R & E Grant Application 17-19 Biennium

Project #: 17-056

Upper Klamath Basin RM&E Equipment

Project Information

Requested Cycle:	17-6
R&E Project Request:	$33,495
Other Funding:	$222,834
Total Project:	$256,329
Spending Start Date:	7/1/2017
Spending End Date:	6/30/2019
Project Start Date:	7/1/2017
Project End Date:	6/30/2030
Organization:	Oregon Department of Fish and Wildlife

Applicant Information

Name:	Benji Ramirez
Address:	1850 Miller Island Rd W Klamath Falls, OR 97603
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Past Recommended or Completed Projects

This applicant has no previous projects that match criteria.

Location Information

Where is it?

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

Landowner Information

Name:	PacifiCorp
Affiliation:	Hydroelectric power
Address:	825 NE Multnomah, Suite 1500 Portland, OR, 97232
Phone:	503-813-6625
Email:	demian.ebert@pacificorp.com

Name:	Bureau of Reclamation
Affiliation:	Klamath Project Manager
Address:	6600 Washburn Klamath Falls, OR, 97603
Phone:	541-883-6935

Site Description

Street Address, nearest intersection, or other descriptive location.

Most of the equipment will be used on waters of the state or on Bureau of Reclamation property throughout the Upper Klamath Basin. The video weir equipment will be utilized throughout the basin as well but will primarily be used for monitoring in Spencer Creek. Spencer Creek flows south, directly into the upper portion of JC Boyle Reservoir, which is created from a dam on the Klamath River. The property that the video weir will be deployed on is owned by PacifiCorp. This parcel of land is part of a package that would be transferred from PacifiCorp ownership to the state of Oregon if the dam removal process goes forward as planned.

Directions to the site from the nearest highway junction.

To access the Spencer Creek site, you would head south from the town of Keno on OR-66 E and continue on the road and cross over the bridge spanning JC Boyle Reservoir. Take the first right turn onto the Keno Access Road and travel till you reach the main road going along the north side of the lake. Take this road for less than a mile till you cross over Spencer Creek. From this point, travel downstream near the lake and this is the general area where we will operate the video weir.

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.

There currently isn't an established agreement for anglers to access Spencer Creek. Green Diamond allows recreational access on their property, as they cover a lot of land in Klamath County and they are not considering changing that in the future. The rest of the equipment will be utilized throughout the basin and will be in areas readily accessible to the public and we will

be utilizing members of the public to sample fish so this project has a great public nexus. GPS coordinates for the general area of the weir are: 42.151817, -122.028061 (WGS 84 Datum).

Dominant Land Use Type:

Wetland

For Spencer Creek, the project area is within the wetted stream channel just upstream from JC Boyle Reservoir.

Project Location

General Project Location.

County:	KLAMATH
ODFW Dist:	Klamath
Stream/Lake/Estuary Name:	Spencer Creek
Sub-basin:	18010206
Tributary of:	Klamath River

Specific Project Location.

Latitude	Longitude
42.15829	-122.02848

Project Summary

Project Summary

Please provide a couple sentence summary of the proposal.

The goal of this proposal is to purchase research, monitoring, and evaluation equipment to establish baseline conditions and assess the recolonization and reintroduction of anadromous fishes in the Oregon portion of the Upper Klamath Basin following restored fish passage in the Klamath River.

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 re-establish viable, self-sustaining, naturally produced populations of anadromous fishes in the Upper Klamath Basin that can sustain harvest rates that will contribute significantly to the welfare of fishery-dependent Klamath Basin communities, while also restoring an integral component to the ecosystem.

Another goal of this project is to establish baseline conditions and monitor changes in life history expression and population structures in resident Redband Trout and other fishes prior to and directly after restored fish passage in the Klamath River to facilitate continued recreational opportunities throughout this large scale restoration project.

Primary objectives of R&E funding

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

The objective of this proposal is to purchase research, monitoring, and evaluation equipment to establish baselines and document changes in resident and anadromous fishes prior to and directly after restored fish passage in the Klamath River.

Current Situation/Justification

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

Salmon and steelhead have been blocked from the Upper Klamath Basin since construction began on Copco 1 Dam in 1912 on the Klamath River. Copco 1 Dam and three other hydroelectric dams on the Klamath River are slated to be removed in 2021 as part of the largest dam removal and restoration project in North America. ODFW is currently writing the Anadromous Reintroduction Implementation Plan detailing the State's efforts in this process. ODFW will utilize a mixture of active reintroduction and volitional recolonization of anadromous fishes. With this approach, it is imperative that we have the ability to collect accurate and timely data on all fish in the Klamath River and Upper Basin. There are a lot of uncertainties with how fish will respond and, in particular, how the native Redband Trout will respond so our best approach is to implement a rigorous research, monitoring, and evaluation plan utilizing the most accurate and current information to make informed decisions. Currently, we do not have the equipment to collect even baseline data on Redband Trout in the Klamath River, leading to public unrest about any affects that dam removal will have on the highly sought after Klamath Redband Trout.

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.

Dam removal and anadromous reintroduction/recolonization will create recreational fisheries that haven't existed since the 1960's and allow for an expansion of the famed Redband Trout fishery in the Upper Klamath Basin. Historically, the Klamath River supported the third largest migration of Chinook salmon on the West Coast so this restoration project has the potential to exponentially expand recreational opportunities and supplement the downriver and ocean commercial fisheries.

The most immediate benefits of this R&E proposal will be the creation and implementation of a research, monitoring, and evaluation program to collect baseline data on Redband Trout prior to dam removals and for anadromous fishes following restored fish passage. The current status of information on Klamath River Redband Trout is insufficient to effectively manage the population and often limits angler opportunities to target these prized fish as managers have to take a highly conservative approach.

Currently in the Klamath River, angler are fairly limited and most are forced to fish Upper Klamath Lake and the upper tributaries. The ability to collect accurate and current information on the Klamath River Redband Trout will allow managers to set regulations based on sound information and potentially expand opportunities for anglers in the river.

Percent benefit split between Commercial and Recreational anglers:

20 % Commercial
80 % Recreational

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

It is incredibly difficult to determine the relative benefits of this R&E proposal in relation to commercial and recreational anglers because of the uncertainties involved in dam removals. Recreational anglers would receive the most immediate benefits as it would give managers the

ability to collect accurate and current information on Klamath River Redband Trout and set angling regulations accordingly. The Upper Klamath Basin Redband Trout fishery is one of the most robust native trout fisheries in North America and is economically and culturally important to the local communities so this project will initially be benefiting sport anglers prior to salmon and steelhead returning to the basin.

This project would also provide benefits to downriver tribal and ocean fisheries following dam removals by giving managers the ability to effectively monitor and evaluate anadromous returns and set escapement and allocation goals that allow harvest and conservation/recovery goals to be met. Because of the uncertainties relating to the proportion of commercial fisheries that will benefit from increased production of Klamath River salmon and steelhead, commercial angler benefits were conservatively set at 20%, but will likely be much greater, further highlighting the need for more accurate and current information to minimize uncertainties.

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.

Oregon's Anadromous Reintroduction Implementation Plan. This plan is still in draft from and ODFW's reintroduction coordinator is currently working on monitoring section. A complete draft is scheduled for December 2018.

Oregon Governor's Natural Resources Office has requested a policy option package for personnel to conduct RM&E efforts following dam removal so it is a priority at the state level.

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
Other Fish Species
Lamprey spp.
Spring Chinook Salmon
Coho Salmon
Lamprey
Winter Steelhead
Summer Steelhead
Rainbow Trout

This project will benefit anglers or fishery by providing:

Monitoring/Research

Monitoring/Research

This project will be used to evaluate:

Population composition (i.e age, species, survival, size, or genetics)

Out migrant/return rates
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

The equipment requested in this proposal was selected by Mark Hereford, ODFW's anadromous reintroduction coordinator, based on consultation with NOAA/NMFS and other agencies or individuals with prior dam removal experience and experience monitoring large rivers. Mark has been working directly with scientists that conducted research, monitoring, and evaluation (RM&E) of the Elwha River in Washington following removal of two large scale dams and the resultant recolonization of anadromous fishes. Through this process, Mark has identified the equipment and techniques that will provide the most accurate and timely data available. For this proposal, Mark only included those equipment items that can be used immediately for Redband Trout so anglers could see the benefits prior to dam removals on the Klamath River.

Is this study critical to fishery management decisions?

Yes

This proposal will allow managers to answer a wide array of fishery management questions, as dam removal on the Klamath River will create fisheries where there haven't been any since the early 1900's. The basic questions as they relate to the Redband Trout fishery are:
1) What are the limiting factors relating to Redband Trout in the Klamath River?
2) What is the timing of migrations in the Klamath River?
3) What are the seasonal and temporal patterns of Redband Trout movement in Spencer Creek and how will this change when the dams are removed.
4) What is the age and size distributions of the current Klamath River Redband Trout population and how will these change with dam removals?
5) Is the population currently robust enough to allow recreational harvest on Redband Trout?

The specific questions this proposal will answer as they relate to anadromous fishes are:
1) Are fish making it past the removed dam sites?
2) If they are making to the Upper Klamath Basin, what numbers are making it and what is the size, age, and species composition of these fish?
3) When are anadromous juvenile and adult fishes migrating in the Klamath River?

Yes

Every bit of information that we can collect on Redband Trout and anadromous fishes in the Klamath River, both pre and post dam removal, will give managers the ability to make informed decisions on all aspects of the current Redband Trout fishery and the fisheries that will be created when the dams are removed. Once salmon and steelhead come back to the Upper Klamath Basin, members of the public will be vying to be able to angle for them and the only way that recreational, commercial, tribal, and conservation/recovery goals can be met is if there is a rigorous research, monitoring, and evaluation program in place that provides the information needed to make high level management decisions that benefit everyone.

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

Yes

This research, monitoring, and evaluation proposal would extend well into the future. Once the dams are removed, there will always be a need to collect accurate and current data on all fish populations in the Klamath River so this project realistically has no end date.

Will the data be reported or published?

Yes

The exact data dissemination program is still yet to be determined. ODFW will produce annual information reports following dam removal that will detail the research, monitoring, and evaluation of anadromous reintroduction and recolonization.

Project Description

Schedule

Activity	Date	RE Funding
Create research, monitoring, and evaluation plan and identify equipment needs.	Winter/Spring 2018	No
Purchase research, monitoring, and evaluation equipment	Summer/Fall 2018	Yes
Collect baseline data on current Redband Trout populations to help guide management decisions.	Summer 2018 - March 2021	Yes
Drawdown of the 4 reservoirs slated to be removed.	January 2021	No
Removal of the 4 dams on the Klamath River.	March 2021	No
Research, monitoring, and evaluation of Redband Trout and anadromous fishes in the Klamath River and Upper Klamath Basin.	March 2021 and into perpetuity	Yes

Permits

Permit	Secured?	Date Expected
No permits will be required for this proposal.	Yes	N/A

Project Design and Description

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

The objective of this proposal is to purchase research, monitoring, and evaluation equipment to establish baselines and document changes in resident and anadromous fishes prior to and directly after restored fish passage in the Klamath River.

This R&E proposal is part of a much larger anadromous fishes reintroduction implementation plan that details the actions that will be undertaken within the Oregon portion of the Upper Klamath Basin to reintroduce anadromous fishes to historically occupied areas above the site of Iron Gate Dam. I will describe how the specific gear requested in this R&E proposal will be used to meet our objectives in the overall plan and also how they will be used for recreational fisheries.

This proposal is requesting funding for passive integrated transponder (PIT) tags and readers that will allow for individual identification and tracking of Redband Trout in the near term and will also be utilized for anadromous fishes following dam removals on the Klamath River. PIT tags are one of the best monitoring tools available to biologists and facilitate accurate real-time data collection that can be used by managers to estimate demographics and other important aspects of fish populations. Specifically, PIT tags will allow us to measure growth, movement, and health of individual fish through time utilizing mark-recapture techniques and mobile and fixed PIT antennas. They will also allow us to estimate the size of the effective population of Redband Trout and managers can utilize this information to set practical angling and harvest regulations and meet our conservation goals.

This proposal is also requesting funding for inflatable catarafts and a trailer that will be used to monitor the mainstem Klamath River. The Klamath River is a technically difficult river that presents many difficulties in surveying. California has monitoring programs in place downstream of Iron Gate Dam and we worked directly with them and other professionals to decide on the best methods for surveying the large water of the Klamath River. The catarafts will be our main method for accessing and surveying the majority of the Oregon portion of the Klamath River. We will conduct spawning ground surveys, carcass surveys, mark-recaputure sampling, and other

methods to document the various fish populations utilizing the mainstem Klamath River. Due to the hazardous nature of the Klamath River, it is imperative that we utilize the best available equipment to minimize risk to surveyors while allowing us to collect accurate and current information. In order for the catarafts to be useful they will need to include the price of frames that will biologists to paddle as well as view the river, and properly store monitoring equipment. A trailer will also be required to properly transport rafts to and from sampling sites.
The remaining equipment requested in this proposal includes a video weir and a juvenile trap that will primarily be operated on Spencer Creek but will also be used at other locations that will be identified through an adaptive management program. Spencer Creek currently flows into the reservoir created by the J.C. Boyle Dam and contains resident populations of Redband Trout and lamprey. The video weir and juvenile trap would be operated prior to dam removal to document baseline conditions for resident fishes and hone in the techniques prior to anadromous fishes returning to the system. Spencer Creek was historically incredibly important for resident and anadromous fishes on the Klamath River and is predicted to be important for Chinook, steelhead, and Coho salmon following dam removal. ODFW has coordinated with California biologists and conducted habitat surveys of Spencer Creek and verified that the habitat is highly suitable. California Department of Fish and Wildlife (CDFW) operates a video weir and a juvenile fish trap on Bogus Creek, which enters the Klamath River directly below Iron Gate Dam. ODFW has been working closely with CDFW biologists to utilize the knowledge and expertise they have gained while operating their monitoring facilities on Bogus Creek to select the best and most cost effective equipment for this proposal. CDFW is incredibly interested in the monitoring of Spencer Creek, as it is hypothesized that opening up that habitat will greatly increase the capacity of the basin to support anadromous fishes (especially Coho and Chinook salmon) and that will have effects basin wide.
The video weir will allow us to document every fish that enters Spencer Creek and passes through our monitoring station. We will have the ability to record species, sex, length, condition, parasite and predator scars, and other physical characteristics of fish in Spencer Creek. These weirs have been used with great success by ODFW in the Odell Lake system so there is a wealth of knowledge available on how to properly operate one of these weirs. These weirs are great tools to collect critical data without having to handle the fish or conduct intensive monitoring methods.
The juvenile fish trap would be operated on Spencer Creek to enumerate outmigrants. Data on returning adults paired with juvenile outmigrants is crucial to understanding limiting factors and population growth patterns that will be used to set escapement and allocation goals for harvest in the Klamath River.
All of the requested equipment in the proposal will be used in conjunction with other items to create a robust system of research, monitoring, and evaluation of all fish populations in the Klamath River and the Upper Klamath Basin giving managers the ability to adapt to new information.

Please see the attached map of the potential and existing monitoring facilities. This map depicts the dams that are to be removed in 2021 as well as our recommended future monitoring facilities and ones that are already in place and maintained by either ODFW or other agencies. This map depicts the Klamth River which will need to be monitored for recolonizing salmon/steelhead as well as Spencer Creek where we are requesting funding for a video weir and juvenile downstream trap. Spencer Creek will be the first major tributary of the Klamath River in Oregon to be recolonized by salmon and steelhead.

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 equipment requested in the proposal will be utilized for the duration of the lifespan of the equipment and will be replaced when it is no longer useable. ODFW will be conducting RM&E activities on the Klamath River into perpetuity so there is no end date for this project.

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

ODFW district fish biologists, fish research, and the anadromous reintroduction coordinator will be utilizing the gear and the project lead will be responsible for gear maintenance and repair. It will be stored at the Klamath Falls District Office. For the overall project, a large group of ODFW staff will be involved and project leads will be hired but the main manager will be Mark Hereford, ODFW's anadromous reintroduction coordinator who is currently writing the anadromous reintroduction implementation plan and is responsible for creating the research, monitoring, and evaluation framework for this program.

Will the project require ongoing maintenance?

Yes

All sampling equipment needs constant maintenance to ensure the safety of personnel and that accurate data is being collected.

Is there a plan to collect baseline data and to conduct monitoring efforts to measure the effectiveness of the project?

Yes

We will be utilizing the requested equipment to set the baselines for the project and allow managers to gauge changes in the various populations related to restoration efforts. This is particularly important with the current population of Redband Trout in the Klamath River, as managers do not have adequate data to effectively manage this population. Little is known about how the Redband Trout population will respond to a drastically different ecological setting following the dam removals so having baseline information is imperative to effectively managing this population.

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":"Policy Option Package submitted to Governor's NRO with combination of funding sources. ","type":"Cash","secured":"Pending","dollarValue":0,"comments":"The RM&E portion of the POP includes a range of 4.5-15 million dollars requested. The RM&E portion is part of a much larger POP spanning multiple agencies. "}]

Other Funding Source	Type	Secured	Dollar Value	Comments

Policy Option Package submitted to Governor's NRO with combination of funding sources.	Cash	Pending	0	The RM&E portion of the POP includes a range of 4.5-15 million dollars requested. The RM&E portion is part of a much larger POP spanning multiple agencies.
		Total	0	

Budget

Item	Unit Number	Unit Cost	In-kind or non-cash contributions	Funding from other sources	R&E Funds	Total Costs
PROJECT MANAGEMENT						
ODFW Anadromous Reintroduction Coordinator (for 1 biennium at 10 hrs per week for project oversight) units are in hours	960	26.04	24998	0	0	24998
ODFW Project Lead NRS-2 (for 1 biennium on the ground project management) units are in hours	3840	22.60	86784	0	0	86784
		SUBTOTAL	111782	0	0	111782
IN-HOUSE PERSONNEL						
ODFW Experimental Biological Aide working full time for 1 biennium (units are in hours)	3840	14.46	55526	0	0	55526
ODFW Experimental Biological Aide working full time for 1 biennium (units are in hours)	3840	14.46	55526	0	0	55526
		SUBTOTAL	111052	0	0	111052
CONTRACTED SERVICES						
			0	0	0	0
		SUBTOTAL	0	0	0	0
TRAVEL						
			0	0	0	0
		SUBTOTAL	0	0	0	0
SUPPLIES/MATERIALS						
			0	0	0	0
		SUBTOTAL	0	0	0	0
EDUCATION/OUTREACH						
			0	0	0	0
		SUBTOTAL	0	0	0	0
EQUIPMENT						
PIT tags and readers	0	0.00	0	0	4795	4795
Inflatable Catarafts (2) with trailer and safety equipment	0	0.00	0	0	18550	18550
Spencer Creek Video Weir	0	0.00	0	0	8150	8150
Spencer Creek juvenile trap	0	0.00	0	0	2000	2000
		SUBTOTAL	0	0	33495	33495
FISCAL ADMINISTRATION						
			0	0	0	0
		SUBTOTAL	0	0	0	0
		BUDGET TOTAL	222834	0	33495	256329

Internal Review Results

Review Score: 1.9 out of 3

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

Summary of Review Team Comments

Generally speaking the review team was supportive of this proposal given the prospect of this monumental reintroduction opportunity and need to establish baseline data. However, they also felt that more clarification and justification would have made it a stronger proposal. Review team scores included two 1s, five 2s, and one 3.

Specific Review Team Comments

The line item for the catarafts and trailers seems to be quite expensive. The applicant should better describe if this is specialty equipment, hence the high price.

Maps of the entire project area, including dams and sampling sites, would be useful.

More information and specifics are needed to justify that this is the appropriate kind of equipment needed for this monitoring program. Will this be all the equipment you need to keep this going and collect all the necessary baseline information?

Appreciate some foresight in the need for baseline information and having a focus on redband, but there are few details provided for evaluating the individual project components. If there is a completed RME plan as a part of the reintroduction plan, it would be useful to include.

Specific Review Team Questions

Please provide an update on the current outlook for dam removal on the Klamath River.

Currently, the schedule for Klamath Hydropower dam removal is set to begin in 2021, with complete removal of dams by the end of 2021. The Klamath River Renewal Corporation (KRRC) is a non-profit organization with the task of removing the dams. They have a website (www.klamathrenewal.org) that is updated regularly with information in regards to the removal. As of now, KRRC submitted the Definite Plan for the Lower Klamath Project to FERC, FERC has approved KRRC's proposed Board of Consultants, and FERC has issued an Order on KRRC's transfer application. At this point, we are all waiting for FERC to approve the transfer application from Pacific Corp to KRRC as well as the decommission of the project. Because this transfer is from one private business to another,there should not be a problem with FERC approving the transfer. We should know if FERC approves the transfer sometime in 2019.

What future requests relating to, or resulting from, the dam removal do you anticipate bringing to the R&E Board for funding? How does this request fit into the bigger picture and will future projects come in bundled or individually?

The dam removals represent one of the largest fish restoration projects ever conducted. Originally, the Klamath Basin Restoration Agreement (KBRA) included a large portion of the funding needed to monitor salmon/steelhead recolonization/reintroduction. Unfortunately, that agreement and the associated funding fell through (fortunately the dams ares till coming out). Therefore, ODFW will be utilizing any type of funding source that we have access to conduct what we think are important monitoring activities to both collect pre-dam removal data as well as monitor the recolonization of salmon/steelhead into habitats that have been blocked for over 100 years. Our hypothesis is that recolonization will occur from downstream to upstream. This is the reason our current request involves equipment that will be used for the Klamath River

immediately above the dams and the first major tributary in Oregon (Spencer Creek) above the dams. As fish recolonize habitats above Upper Klamath Lake, requests for monitoring equipment will be more focused for those habitats.

Please see the attached map of the potential and existing monitoring facilities in the Upper Klamath Basin. Funding for the equipment we are requesting are a piece of the broader monitoring program, but they represent the most important piece at this time as we hypothesize that fish will first recolonize the Klamath River above the dams as well as Spencer Creek.

Please explain the video weir better. Will video it be on public or private ground? What sort of Security will it have? Who will be reviewing the video? Is Spencer Creek clear or can it muddy up rendering video ineffective?

We have not come to a consensus on the exact location of the video weir, so it could be located on either private or public land, but it would most likely be located on private land (Green Diamond Resource Co), which is where ODFW has had capture weirs in the past. Equipment will be enclosed in metal storage containers in a location that is not easy to get to. Near this location Oregon Water Resource Department maintains a flow gage that is not vandalized. An OSP officer that specifically monitors Green Diamond property and adjacent properties regularly inspects these areas for suspicious activity. Therefore, we feel that equipment located on Spencer Creek is relatively safe. Like all fisheries and aquatic monitoring equipment, environmental conditions can make them inoperable during certain situations. But we feel that there will be large portions of time when conditions will be perfect for this type of monitoring. Another consideration is that Chinook Salmon will be spawning in the fall when snowmelt will not be an issue. There will be times in the spring when we are gathering information on Redband Trout and steelhead will not be possible due to high flows, but we feel there will be many times when data will be collected to make it worth it. There are times in the spring when clarity will be an issue with standard video equipment, because of this we are looking into video equipment that also has the capability of recording infrared as well. Infrared will eliminate any issues with water clarity.

Please better explain the PIT tagging. How many fish? Locations? How many tags? How many readers (and are they fixed, mobile, handheld)? How will fish be captured/recaptured? With the hazardous nature of the river what alternatives have you considered to track them? Is it possible to install a pit tag antennae on a drone to fly the reaches to provide a safer surveying method?

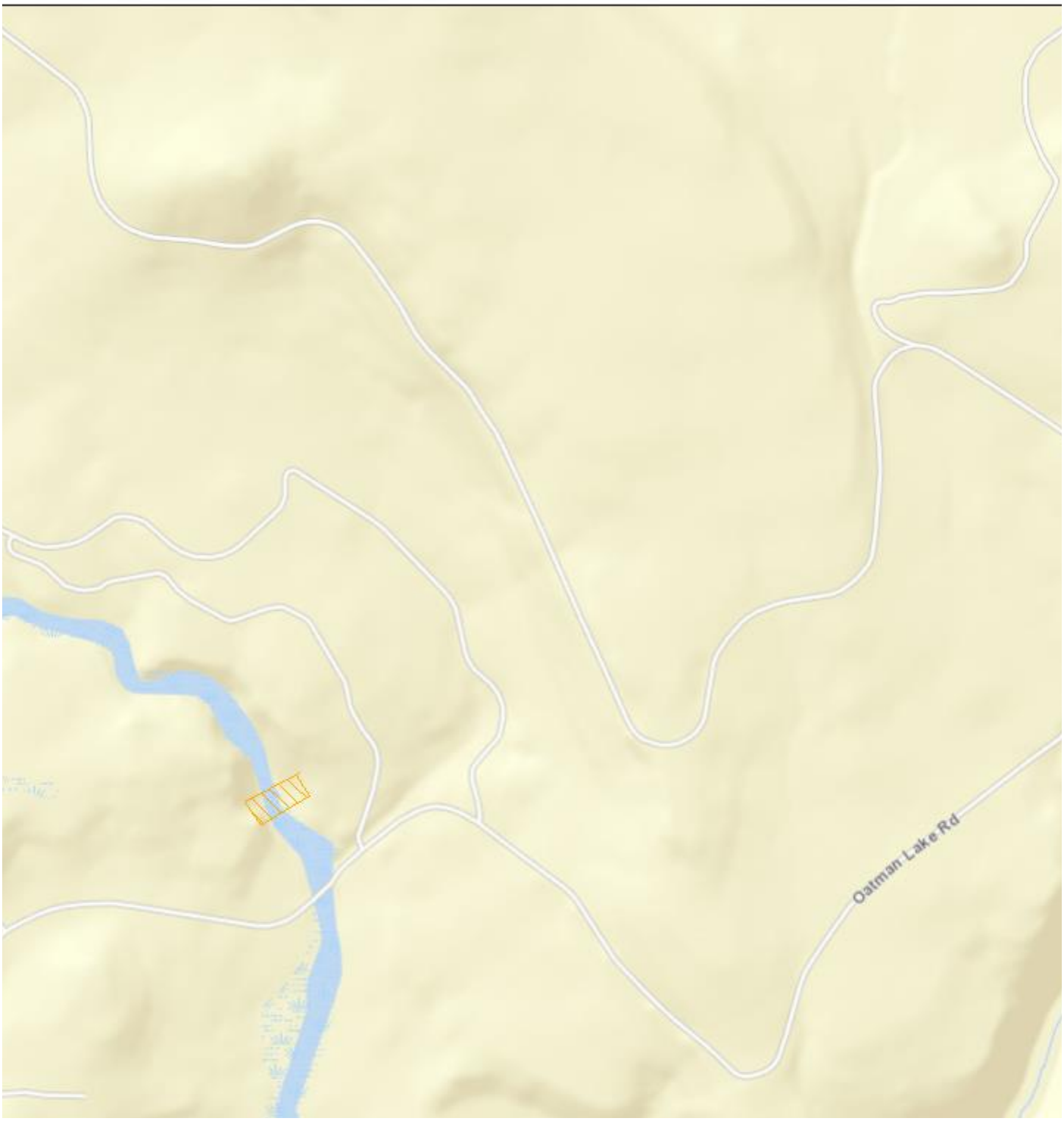
PIT tag technology is one of the most effective methods at better understanding fish populations because it allows biologists the opportunity to know if they have caught a fish multiple times allowing for assessments of growth, movement, and survival. There are currently a dozen fixed PIT arrays in the Upper Klamath Basin, located at strategic locations for determining fish presence. We currently PIT tag a few Redband Trout throughout the basin and we would like to do more, especially before dams are removed to investigate movements. When salmon and steelhead recolonize and we actively reintroduce spring-run Chinook ODFW will be tagging just about every fish we can get our hands on. Because of this we are requesting PIT tagging equipment that will make this more efficient and produce a high quality data. Redband are difficult to capture using traps/nets etc., the majority of Redband captured for monitoring are from hook and line. In the near future we will be capturing fish at Keno Dam, which we could then tag and monitor throughout the whole basin via PIT arrays (which are already on the landscape). PIT tag technology keeps improving, fixed PIT arrays are the best way to know if an individual enters a stream, however there is always the potential for novel equipment such as drones or other mobile arrays to pick up a tag.

Could it be possible to phase in these purchases or is everything needed now? For example, the

catarafts seem to be directed at spawning surveys, etc. for anadromous fish, so it might be possible to purchase those closer to the dam removals in a few years.

Because this is a huge fish restoration project, a lot of eyes are going to be watching how ODFW monitors salmon/steelhead recolonization. while 2021 is a couple of years away, it will be here before we know it. We feel that it is imperative that we are prepared to know when that first salmon or fist steelhead swims into habitat above the dams. The Klamath River and its tributaries is an area that ODFW has not extensively monitored in the past. In a couple of years it will be one of the most looked rivers in the west. We want to be prepared for this, the last thing we want is to have dams removed and not know how/where/when to monitor the Klamath River. Therefore, we are requesting equipment like catarafts at this time so we can fine-tune our monitoring efforts on the Klamath River (and other rivers in our area) before salmon and steelhead are occupying the river, while also having the ability to monitor Redband Trout populations that are currently in the river.

Project Map



Additional Files

Budget Information

Maps

Potential and existing Monitoring facilities	*locations of potential and existing monitoring facilities*
Project Map	*Map image of project location*

Photos

Design Information

Management Plans and Supporting Documents

Permits and Reviews

Partnerships

Public Comment

Administrative Documents

Signiture Page	*Signitures*

Completion Report

A completion report has not been submitted for this project.