



R & E Grant Application 23-25 Biennium

Project #: 23-001

Diamond Lake Monitoring/Invasive Species Removal

Project Information

Requested Cycle: 23-1
R&E Project Request: \$89,951
Other Funding: \$67,642
Total Project: \$157,593
Spending Start Date: 7/1/2023
Spending End Date: 6/30/2025
Project Start Date: 7/1/2023
Project End Date: 6/30/2025
Organization: Oregon Department of Fish and Wildlife

Applicant Information

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Past Recommended or Completed Projects

This applicant has no previous projects that match criteria.

Location Information

Where is it?

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

Landowner Information

Name: Umpqua National Forest
Affiliation: United States Forest Service, Department of Agriculture
Address: 2020 Toketee Ranger Station Rd
Idlelyd, OR, 97447, Oregon, 97447
Phone: 541-498-2531

Site Description

Street Address, nearest intersection, or other descriptive location.

Nearest major intersection: OR Highway 138 and NF-4795.

Diamond Lake Resort: 350 Resort Dr.

Diamond Lake, OR 97731

The resort is the main epicenter of activity on Diamond Lake. 1.4 miles South of the resort on NF-4795 (Diamond Lake Loop), is a USFS Visitor Information Center. The ODFW cabin and the weir are located 2.2 miles from the resort and marina on the North end of the lake.

Directions to the site from the nearest highway junction.

From Highway 138, exit and follow the signs for the Diamond Lake Resort. Continue for 0.9 miles to the entrance of the resort.

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.

N/A; US Forest Service public land and boat ramps allow angler access at multiple points.

Dominant Land Use Type:

Forest

Project Location

General Project Location.

County: Douglas
Town/City: Diamond Lake
ODFW Dist: Umpqua
Stream/Lake/Estuary Name: Diamond Lake
Sub-basin: 17100301
Tributary of: North Umpqua River

Specific Project Location.

Latitude

Longitude

Project Summary

Project Summary

Please provide a couple sentence summary of the proposal.

Tui chub presence was confirmed in Diamond Lake in 2015. As per the Diamond Lake Restoration Project FEIS (2004), Diamond Lake Management Plan (2009), and Diamond Lake Oregon Administrative Rule 635-500-0703, action continues to be taken by ODFW to manually remove tui chub and golden shiner, and stock piscivorous trout.

Overall Project Goals

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

Per the Diamond Lake Management Plan, FEIS and OAR 635-500-0703, maintain a premier, "blue-ribbon" trout fishery and promote healthy lake ecology which contributes to quality trout habitat

Inhibit tui chub population growth in Diamond Lake by removing as many of the invasive cyprinids as possible via mechanical removal methods and stocking of piscivorous trout.

Evaluate the impact of mechanical removal and piscivorous trout on the tui chub population.

Continue to maintain a positive working relationship with the Diamond Lake Working Group and other partners. In addition, improve public outreach on invasive species awareness.

Primary objectives of R&E funding

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

Hire two employees (seasonal BSAs) to be housed at Diamond Lake for at least three months(2023 and 2024)and purchase necessary equipment for the most efficient monitoring and removal of invasive cyprinids at Diamond Lake.

Maximize net set efforts on a daily/weekly basis to remove as many invasive cyprinids as possible. Propose trap net sets 100-150 per season and cast/seine net samples as time and conditions allow.

Collect a statistically valid number of tiger and triploid brown trout diet samples as determined by ODFW biometrician for diet evaluation and comparisons. Use results to inform future stocking numbers and species.

Run the Diamond Lake weir panel trap on a daily basis to monitor possible out-migration of tiger and triploid brown trout.

Conduct 2-3 creel surveys per month selected by the statistical creel protocol to evaluate rainbow trout fishery metrics.

Monitor trends in tui chub catch per unit effort to track changes in relative abundance and provide information to adjust techniques and locations of sampling.

Current Situation/Justification

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

On two separate occasions tui chub have completely decimated the ecosystem of Diamond

Lake, causing poor water quality, lack of a fishery, and closures due to toxic algae blooms. Successful efforts funded by R&E to curtail possible tui chub proliferation and therefore protect the health of the trout fishery, water quality, and dependent economy have been undertaken since the rediscovery of tui chub in October 2015. (See attached Project Update and Diamond Lake Economic Reports.)

The continuation of this project has been deemed critical at both District and Statewide levels to help prevent the proliferation of tui chub as well as to meet requirements of the Diamond Lake Restoration Project FEIS (2004), Diamond Lake Management Plan (2009), and Diamond Lake OAR 635-500-0703. Additionally, in the internal 2018 ODFW Reservoir Dogs statewide project prioritization process this project ranked high in both the "Illegal Introduction" (#2 of 12 projects) and "RM&E" (#2 of 37 projects; #1 in the "Science" sub-category) groups. As such, this project was chosen by both groups to be recommended for R&E funding. See attached Reservoir Dogs ranking.

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.

Diamond Lake is one of the premiere fishing destinations in Oregon. It attracted over 50,000 anglers and generated over \$2 million in local revenue in 2009 (see attached Diamond Lake Economic Report). History of tui chub at Diamond Lake indicates that these invasive minnows can proliferate to population levels that adversely affect both the health of the lake and the renowned trout fishery. Tui chub population expansion in Diamond Lake has previously led to complete ecosystem collapse which was devastating to both recreational fishing opportunities and the nearby economy. Addressing the possible tui chub issue before the population reaches levels seen in previous years should help to ensure that the premiere rainbow trout fishery remains productive and water quality continues to be good enough for other recreational activities on the lake.

Percent benefit split between Commercial and Recreational anglers:

0 % Commercial

100 % Recreational

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

No commercial fishing opportunities are available at Diamond Lake. It is stocked specifically for recreational sport anglers. Funding will be used to ensure the premiere Diamond Lake recreational rainbow trout fishery remains productive and to provide additional catch-and-release tiger and brown trout fisheries.

This project has been identified as an ODFW priority for:

Local/watershed

Basin/regional

Statewide

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

Yes

Diamond Lake Restoration Project FEIS (2004); see "Additional Materials"

Diamond Lake Management Plan (2009); see "Additional Materials"
Diamond Lake OAR 635-500-0703; see "Additional Materials"

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

The Diamond Lake FEIS (2004 USFS, ODFW, ODEQ) and Diamond Lake Management Plan (2009 ODFW) identified tui chub as a primary factor influencing the decline of the lake's water quality, ecosystem, and subsequently the trout fishery. ODFW Reservoir Dogs also identified as priority in 2018.

Identify any plan or other document that identifies this priority.

Diamond Lake Restoration Project FEIS (2004): The large tui chub population has affected lake conditions such that toxic algae blooms have occurred during the summers of 2001-2003...triggering lake closures.

Diamond Lake Management Plan (2009): The first year post-treatment (2007), Diamond Lake attracted 72,085 angler trips and generated an estimated \$3.76 million dollars in sales and \$2.57 million in labor

Diamond Lake OAR 635-500-0703: Conduct ecologically based fishery monitoring and evaluations necessary to maintain ecology based fishery objectives and healthy lake ecology; and ...control illegally introduced fish species.

Diamond Lake Economic Report (2011): From 1994-2006 angler numbers dropped from 70,500 to 6,000. This resulted in a loss of \$4.9 million in annual sales and \$1.4 million in labor.

ODFW Reservoir Dogs RME-Group ranked 1st for Monitoring category

Is this project part of an approved Salmon-Trout Enhancement Program (STEP) activity?
No

This project is intended to benefit the following species:

Other Species
Tiger Trout, Triploid Brown Trout
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)
Provide new opportunity for anglers to catch fish (new pond, more fish to stock more areas, new species)
Restore a degraded fishery

Monitoring/Research

This project will be used to evaluate:

Population composition (i.e age, species, survival, size, or genetics)
Angler satisfaction/harvest (Creel)
Distribution (i.e. presence, absence, abundance)

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

Yes

District Fish Biologist Greg Huchko and former Assistant District Fish Biologist Jason Brandt developed the initial project plans that have been utilized since 2016. Since then the project has been discussed with ODFW Fish Division staff, the Umpqua Watershed Manager, ODFW biometrician, Diamond Lake Working Group (Douglas County, USFS, and USFWS), and local conservation groups (Audubon Society, Steamboaters). Ongoing project components and further details related to the design of the proposed diet analysis aspect of this project were discussed and reviewed during the Reservoir Dogs statewide project evaluation process.

Is this study critical to fishery management decisions?

Yes

Building upon the efforts that have taken place since 2016, which have shown positive results in terms of cyprinid removal and tui chub population growth reduction, we plan to continue evaluating the effectiveness of early targeted removal efforts in conjunction with the stocking of piscivorous trout species in limiting tui chub population expansion in Diamond Lake. Based on continued observations of tiger trout preying on invasive cyprinids in Diamond Lake, we plan to continue working closely with the ODFW biometrician and Oregon State genetic research personnel this winter to develop a more statistically rigorous diet comparison between tiger and brown trout which will help inform the Umpqua District if either of the species is more likely to prey on invasive cyprinids in Diamond Lake and in turn which species we should focus on stocking. We will also continue to evaluate how possible tui chub proliferation impacts the important rainbow trout fishery. By monitoring tui chub population dynamics and trying to remove as many tui chub as possible, ODFW will work to ensure there is a viable trout fishery and suitable water quality in the future.

Yes

Site-specific catch rates of introduced species help to inform trapping location, gear type, and duration in order to maximize efficiency. Tiger and brown trout gut content samples can help to inform annual stocking needs/rates necessary for invasive species control.

Yes

The Umpqua District, consulting with Fish Division, will evaluate the results of the monitoring effort on rainbow trout and determine appropriate changes to stocking amounts. Consideration will be given to trout condition, angler catch, angler harvest, and benthic invertebrate abundance and diversity.

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

Yes

The Umpqua District will continue to work with Fish Division to determine long-term funding strategies. Efforts are likely to continue as long as tui chub are present in Diamond Lake. However, results from this project will inform the most efficient and effective future management

Will the data be reported or published?

Yes

A report outlining results from the project will be made available to the public yearly or bi-yearly depending on information availability and completeness, and continued monitoring will hopefully result in a scientific manuscript comparing tiger and triploid brown trout diets.

Project Description

Schedule

Activity	Date	RE Funding
Set 3-6 trap nets 3-4 days per week	July-September, 2023; June - September 2024, June 2025	No
Monitor panel trap at outlet weir daily	July-September, 2023; June - September 2024, June 2025	No
Statistically designed creel survey 2-3 per month	July-September, 2023; June - September 2024, June 2025	No
Shoreline oriented seine and cast net sampling as conditions and time allow	July-September, 2023; June - September 2024, June 2025	No
Tiger and brown trout diet analysis as fish are collected	July-September, 2023; June - September 2024, June 2025	No
Data entry and analysis weekly/monthly and summary report yearly/bi-yearly.	July-September, 2023; June - September 2024, June 2025	No

Permits

Permit	Secured?	Date Expected
N/A	No	

Project Design and Description

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

In order to meet our objective of hiring two employees (seasonal BSAs) to be housed at Diamond Lake for at least three months (per year) and purchase necessary equipment for the most efficient monitoring and removal of invasive cyprinids at Diamond Lake we plan to:

- (1) Acquire appropriate levels of funding through this grant, work with ODFW HR staff to work through the hiring process, interview candidates and ultimately hire two seasonals by May 15th.
- (2) Prepare the ODFW cabin at Diamond Lake for residence prior to the start of the field season or arrange other accommodations if the cabin is not suitable. Preparations include fixing overwinter damage, maintaining running water and heat, and pest management.
- (3) Through experience gained from the 2016 through 2022 removal efforts, evaluation of literature, and discussions and recommendations from other ODFW staff we will determine what equipment is most appropriate to purchase. We will make these purchases via state Visa "SPOTS" cards or through a purchase order.

In order to meet our objective of maximizing net sets on a daily/weekly basis to remove as many invasive cyprinids as possible, we plan to: (1) Complete 150-200 trap net sets per season. Trap nets are comprised of 1/4" mesh netting, (1) 4'x5' framed "traps", (1) 4'x50' leads, and (2) 4'x 25' wings. Work done from 2016-2022 indicates that trap-netting is an efficient sampling method for the collection of cyprinids. Up to six trap nets at a time will be fished for 24-hour periods on average. (2) Cast/seine netting as many times as conditions and schedules allow. (3) All cyprinids will be enumerated and removed from the lake and tui chub will be examined further

for size, sex, and ripeness. If juvenile cyprinids cannot be identified to species, a sub-sample will be preserved for future identification analyses.

In order to meet our objective of collecting a statistically valid number of tiger and triploid brown trout for diet evaluation and comparisons, we plan to: (1) Continue consultation with the ODFW biometrician to finalize an appropriate sampling strategy. (2) Opportunistically collect samples from piscivorous trout stomachs via gastric lavage during trap-netting efforts, beach seining, cast-netting, weir trapping, and from permitted angler efforts. If possible, fish prey items will be identified to species. Results will be used to inform future stocking numbers and species.

In order to meet our objective of running the Diamond Lake weir panel trap on a daily basis to monitor possible out-migration of tiger and triploid brown trout we plan to: (1) Check the trap once in the morning and once the evening daily. (2) Clean the screening/paneling and trap to maintain adequate flow which will be done as needed (likely multiple times a day). (3) Record all pertinent data relative to fish presence in the trap. Any trout that are collected in the trap will be relocated away from the lake outlet.

In order to meet our objective of conducting 2-3 creel surveys per month we plan to: (1) Consult the creel protocol that has already been developed by our ODFW biometrician and subsequently select days, times, and locations of creel as the protocol suggests. Surveys will be conducted at a single, randomly chosen boat ramp per sampling event and will collect information such as number of anglers, number of hours fished, number of fish kept/released, two-rod validation, and size of trout harvested.

In order to meet our objective of monitoring trends in tui chub catch per unit effort to track changes in relative abundance and provide information to adjust techniques and locations of sampling we plan to: (1) Continue discussions between District staff and the ODFW biometrician to statistically test changes in catch per unit effort over time. (2) Continue discussions with the ODFW biometrician to further refine all of our sampling efforts.

In addition to the objectives detailed above that are specific to this R&E proposal we also plan the following actions through use of Umpqua Fisheries Enhancement Derby funds, ODFW Propagation resources, and California Fish and Wildlife resources:

(1) In 2023/2024 we plan to continue acquiring and stocking approximately 15,000 3" tiger trout.
(2) In 2023/2024 we plan to continue acquiring and stocking approximately 15,000 3" triploid brown trout.

(3) Beyond 2024 we plan to continue the stocking of 15,000 3" tiger trout and 15,000 3" triploid brown trout annually as funding allows and our analysis of tiger and brown trout diets informs. We have worked with Fish Division, including Propagation staff, Klamath Hatchery, and other ODFW staff to make these stocking decisions. For more comprehensive information regarding this objective, please see attached documents and studies that were reviewed extensively and used to help guide us prior to making the decision to use tiger and triploid brown trout for cyprinid control.

See also attached Project Update and 2018, 2021 R&E Review Team Questions and Answers documents for further information. Prior questions to alternatives to project proposal

can be found in attachments.

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?

This project will continue as long as tui chub are present. Data will always remain valid.

Equipment will continue to be used for fish removal and monitoring at Diamond Lake and others around the Umpqua District as long as equipment is in working condition.

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

Umpqua District ODFW staff will oversee the project indefinitely. Equipment maintenance will also be undertaken by the Umpqua District for the life of the equipment. We have asked for \$2000 in this grant for cabin maintenance that may be needed over the next couple of years. Since the initiation of this project, we have had to address multiple cabin maintenance needs (e.g. new roof, plumbing and electrical fixes), but even though it is likely that additional maintenance will be needed, use of the cabin will still be much more economical than paying for alternative housing at Diamond Lake.

Will the project require ongoing maintenance?

Unknown

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

Yes

Results from the 2018 through 2022 monitoring and removal efforts will be used as baseline data for this project (see attached 2020-2022 Project Update). Information and data collected in 2023/24 will be analyzed in an effort to determine the effectiveness of the following components of the project:

1. CPUE (fish/net) comparisons of tui chub and golden shiner removal efforts to track relative abundance and population trends as well as removal effectiveness.
2. Diet analysis of tiger and brown trout to determine the effectiveness of our stocking strategies of these two species as it relates to the predation upon, and reduction of, invasive cyprinids. These effectiveness monitoring efforts will help us formulate future stocking strategies of piscivorous trout. With the recent discovery of tiger trout predation on cyprinids at Diamond Lake, we are working to finalize a sampling strategy and statistically rigorous diet composition comparison between tiger and brown trout which will also inform the Umpqua District on the feasibility of continuing to stock piscivorous trout.
3. Creel analysis will continue in an effort to monitor the productivity of the fishery. This information will be analyzed and compared to the invasive species abundance data in order to determine the effectiveness of the project, i.e. if removal efforts are positively impacting the fishery.

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
Umpqua Fish District / HQ staff-ODFW		Secured	0	This funding is for District staff, equipment/gas and the ODFW biometrician's estimated time on the project
Propagation-ODFW/California Fish and Wildlife	Cash	Secured	32900	Donation of 30K triploid brown trout eggs and rearing of brown and tiger trout
		Total	32900	

Budget

Item	Unit Number	Unit Cost	In-kind or non-cash contributions	Funding from other sources	R&E Funds	Total Costs
PROJECT MANAGEMENT						
Umpqua District Fish Biologist (Hours+OPE)	80	72.22	5778	0	0	5778
		SUBTOTAL	5778	0	0	5778
IN-HOUSE PERSONNEL						
2 BSA's for 2 seasons + OPE (80%)	2688	32.72	0	0	87951	87951
Umpqua District Staff, Hours+OPE (Tech)	240	45.38	10892	0	0	10892
Umpqua District Staff, Hours+OPE (NRS-2)	180	54.29	9773	0	0	9773
Umpqua District Fish Biologist, Hours+OPE (NRS-3)	40	72.22	2889	0	0	2889
ODFW Biometrician (estimated hours)	20	64.40	1288	0	0	1288
ODFW Watershed Manager, Hours+OPE	20	72.08	1442	0	0	1442
		SUBTOTAL	26284	0	87951	114235
CONTRACTED SERVICES						
Tiger Trout fingerlings (22, 23)	1000	10.91	10910	0	0	10910
Triploid brown trout fingerlings (22, 23)	3500	6.30	22050	0	0	22050
		SUBTOTAL	32960	0	0	32960
TRAVEL						
ODFW cabin maintenance	1	0.00	0	0	2000	2000
		SUBTOTAL	0	0	2000	2000
SUPPLIES/MATERIALS						
Vehicle mileage and gas	3000	0.50	1500	0	0	1500
Boat gas (gallons)	120	6.00	720	0	0	720
		SUBTOTAL	2220	0	0	2220
EDUCATION/OUTREACH						
			0	0	0	0
		SUBTOTAL	0	0	0	0
EQUIPMENT						
Miscellaneous (formalin, jars, gastrolavage equipment)	1	0.00	400	0	0	400
		SUBTOTAL	400	0	0	400
FISCAL ADMINISTRATION						
			0	0	0	0
		SUBTOTAL	0	0	0	0
		BUDGET TOTAL	67642	0	89951	157593

Internal Review Results

Review Score: 1.9 out of 3

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

Summary of Review Team Comments

There is concern from the Internal Review Team that this project is an ongoing project with no defined end date and it continues to come back to R&E for funding each biennium. R&E is not the appropriate funding mechanism for perpetual projects. This is an important fishery, but IRT feels base funding for this project should come from another source.

Specific Review Team Comments

Ongoing concern. This appears to be a base program implemented with temporary funds.

Continued concern over finding an alternative, long-term funding approach. Until that is found, policies/rules/management plans call for continued trout stocking plan and invasive species control.

I'm sure we've mentioned it before, but this one is clearly a long term and sustained need, so finding some base \$ to support it would be better for sustainability than having to rely on continual R&E proposals.

Good project to keep going- this is a great fishery that is important to maintain. Eventually needs to transition to base funding though.

Over time, the project seems to be refining trout stocking and invasive species control based on information learned from trapping, seining, creel and other methods. Project is highly-ranked through the Res. Dogs prioritization process, which was developed to establish a systematic queue for District project to be submitted to R&E. Combination of rainbow stocking, brown & tiger trout predator stocking, and chub/shiner removal seems to be working toward maintaining a quality rainbow trout fishery.

There is discrepancy in the data on the project update report, the number reported in the first paragraph to not match the data listed in table 1.

It would be helpful to have the most recent report for 2022 sampling and removal efforts. Ideally, this project would be funded from somewhere other than R&E since this work will have to continually be done and elimination of invasive Tui Chub is not achievable through these methods and since piscicide treatment is not likely financially or logistically feasible. The overall ask of this project includes a fairly high price tag so that should be considered since the work needs to be done annually and into perpetuity.

Specific Review Team Questions

The number of tui chub that have been collected is pretty minimal since 2016, Is there an option of reducing the frequency the annual removal efforts to less frequent events?

The Umpqua District has serious concerns reducing the amount of effort spent controlling invasive tui chub in Diamond Lake. Prior to the roughly six-million-dollar rotenone treatment in 2006, we attempted trapping with less effort than we currently are, and it was not successful. We believe that current sampling is only a minimum and would like to conduct more sampling and removal if it was feasible. Some spring and fall sampling occurs without outside funding but due to other District obligations it is only twice a year. Increased effort would likely help better inform the agency on population trends.

Catch per trap set seems to be declining but the number of tui chub has varied from year to year since 2016. The highest number of fish captured was in 2022, though this was likely due to previous misidentification of tui chub under 200mm. These smaller fish indicate a reproducing population exists in Diamond Lake proving a potential for an increase in population if not properly controlled.

If a reduction in removal was to occur, we are concerned that changes in tui chub distribution or population would not be detected. It is possible that less frequent events would miss a significant increase in population leading back to a situation like the 1950's or 1990's where the population increased exponentially, and the lake's ecosystem collapsed.

Less frequent sampling may also preclude ODFW from meeting its obligations under Oregon law. Under OAR 635-500-0703, ODFW is to provide for the control of illegally introduced fish species in Diamond Lake

Can we move to less sampling and use volunteer or interns to conduct the work with district oversight?

Please review the answer to the previous question. In addition, we currently use volunteers and interns in our efforts at Diamond Lake. We have been using volunteers to supplement creel surveys and assist with removal efforts since 2016. By using volunteers to cover the creel surveys it allows the removal crew to operate more frequently and the District to focus on other projects.

Although it theoretically might be possible to operate solely on volunteers and interns, employees tend to be more reliable and are better able to accomplish the tasks. Expecting volunteers to conduct the amount of effort necessary for this project is likely unrealistic.

Regarding interns, we were informed in early February 2023 that no paid internships would be available for this year and so any interns would be on a voluntary basis.

In addition, the District is also under other more serious recent obligations including Winchester Dam repair coordination and increased spring Chinook and summer steelhead monitoring. Winchester Dam has become very time consuming with repair work and other political and biological issues. Spring Chinook in the North and South Umpqua rivers have become important monitoring projects due to recent declines. Summer steelhead have also taken on a higher priority with recent litigation, Rock Creek Hatchery issues and declining populations.

Additional Files

Budget Information

Maps

[Map](#)

Photos

Design Information

Management Plans and Supporting Documents

[1990 Diamond Lake Management Plan](#)

Plan outlining direction of management of Diamond Lake trout fishery

[2018-2019 Internal Review Comments](#)

2018-19 review of previous applications

[2020-22 Diamond Lake Project Update](#)

Summary of work conducted thus far

[2021 Summary of Review Team Comments](#)

asnwers to 2021 review team commments

[British Columbia Stocking Study](#)

provides information on other projects related to Diamond Lake

[Diamond Lake Administrative Rule](#)

Oregon law surrounding the management of Diamond Lake

[Diamond Lake Economic Analysis](#)

provides information on economic benefits of the fishery

[Diamond Lake FEIS](#)

documents alternatives considered prior to the Diamond Lake Restoration project in 2006

[Diamond Lake Historic Angler Trips](#)

Information on angler trips and goals

[Diamond Lake Management Plan](#)

Management plan for Diamond Lake

[Picivorous Trout Study](#)

Peer-reviewed journal article on fish eating trout.

[Piscivorous Rainbow Trout Study](#)

Peer-reviewed journal article on rainbow trout eating other trout

[Rainbow Trout Stocking Analysis](#)

Peer-reviewed journal article on rainbow trout stocks

[Reservoir Dogs recommended project list to R&E](#)

[Tiger Trout Life History](#)

Peer-reviewed journal article tiger trout life cycle

[Tiger Trout Life Performance](#)

Peer-reviewed journal article tiger trout

[Tiger Trout Life Review](#)

Peer-reviewed journal article tiger trout success

Permits and Reviews

Partnerships

Public Comment

[CCBUTI Letter of Support](#)

Letter of Support for project from Cow Creek Band of Umpqua Tribe of Indians

[Douglas County Commisisoners Letter of Support](#)

Letter of Support for project from Douglas County Commission

[Letter of Support from Steamboaters](#)

Letter in support of the project from local flyfishing/ conservation group Steamboaters

[Letter of Support from UFA](#)

Letter in support of the project from Umpqua Fishermen's Association

[Letter of Support from UFED and Cabin Owners](#)

[Letter of Support from USFS](#)

Letter in support of the project from United States Forest Service

[UVFF Letter of Support](#)

Letter of Support for project from Umpqua Valley Flyfishers

Administrative Documents

Completion Report

A completion report has not been submitted for this project.