



R & E Grant Application 17-19 Biennium

Project #: 17-006

Diamond Lake Monitoring/Invasive Species Removal

Project Information

Requested Cycle: 17-1
R&E Project Request: \$66,660
Other Funding: \$54,083
Total Project: \$120,743
Spending Start Date: 1/1/2017
Spending End Date: 10/1/2018
Project Start Date: 6/1/2015
Project End Date: 10/1/2018
Organization: ODFW - Umpqua Watershed District Office

Technical Contact

Name: Leslie ONeil
Address: 2255 Rogers Ln NW
Salem, OR 97304
Telephone: 503-949-8879
Email: leslie.e.oneil@gmail.com

Applicant Information

Name: Gregory Huchko
Address: 4192 N. Umpqua Hwy.
Roseburg, OR 97470
Telephone: 541-440-3353 x249
Telephone 2: 412-558-8591
Email: Greg.F.Huchko@state.or.us

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
Idleyld, OR, 97447
Phone: 541 498 2531
Fax: 541 498 2515

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.

Dominant Land Use Type:

Forest

Project Location

General Project Location.

County: DOUGLAS
ODFW Dist: Umpqua
Stream/Lake/Estuary Name: Diamond Lake
Sub-basin: Diamond Lake

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 OAR 635-500-0703, action is being taken by ODFW to manually remove tui chub 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 (temporary EBAs) to be housed at Diamond Lake for three months (2017 and 2018) and purchase necessary equipment for the most efficient monitoring and removal of invasive cyprinids at Diamond Lake.

Maximize net sets and electrofishing efforts on a daily/weekly basis to remove as many invasive cyprinids as possible. Propose trap net sets 90-100 per season, boat electrofishing 12-24 samples per season, and cast/seine net samples as time and conditions allow.

Collect a statistically valid number of tiger and triploid brown trout 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 1-2 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 across sampling techniques 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 historic instances tui chub have completely dominated the ecosystem of the

lake, causing poor water quality, lack of a fishery, and closures due to toxic algae blooms. Their populations were estimated between 50-100 million in both cases and the lake was successfully treated with rotenone in 1954 and 2006 to eliminate them. In October 2015 tui chub were found in the lake again leading to efforts to curtail possible tui chub proliferation. Monitoring and removing tui chub before their population expands will protect the health of the trout fishery, water quality, and dependent economy.

In June 2016, approximately 18,000 tiger trout, which are expected to prey on tui chub, were stocked. Also in 2016, a crew of two ODFW personnel worked for approximately two months to remove tui chub via trap nets, beach seines, and cast nets. That effort needs to continue into the future 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. Funding obtained through R&E will help support that effort for the next two years.

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 SFR business 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?

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

to identified this as an ODFW priority.

Identify any plan or other document that identifies this priority.

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"

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

Tiger trout and 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 Assistant District Fish Biologist Jason Brandt developed the initial project plans and it 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). The ODFW biometrician in conjunction with Umpqua Fish District staff developed the creel design and protocol. Further consultations are forthcoming with the biometrician on the triploid brown trout and tiger trout diet comparison.

Is this study critical to fishery management decisions?

Yes

We will be striving to determine effectiveness of early targeted removal efforts in conjunction with the stocking of piscivorous trout species in limiting tui chub population expansion in Diamond Lake. We will also 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

Mechanical removal of tui chub and population dynamics monitoring through catch per unit effort analysis will help ODFW formulate future tui chub control measures (e.g. maintain current efforts, increase/decrease efforts, undertake more intensive efforts) and rainbow trout stocking strategies (e.g. number of fish stocked, stocking larger fish if water quality is degraded from tui chub proliferation). Initiation of diet analysis and diet comparison for the stocked piscivorous trout species will help to inform future stocking levels and potentially which species to stock if one species is more proficient at preying on tui chub than the other.

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

Yes

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 actions.

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 2-4 trap nets 3-4 days/week	June-August 2017-18	Yes
Boat electrofishing 1-2 days/week	June-August 2017-18	Yes
Monitor panel trap at outlet weir daily	June-August 2017-18	Yes
Statistical creel surveys 1-2/month	June-August 2017-18	Yes
Shoreline oriented seine and cast net sampling as conditions and time allow	June-August 2017-18	Yes
Tiger and brown trout diet analysis as fish are collected	June-August 2017-18	Yes
Data entry and analysis weekly/monthly and summary report yearly/bi-yearly	June-August 2017-18	Yes

Permits

Permit	Secured?	Date Expected
Covered by ODFW Scientific Take permit.	Yes	In hand

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 (temporary EBAs) to be housed at Diamond Lake for 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. (3) Through experience gained from the 2016 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 and electrofishing efforts on a daily/weekly basis to remove as many invasive cyprinids as possible, we plan to: (1) Complete 90-100 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 in 2016 indicated that trap netting is an efficient sampling method for the collection of cyprinids. Up to four trap nets at a time will be fished for 24-hour periods.(2) Complete 12-24 boat electrofishing samples per season. Night boat electrofishing has proven to be effective for cyprinid collection at Diamond Lake in the past. (3) Cast/seine netting as many times as conditions and schedules allow. (4) 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 analysis in the lab.

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 ODFW biometrician to determine appropriate sampling strategy and sample size. (2) Opportunistically collect samples from piscivorous trout stomachs via gastric lavage during trap-netting efforts, beach seining, cast-netting, electro-fishing, 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, this will be done as needed (likely multiple times a day). (3) Record all pertinent data relative to fish presence in the trap. Though very few trout entered the trap during the 2016 sampling season, any trout that may possibly collected in the trap would be relocated away from the lake outlet.

In order to meet our objective of conducting 1-2 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, and size of trout harvested.

In order to meet our objective of monitoring trends in tui chub catch per unit effort across sampling techniques to track changes in relative abundance and provide information to adjust techniques and locations of sampling we plan to: (1) Continue discussions within our District staff and ODFW biometrician to statistically test changes in catch per unit effort over time. (2) Continue discussions within our District staff and engage ODFW biometrician to develop statistical analyses of various techniques used and locations sampled to further refine our 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: (1) In 2017 we plan to purchase and stock approximately 15,000 3" tiger trout (2) In 2017 we plan to purchase 15,000 triploid brown trout eggs and subsequently stock approximately 10,000 3" triploid brown trout (3) Beyond 2017 we plan to purchase 20,000 tiger trout eggs and 20,000 triploid brown trout eggs in order to stock 15,000 3" tiger trout and 15,000 3" triploid brown trout annually as funding allows. We have worked with Fish Division, including Propagation staff, Klamath Hatchery, and other ODFW staff to make this decision. Currently our plan is to purchase these fish and/or eggs from Cold Springs Fish Hatchery in Ogden, UT although Propagation staff has identified other possible suppliers and we will continue to work with them to identify most appropriate sources. 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 trout and triploid brown trout for cyprinid control.

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.

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 fall of 2015 and summer of 2016 monitoring and collection efforts will be used as baseline data moving forward for this project. Tui chub and rainbow trout fishery monitoring will continue indefinitely at Diamond Lake, and it is likely that fish stocking and removal efforts similar to what is proposed for this funding will occur after 2017-18 until tui chub are no longer an issue at Diamond Lake, but we will consult with Fish Division to develop alternative funding.

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?

[{"source":"Umpqua Fisheries Enhancement Derby","type":"Cash","secured":"Secured","dollarValue":28446,"comments":"This funding is for the purchase of 15K tiger trout fingerlings and 15K triploid brown trout eggs (released as fingerlings 2017). Additional funds will be used towards equipment and/or future purchase of tiger and brown trout eggs."},{ "source":"Umpqua Fish District","type":"In-Kind","secured":"Secured","dollarValue":25637,"comments":"This funding is for District staff, equipment/gas and the ODFW Biometrician's estimated time spent on the project."}]

Other Funding Source	Type	Secured	Dollar Value	Comments
Umpqua Fisheries Enhancement Derby	Cash	Secured	28446	This funding is for the purchase of 15K tiger trout fingerlings and 15K triploid brown trout eggs (released as fingerlings 2017). Additional funds will be used towards equipment and/or future purchase of tiger and brown trout eggs.
Umpqua Fish District	In-Kind	Secured	25637	This funding is for District staff, equipment/gas and the ODFW Biometrician's estimated time spent on the project.
		Total	54083	

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	80	37.79	3023	0	0	3023
		SUBTOTAL	3023	0	0	3023
IN-HOUSE PERSONNEL						
ODFW Staff (salary for Step 4 EBA w/ 2.75% adjustment applied) for 2 seasons	2	16548.00	0	0	33096	33096
*Insurance (if temporary employee is eligible through the Affordable Care Act) for 2 seasons	2	7632.00	0	0	15264	15264
Umpqua District Staff, Hours (Technician)	240	26.79	6429	0	0	6429
Umpqua District Staff, Hours (NRS-2)	180	33.77	6078	0	0	6078
Umpqua District Fish Biologist, Hours (NRS-3)	60	37.79	2268	0	0	2268
ODFW Biometrician (estimated hours)	20	37.79	756	0	0	756
ODFW Watershed Manager, Hours	20	45.76	915	0	0	915
		SUBTOTAL	16446	0	48360	64806
CONTRACTED SERVICES						
Tiger trout fingerlings (2017)	15000	0.70	0	12000	0	12000
Brown trout fingerlings (bought as eggs 2016 released in 2017)	15000	0.07	0	1096	0	1096
Tiger/brown trout eggs (2018-2021 depending on rearing costs)	160000	0.07	0	11200	0	11200
		SUBTOTAL	0	24296	0	24296
TRAVEL						
Non-commercial lodging for two seasons if necessary (184 days at \$25.00 per day)	1	13800.00	0	0	13800	13800
		SUBTOTAL	0	0	13800	13800
SUPPLIES/MATERIALS						
Vehicle mileage	10800	0.00	5832	0	0	5832
Boat gas (gallons)	96	0.00	336	0	0	336
		SUBTOTAL	6168	0	0	6168
EDUCATION/OUTREACH						
			0	0	0	0
		SUBTOTAL	0	0	0	0
EQUIPMENT						
Trap-nets	2	2000.00	0	0	4000	4000
Miscellaneous (formalin, jars, gastrolavage equipment, etc.)	1	500.00	0	0	500	500
Miscellaneous (equipment, diet analysis beyond 2018)	1	4150.00	0	4150	0	4150
		SUBTOTAL	0	4150	4500	8650
FISCAL ADMINISTRATION						
			0	0	0	0
		SUBTOTAL	0	0	0	0
		BUDGET TOTAL	25637	28446	66660	120743

Internal Review Results

Review Score: 1.7 out of 3

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

Summary of Review Team Comments

The review team was mixed on this proposal. While there is support to keep this fishery going and reduce impacts from chub it was not clearly demonstrated that this is the best approach or most appropriate use of RE funds. The applicant will need to improve their application. Scores two 0s, one 1, four 2s, and two 3s.

Specific Review Team Comments

This is a quality fishery that deserves every effort to maintain it. Additional information and effort might be able to suppress the invasive species sufficiently.

Budget shows \$6K for purchase of 0 eggs - should update to reflect the number of eggs. Could include District and Biometrician time, District boats and equipment used, as match in the Budget.

Project necessary to maintain/restore Premier/Blue Ribbon trout fishery.

Specific Review Team Questions

Have you discussed long term options and alternatives with Fish Division? RE may not be the correct choice as a long term funding source? SFR or license dollars may be a better source but that needs to be discussed with Fish Division and Management. Describe how this request fits into the bigger picture.

Yes, we have had discussions regarding this issue with Fish Division and there was support to pursue R&E funding. Fish Division agrees that the future of the Diamond Lake fishery and ecology was/is a high priority and that our objectives, techniques, and methodologies are appropriate. In addition, we have support for this effort from the US Forest Service, US Fish and Wildlife Service, Douglas County Natural Resources Department, Umpqua Fisheries Enhancement Derby, Umpqua Fisherman's Association, Audubon Society, the Steamboaters, Diamond Lake Resort, and the Diamond Lake Home Owners Association.

We propose R&E as a short term funding solution as a means to complete the legally mandated work necessary for 2017/18. We will continue to work with Fish Division on long term funding solutions, particularly the pursuit of SFR funding.

This project fits into the bigger picture as it is the premiere trout fishing destination in the Umpqua District and one of the more popular trout fisheries in Oregon. It attracted over 50,000 anglers and generated over \$2 million in local revenue in 2009 (see attached SFR business report). It is well known as a productive fishery, produces very large trout, and in a picturesque setting. Tui chub have become prolific (50-100 million) on two previous occasions at Diamond Lake (1954 and 2006). The history of tui chub at Diamond Lake has proven that these invasive minnows can proliferate to population levels that adversely affect both the health of the lake and the renowned trout fishery (see attached "historic angler trips and harvest" graph). More specifically, this overpopulation disrupts the lake ecology by contributing to elevated blue-green algae counts, creating excessive nutrient loading from waste which stimulates cyanobacteria, and dramatically reducing benthic macro-invertebrate populations. For example, benthic macro-invertebrate populations were estimated at less than 20 lbs/acre in the three years leading up to

the 2006 rotenone treatment, current population levels are over 400 lbs/acre. 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.

Please provide more information on the study design and rationale for this design. It seems like there are methods that could be utilized to do this more efficiently and with less effort while still obtaining relevant results. Is this the right amount and type of work? Why do you need three staff? With efficient study designs it seems like this could be reduced.

Please see modifications to attached proposal. The intent of this proposal is primarily a removal effort with effectiveness monitoring, as opposed to a research project. Although it is not designed primarily as a research project, the information and data obtained will be useful for future fishery management decisions. We have evaluated multiple fish collection techniques, particularly those used at Diamond Lake in the past and others used in similar cases elsewhere, and believe the proposed techniques are the best for cyprinid removal, limiting trout mortality, and are the most cost effective. We will remain open to pursuing other techniques and continue to be open to other's advice and suggestions.

In an effort to reduce the amount of R&E funds asked for, we have chosen to reduce the number of staff requested from three to two. In order to account for this it will be necessary to have District staff travel to Diamond Lake an average of two days/week to help the crew, particularly with boat electro-fishing at night. Trap-netting is possible with two staff but as we learned in 2016, it is much more efficient with three. We will make necessary adjustments and will have to reduce our expectations regarding the number of traps set per season.

What other alternatives have you looked into? Have you looked at adjusting stocking? It seems like the monies spent on this and future removal/monitoring grants might be better on options like stocking larger fish to maintain the fishery.

We have looked into other alternatives, but quickly ruled out options that include but are not limited to: 1) Tiger muskellunge, spring Chinook, Williamson strain rainbow trout, Blackwater strain rainbow trout, etc. stocking. These were discussed, (with some even attempted in the past) but due to ecological, legal, lack of past effectiveness, or public perception concerns were not considered. 2) Primacord detonation: This was discussed primarily after the most recent discovery of golden shiners. It was not considered due to public and staff safety concerns, the fact it is non-discriminate and will affect non-target species, and predicted limited effectiveness. 3) No action, this was considered but is not an option due to legal obligations to remove tui chub and stock piscivorous trout as described in the FEIS, Diamond Lake Management Plan, and OAR 635-500-0703.

Rainbow trout stocking changes were considered, but the option was eliminated for the following reasons: 1) According to the 2009 Diamond Lake Management Plan and the Diamond Lake OAR 635-500-0703 we are obligated to maintain Diamond Lake's fishery primarily through the stocking of fingerling rainbow trout. 2) District staff agrees, based on historic creel and stocking data, that the stocking of 300,000 fingerling annually is the most cost efficient means to support our benchmarks of angler CPUE of at least 1.5 fish/angler. In order to maintain similar catch rates we estimate it would be necessary to stock a minimum of 100,000 legal sized trout, this would cost approximately \$40,000 annually as opposed an estimated \$6,250 for fingerlings 3) By just stocking larger "put and take" rainbow trout and not addressing the tui chub presence, ODFW would not be addressing all of the components of the Diamond Lake fishery. Specifically,

we would not be considering the potential impacts to the Diamond Lake ecology and deleterious water quality impacts in the lake and downstream, habitats for recreational fish, habitats for wildlife, and human safety issues for recreational users.

Project Map



Additional Files

Budget Information

Maps

[Project Map](#)

Map image of project location

Photos

Design Information

Management Plans and Supporting Documents

[2004 FEIS](#)

[2009 Diamond Lake Management Plan](#)

[British Columbia Rainbow Trout Comparison](#)

[Diamond Lake Economic Report](#)

[Diamond Lake OAR](#)

[Diamond Lake Trout Stomach Analysis](#)

[Eagle Lake Rainbow Trout](#)

[Historic Angler Trips and Total Harvest](#)

[Piscivorous Trout Behavior](#)

[Racial and Ethnic Impact Statement](#)

[Rainbow Trout Analysis](#)

[Tiger Trout Life History](#)

[Tiger Trout Performance](#)

[Tiger Trout Review](#)

Permits and Reviews

Partnerships

Public Comment

Administrative Documents

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Completion Report

A completion report has not been submitted for this project.