---------|--------------|---|
| Malheur Fish District Funds | In-Kind | Pending | 17055 | Pre- and post- project sampling/ monitoring including staff time, vehicle fuel, maintenance and travel costs. |
| | | Total | 17055 | |

Budget

| Item | Unit Number | Unit Cost | In-kind or non-cash contributions | Funding from other sources | R&E Funds | Total Costs |
|--|-------------|---------------------|-----------------------------------|----------------------------|-----------|-------------|
| PROJECT MANAGEMENT | | | | | | |
| Dave Banks - District Fish Biologist | 108 | 68.55 | 7404 | 0 | 0 | 7404 |
| | | SUBTOTAL | 7404 | 0 | 0 | 7404 |
| IN-HOUSE PERSONNEL | | | | | | |
| Kirk Handley - Asst. District Fish Biologist | 144 | 58.02 | 8355 | 0 | 0 | 8355 |
| | | SUBTOTAL | 8355 | 0 | 0 | 8355 |
| CONTRACTED SERVICES | | | | | | |
| | | | 0 | 0 | 0 | 0 |
| | | SUBTOTAL | 0 | 0 | 0 | 0 |
| TRAVEL | | | | | | |
| Motorpool lease | 4 | 107.00 | 428 | 0 | 0 | 428 |
| fuel | 27 | 3213.00 | 868 | 0 | 0 | 868 |
| | | SUBTOTAL | 1296 | 0 | 0 | 1296 |
| SUPPLIES/MATERIALS | | | | | | |
| Parts/Repairs | 1 | 500.00 | 0 | 0 | 500 | 500 |
| 5% powdered rotenone 110 lb barrel | 28 | 960.00 | 0 | 0 | 26880 | 26880 |
| 5% liquid rotenone 2.5 gal jug | 22 | 345.00 | 0 | 0 | 7590 | 7590 |
| tyvek chemical resistant suit | 4 | 16.00 | 0 | 0 | 64 | 64 |
| gloves | 24 | 2.57 | 0 | 0 | 62 | 62 |
| filters for respirators | 4 | 68.00 | 0 | 0 | 272 | 272 |
| water chemistry analysis | 36 | 180.00 | 0 | 0 | 6480 | 6480 |
| | | SUBTOTAL | 0 | 0 | 41848 | 41848 |
| EDUCATION/OUTREACH | | | | | | |
| | | | 0 | 0 | 0 | 0 |
| | | SUBTOTAL | 0 | 0 | 0 | 0 |
| EQUIPMENT | | | | | | |
| | | | 0 | 0 | 0 | 0 |
| | | SUBTOTAL | 0 | 0 | 0 | 0 |
| FISCAL ADMINISTRATION | | | | | | |
| | | | 0 | 0 | 0 | 0 |
| | | SUBTOTAL | 0 | 0 | 0 | 0 |
| | | BUDGET TOTAL | 17055 | 0 | 41848 | 58903 |

Internal Review Results

Review Score: 2.1 out of 3

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

Summary of Review Team Comments

Internal Review Team was supportive of this project. One concern is how will the bullhead upstream of the reservoir be eradicated to prevent re-infestation.

Specific Review Team Comments

Another good project to restore a fishery.

Equipment necessary to deploy rotenone (e.g. boats, sprayers, pumps, etc.) are not shown in application or budget. Also, other staff that will participate during rotenone application can be shown as match.

Fairly straightforward Rotenone treatment and Malheur District staff are well experienced to conduct this work with a high likelihood of success. Treatment would likely get at least 10 more years of bullhead-free fishing and hopefully even more if someone doesn't reintroduce them again.

Specific Review Team Questions

Why would the project life expectancy be 10+ years? Barring illegal introductions wouldn't the benefit be permanent?

Yes, it would be permanent if no illegal introductions occur and we are effective at finding all Brown Bullhead in the watershed upstream of the dam. We plan to completely eradicate Brown Bullhead from upstream of Cottonwood Reservoir dam in the Cottonwood Creek watershed.

Will there be pre-project salvage of redband trout in the creek, to re-stock post-project? Will there be a barrier placed in the creek just above the bullhead distribution/treatment area, to prevent bullhead evasion of rotenone, and redband drift into the treated area? Will the pool be drawn down enough to prevent spill downstream of the dam, or will neutralization be necessary for the creek below the reservoir?

We plan to treat during minimum pool conditions in late summer. At minimum pool in late summer there is no flow in or out of the reservoir and no chance bullhead can move upstream. The stream is intermittent at that time and we will only treat portions of the stream where we find Brown Bullhead. We electrofished and set baited catfish traps in portions of stream last summer with perennial flow and some nice deep pools but did not capture any bullheads. We will have to conduct a more thorough electrofishing and sampling survey of the entire reach of Cottonwood Creek upstream of the reservoir just prior to treatment to locate any pockets of Brown Bullhead. This sampling needs to be done the same year prior to treatment when Cottonwood Creek is intermittent because bullhead could potentially move into portions of Cottonwood Creek during periods of high flow in early spring from the Alder Creek Pond (we are treating that too) or Cottonwood Reservoir. Alternatively we could treat the entire stream to make sure we get them all but an extensive fish salvage effort would need to be done if we wanted to reduce impacts to native Redband and other non-game fish that are abundant in perennial portions of stream.

How much angling effort occurs at this location and expand on how this project is a priority. Have any funding alternatives been evaluated, say from local fishing groups?

There are currently no organized angling groups in Harney County. It is possible Trout

Unlimited would like to get on board because this project will benefit Redband Trout. The closest chapter of TU is in Bend, there are other angling groups there as well but that is the closest hub to Burns for angling groups interested in coldwater fish in Oregon. This reservoir has the potential to be a great trout fishery and could also offer a quality warmwater fishery but we hope to manage for Redband Trout and hatchery Rainbow Trout here. Brown Bullheads are currently the limiting factor for this trout fishery and word has gotten out which has negatively impacted use. We anticipate much more angling use when this fishery is restored.

Any idea what the detection efficiency is for bullhead with e-fishing in the tribs? How confident are we that non-detects in the tribs means there is no direct source population for recolonizing the lake?

Capture probability in this particular watershed will be higher than most. These are small intermittent by mid June most years with isolated pools. We will look into eDNA as another tool we can use to detect Brown Bullhead. We plan to do some very thorough sampling to reduce the chance we miss them. There is also a pond at the headwaters of Alder Creek that has bullhead we will treat first and work our way through the watershed looking for bullhead in Cottonwood Creek. We will need to sample the same year we plan to treat the reservoir to reduce the chance Bullhead move between sampling and treatment. We will set baited catfish traps in pools as we do our pre treatment stream sampling. We have had success capturing bullhead with baited catfish traps at other locations and think an overnight set will be the best strategy for sampling in more complex habitat.

Would treatment be conducted at a time when there is little or no redband trout use of the reservoir?

Not sure if any Redband will be in the reservoir in late summer, if they are present they will probably be in bad shape due to the extremely high density of Brown Bullhead. We have not stocked this reservoir for the last couple of years so any O. mykiss we capture during salvage efforts would most likely be native Redband. Attempting a salvage prior to treatment would also be valuable baseline data. When we sampled the reservoir in September 2020 with trap nets we only captured a handful of trout and those could have been hatchery or native.

Are there any identified springs and areas that would complicate the treatment or decrease the chances of success? What are the nearby sources of bullhead that these illegally introduced fish may have come from? Are they downstream of the dam?

We do not anticipate using much rotenone in the stream, water volumes are low in summer and surprisingly we have not found any bullhead where we have looked so far. The stream will be intermittent when we treat and could be treated with backpack sprayers and some sand/rotenone bombs where springs exist. Using eDNA is not a bad idea, maybe we can collect some this summer. There are springs in the stream that we will have to deal with if we need to treat portions of stream but overall pretty simple system. There are bullhead downstream of the dam all the way to the Snake River so source populations do exist. They have not shown up in Beulah Reservoir or other nearby locations so that is encouraging.

Additional Files

Budget Information

Maps

[Cottonwood Res. Location](#)

[Cottonwood Res. Watershed](#)

[Cottonwood Reservoir](#)

Photos

[Google Earth 2014](#)

Design Information

[Heart Lake Rotenone Treatment Plan](#)

Management Plans and Supporting Documents

[Signature Authorization Page](#)

signed approval from watershed manager

[Tables and Figures](#)

Permits and Reviews

[2300A NPDES Permit DEQ](#)

Partnerships

Public Comment

Administrative Documents

[Signature Page](#)

Signature Page

Completion Report

A completion report has not been submitted for this project.