R & E Grant Application 23-25 Biennium

Project #: 23-006

Internships Invasive Removal in High Lakes 23-24

Project Information

Requested Cycle:	23-1
R&E Project Request:	$41,165
Other Funding:	$42,992
Total Project:	$84,157
Spending Start Date:	7/1/2023
Spending End Date:	10/30/2024
Project Start Date:	7/1/2023
Project End Date:	10/30/2024
Organization:	Oregon State University Cascades

Fiscal Officer

Name:	Kira Lueck
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Technical Contact

Name:	Jennifer Luke
Address:	61374 Parrell Road Bend, OR 97702
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Email:	jennifer.a.luke@odfw.oregon.gov

Applicant Information

Name:	Matt Shinderman
Address:	Office of Sponsored Programs B308 Kerr Administration Bldg Corvallis, OR 97331-2140
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Past Recommended or Completed Projects

Number	Name	Status

17-008	Chub Removal Internships in Deschutes High Lakes 2	Approved

Authorized Agent

Name: Jennifer Luke
Address: 61374 Parrell Road
Bend, OR 97702
Telephone: 541-388-6350 x225
Email: jennifer.a.luke@odfw.oregon.gov

Location Information

Where is it?

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

Landowner Information

Name:	USFS - Deschutes
Address:	63095 Deschutes Market Rd Bend, OR, 97701
Phone:	541-388-5300

Site Description

Street Address, nearest intersection, or other descriptive location.

East and Paulina Lakes (Deschutes NF/Newberry National Volcanic Monument), Big Lava Lake, S.Twin and N.Twin Lakes,
Crane Prairie Reservoir, Suttle Lake

Directions to the site from the nearest highway junction.

Hwy 97, Century Drive

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.

Dominant Land Use Type:

Forest

Project Location

General Project Location.

County:	Deschutes
ODFW Dist:	Bend
Stream/Lake/Estuary Name:	East, Paulina, Lava Lake Crane Prairie Res, Twin Lakes, Suttle Lake
Sub-basin:	17070301
Tributary of:	Deschutes River

Specific Project Location.

Latitude	Longitude

Project Summary

Project Summary

Please provide a couple sentence summary of the proposal.

East, Paulina, Lava Lakes are popular trout angling waters infested with invasive chub. Large numbers of chub have a detrimental effect on trout and angling. Catfish have overpopulated in

Crane Prairie Reservoir. Interns would work with ODFW to remove invasive fish and monitor trout and water quality.

Overall Project Goals

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

Trap and remove chub and catfish to improve trout survival, condition and abundance.

Improve recreational angling.

Monitor effects of chub and bullhead removal.

Monitor lakes with past rotenone treatments (Twin Lakes)

Provide opportunity for students to gain experience in fisheries management.

Primary objectives of R&E funding

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

R&E funds would provide a stipend for two students to work 12 weeks or 960 hours per summer (2023 - 2024). Funds would also be used to a lease a truck for two seasons.

Students will trap and remove invasive fish and collect associated monitoring data. Students will assist with other lake monitoring as time allows.

Current Situation/Justification

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

Thirteen years ago, declining fisheries in East Lake led ODFW staff to write a 5 year experimental management plan, which included experimental removal of chub with boat electrofishing and fyke nets. Initital chub trapping (2010-11) in East Lake was conducted by ODFW staff and volunteers. Chub trapping was successful in East Lake but labor intensive. It was apparent that ODFW staff and volunteers could not trap and remove chub from three lakes, given the level of manpower and equipment. In 2012-2014 the R&E board funded student interns to remove chub from three lakes and evaluate results. Data collected through 2014 demonstrated removal had a positive impact on trout and recreational fishing in East and Lava Lakes. Chub removal efforts have continued through 2022, with intermittent breaks in 2015-2016, 2018 and 2020. Since 15-30% of adult chub are caught in the nets, there will always be chub present in the lake and periodic removal efforts will be necessary to maintain a quality fishery. In 2021-2022, fifteen thousand pounds of chub were removed from East Lake. As part of the bullhead experimental removal, seventeen thousand pounds were removed in Crane Prairie in 2021.

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.

East, Paulina and Lava Lakes have been popular fishing destinations because of the fishing, campgrounds, resorts and aesthetics. When chub populations are high, trout and water quality are negatively impacted. Removing spawning chub on a regular basis retains a good to excellent trout fishery. All of these lakes have the potential to provide excellent, "blue ribbon"

trout fishing. After 10 years of chub removal and monitoring in East Lake, data shows chub removal by trap netting is an effective way to improve trout growth rates and abundance. Angler reports have been positive and ODFW doesn't receive as many complaints from anglers about poor fishing or "I only catch chub." In addition, chub removal likely improves water quality by reducing algae blooms.

Percent benefit split between Commercial and Recreational anglers:

0 % Commercial
100 % Recreational

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

100% Recreation fishery. There are no commercial fisheries on these lakes, although they are used heavily for guided fishing trips by licensed/permitted guide services.

This project has been identified as an ODFW priority for:

Local/watershed
Statewide

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

Yes
Goal 2 of the ODFW strategic plan; "increase participation in fishing," and 'increase and maintain satisfaction with work we do." By removing chub in these popular waterbodies, trout fishing improves.

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

Anglers, resort owners and ODFW initiated this project. A working group was formed in 2009 with resort owners, local fishing club representatives, OSU Cascades and ODFW to develop a strategy to control chub.

Identify any plan or other document that identifies this priority.

Supports goals 1 and 2 of ODFW's 25 year Angling Enhancement Plan.

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

Yes
Yes, the STEP biologist will oversee interns and volunteers for this project.

This project is intended to benefit the following species:

Other Species
kokanee salmon, 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)
Restore a degraded fishery

Monitoring/Research

This project will be used to evaluate:

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

No

Is this study critical to fishery management decisions?

Yes

Information developed by the removal project is used to determine management options for maintaining current target species populations of stocked rainbow, brown trout and kokanee salmon.

Yes

Yes, results of this project will help determine frequency of chub and bullhead removal, as well as stocking allocations.

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

Yes

At present it is believed that periodic chub removal is necessary to maintain the viability and quality of the trout fishery.

Will the data be reported or published?

Yes

Data from the project, namely East Lake data, is summarized in a district report and used to determine management options for maintaining current target species of rainbow trout, brown trout and kokanee salmon.

Project Description

Schedule

Activity	Date	RE Funding
Interview candidates for OSU Sponsored Program Internships	April 2023, 2024	No
Interns and ODFW staff training and preparation	June 2023, 2024	No
Interns and ODFW staff set 8-10 trap nets in lakes	July-September 2023, 2024	No
Fish are marked for mark recapture estimate	June 2023, 2024	No
Nets are checked regularly, chub removed and hauled to dumpsite. Trout measured and released.	July - September 2023, 2024	No
Zooplankton samples are taken from various lakes that have invasive fish.	July-August 2023, 2024	No
Bullhead catfish trapping in Crane Prairie Reservoir	August 2023, 2024	No
Data entry, data and lab analysis, summary report	August 2023, 2024	No
Remove nets from lakes, clean and repair all equipment	August - September 2023, 2024	No

Permits

Permit	Secured?	Date Expected
Special use permit - USFS - disposal sites for invasive fish	No	

Project Design and Description

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

The purpose of this project and internship is to remove invasive tui and blue chub from East, Paulina and Lava Lakes and improve the trout fishery for recreational angling. If time permits, the interns will trap and remove brown bullhead from Crane Prairie Reservoir. The interns and

ODFW will monitor these efforts and collect biological data on trout, zooplankton and invasive fish. Interns will be responsible for trapping chub using fyke nets. Duties require driving a a boat, setting nets, emptying nets, lifting barrels of chub, and hauling chub or bullhead to disposal sites. Loads of chub will vary from 200-2000 pounds a day. Trout and kokanee are weighed and measured and released unharmed.

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?

ODFW owns and maintains all the fyke nets, boats and equipment for invasive fish removal and trout sampling.

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

In the years we do not remove invasive fish, ODFW will continue to monitor the chub population, trout conditions and abundance and zooplankton levels.

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

Yes, Baseline data was collected prior to chub removal in East Lake and we continue to monitor lakes each year.

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
OSU Cascades Faculty staff: faculty supervision, student recruitment, credit evaluation	In-Kind	Pending	1540	
ODFW Staff, STEP biologist	In-Kind	Pending	9600	
ODFW Staff, District Biologist	Cash	Pending	1000	
Sunriver Anglers	Cash	Pending	1426	
Central Oregon Flyfishers	Cash	Pending	1426	
East and Paulina Resorts: boat mooring and boat ramp use	In-Kind	Pending	1200	
Lava Lake Resort: volunteer time	In-Kind	Pending	3600	
ODFW Staff Nrs1	Cash	Pending	2400	

boat fuel	Cash	Pending	600	
supplies for tagging and trout sampling	Cash	Pending	200	
fyke nets	Cash	Pending	20000	
		Total	42992	

Budget

Item	Unit Number	Unit Cost	In-kind or non-cash contributions	Funding from other sources	R&E Funds	Total Costs
PROJECT MANAGEMENT						
Matt Shinderman, OSU Cascades Salary	22	70.00	1540	0	0	1540
Jennifer Luke, ODFW STEP Salary	240	40.00	9600	0	0	9600
Ben Stout, ODFW M&E Salary	80	30.00	2400	0	0	2400
ODFW District Biologist, Salary	20	50.00	1000	0	0	1000
Joey Frazee, Lava Resort	120	30.00	3600	0	0	3600
		SUBTOTAL	18140	0	0	18140
IN-HOUSE PERSONNEL						
			0	0	0	0
		SUBTOTAL	0	0	0	0
CONTRACTED SERVICES						
Sponsored Program OSU Internships, (111 days (22 weeks) 23-24	1776	31968.00	0	0	31968	31968
Sponsored Program COF/SRA funds (9 days-June 2023)	144	2592.00	0	2592	0	2592
		SUBTOTAL	0	2592	31968	34560
TRAVEL						
Motor Pool Truck Lease	3	1000.00	0	0	3000	3000
Truck Fuel	3	1000.00	0	0	3000	3000
		SUBTOTAL	0	0	6000	6000
SUPPLIES/MATERIALS						
boat fuel	1	600.00	600	0	0	600
supplies for trout sampling, mark recapture	1	200.00	200	0	0	200
boat mooring - Resorts	3	400.00	1200	0	0	1200
		SUBTOTAL	2000	0	0	2000
EDUCATION/OUTREACH						
			0	0	0	0
		SUBTOTAL	0	0	0	0
EQUIPMENT						
fyke nets	10	2000.00	20000	0	0	20000
		SUBTOTAL	20000	0	0	20000
FISCAL ADMINISTRATION						
Internship OPE (10%)	24	0.00	0	260	3197	3457
		SUBTOTAL	0	260	3197	3457
		BUDGET TOTAL	40140	2852	41165	84157

Internal Review Results

Review Score: 1.5 out of 3

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

Summary of Review Team Comments

Internal Review Team is concerned that this project is an ongoing project that has been funded by R&E for the past 6 biennia with no apparent future funding source in place other than R&E.

Specific Review Team Comments

Appears to be similar to the Diamond Lake request. Temporary funding for base program

Would like to see a commitment to some bullhead removal at Crane Prairie rather than "as time permits".

Similar to my comment for Diamond Lake, this work seems to support that the need will be more or less continuous, so it would be good to see a strategy for more sustained funding.

Another example of obligatory/ongoing removal in order to maintain a high quality trout fishery.

Photos only show the map of Paulina Lake. Ensure the photo links work.

I do like that this project is an example of an educational opportunity that also provides a service for ODFW and improved conditions for anglers.

The majority of the requested funds are for the hiring of interns from the OSU program. This is great way to get the help we need while also working to foster future fish biologist, especially when ODFW is not funding internships like we previously have done. This project would ideally be paid for by another funding source as it is something that will have to be done every year and if it is unfunded for a single year, the invasive populations will quickly rebound. Have other more permanent funding sources been looked into?

Specific Review Team Questions

In the Other Funding Sources table--"boat fuel, supplies for tagging, and fyke nets" are not funding sources, those are expenditures. In the Budget, the days and weeks is a little confusing. Is that 2 interns x 11 weeks per year x 2 years? Measurable Objectives (page 4) says 12 weeks or 960 hours per summer.

> The boat fuel, supplies, and nets are actually in-kind contributions, not expenditures, so they were included in the other funding sources table as contributions as they have been in past applications. We can alter the application if that is a sticking point. The funding accounts for 12 weeks of intern pay each year for two years, which has to be split into pay periods consistent with the biennial budget timelines (hence the 11 weeks plus 9 days split).

Are there alternative funding sources being pursued to pay for this project?
Do we need to do removals every year, data suggests that an annual removal is not necessary?
Are there other methods of removal that can be used like electrofishing during spawning seasons to remove spawning fish?

> We are not currently seeking long term funding through another source. Possible sources could be local fishing clubs, resorts, or SFR. However, the two local fishing clubs already contribute matching funds and are experiencing tight budgets currently. Reservoir Dogs is a likely nexus, but their funding comes through R&E as well.

Monitoring data demonstrates that it may not be necessary to remove chub annually to maintain a good to excellent trout fishery in East and Paulina Lakes. Chub removal in East Lake could occur every other year, or possibly every two years, without the trout fishery collapsing. However, trapping effectiveness (and corollary population impact) in influenced by weather patterns. For example, in 2021, chub in East Lake were visibly in large schools spawning along the shoreline and 12,000 pounds were trapped from East Lake. The following year, there was a cool, windy spawning season and only 2,200 pounds were trapped in East Lake. We do not know for certain if the low number of fish caught in 2022 was due to the large number caught the previous year, or because of the cool water temperature. Regardless, multiple consecutive years of chub removal (2010-2014) did sustain several years (2015-2018) of a good trout fishery.
The Lava Lake resort owner insists that chub should be trapped annually in order maintain a good trout fishery and to improve water quality. Fortunately, once the nets are set by ODFW and with some help of interns, the resort owner and staff can work the nets themselves.

An alternative long-term plan is utilizing volunteers and ODFW staff to remove chub from a single lake each year rather than two or three lakes every other year. Chub removal in East Lake and Paulina could alternate by year. This would reduce the workload and need for two dedicated interns to remove chub. However, the work to remove chub (setting nets, netting fish every day, loading chub on trucks, hauling chub) is labor intensive and it may not be a realistic solution to rely on volunteers to take on this work. ODFW district staff does not have the time to take it on.

Removal of invasive chub in East and Paulina lakes poses considerable challenges. Electrofishing was tried at Diamond and East Lake and did not work for various reasons; too many fish swam from the electrical field, difficulty netting large numbers of fish, safety issues with anglers and swimmers.
East and Paulina lakes are deep lakes with geothermal springs and for these reasons a rotenone treatment would not work. “Spot” rotenone treatments were executed in the past, but today the use of rotenone in a National Monument would be prohibited. ODFW stocked piscivorous salmonids (brown trout, Atlantic salmon, and Blackwater rainbow trout), and while these fish may help with the control of chub, they cannot feed on enough chub to prevent a chub infestation. To this date, mechanical removal of spawning chub is the only option to control invasive chub.

Is this a sustainable project/program and should R & E continue to make long-term financial commitments or are there other funds/partners that should contribute if this approach will continue into the future for these high lakes?

Although we have not done a cost-benefit analysis, we do know East, Paulina and Lava Lakes are popular fishing destinations with resorts, campgrounds, and boat rentals at each lake. There is a significant economic consideration in the case of these trout fisheries as they are an attraction for thousands of anglers each year. East, Paulina and Lava Lakes support excellent trout fisheries if tui chub populations are curbed.

Management of invasive species, aquatic or otherwise, often requires long-term investments with few ready-made solutions. This project directly aligns with several Restoration and Enhancement program objectives, including increasing recreational fishing opportunities and

enhancing natural fish production. The fisheries being managed by this program are all high value fisheries that contribute to statewide goals of providing high-quality recreational fishing opportunities for anglers, and thus in maintaining interest in recreational fishing more broadly. While the project has relied on long-term investment from R&E, it squarely fits within the program's overall mission and generates significant long-term value.
One of the values of commissioning student interns is their gain of field and career experience, and ODFW benefits from having knowledgeable and dedicated students. The program includes monitoring the effects of chub removal, analyzing data and report writing. Once interns are trained it greatly reduces the ODFW staff time required. The majority of the interns who have participated in the program have successfully obtained jobs in fisheries or wildlife management, including the current habitat biologist for the ODFW Bend Deschutes Watershed District Office. These former interns gain a great deal of professional experience from the program, which has long-term benefits to the agencies that employ them and the various populations they serve. Finally, the relationship with Oregon State University brings great value to the program, as the faculty PI administers the program as an in-kind donation and the university allows this to be a no-overhead award, despite the substantial amount of staff time required by the business office to support program administration and reporting.

Per the comment about committing to brown bullhead removal in Crane Prairie Reservoir, OSU and ODFW are seeking an alternative funding source for bullhead catfish removal in Crane Prairie Reservoir in 2023 in collaboration with USFWS. In 2022, OSU received a grant to contract interns to remove bullhead from Crane Prairie Reservoir to protect the spotted frog. Bullhead removal will also benefit the trout fishery. OSU and ODFW are applying for similar funds for 2023. The interns for chub removal would remove bullhead when chub removal slows and monitor work is complete. In 2022, chub removal interns assisted at Crane Prairie Prairie Reservoir for approximately two weeks, which allowed for additional nets to be deployed.

Additional Files

Budget Information

Maps

East and Paulina Lakes - Map	*East and Paulina Lake map*
Lava Lake - Map	*Lava Lake map*

Photos

14 inch tui chub from East Lake	*Large tui chub from East Lake 2021*
Barrels of chub from Lava Lake 2022	*Chub removal in Lava Lake*
Brown trout from East Lake 2021	*Measuring trout from East Lake 2021*
Intern netting chub from net in East Lake	*Netting chub from net in East Lake*
Interns sampling trout 2022	*Interns at East Lake 2022*

Design Information

Management Plans and Supporting Documents

Summary of management of Tui Chub - East Lake	*Summary of the management of Tui Chub and their effect on trout in East Lake*

Permits and Reviews

Partnerships

Public Comment

Administrative Documents

authorization page needs signature	*authorization page*
Signature Page	*Signature Page*

Completion Report

Objectives and Accomplishments

R&E funds would provide a stipend for two students to work 12 weeks or 960 hours per summer (2023 - 2024). Funds would also be used to a lease a truck for two seasons.

Did you meet the objective? Yes

Two OSU-Cascades students were hired as interns and worked the entire 12-week period. An OSU motor pool vehicle was procured for both field seasons.

Students will trap and remove invasive fish and collect associated monitoring data. Students will assist with other lake monitoring as time allows.

Did you meet the objective? Yes

Interns trapped and removed invasive chub from East and Lava Lakes in 2024. Invasive catfish were trapped and removed from Crane Prairie Reservoir in 2023. Trout lengths and weights were used to determine relative weights and condition factors. Zooplankton samples were collected from multiple lakes to determine abundance and size of zooplankton for monitoring purposes. Eleven thousand pounds of tui chub were removed from East Lake in 2024, and 8,200 pounds in 2023. A total of 16,000 lbs of chub were removed from Lava Lake in 2023-2024. Trout conditions and water quality significantly improved in Lava Lake in 2024.

Comments

Grantee agreed to forfeit all remaining funds.