



R & E Grant Application 23-25 Biennium

Project #: 23-005

Coaledo Tide Gate Monitoring

Project Information

Requested Cycle: 23-1
R&E Project Request: \$14,988
Other Funding: \$924,195
Total Project: \$939,183
Spending Start Date: 7/1/2023
Spending End Date: 12/31/2023
Project Start Date: 10/1/2020
Project End Date: 12/31/2025
Organization: Coquille Watershed Association (Tax ID #: 93-1171301)

Fiscal Officer

Name: Julie Huff
Address: 390 N Central Blvd
Coquille, OR 97423
Telephone: 15413962541
Telephone 2:
Fax:
Email: jhuff@coquillewatershed.org

Applicant Information

Name: Julie Huff
Address: 390 N. Central Blvd
Coquille, OR 97458
Telephone: 541-396-2541
Email: jhuff@coquillewatershed.org

Past Recommended or Completed Projects

This applicant has no previous projects that match criteria.

Authorized Agent

Name: Derrek Faber
Address: 3600 Crates Way, Bldg 2 Ste A
The Dalles, OR 97058
Telephone: 541-296-3023 x221

Email:

derrek.m.faber@odfw.oregon.gov

Location Information

Where is it?

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

Landowner Information

Name: Luke Fitzpatrick
Affiliation: The Bridges Foundation
Address: PO Box 1210
Turner, OR, 97392
Phone: 503-930-9431
Email: luke.fitzpatrick@thebridgesfoundation.info

Site Description

Street Address, nearest intersection, or other descriptive location.

North Bank Lane at Old Railroad Grade Rd, Coquille Oregon

Directions to the site from the nearest highway junction.

From highway 42, take North Bank Lane west 1.3 miles. Park at the large barn on the left before Old Railroad Grade Rd.

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.

There is currently no public access to the site.

Dominant Land Use Type:

Range/pasture
Wetland

Project Location

General Project Location.

County: Coos
Town/City: Coquille
ODFW Dist: Charleston
Stream/Lake/Estuary Name: Beaver Slough
Sub-basin: Coquille

Specific Project Location.

Latitude	Longitude
043.2083	-124.2639

Project Summary

Project Summary

Please provide a couple sentence summary of the proposal.

Tide gates are being replaced along the coast and the Lower Coquille Tide Gate and Fish Passage project is determining how and when juvenile salmonids use tide gates. A tide gate with a pet door is being installed in 2023. Enhanced monitoring will help determine the effectiveness of this approach.

Overall Project Goals

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

Improve our understanding of how juvenile coho and Chinook respond to the varied sizes and complexities of new MTR tide gates and the restored upstream habitat. A comprehensive understanding of the migratory habits of juvenile coho and Chinook within the Coquille Estuary will be determined and help inform future projects.

Aid in the adaptive management of these tide gate projects on the Oregon Coast by providing data that informs how tide gate management practices can benefit the run of salmon at large.

Primary objectives of R&E funding

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

Install a PIT antenna on the pet door of the new Coaledo tide gate (install summer 2023) and operate for the final 2 years of the Lower Coquille Monitoring project.

Current Situation/Justification

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

Since the mid-1800s, land-use practices have substantially decreased the floodplain complexes in the Coquille basin to 5% of historical acreage by the use of levees, ditches and tide gates negatively affecting anadromous fish returns. Present tide gate styles are largely top-hinged wood or steel that restrict juvenile fish movements from the river into locations that provide prime rearing habitat. The older tide gates limit fish passage and typically provide lower ecological benefit than natural systems. It is hypothesized that MTR tide gates can provide greater ecological benefits through reduced velocities, adjustable control, and increased time that tide gates remain open.

A growing number of tide gates are being replaced along the Oregon Coast, necessitated by aging infrastructure and the need to improve fish passage. The Coaledo tide gate is being replaced in the summer of 2023 by three MTR tide gates with the addition of a “pet door”. There is uncertainty in how beneficial the pet door will be in improving fish passage during the high water periods in winter and spring. A PIT antenna installed directly on the pet door will provide data on exactly when juvenile coho and Chinook pass through the tide gate via pet door.

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 project is focused on learning how juvenile coho and Chinook are passing through many

types of tide gates so that they can access the high-growth areas of off-channel habitat. We desire to formulate best practices for replacement of tide gate type, their use, and operational timing for the benefit of off-channel habitat use, with the ultimate goal of improving salmon survival and production. Providing the greatest access to habitat controlled by tide gates will benefit growth (and thereby survival) of juvenile salmon. If juvenile salmon realize the improved growth and survival from accessing off-channel habitat during critical time periods, their ocean survival will also benefit thereby resulting in more angler opportunities from the excess adult returns. Overall, there will be more opportunity for recreational fishing of wild adult salmon.

Percent benefit split between Commercial and Recreational anglers:

0 % Commercial

100 % Recreational

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

This project has been identified as an ODFW priority for:

Not identified

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

No

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.

Increased effectiveness monitoring of tide gates was deemed a priority in the 2018 OWEB funded Ecological Effects of Tide Gate Upgrade or Removal: A Literature Review and Knowledge Synthesis.

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

Coho Salmon

Lamprey

Winter Steelhead

Cutthroat Trout

Rainbow Trout

This project will benefit anglers or fishery by providing:

Monitoring/Research

Monitoring/Research

This project will be used to evaluate:

Habitat (i.e structure, passage, water quality)

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

Yes

Jamie Anthony, ODFW REDD Group is the lead analyst on this project.

Is this study critical to fishery management decisions?

No

No

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

No

Will the data be reported or published?

Yes

The data is reported on in annual reports with the long-term goal of publishing the data in a peer-reviewed journal.

Project Description

Schedule

Activity	Date	RE Funding
Fabricate PIT antenna off-site (D. Faber, The Dalles)	July, 2023	Yes
Install PIT antenna on-site (Coquille, OR)	Aug, 2023	Yes
Monitor site parameters (temperature, velocity, water level, gate door openness, conductivity) annually Dec-June	Dec 2020 - June 2025	No
Install PIT antenna arrays on tide gates at Winter Lake, Seestrom, Cochran and in-stream at Coaledo.	Sept 2020 - Oct 2021	No
Fish sampling and PIT tagging juvenile coho and Chinook at project sites (Annually, Dec - May)	Dec 2020 - June 2025	No
Report Dissemination (Annually, Dec)	Dec 2021 - Dec 2025	No

Permits

Permit	Secured?	Date Expected
Not Applicable	No	

Project Design and Description

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

Detailed Monitoring Activities

1) An extensive fish sampling effort will be carried out every year from December through May using a combination of passive and active capture techniques (e.g., hoop trap nets, beach seines). In addition, early season fish sampling will occur at the headwaters of the North Fork Coquille River three times each year in September or early October. Weekly fish sampling will occur at Beaver Creek from December to May and at Winter Lake from March to May. Fish sampling will happen nine (9) times from December to May at both Seestrom and Cochran project sites. Mainstem Coquille River seining will happen seven (7) times each year from January to May. During each capture event, all juvenile coho and Chinook salmon will be PIT tagged, counted and measured for fork length and wet mass. All other species, both native and non-native, will be counted. Through the combined fish sampling activities, the annual target is to tag 3,500 coho; Chinook targets are more moderate due to the sensitivity of the population as a whole within the Coquille Basin and will be set by ODFW Charleston each year.

2) The installation and operation of PIT antenna arrays are at the core of this study as they allow greater resolution of juvenile salmonid movement in both space and time. The arrays are attached directly to the inlet of the tide gate culvert (except at Coaledo) so not only will PIT detections denote when a juvenile coho is moving throughout the estuary but it will also identify when passage of the tide gate has occurred. A total of eight (8) PIT antenna arrays have been

installed; four (4) on the Winter Lake tide gates, one on each of the Seestrom and Cochran tide gates and two (2) on Beaver Creek (150 ft upstream of the tide gate). An additional PIT antenna array will be installed in spring of 2023 at Bandon Marsh on a non-gated channel in the brackish estuary. At Bandon Marsh, a solar power system will be installed and used as the power source to operate the PIT array. Funds from the R&E program would install an additional PIT antenna on the pet door of the Coaledo tide gate slated to be upgraded in 2023. The PIT antenna arrays are operated continually from 2020 through 2025.

3) Monitor project site parameters that could be considered as covariates during statistical analysis. At Winter Lake, Seestrom, Cochran and Beaver Creek the following data loggers will be deployed from November to June on 15-minute intervals: Onset ProV2 Temperature loggers, Onset U24 Conductivity loggers and Onset U20L water level loggers. Water level loggers are deployed upstream and downstream of each tide gate to assess duration of gate openness and tidal stage. Velocity will be measured at Winter Lake with Sontek velocity meters. Only water level and conductivity will be monitored at the Bandon Marsh site.

4) To assess habitat quantity, a subcontract to obtain high resolution LiDAR at both Seestrom and Cochran project sites has been included. The LiDAR will be flown during the summer months at low tide to maximize accuracy and resolution. The ODFW Charleston office will obtain high resolution LiDAR for the Winter Lake Restoration site.

5) Statistical analysis will happen concurrently for all monitoring objectives and will occur from July through October of each year with an annual report completed in December.

Study Design

Effect of restoration on residence time, abundance, body condition and survival of juvenile coho salmon: Ocean conditions and other stochastic events can strongly regulate coho salmon productivity (e.g., Mantua et al. 1997), which can complicate attribution of causation to any changes in status or trend trajectories. A Before-After-Control-Impact (BACI) design (Stewart-Oaten et al. 1986) is frequently used to evaluate the Before (pre-construction baseline) and After (post-construction) condition and to provide a comparison of a Control (reference site) and Impact site (restoration site). In this case, the tide gates have already been replaced, so the design will be Control-Impact. This design will be used to determine if juvenile abundance, growth and condition differs from that observed in a control habitat (Beaver Creek).

A combination of passive and active capture techniques (e.g., hoop trap nets, beach seines) will be used to sample juvenile salmonid in the restored area of Winter Lake, Seestrom and Cochran projects (impact area), Beaver Creek (control area) and in the lower Coquille River throughout the winter and spring periods (December – May).

Evaluation of passage effectiveness at the tide gate structure: Juvenile salmonids will be captured from the Coquille River margins upstream of the tide gate structures using beach seines. Additionally, juvenile salmonids will be captured behind the tide gates during sampling events for PIT tagging. A target of at least 3500 juvenile coho of the appropriate size will be PIT tagged and released, fewer juvenile Chinook will be tagged and target numbers will be determined on an annual basis by ODFW. PIT antenna arrays will be deployed on the tide-gate structure to monitor fish passage through the tide gates.

Water Quality: Water level data logger locations were chosen to aid in assessing when the tide gate door is open. Water temperature and conductivity data logger locations were chosen to give a generalized understanding of the temperature and salinity regime at each restoration site. Water temperature and conductivity will be collected at the tide gate and in the main restoration channels. Maximum Weekly Maximum Temperature (MWMT) will be calculated using these data loggers. Juvenile salmonids are sensitive to temperature which impacts their migration and residence time therefore MWMT will be used as a possible covariate in the statistical analysis.

Monitoring Methods

Fish sampling and capture efforts will be systematically spaced within the sample frames. Sampling events will occur nine times annually at each of the Seestrom and Cochran project areas (December – May), and weekly at the control site (Beaver Creek, December - May). Past capture efforts at Winter Lake have deemed hoop traps ineffective therefore, capture efforts will focus on seining during the high-use months of March through May. Capture and tagging of juvenile coho upstream of the tide gate structures in the Coquille River will take place from December to May. If necessary to achieve tagging targets, juvenile coho may be captured in the Coquille River downstream from the tide gate structure and translocated upstream for release post-tagging. Tagging of juvenile Fall Chinook will be conservative due to the perilous state of the Coquille population; close communication between CoqWA and ODFW will occur throughout the tagging season to ensure no adverse effects. Complete random design is not possible for the sites due to daily/weekly changes in water levels, safety associated with individual trapping sites, and channel configurations that contribute to gear function deficiency (excessive depths) therefore sampling locations will stay static throughout the project.

During each capture event, all juvenile salmonids will be counted and measured for fork length (LF) and wet mass in all project areas and the Coquille River. All juvenile salmonids captured at all project areas and the Coquille River with $LF \geq 65\text{mm}$ will be tagged with PIT tags to allow for the identification of individual fish on recapture. Tracking individual fish through the winter period will be necessary to support all objectives. At each capture event, all juvenile salmonids will be scanned for the presence of a PIT tag using a hand-held scanner. In addition to using a hand-held scanner, eight (8) PIT antenna arrays have been constructed with one on each main tide gate for the Seestrom and Cochran restoration projects and an antenna on four of the seven tide gates at Winter Lake. Additional PIT antenna arrays will be installed in Fahy Creek of the Bandon Marsh restoration project and on the pet door of the soon to be replaced Coaledo tide gate. Employing PIT antenna arrays will allow greater resolution of juvenile salmonid movement in both space and time therefore the core of our study.

Water level, conductivity and temperature will be monitored using Onset HOBO Water Level U20, Temperature ProV2 and Fresh Water Conductivity U24 data loggers and follow protocols outlined in Roegner et al. 2008. All loggers will record at 15 minute intervals and be deployed from November to the following June for two (2) consecutive years (year 4 and 5 of the larger monitoring project). Field audits and data collections will occur quarterly for all data loggers in addition to pre and post deployment calibration verifications.

Water level data loggers will be placed on the upstream and downstream side of each tide gate

and will be used in calculating when the tide gate is open to assess fish passage. Furthermore, velocity can be roughly approximated with the water level loggers as water level within the culvert structures drives velocity. Water temperature and conductivity will be collected at the tide gate and in the main restoration channels. Maximum Weekly Maximum Temperature (MWMT) will be calculated using these data loggers.

R&E Funding

R&E funds will be used solely for the fabrication and installation of the PIT antenna on the Coaledo tide gate pet door. Derrek Faber of ODFW The Dalles will lead the design, fabrication and installation of the PIT antenna with Julie Huff of the Coquille Watershed Association managing the grant and overall project. Secured funding will cover the cost of monthly cellular data plans for transmitting the data over a cellular modem. Additionally, the main equipment (Biomark Master Controller), infrastructure (1200' of CANBUS cable) and power is already on site and has been funded by a matching grant.

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 PIT antenna equipment used will last the life of the 2 year project and will be used by Derrek Faber of ODFW after project completion. The data will be valid until there is a significant improvement in tide gate design.

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

The Coquille Watershed Association is responsible for the long-term management, maintenance and oversight of the project. Although they consult with Derrek Faber on initial data compilation and any repairs to the PIT antenna.

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

There is currently baseline data collected for the failing Coaledo Tide Gate with the requested R&E funding to further the effectiveness monitoring already funded for the project site.

Project Funding

Funding

Have you applied for OWEB funding for this project?

Yes

OWEB application number: 222-2034-22290

Received an award.

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
NOAA	Cash	Secured	294832	Winter Lake Fish Passage and Migration Monitoring
OWEB	Cash	Secured	481948	Lower Coquille River Effectiveness Monitoring (220-2057), Lower Coquille Tide Gate and Fish Passage Monitoring Expansion (222-2034)
USFWS	Cash	Secured	50000	Seestrom Restoration MAMP Monitoring
Wild Rivers Coast Alliance	Cash	Secured	49955	Coaledo Tidelands Fish Passage Monitoring
ODFW	In-Kind	Secured	47460	In-kind labor for Charleston office fish biologists and Jamie Anthony of REDD Group
		Total	924195	

Budget

Item	Unit Number	Unit Cost	In-kind or non-cash contributions	Funding from other sources	R&E Funds	Total Costs
PROJECT MANAGEMENT						
NOAA Secured Matching Funds	0	0.00	0	294832	0	294832
OWEB Secured Matching Funds	0	0.00	0	481948	0	481948
USFWS Secured Matching Funds	0	0.00	0	50000	0	50000
WRCA Secured Matching Funds	0	0.00	0	49955	0	49955
ODFW Secured In-Kind Match	0	0.00	47460	0	0	47460
Julie Huff, CoqWA (hours)	15	47.00	0	0	0	0
		SUBTOTAL	47460	876735	0	924195
IN-HOUSE PERSONNEL						
Julie Huff, CoqWA (hours)	40	47.00	0	0	1880	1880
		SUBTOTAL	0	0	1880	1880
CONTRACTED SERVICES						
Derrek Faber, ODFW (weeks)	2	3197.00	0	0	6394	6394
		SUBTOTAL	0	0	6394	6394
TRAVEL						
Mileage (D. Faber)	1237	0.66	0	0	810	810
Vehicle lease (D. Faber)	2	95.00	0	0	190	190
lodging and per diem (D. Faber)	3	186.00	0	0	558	558
		SUBTOTAL	0	0	1558	1558
SUPPLIES/MATERIALS						
Biomark IS-1001 24V	1	1985.00	0	0	1985	1985
West Fork node housing	1	825.00	0	0	825	825
CANBUS shielding cable	186	4.25	0	0	791	791
Antenna construction materials (LITZ wire, connectors, crimps, PEX tubing)	1	1400.00	0	0	1400	1400
		SUBTOTAL	0	0	5001	5001
EDUCATION/OUTREACH						
			0	0	0	0
		SUBTOTAL	0	0	0	0
EQUIPMENT						
			0	0	0	0
		SUBTOTAL	0	0	0	0
FISCAL ADMINISTRATION						
Grant management, CoqWA	5	31.00	0	0	155	155
		SUBTOTAL	0	0	155	155
		BUDGET TOTAL	47460	876735	14988	939183

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

Internal review team was concerned about the large portion of the project that is used to pay for ODFW staff time.

Specific Review Team Comments

This seems like a very small amount in the overall project that could have been incorporated in other grants. Only pays for an ODFW employees time and some supplies (and a little project management). With no direct angler benefit this needs more justification.

My concern is how relevant the request is to the \$920,000 project. Appears just a request of funds to off-set base programs.

The cost for Derek Faber looks very high (\$3,197.00 per week?).

\$10,000 of the request funds is being used for ODFW staff time

This project will contribute to addressing a data and monitoring gap related to tide gates, alternative design configurations and fish passage efficacy and will be useful in demonstrating the importance of fish passage in estuaries where tide gates are protecting infrastructure. These funds fit well with other investments ODFW is and continues to make along the coast and particularly in areas managed for agricultural practices. Success of monitoring and reporting on fish passage efficacy at "pet doors" on tide gates will help demonstrate the value of adding these features to tide gates when new projects are built and when existing tide gates are repaired and replaced.

Potential benefit to commercial anglers from this project, not just recreational anglers.

The dollar ask is fairly low compared to the total project thanks to in kind contributions and gear already acquired. It is also nice that ODFW will inherit the PIT Master Controller following this work so that it can be used on other projects. That helps because some projects purchase gear that is only used for a short period of time and then it sits on a shelf. The project states that it will only potentially benefit recreational fisheries but those fish could be caught in the commercial fishery as well, though I am unsure how many fish utilize this tide gate

Specific Review Team Questions

How will detections through the PET door be separated from detections through the larger door?

The detections at each antenna can be separated based on the individual identification code of the antenna; therefore, each detection can be determined exactly which antenna the tagged salmonids swam through. Additionally, the existing antennas for the Coaledo tide gate project is in the channel 150' upstream of the tide gate. Due to the high cost of the construction and installation of the antennas, the project was designed so that when the Coaledo tide gate was upgraded the antennas would not need to be removed or reinstalled. Unfortunately, this means we do not have data on the exact conditions of when the tagged salmonids are passing through the tide gate at this site. The proposed antenna would provide the only data on exact conditions at time of passage.

If this project is mostly funded by OWEB why wasn't this portion funded? Is it new information? opportunistic?

The Lower Coquille Monitoring project has been funded in phases, starting originally in 2019

with two grants from NOAA and OWEB. The latest funding from OWEB is to extend the project for an additional two years. When this latest grant was submitted the Coaledo tide gate design was not complete. It did not include a PET door and it was still uncertain if the tide gates would be mechanical (MTR) or electrical (similar to Winter Lake slide gates).

For these reasons, the proposed project is more opportunistic in nature since the PET door is a recent addition to the tide gate design. Although opportunistic the proposed project is a fraction of the cost of a typical PIT array because the PET door antenna would be able to use much of the same infrastructure of the existing PIT antenna at the Coaledo tide gate, which cost over \$55,000.

\$10,000 of the request funds is being used for ODFW staff time

\$876,000 has been secured for the this project, why cant this assessment be paid for by those funds?

Is this monitoring essential to the overall project success?

Derrek Faber is a leading expert in PIT antenna systems and has designed, fabricated and installed all of the PIT antennas in the Coquille basin. The Lower Coquille Monitoring project would not exist without his expertise. His position is 100% funded by grants outside of ODFW, which requires project specific funding and project specific task orders which unfortunately cannot be used as in-kind match. His fully burdened salary and benefits are included in the overall weekly estimate, which is the reason for the seemingly inflated value for staff time as an NRS-3.

The secured funding for this project has already paid for 16 PIT antennas, 3 years of intensive fish sampling and analysis and the rest is earmarked for an additional 4 PIT antennas (at Bandon Marsh) and 2 more years of sampling and analysis. We have already incurred unforeseen costs for PIT antenna repairs and do not feel confident there is an additional \$15,000 to pay for the proposed antenna while still meeting our current grant deliverables.

This monitoring is not essential to the overall project success but the return on investment for the proposed antenna would be monumental. In the 2022 season, we detected 576 unique coho at the Coaledo PIT antenna with many of those coho passing through the tide gate more than once. The proposed project would provide an incredible amount of data on how successful PET doors are at improving fish passage through tide gates and help inform future projects.

Additional Files

Budget Information

Maps

[Lower Coquille Monitoring Map](#)

Photos

Design Information

[Coaledo Tide Gate Design Drawings](#)

[Pet Door Schematic](#)

Preliminary pet door schematic on Coaledo Tide Gate. Official engineer drawing will be completed during permitting phase.

Management Plans and Supporting Documents

Permits and Reviews

Partnerships

[Landowner Agreement](#)

[Proof of Match](#)

Public Comment

[Letter of Support](#)

Administrative Documents

[Signature Authorization Page](#)

[Tax Exempt Status](#)

Completion Report

A completion report has not been submitted for this project.