R & E Grant Application 17-19 Biennium

Project #: 17-041

Elk River Telemetry Study

Project Information

Requested Cycle:	17-4
R&E Project Request:	$99,480
Other Funding:	$4,885,220
Total Project:	$4,984,700
Spending Start Date:	7/1/2017
Spending End Date:	6/30/2019
Project Start Date:	9/1/2018
Project End Date:	6/30/2019
Organization:	ODFW - Corvallis Research Lab

Applicant Information

Name:	Kevin Goodson
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Telephone:	541-947-6250
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Email:	kevin.w.goodson@state.or.us

Past Recommended or Completed Projects

This applicant has no previous projects that match criteria.

Authorized Agent

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Telephone:	541-757-5121
Telephone 2:	541-953-8803
Email:	shannon.richardson@oregonstate.edu

Location Information

Where is it?

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

Landowner Information

Name: Potentially multiple landowners involved (see project summary)

Site Description

Street Address, nearest intersection, or other descriptive location.

This research project will take place in the Elk River and Sixes River watersheds in Curry County, Oregon. Adult fall Chinook will be radio-tagged and tracked throughout the basin.

Directions to the site from the nearest highway junction.

The Elk River watershed enters the Pacific Ocean just south of Cape Blanco on the southern Oregon coast; the Sixes River watershed enters the Pacific Ocean just north of Cape Blanco on the southern Oregon coast.

Following project completion, public anglers will be allowed the following level of access to the project site:

No 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.

This project will not result in any additional public access being created, but no current access will be lost as a result of this project

Dominant Land Use Type:

Forest
Range/pasture
Rural residential

Project Location

General Project Location.

County: Curry
ODFW Dist: Lower Rogue
Stream/Lake/Estuary Name: Elk River
Sub-basin: 17100305
Tributary of: Pacific Ocean

Specific Project Location.

Latitude	Longitude
42.72195	-124.31537

Project Summary

Project Summary

Please provide a couple sentence summary of the proposal.

This proposal seeks to implement a research project to study the migration behavior of hatchery fall Chinook returning to the Elk River. Fish will be radio-tagged and tracked by foot, boat and car throughout the Elk and Sixes Rivers watersheds. We may enter public or private land while tracking.

Overall Project Goals

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

The goal of this project is to understand the movement of hatchery fish that spawn in the Elk River rather than returning to Elk River Hatchery. This is part of a larger OHRC research project seeking to improve the homing of hatchery fish back to the hatchery.

Primary objectives of R&E funding

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

To radio-tag 100 hatchery fall Chinook in Elk River and track them through spawning to determine migration behavior prior to implementing an imprinting experiment. Study will also provide insight into general migration behavior of hatchery fish that could improve harvest.

Current Situation/Justification

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

The Coastal Multi-species Conservation Plan identified that the Elk River population of fall Chinook was at risk of extinction due to too many hatchery fish spawning in the wild. Getting a higher proportion of hatchery fish to return to the hatchery was identified as a key action that needed to be taken to improve the status of the population. The Oregon Hatchery Research Center is currently funding a multi-year research project seeking to develop a method to improve the homing of hatchery fish into the hatchery. The R&E funded portion of the larger study being proposed for funding seeks to determine if hatchery fish currently swim to the hatchery and migrate back downriver, or never make it up to the hatchery. This would be the first of three years of pre-treatment monitoring. Future telemetry work will determine if imprinting methods developed and implemented change hatchery fish migration behavior.

Information on migration behavior could also provide insights into increasing the harvest of hatchery fish in Elk River. Understanding how quickly fish migrate over varying flow conditions and where they hold could inform how the fishery is managed to focus on harvest of hatchery fish.

Recreation and Commercial Benefit

This project will provide benefits to:

Recreational fisheries
Commercial fisheries

Explain how this project will contribute to current (and/or potential) fishing opportunities, access, or fisheries management.

If the OHRC research project is successful in attracting a greater proportion of returning hatchery fish into the hatchery, it will lessen the threat to the sustainability of the wild Elk River fall Chinook population. Once the proportion of hatchery fish on the spawning grounds gets low enough, it may be possible to increase the number of hatchery fall Chinook released into Elk

River. The results of the entire study (imprinting and telemetry) could have significant benefits to other hatchery programs throughout the Pacific Northwest - allowing hatchery programs to more effectively minimize impacts to wild populations.

Percent benefit split between Commercial and Recreational anglers:

20 % Commercial
80 % Recreational

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

Catch data suggests that half of the harvest of Elk River hatchery fall Chinook occurs in the ocean, and half occurs in Elk River. The majority of ocean harvest comes from commercial fisheries along the coast of Alaska, Canada and Washington, with approximately 20% of ocean harvest coming from sport anglers.

This project has been identified as an ODFW priority for:

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.

The Coastal Multispecies Plan calls for research to be done to improve the homing of hatchery fall Chinook in Elk River.

ODFW's Hatchery Program Management Policy calls for minimizing the interactions of hatchery and wild fish. The Elk River study seeks to develop techniques to limit interactions.

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

No

This project is intended to benefit the following species:

Fall Chinook Salmon
Spring Chinook Salmon
Coho Salmon
Winter Steelhead
Summer Steelhead

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)
Enhance natural production of fish stocks to levels that allow for recreational fishing opportunities

Monitoring/Research

This project will be used to evaluate:

Hatchery releases and/or stray rates
Hatchery production methods

Distribution (i.e. presence, abscence, abundance)

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

Yes

This research project was developed by Dr. David Noakes (OSU), Dr. Andrew Dittman (NOAA), Dr. Marc Johnson (ODFW), Kevin Goodson (ODFW), and Shannon Richardson(ODFW) as part of the Oregon Hatchery Research Center's Research Plan.

Is this study critical to fishery management decisions?

Yes

The R&E-funded portion of this project seeks to determine if hatchery fish migration behavior can be changed by exposing the hatchery fish to unique odorants during hatchery rearing and adult return. The first three years of telemetry work will determine the current migration behavior of Elk River Hatchery fall Chinook adults. Once odorant-exposed adults are returning, three more years of telemetry work will determine whether the migration behavior has been altered.

Yes

If the overall OHRC research project is successful in attracting more hatchery fish to a specific location (Elk River Hatchery), the use of odorants in hatcheries to improve homing will become another fish management tool that can be used to provide fish for harvest while minimizing the risks to wild fish conservation. The research results, including how migration behavior was altered, will be widely shared, and could be adopted by fisheries managers world-wide.

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

Yes

The telemetry study will be repeated for an additional two years prior to exposing the Elk River Hatchery fish to an odorant in order to fully describe the current migration behavior of hatchery adults under varying conditions. Once Elk River Hatchery adults that have been exposed to a unique odor during rearing begin returning, we hope to conduct three more years of telemetry work to fully describe any changes in migration behavior.

Will the data be reported or published?

Yes

The data from both the imprinting research and telemetry study will be reported in annual reports to the OHRC Advisory Board, as well as a completion report to the R&E Board. The results will also be reported in peer-reviewed journal articles.

Project Description

Schedule

Activity	Date	RE Funding
Conduct literature review and test potential odorants for innate response in fall Chinook.	4/16 through 4/17	No
Test a limited number of odorants for stimulation of olfactory receptors.	4/17 through 11/17	No
Determine if fall Chinook can "remember" select odors.	6/17 through 11/17	No
Determine which rearing periods fall Chinook are actively imprinting.	3/18 through 10/18	No
Conduct telemetry study to determine hatchery fall Chinook adult migration behavior prior to imprinting experiment (3 years of tracking to more fully understand the current migration behavior).	9/18 through 4/21	Yes
Expose hatchery fall Chinook at Elk River Hatchery to selected odorant and determine if homing improves (multiple years).	3/19 through 3/27	No
Conduct telemetry study to determine hatchery fall Chinook adult migration behavior post-exposure to an imprinting odorant (3 years to more fully understand the post-treatment migration behavior).	9/22 through 4/25	Yes

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.

This project is part of a larger research project being conducted through the Oregon Hatchery Research Center, Oregon State University, University of Washington and NOAA's Northwest Fisheries Science Center. The larger project is seeking to determine whether the addition of an odorant to the hatchery water can improve the homing of hatchery fall Chinook into Elk River Hatchery. This proposed telemetry study is intended to inform the homing study by describing the current migration behavior of returning hatchery fall Chinook adults. Once experimentally treated fish begin returning from the OHRC research project, a three-year proposal will be submitted to R&E to describe the migration behavior of those treated fish and how it changed.

R&E funds will be used to hire seasonal staff and purchase gastric radio tags and equipment to insert into 100 adult hatchery fall Chinook returning to Elk River. Staff from the Coastal Chinook Research and Monitoring Program (CCRMP) that normally are funded through the Pacific Salmon Treaty (PST) will also be funded to take advantage of their years of experience netting fall Chinook in Elk River and surveying throughout the basin (due to CCRMP staff's funding through the PST, they must have outside funding to work on non-PST projects). Because this project is not considered essential to estimate the PST exploitation rate, this study was not eligible for PST funding.

Fall 2018 will be the first of three years that we intend to tag and track hatchery adults at Elk River (with R&E funding) prior to the OHRC research experiment being conducted there to improve the homing of the hatchery fish. Returning adult fall Chinook will be netted and tagged just above the mouth of Elk River using tangle nets at night during the fall Chinook run and tracked throughout their migration and spawning in Elk River (October through March). Stationary and mobile receivers will be used to track the movements of hatchery adults. Telemetry data will be analyzed to determine the range and consistency of migration of the hatchery fish to determine whether significant numbers of fish regularly migrate far enough upriver to reach the hatchery. Three years of telemetry are also planned to occur as adults return that have been exposed to unique odors in the hatchery. Commonly used practices will be followed to insert tags, track tagged fish and analyze the telemetry data.

This telemetry study will verify whether the addition of a unique odor in the rearing water of hatchery fall Chinook, and in the hatchery fish ladder as they return to spawn, has altered their migration behavior and led to more hatchery fish entering the hatchery. Attracting more hatchery fish into the hatchery trap was identified in the Coastal Multi-Species Conservation and Management Plan as a key action to reduce the risk of extinction on the wild fall Chinook population in Elk River. Reducing the risk on Elk River fall Chinook has been identified as a high priority within Fish Division.

If the OHRC imprinting and homing research leads to techniques that can be used at other hatcheries to attract hatchery fish into the hatchery, it could provide opportunities to expand or initiate hatchery programs throughout the Pacific Northwest and anywhere in the world where

salmon are propagated. Reducing the proportion of hatchery salmon or steelhead on wild spawning grounds is an issue of concern with Atlantic salmon along the Atlantic coast of North America and in Europe, with farmed pink salmon along the Atlantic coast in Europe, as well as with Chinook, coho, chum, and pink salmon and steelhead throughout the Pacific Northwest and Alaska.

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 during the telemetry study will be analyzed and summarized in annual and completion reports, as well as for publication into an appropriate peer-reviewed journal. The findings could influence hatchery salmon and steelhead management world-wide for decades.

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

The overall research project at Elk River Hatchery is being led by Dr. David Noakes at OSU, and is part of the Oregon Hatchery Research Center's Research Plan. The OHRC Research Plan will be overseen by the OHRC Advisory Board and ODFW's Fish Division at quarterly meetings. Funding of the OHRC Research Plan has been secured for 10 years through legislative action.

The ODFW Coastal Chinook Research and Monitoring Project (CCRMP) will oversee the implementation of the telemetry work. CCRMP has been conducting monitoring of the fall Chinook runs in Elk River for many years and has considerable experience with netting and tracking adult Chinook in the basin.

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

There are plans to conduct monitoring on the larger project of improving the homing of hatchery fish into the hatchery. This 3-year telemetry project is one piece of the baseline information being collected prior to exposing the hatchery fish to additional odors in the hatchery. There have also been multiple years of extensive spawning ground surveys in Elk River to describe the current distribution of hatchery fish that do not return to the hatchery. Once experimental releases of "exposed" hatchery fish start returning, we will seek R&E funding to conduct another 3-year telemetry study to monitor how the fish's migration behavior has changed.

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":"Oregon Hatchery Research Center Research Fund (through ODFW)","type":"Cash","secured":"Secured","dollarValue":4000000,"comments":"This is for the overall imprinting project and is an estimate for research costs over 10 years starting in 2016. Final costs may be higher or lower. "},{"source":"ODFW Coastal Chinook Research & Monitoring Project - CWT recovery (PST funds)","type":"In-Kind","secured":"Pending","dollarValue":850000,"comments":"This is for 10 years of PST-funded CWT recoveries in Elk River. These data are used in part to estimate how many hatchery fish spawn in the wild. This will show if odor exposure improves homing in hatchery fish."},{"source":"ODFW Coastal Chinook Research & Monitoring Project - staff in-kind support","type":"Cash","secured":"Secured","dollarValue":17220,"comments":"Project leader and staff supporting the telemetry study."},{"source":"Telemetry receivers provided by OHRC and OSU","type":"In-Kind","secured":"Secured","dollarValue":18000,"comments":"Six receivers borrowed from the OHRC and OSU to be used during telemetry study."}]

Other Funding Source	Type	Secured	Dollar Value	Comments
Oregon Hatchery Research Center Research Fund (through ODFW)	Cash	Secured	4000000	This is for the overall imprinting project and is an estimate for research costs over 10 years starting in 2016. Final costs may be higher or lower.
ODFW Coastal Chinook Research & Monitoring Project - CWT recovery (PST funds)	In-Kind	Pending	850000	This is for 10 years of PST-funded CWT recoveries in Elk River. These data are used in part to estimate how many hatchery fish spawn in the wild. This will show if odor exposure improves homing in hatchery fish.
ODFW Coastal Chinook Research & Monitoring Project - staff in-kind support	Cash	Secured	17220	Project leader and staff supporting the telemetry study.
Telemetry receivers provided by OHRC and OSU	In-Kind	Secured	18000	Six receivers borrowed from the OHRC and OSU to be used during telemetry study.
		Total	4885220	

Budget

Item	Unit Number	Unit Cost	In-kind or non-cash contributions	Funding from other sources	R&E Funds	Total Costs
PROJECT MANAGEMENT						
Shannon Richardson- Project Management, ODFW	240	55.00	0	13200	0	13200
		SUBTOTAL	0	13200	0	13200
IN-HOUSE PERSONNEL						
Sandra Kennedy- Project Assistant, ODFW	120	50.50	0	0	6060	6060
Linda Campbell- Project Specialist, ODFW	120	33.50	0	4020	0	4020
Crew Leader, ODFW	1120	32.00	0	0	35840	35840
EBA, ODFW	800	23.50	0	0	18800	18800
EBA, ODFW	480	23.50	0	0	11280	11280
Coastal Chinook Research & Monittoring (CWT recovery)	10	85000.00	850000	0	0	850000
		SUBTOTAL	850000	4020	71980	926000
CONTRACTED SERVICES						
Oregon State University (OHRC Elk River study over 10 years)	0	0.00	4000000	0	0	4000000
		SUBTOTAL	4000000	0	0	4000000
TRAVEL						
vehicles (2 trucks- 1 for 7 months, 1 for 4 months)	11	500.00	0	0	5500	5500
travel between Elk River and Corvallis	0	0.00	0	0	1500	1500
		SUBTOTAL	0	0	7000	7000
SUPPLIES/MATERIALS						
Radio tags	100	160.00	0	0	16000	16000
Receiver upgrades, cables, antennas	0	0.00	0	0	3000	3000
Survey equipment (sampling and safety gear for staff)	0	0.00	0	0	1500	1500
		SUBTOTAL	0	0	20500	20500
EDUCATION/OUTREACH						
			0	0	0	0
		SUBTOTAL	0	0	0	0
EQUIPMENT						
Receivers (OHRC providing)	6	3000.00	18000	0	0	18000
		SUBTOTAL	18000	0	0	18000
FISCAL ADMINISTRATION						
			0	0	0	0
		SUBTOTAL	0	0	0	0
		BUDGET TOTAL	4868000	17220	99480	4984700

Internal Review Results

Review Score: 1.4 out of 3

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

Summary of Review Team Comments

The review team was supportive of this project after hearing some addition information. The team felt that the application needed to be strengthened to include this additional information and justification for the project. The current version does not tell a clear story of the potential value and need of this project. Review team scores included two 0s, two 1s, and six 2s.

Specific Review Team Comments

The budget includes funds for existing ODFW employees, not just the seasonals used for telemetry. Why is RE being asked to pay for existing staff? will employees be laid off if RE does not fund existing staff?

The applicant should strengthen the justification for use of the CCRMP crew (experienced with Elk River and this kind of work) and that current funding stream for the crew requires other funding (i.e., the proposed work is not currently funded by PST funding).

Useful information but uncertainty that the project could be funded all the way to completion.

The applicant needs expand their justification for this project (CMP) and better describe how it ties into fisheries management and improving fisheries. This would include the overall study objectives and describing how it could improve hatchery management at Elk River, other state hatcheries, and the "worldwide" implications.

Specific Review Team Questions

This project includes the period October through March. Is that really necessary? Some fish come back later, but could you shorten it a month or two and still accomplish the goals while saving some money? What percentage of the run comes in Feb and Mar?

The extended period for this project is to allow time for data refinement, analyses and reporting. The seasonal staff doing the tagging and tracking will not be employed for the entire period, and one of the positions will be hired for a shorter time period. This was done in acknowledgement of the workload decreasing as the season progresses. How long the tracking will occur depends on how quickly the tagged fish (100 total) are determined to have spawned. If a significant number of the tagged fish spawn late, tracking will continue. If the vast majority of fish have already spawned, it may be possible to stop tracking the last few fish (dependent on how the loss of this final information will affect the power to draw conclusions for the entire study).

Project shows OHRC match for 10 years, but what work is that? Is that all related to Elk River?

The 10 years of match funding is for the estimated cost of 10 years of olfactory imprinting work to be conducted at Elk River. The study will likely run for at least 12 years, but the OHRC Research fund sunsets after 10 years, so the match was limited to what has been dedicated.

Is this request just for one year, the pre-odorant-exposed telemetry (three years), or for all six years (pre- and post)? Who will be asked to pay for future years?

This proposal is just for one year of funding. That will cover all of the telemetry work being conducted in this biennium. We will submit a follow-up proposal to be funded in the 2019-21 biennium that will cover the last two years of telemetry prior to hatchery returns that include fish

exposed to odor

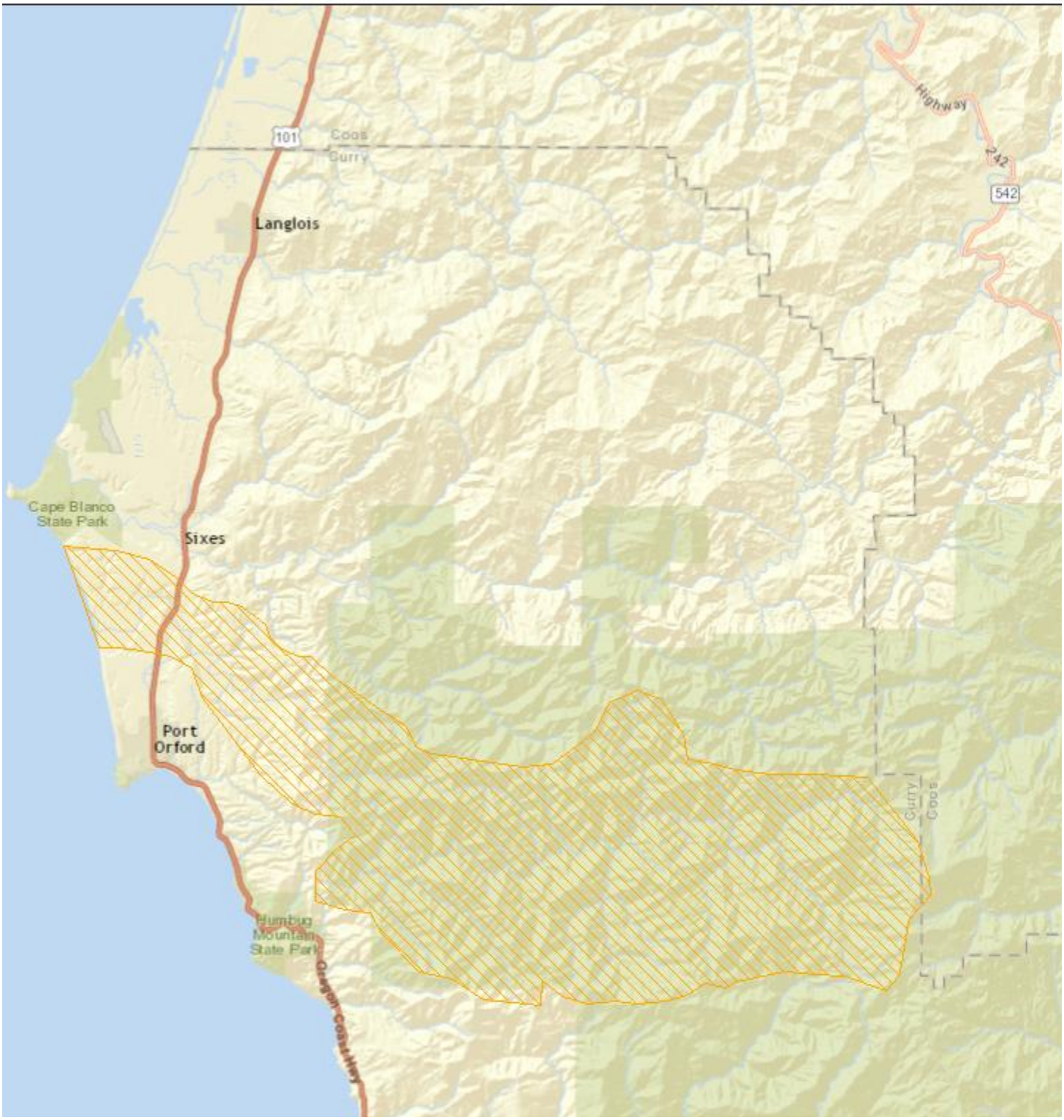
Why is RE being asked to foot most of the bill for this? If it is such and important study, why aren't these funds coming from the OHRC Budget? Are there any other PST funds that might also help fund this?

The OHRC Research Fund was created to provide seed money for hatchery/wild research. The intent was for researchers to combine these funds with other sources to optimize the amount of research that will occur. The OHRC Board dedicated $4 million over 10 years towards the Elk River olfactory imprinting research The Elk River researchers sought Sea Grant funding for this telemetry study, but were unsuccessful. Since the olfactory research is close to being tested on production fish, there was not enough time to consider other funding sources for the telemetry work that will help to understand migration behavior prior to exposing the hatchery fish to an odor to improve homing.

Are there other factors that may lead to fewer fish returning to the hatchery, such as the entrance to the fish ladder, or flows, or something else? Describe why the focus is on homing?

The Coastal Multi-Species Plan (CMP) called for the implementation of four actions at Elk River Hatchery to try to attract more hatchery fish into the trap, and get them off of the spawning grounds - 1) run the ladder and trap for the entire season, 2) modify the ladder entrance to make it more attractive, 3) explore putting more flow through the ladder to attract hatchery fish, and 4)

Project Map


101
Coos
Curry
Langlois
Highway
242
542
Cape Blanco
State Park
Sixes
Port
Orford
Curry
Coos
Humbug
Mountain
State Park

Additional Files

Budget Information

Maps

Project Map — *Map image of project location*

Photos

Design Information

Management Plans and Supporting Documents

Permits and Reviews

Partnerships

Public Comment

Administrative Documents

sig page

Completion Report

A completion report has not been submitted for this project.