R & E Grant Application 17-19 Biennium

Project #: 17-018

Alsea River Steelhead Angler Vulnerability Study

Project Information

Requested Cycle:	17-2
R&E Project Request:	$122,648
Other Funding:	$30,673
Total Project:	$153,321
Spending Start Date:	12/1/2017
Spending End Date:	6/30/2019
Project Start Date:	12/1/2017
Project End Date:	6/30/2019
Organization:	ODFW - Newport

Applicant Information

Name:	Jitesh Pattni
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Past Recommended or Completed Projects

This applicant has no previous projects that match criteria.

Authorized Agent

Name:	john spangler
Address:	3406 Cherry Avenue NE Salem, OR 97303
Telephone:	503-947-6000
Email:	john.j.spangler@state.or.us

Location Information

Where is it?

The project will occur on public land owned or managed by the applicant

Site Description

Street Address, nearest intersection, or other descriptive location.

This project involves conducting a winter steelhead creel survey and collecting genetic tissue samples along the Alsea River at multiple public access points from the head of tide upstream to the Alsea River Hatchery.

Directions to the site from the nearest highway junction.

The Alsea River runs east to west along Hwy 34 between Waldport and the Alsea River Hatchery.

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
Rural residential

Project Location

General Project Location.

County:	LINCOLN and BENTON
Town/City:	Alsea
ODFW Dist:	North Coast Watershed District
Stream/Lake/Estuary Name:	Alsea River
Sub-basin:	NA
Tributary of:	NA

Specific Project Location.

Latitude	Longitude
NA	NA

Project Summary

Project Summary

Please provide a couple sentence summary of the proposal.

This study will test the hypothesis that methods of broodstock collection could act as a selective force on the behavior of steelhead in the river recreational fishery.

Overall Project Goals

Describe the primary goals or outcomes of the entire project, including elements not requesting

funding from R&E.

Conduct a creel survey to determine harvest in the Alsea River winter steelhead fishery.

Collect genetic samples of harvested steelhead using creel clerks and returning trap caught steelhead at Alsea Hatchery.

Use genetic parental-based tagging to identify the offspring of trap-caught and angler-caught steelhead harvested in the Alsea River winter steelhead fishery.

Primary objectives of R&E funding

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

Hire creel clerks to determine harvest estimates and collect genetic samples of steelhead harvested in the Alsea River in 2018 and 2019.

Use genetic parentage analyses to determine parentage of all genetic samples collected in 2018 and 2019 from both fishery and trap to ascertain whether angler or trap caught broodstock provide better return to the angler.

Current Situation/Justification

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

During the 1990s, the Alsea hatchery winter steelhead production experienced a precipitous decline in adult returns and in harvest. This prompted management changes to include two broodstocks; a new broodstock comprised of wild steelhead and the "traditional" segregated hatchery broodstock. The performance of these two broodstocks were evaluated in a previous study indicating the wild broodstock has higher adult return and harvest rates. Public perception is that the wild broodstock production has improved harvest rates with the inclusion of angler caught broodstock.

In 2016, ~40,000 steelhead smolts produced from angler caught and trap caught wild broodstock were released in the Alsea River. Approximately 82,000 smolts produced from angler caught and trap caught wild broodstock were released in 2017. Funding is needed to hire creel clerks that will collect genetic samples from the steelhead fishery on the Alsea River from the head of tide upstream to the Alsea Hatchery. Funding is also needed to run the analysis of the genetic samples collected in the creel and the from the Alsea Hatchery trap. This study is an ODFW Fish Division and the North Coast Watershed District priority to address concerns of the steelhead angling community related to improving opportunity and catch rates.

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 use of wild origin broodstock is intended to improve winter steelhead fisheries through increased angling opportunity that might be gained through protracted run-timing and, possibly, other heritable behaviors. Our hypothesis is that the offspring of angler caught broodstock will be harvested at a greater rate than offspring of brood collected at traps.

Percent benefit split between Commercial and Recreational anglers:

0 % Commercial
100 % Recreational

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

This study will test the hypothesis that methods of broodstock collection could act as a selective force on the behavior of steelhead in the river recreational fishery. There is no commercial harvest for winter steelhead in the river or ocean environments.

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.

This study is a priority for ODFW Fish Division and the North Coast Watershed District to address concerns of the steelhead angling community.

ODFW 25-Year Angling Enhancement Plan specifically Goal 1: Provide diverse, stable, and productive angling opportunities; Strategies C, D,and E.

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

No

This project is intended to benefit the following species:

Winter Steelhead

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)

Project Description

Schedule

Activity	Date	RE Funding
Collect and spawn angler caught and trap caught broodstock and collect a sample of genetics (tissue) from each fish.	12/14-4/15	No
Collect and spawn angler caught and trap caught broodstock and collect a genetics sample from each fish.	12/15-4/16	No
Release 37,655 smolts with ADRM (adipose and right maxillary clips) to the Alsea River.	4/16	No
Release 82,032 smolts with ADRM clips to the Alsea River.	4/17	No
Creel the Alsea winter steelhead fishery and collect genetic samples from each observed fish in the creel.	1/18-4/18	Yes
Collect genetic samples from ADRM steelhead captured at Alsea River Hatchery traps.	1/18-4/18	No
Creel the Alsea winter steelhead fishery and collect genetic samples from each observed fish in the creel.	1/19-4/19	Yes
Collect genetic samples from ADRM steelhead captured at Alsea River Hatchery traps.	1/19-4/19	No
Use genetic parental-based tagging analysis to identify the offspring of trap caught and angler caught steelhead.	5/19	Yes
Write up final report.	6/19	No

Permits

Permit	Secured?	Date Expected
	No	

Project Design and Description

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

Our proposed research is designed to empirically test the assumption that angler-caught broodstock can be used to produce hatchery steelhead that are measurably more vulnerable to anglers than fish produced with trap-caught brood. Our findings will have clear and direct implications for the management of winter steelhead hatchery programs. Collection and transport of angler-caught brood is costly and difficult, relative to trap-caught brood. However, if angler-caught brood do produce steelhead that are more likely to be caught by anglers, then these fish should be included in hatchery broodstock programs to maximize benefits to anglers and minimize artificial selection.

During the 2014-15 winter steelhead season, 34 wild (unmarked) winter steelhead were collected by anglers and transferred to Alsea Hatchery. An additional 44 wild winter steelhead were collected from Alsea Hatchery fish traps. Fish from each group were spawned together (single pair matings) and genetically sampled at time of spawning to produce a total 37,655 smolts. By genetically sampling all parents from both groups (angler caught and trap caught), all offspring will be "genetically tagged" and assignable to family and group. During the 2015-2016 winter steelhead season, 46 angler caught and 53 trap caught wild winter steelhead were spawned together and genetically sampled to produce 82,032 smolts. All study fish were marked with adipose and right maxillary clips (ADRM) to distinguish them from traditional Alsea Hatchery winter steelhead, which are ADLM marked. In April of 2016, all ADRM marked smolts from the 2015 brood were released from the Alsea Hatchery, according to standard hatchery protocols. The smolts from the 2016 brood will be released in April 2017. Adult study fish are expected to return in the winters of 2017-18 and 2018-19.

A genetic sample will be collected from all adult study fish (marked with an adipose and right maxillary clips, ADRM) captured at fish traps in the Alsea Basin. Genetic samples will also be collected from all ADRM fish encountered in the creel survey. Roving creel surveys will be conducted with the objective to maximize the number of harvested fish observed while maintaining statistical validity of harvest estimates. The fishery will be stratified into two sections with one creel clerk assigned to sample each section. Creel clerks will work both weekend days and two randomly-selected weekdays throughout the fishing season.

We will use genetic parentage analyses to determine the parentage and (consequently) brood group (angler caught or trap caught) of all study fish collected at Alsea River traps or sampled in the creel. We chose to use parental-based tags (PBTs) for this study, and not conventional (e.g. coded wire) tags, for several reasons. First, PBTs allowed us to initiate the project with little or no tag cost. Tissue samples were collected from broodstock during spawning, and were only analyzed once their offspring had been successfully released. This approach circumvents financial risk associated with conventionally tagging groups that could then experience unacceptable levels of mortality prior to release. But, most importantly, parental-based tagging allowed us to rear the two study groups (offspring from angler- and trap-caught parents) in a common pond, thereby avoiding effects that could arise from differential rearing densities,

pathogen loads or other “pond effects”. This could not be done with conventional tags or external marks, and PBTs offered an elegant solution to the infrastructure limitations at Alsea Hatchery, which could not accommodate separate rearing of study groups at equal densities until tagging. We were able to produce and rear all fish in a common environment, such that any traits that we might observe (e.g. vulnerability to harvest) can be attributed to heritable, genetic causes. Finally, PBTs will allow us to test for associations between the timing and capture locations of individual brood fish and those of their offspring. Standard molecular genetic tools (i.e. microsatellites or other, as appropriate) will be used to characterize broodstock (parents) and marked study fish (offspring). Contemporary genetic parentage methods (reviewed by Jones et al. 2010) will be used to perform parentage and group assignments. These methods are routinely used by ODFW and OSU researchers to address a variety of fisheries management questions (e.g. Banks et al. 2014; O’Malley et al. 2014; Araki et al. 2007; Johnson and Friesen 2013).

We will compare the proportion of angler caught (AC) fish harvested by anglers (pACcreel) with the proportion of trap caught (TC) fish harvested by anglers (pTCcreel) with a z-test for proportions, where:

pACcreel= ACcreel/(ACcreel+ ACtrap) and pTCcreel= TCcreel/(TCcreel+ TCtrap)

Assuming adequate statistical power, no significant difference between these proportions would suggest that steelhead produced from trap-caught brood are generally as vulnerable to anglers as fish produced with angler-caught brood.

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?

The data collected and analyzed will be valid in perpetuity. Findings from this study will inform fishery managers on the direction for broodstock collection to maximize angler benefit.

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

The ODFW North Coast Watershed District Office in Newport, Oregon Hatchery Research Center and the Alsea River Hatchery will incorporate these data into the Alsea River winter steelhead hatchery production management to either continue with current practices or make changes in accordance with this study's findings. These findings could also be used by other Fish Districts in their hatchery programs.

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?

No

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":"ODFW","type":"In-Kind","secured":"Secured","dollarValue":9673,"comments":"Cost of running genetics on the parental samples"},{"source":"OHRC","type":"In-Kind","secured":"Secured","dollarValue":8000,"comments":"Housing creel clerks, office space, lab equipment and lab space"},{"source":"ODFW","type":"In-Kind","secured":"Secured","dollarValue":3200,"comments":"District staff time"},{"source":"ODFW","type":"In-Kind","secured":"Secured","dollarValue":3000,"comments":"Alsea hatchery staff time collecting genetic samples at traps"},{"source":"ODFW","type":"In-Kind","secured":"Secured","dollarValue":1800,"comments":"Biometrician"},{"source":"ODFW","type":"In-Kind","secured":"Secured","dollarValue":5000,"comments":"ODFW Geneticist"}]

Other Funding Source	Type	Secured	Dollar Value	Comments
ODFW	In-Kind	Secured	9673	Cost of running genetics on the parental samples
OHRC	In-Kind	Secured	8000	Housing creel clerks, office space, lab equipment and lab space
ODFW	In-Kind	Secured	3200	District staff time
ODFW	In-Kind	Secured	3000	Alsea hatchery staff time collecting genetic samples at traps
ODFW	In-Kind	Secured	1800	Biometrician
ODFW	In-Kind	Secured	5000	ODFW Geneticist
		Total	30673	

Budget

Item	Unit Number	Unit Cost	In-kind or non-cash contributions	Funding from other sources	R&E Funds	Total Costs
PROJECT MANAGEMENT						
ODFW NRS2 Asst District Fish Biologist	80	40.00	3200	0	0	3200
ODFW Alsea Hatchery Technician	100	30.00	3000	0	0	3000
ODFW Biometrician	40	45.00	1800	0	0	1800
ODFW Geneticist	100	50.00	5000	0	0	5000
		SUBTOTAL	13000	0	0	13000
IN-HOUSE PERSONNEL						
2 seasonal EBA Creel Survey positions (8 months each)	16	2716.00	0	0	43456	43456
Insurance for 2 EBAs	16	1487.00	0	0	23792	23792
Genetic Analysis	1200	35.00	0	0	42000	42000
Parental Genetic Analysis	1	9673.00	9673	0	0	9673
		SUBTOTAL	9673	0	109248	118921
CONTRACTED SERVICES						
			0	0	0	0
		SUBTOTAL	0	0	0	0
TRAVEL						
2 vehicles (rental, mileage, maintenance for 8 months)	16	750.00	0	0	12000	12000
Housing, office space, lab space and equipment (OHRC)	2	4000.00	8000	0	0	8000
		SUBTOTAL	8000	0	12000	20000
SUPPLIES/MATERIALS						
Field gear (rain gear, boots, water proof paper, pencils, etc per creel clerk)	4	350.00	0	0	1400	1400
		SUBTOTAL	0	0	1400	1400
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	30673	0	122648	153321

Internal Review Results

Review Score: 2 out of 3

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

Summary of Review Team Comments

While the concept of this project was supported by the review team there were some questions about certain aspects of the project design. More information should be provided to clarify the study design, justification, and management implications. Review team scores included two 1s, five 2s, and two 3s.

Specific Review Team Comments

Should/will sampling be conducted an additional year (19-20) to account for 3 salts from the 2016 brood? It could influence the results if left out.

Applicant should give an update on smolt releases for this year (82,500 must be a projected number).

This will be interesting information, but anglers still may not believe it if the data shows there is no difference.

Stated it is a region and Fish Division priority, but it was not reflected that way in the 'Priority' section of the application.

I'm not following why the PBT is necessary (and correct me if I'm wrong). If the group of smolts is of known parental origin and are separated from the time of spawning, then a simple differential external mark (Ventral, Max clip or combination) paired with creel should be adequate to do this evaluation at no additional cost to identify fish. Unless, there is additional evaluations not mentioned here.

This is an important assessment of these wild broodstock supplemented hatchery stocks.

Results will provide insights to future brood stock programs efforts throughout the state.

I'd like to see more justification for PBT. I think this under sells the additional benefits of the creel surveys.

The geneticist should be on hand to assist with the interpretation and analysis of results.

You should look at some of the results in the Grande Ronde (Enterprise Office) that have shown evidence that progeny of angler caught brood return to angler up to 10 times more than trap caught. This could relate to timing but there is some creel data that could be used in support of this effort.

Specific Review Team Questions

Please clarify the design. What is driving the need for the study? Are you getting lots of complaints that Alsea steelhead don't bite? Are there any indications of poor survival (poor SAR, as opposed to good SAR, but poor return to creel)? Why are maxillary clips used? Could improving your acclimations or changing release sites improve catch rates? Do you have information on the fitness effect of the ADRM clips? Do all the genetic samples need to be run or could a subset of genetic samples be run and provide the same information? Will you be able to detect a difference among angler-caught and trap-caught steelhead?

During the 1990s, the Alsea hatchery winter steelhead production experienced a precipitous decline in adult returns and therefore a decrease in harvest. This decline prompted a change in management to include two broodstocks for smolt production; a new broodstock comprised of native (wild) steelhead and the "traditional" segregated hatchery broodstock. The performance

of these two broodstocks along with differing release locations were evaluated over three years in a previous study conducted from the 2013-2014 season through the 2015-2016. The results from this study indicate the wild broodstock has a higher adult return rate, protracted run timing, and a higher in-river harvest rate than the traditional stock. Public perception is that the wild broodstock production has improved harvest rates even more with the inclusion of angler caught broodstock.

Maxillary clips are used to differentiate between traditional and wild brood.

Improving acclimation is not likely, due to limited quality acclimation sites. The 2013-2016 study does not suggest changing release sites improves catch rates.

The 2013-2016 study indicates an increased fitness effect of the ADRM wild brood in terms of an increased adult return. However, more generally if the question is getting at the impacts of multiple clips on a fish's fitness, the answer is yes, the more clips applied the bigger effect on fitness.

We performed a power analysis for this study to estimate the number of samples that would be required to confidently detect differences between catch rates of steelhead produced from angler- and trap-caught brood. In general terms, larger sample sizes (hundreds of fish) will be required to detect differences in catch rates if differences are not pronounced. But, if larger differences exist between the two groups, fewer samples will need to be (genetically) analyzed to provide data for statistical tests. We are requesting funds from R&E to analyze a sufficient number of samples so as to allow us to detect relatively small differences in catch rates. If large differences in catch rates are revealed during preliminary analyses, it may be possible to subsample, reduce costs and reimburse funds.

We are requesting funds from R&E to analyze a sufficient number of samples so as to allow us to detect relatively small differences in catch rates.

“Our hypothesis is that the offspring of angler caught broodstock will be harvested at a greater rate than offspring of brood collected at traps.” How quickly will this hypothesis be proven/disproven? After the winter of 2018-19? Is this grant sufficient to reaching that conclusion? How did you arrive at your hypothesis?

We will have tested this hypothesis and have the final report written up by June 2019.

This grant will be sufficient to reach a conclusion.

Public perception on the Alsea as well as in other basin's with angler caught wild broodstock is that angler caught brood produce offspring that are more vulnerable to anglers.

What can be done to decrease the insurance costs for the EBAs that is over 1/2 the expense of hiring them?

Unfortunately, nothing. EBAs' compensation package is negotiated through a collective bargaining agreement.

Has you worked with fish research or biometrician in developing sampling protocols?

We have worked with fish research to develop sampling protocols and will work with the new biometrician once the vacant position is filled.

It is an interesting question, no doubt, but if you find that angler-caught steelhead return to the angler

at higher rates, where would the funding come from to implement a program already identified as more time and labor intensive?

Collection and transport of angler-caught brood is costly and difficult, relative to trap-caught brood. However, if angler-caught brood do produce steelhead that are more likely to be caught by anglers, then these fish should be included in hatchery broodstock programs where possible to maximize benefits to anglers and minimize artificial selection. There are multiple basins that already incorporate angler-caught broodstock.

Project Map


E Fall Creek Rd
Scale Shack
Horse Creek
Fall Creek
Fall Creek
E Fall Creek Rd
Hatchery

Additional Files

Budget Information

Maps

Project Map — *Map image of project location*

Photos

Design Information

Management Plans and Supporting Documents

25 year Angling Enhancement Plan

Racial and Ethnic Impact Statement

Permits and Reviews

Partnerships

Public Comment

Administrative Documents

Applicant Signature Page

Completion Report

A completion report has not been submitted for this project.