

**FINAL Meeting Notes**  
**Lewis River License Implementation**  
**Aquatic Coordination Committee (ACC) Meeting**  
**November 8, 2012**  
**Merwin Hydro Control Center**

**ACC Participants Present (16)**

Kimberly McCune, PacifiCorp Energy  
 Frank Shrier, PacifiCorp Energy  
 Peggy Miller, WDFW  
 Adam Haspiel, US Forest Service  
 Erik Lesko, PacifiCorp Energy  
 Jeremiah Doyle, PacifiCorp Energy  
 Mark Ferraiolo, PacifiCorp  
 LouEllyn Jones, USFWS (via conference)  
 Jim Malinowski, Fish First (via conference)  
 David Hu, US Forest Service  
 Diana Gritten-MacDonald, Cowlitz PUD  
 Eric Kinne, WDFW  
 Aaron Roberts, WDFW  
 Jeff Breckel, LCFRB (via conference)

Dr. Robert Al-Chokhachy, USGS  
 Peter Mackinnon, BioMark

**Calendar:**

December 13, 2012	ACC Meeting	Merwin Hydro
January 10, 2013	ACC Meeting	Merwin Hydro

<b>Assignments from November 8, 2012 meeting</b>	
Haspiel: Gather more data from the Forest Service regarding the Crab Creek Acclimation Pond site to determine an expected EA timeline and report back to the ACC.	<b>Complete</b>
Shrier: Email 60% design to the ACC Acclimation Pond Subgroup for its review.	<b>Complete – 10/8/12</b>
Rose: Set up meeting with Acclimation Pond Subgroup to discuss 60% design and report back to the ACC.	<b>Complete – Scheduled for 12/6/12</b>
Al-Chokhachy: Provide description and photos of the PIT tag detection site to Haspiel (US Forest Service) as soon as possible for the required Special Use Permit relative to the <i>Development of New Information to Inform Fish Passage Decisions at the Yale and Merwin Hydro Projects</i> .	<b>In process as of 12/13/12</b>

<b>Assignments from September 13, 2012 meeting</b>	
Haspiel: Check on the Acclimation Pond temporary tanks, confirm tank removal date is May 31 <sup>st</sup> and check on the NEPA document and report back to Frank Shrier, PacifiCorp.	<b>Confirmed tank removal date is between 4/15 to 5/31. Wild &amp; Scenic is not going to be an issue.</b>
Shrier: Provide a picture of the Acclimation Pond paddle pump and send to Adam Haspiel at US Forest Service.	<b>Pumps idea tabled; will not pass Wild &amp; Scenic requirements</b>
Shrier/Lesko: Email NMFS re concerns with Pond 15 as temporary release site and use release into Lewis River at Pekins Ferry from January 2013 to August 2013.	<b>Conditionally complete as of 11/8/12; OK with NMFS but not in written form</b>

<b>Assignments from September 13, 2012 meeting</b>	
Kinne: H&S Supplementation Program – Determine location and installation method for screw trap placement in the lower river.	<b>In process as of 12/13/12</b>

<b>Assignments from January 12, 2012 meeting</b>	
Coordinate a summer tour of the Swift Downstream Collector Construction for the Cowlitz tribal council. (One month delay was recommended. Shannon Wills to confirm with Tribe leadership). <i>June 2012: Frank Shrier added that it might be easier, and better for access, to wait until the trestle has been floated down.</i>	<b>Pending as of 12/13/12– Shrier will update Wills on the best timing for the tour. Likely Spring 2013</b>

<b>Assignments from March 8, 2012 meeting</b>	
Murdock - indicated that she will email literature to Shrier regarding Yakama Nation acclimation reports. <i>November 2012: Shrier is still awaiting information.</i>	<b>Status</b> <b>Pending as of 11/8/12</b>
Kinne - will get some information for the ACC on the White River acclimation and any other information his agency might have.	<b>As of 11/8/12 cannot find the information needed, per Kinne.</b>

### **Opening, Review of Agenda and Meeting Notes**

Frank Shrier (PacifiCorp) called the meeting to order @ 9:05 a.m. Shrier requested all attendees identify themselves for the benefit of all attendees on the conference call. The ACC reviewed the agenda and no new topics were added, however, the presentation by Dr. Robert Al-Chokhachy will be presented earlier as he has other matters to address on the Lewis River. The pending assignments were reviewed and updated and will be reflected in the meeting notes.

The October 11, 2012 meeting notes were reviewed and approved at 9:20am to include those submitted via email by Peggy Miller (WDFW).

Kim McCune (PacifiCorp) will finalize the October 11, 2012 meeting notes for posting to the Lewis River website.

### **Acclimation Pond Subgroup Update**

Adam Haspiel (US Forest Service) informed the ACC attendees that there is a cultural resource issue with the Crab Creek site, may require excavation that cannot be done until Spring 2013. Timing has become a bigger issue which affects the ability to complete the environmental assessment (EA) followed by acclimation pond construction.

Shrier provided a cursory historical update of previous ideas/plans for the Crab Creek Acclimation Pond site. The original plan was to use a temporary tank on the bench next to the FS 90 Road and tap into Crab Creek for water. Hydrologists determined that there is not enough flow in late May to mid-June, and the Forest Service did not want to take more than ½ of the water, so the idea was scrapped. An in-stream idea was presented but it was scrapped due to the Wild & Scenic designation, which led us back to the temporary tank idea as long as we did not exceed 50% water take. If we get near the 50% threshold we will release the fish. This method would cut the rearing period so we would release the fish sooner. Regardless, the fish must be released and the tank removed by May 31<sup>st</sup>.

Shrier also informed the ACC attendees that he received a voicemail message from Diana Perez (US Forest Service) and the message was very clear... the Forest service would not be able to respond in the time frame needed to allow for construction during summer 2013. Haspiel expressed that the concern for not being able to complete the Crab Creek site in 2013 was a fair assessment. Haspiel further stated that other NEPA projects are ahead of the Crab Creek acclimation pond requirements. There is also an issue with botany and getting all the reports written up. Given this new information, Crab Creek will not likely be complete in 2013 as originally planned. Shrier communicated that the construction would then be delayed to 2014, followed by first production in 2015.

Peggy Miller (WDFW) asked if covering the site with gravel rather than excavating could be considered to remove the need for intense archeological surveys. Haspiel informed the ACC attendees that lithic scatter was discovered at the site so there is a potential for cultural concerns. Haspiel said that he will gather more data from the Forest Service to determine an expected timeline and report back to the ACC.

In addition, the Forest Service is looking for NEPA cost reimbursement from ACC/PacifiCorp in the amount of \$10,000 - \$30,000. The low end is if cultural issues are minimal.

David Hu (US Forest Service) expressed that the Forest Service is working hard to make this work. Certain things are out of their control.

Diana Gritten-MacDonald (Cowlitz PUD) asked Haspiel if after all this will the Forest Service say “no deal” to proceeding with the Crab Creek site. Haspiel said that with NEPA action there is a possibility. Haspiel further stated that the Forest Service will do all they can do to expedite.

Shrier said that 60% design is complete and he will email it to the ACC Acclimation Pond Subgroup for its review. Shrier will also contact Rose and request he schedule a meeting with the Subgroup to discuss the 60% design after the Thanksgiving holiday.

Miller asked that we keep moving ahead with the other two and proceed with the third site (Crab Creek) as fast as possible.

**The ACC consensus is that Crab Creek (3<sup>rd</sup> site) will likely be delayed until 2014 for construction. The site is on its own path and its own NEPA. Another direct release into Crab Creek site will be required in fall 2013.**

**The ACC further agreed that we are proceeding with 2013 construction for the Muddy and Clear Creek sites pending receipt of a FONSI from the GPNF and the remaining permits.**

#### **Development of New Information to Inform Fish Passage – Dr. Robert Al-Chokhachy**

Shrier introduced Dr. Robert Al-Chokhachy (USGS) who is presenting the attached PowerPoint ([Attachment A](#)), *Development of New Information to Inform Fish Passage Decisions at the Yale and Merwin Hydro Projects on the Lewis River* for ACC review.

Shrier informed the ACC attendees of the Settlement talks around the topic of fish passage at the Yale and Merwin hydro projects and that there was some disagreement. The Utilities had a paradigm shift during these talks and agreed to build all projects, but wanted to assess the anadromous fish potential of Merwin and Yale before construction of any passage project. Additionally, the Utilities established a fund (In Lieu Fund) to be dispensed in the case that stakeholders, after the anadromous habitat assessment was completed, found Merwin and Yale to be severely limiting in anadromous fish production potential. The Utilities were concerned about creating a sink and they wanted the opportunity to gather new information and study the production potential in Yale and Merwin to determine if indeed we can see success if we put fish up there. Therefore, the Settlement Agreement Article 4.1.9 ‘Development of New Information to Inform Fish Passage’ was established, and has become a 3-year study which will be submitted to the Services by December 2016. The Services must decide by June 2017 if we continue the progress towards fish passage at Yale and Merwin.

Al-Chokhachy addressed project objectives and task-by-task description of methods and timelines for task completion and potential for success. Field data will be used to assess feasibility of fish passage and to identify current data gaps. Annual reports will be provided to the ACC. The scope of the project will include:

- Review information regarding fish transport into Lake Merwin and Yale Lake
- Habitat assessment of tributaries to Yale Lake and Lake Merwin
- Assessment of adult potential for spawning success
- Assess juvenile production potential and emigration success
- Evaluation of Lake Merwin predator impacts
- Assess anadromous/resident interactions

Please see [Attachment A](#) for further detail.

Al-Chokhachy indicated that all tributaries that have adequate flow during the low flow period will be evaluated to quantify potential for passage over barriers including plunge pool depth and

jumping threshold. Thalweg profiles will be measured and general review of previous tributary information will be performed to verify present conditions.

Haspiel asked that Al-Chokhachy provide description and photos of the PIT tag detection site as soon as possible for the required Special Use Permit.

LouEllyn Jones (USFWS) inquired if a Section 10 permit would be required. Shrier said that Clear Creek is being used for the PIT tag detector which is not bull trout habitat so likely a Section 10 is not an issue. In addition, Settlement Agreement required activities were covered in the respective BiOps from NMFS and USFWS.

<Break 10:15am>

<Reconvene 10:30am>

### **Aquatic Fund Pre-proposal Review**

Shrier provided a cursory review of the ACC/Utilities Evaluation Matrix ([Attachment B](#)) and informed the ACC attendees of the following review, comment, selection and approval process timeline for full proposals:

<b>Activity</b>	<b>Actual Date</b>
Submit Request For Pre-Proposal Forms	Early September - 9/5/12
Pre-Proposal Forms due	Early October – 10/5/12
Pre-Proposal Listing and Evaluation Report Submitted to ACC	Early November – 10/26/12
Pre-Proposal Report Comments due from ACC	Late November – reviewed with ACC on 11/8/12; <b>comments due 11/28/12</b>
Finalize List of Selected Projects for Additional Consideration	Early December – 12/13/12
Submit Request For Proposals to Selected Applicants	Early December – 12/14 to 12/18/12
Proposals due	Mid January – 1/31/13
Proposal Evaluation Report Submitted to ACC (30 day review)	Mid February – 2/14/13

Kim McCune (PacifiCorp) provided the current balance of the Lewis River Aquatic Funds (7.5 - Resource and Bull Trout), see [Attachment C](#).

### **Study Updates**

#### **Hatchery & Supplementation (H&S) Program**

Erik Lesko (PacifiCorp) informed the ACC attendees that the next HS subgroup meeting is Friday, November 16, 2012 from 9AM to Noon. The location is tentatively planned for WDFW office in Vancouver, WA. The primary task will be to review the draft 2013 Annual Operating Plan in hopes of getting this document finalized. A number of issues need to be discussed including screw trap siting in the lower river, steelhead run curve, how to deal with low hatchery adult returns and what to do with snout tagged steelhead captured during in-river netting among other things. Early coho transport to the upper basin is around 200 adults – well below the goal of 9,000.

### *Hatchery Upgrades -*

#### **Merwin Rearing Ponds**

Work is complete.

#### **Hatchery projects expected to be completed in 2013**

- Lewis River Hatchery – Modifications and structural support for the downstream intake.
- Merwin Hatchery – Upgrades to the PLC, metering and alarming at the ozone facility
- Speelyai Hatchery – Modifications to the intake structure
- Speelyai Hatchery – Conversion of Pond 14 to raceways

#### **Woodland Release Ponds**

Waiting on completion of Eulachon consultation between NMFS and FERC. The FERC approved the requested extension to December 26, 2013.

#### **M&E Plan Implementation**

Coho survey crews have been surveying their respective reaches in the upper Lewis River, and while not necessarily finding redds and carcasses, the data is providing insight into accessibility and available habitat that can be applied to efforts in 2013. Bull trout 2012 data collection is complete. Data analysis, and Annual Report and Plan writing is currently under way.

#### **Merwin Upstream Construction Status**

No issues; sorting building progressing.

#### **Swift Downstream Collector Construction Status**

On schedule and expected to be operational by December 26 2012; conducting a full test run for 7 days beginning on November 12, 2012. The week following the test R2 Resource, NMFS and WDFW will be on site to conduct a flow evaluation (attraction flow, sweeping flow); evaluation takes about two 2 weeks.

#### **Yale Spillway Barrier Net**

Yale nets completed. Construction expected to be complete by end of November 2012.

*<12:10 p.m. meeting adjourned >*

#### **Agenda items for December 13, 2012**

- Review November 8, 2012 Meeting Notes
- Updates - Dr. Robert Al-Chokhachy, Development of New Information to inform fish passage decisions at Yale and Merwin
- Acclimation Pond/Crab Creek Update
- **Aquatic Fund Pre-proposal Selections (Decision required)**
- Study/Work Product Updates

#### **Public Comment**

None

## Next Scheduled Meetings

December 13, 2012	January 10, 2013
Merwin Hydro Control Center	Merwin Hydro Control Center
Ariel, WA	Ariel, WA
9:00 a.m. – 3:00pm	9:00 a.m. – 3:00pm

## Meeting Handouts & Attachments

- Notes from 10/11/12
- Agenda for 11/8/12
- 2012/2013 Aquatic Fund Pre-proposals and Comment Evaluation Matrix
- **Attachment A** – PowerPoint titled: Development of New Information to Inform Fish Passage Decisions at the Yale and Merwin Hydro Projects on the Lewis River, dated November 8, 2012
- **Attachment B** - Lewis River Aquatic Fund – Utilities and ACC Evaluation of 2012/2013 Project proposals, dated November 6, 2012
- **Attachment C** – Lewis River Aquatics Fund (Resource and Bull Trout) current balance as of 11/8/2012

# Development of New Information to Inform Fish Passage Decisions at the Yale and Merwin Hydro Projects on the Lewis River

Photo by R. Al-Chokhachy, USGS



Robert Al-Chokhachy (USGS)\*, Dave  
Beauchamp (UW)



# Outline

1. Project objectives
2. Task-by-task description of methods and timelines for task completion
3. Questions



# Scope of Work: project tasks

1. Review information regarding fish transport into Lake Merwin and Yale Lake
2. Habitat assessment of tributaries to Yale Lake and Lake Merwin
3. Assessment of adult potential for spawning success
4. Assess juvenile production potential and emigration success
5. Evaluation of Lake Merwin predator impacts
6. Assess anadromous/resident interactions

# Scope of Work: project tasks

- 1. Review information regarding fish transport into Lake Merwin and Yale Lake**
2. Habitat assessment of tributaries to Yale Lake and Lake Merwin
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# Task 1: Review information regarding fish transport into Lake Merwin and Yale Lake

- Methods
  - No fieldwork associated with this task
  - Assessment of existing data related to anadromous fish reintroductions
    - Literature review

# Task 1: Review information regarding fish transport into Lake Merwin and Yale Lake

- Assessment of existing data related to anadromous fish reintroductions: methods
  1. Upstream and downstream fish collection and transport
    1. Methodologies and efficiencies
    2. Potential impacts to target and other native species

# Task 1: Review information regarding fish transport into Lake Merwin and Yale Lake

- Assessment of existing data related to anadromous fish reintroductions: methods
  1. Upstream and downstream fish collection and transport
  2. Successful reintroductions
    1. Self-sustaining populations
    2. Viability
    3. Recreational and harvest potential
    4. Impacts to native fishes (e.g., bull trout)
    5. Impacts of existing native and non-native fishes on reintroduced populations

# Task 1: Review information regarding fish transport into Lake Merwin and Yale Lake

- Assessment of existing data related to anadromous fish reintroductions: methods
  1. Upstream and downstream fish collection and transport
  2. Successful reintroductions
  3. Identify current data gaps related to anadromous fish reintroductions

# Task 1: Review information regarding fish transport into Lake Merwin and Yale Lake

- Timeline:
  - Task initiation in December 2012
  - Final report submitted by September 30<sup>th</sup>, 2013



# Scope of Work: project tasks

1. Review information regarding fish transport into Lake Merwin and Yale Lake
- 2. Habitat assessment of tributaries to Yale Lake and Lake Merwin**
3. Assessment of adult potential for spawning success
4. Assess juvenile production potential and emigration success
5. Evaluation of Lake Merwin predator impacts
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# Task 2: Habitat assessment of tributaries to Yale Lake and Lake Merwin

- Objectives and methods
  1. Confirm existing fish barriers within tributaries
  2. Quantify flow and thermal regimes in tributaries
  3. Assess tributary habitat
  4. Assess riparian conditions
  5. Rerun EDT model with quantitative field-based measures of habitat

# Task 2: Habitat assessment of tributaries to Yale Lake and Lake Merwin

## 1. Confirm existing fish barriers within tributaries

- Methods:
  - Assess vertical jumping thresholds for anadromous species from literature
  - Field validate barriers in each tributary
    - » Measure height of potential barriers
    - » Geo reference barrier
  - Existing habitat and production potential

# Task 2: Habitat assessment of tributaries to Yale Lake and Lake Merwin

## 2. Quantify flow and thermal regimes in tributaries

- Methods:
  - Install pressure transducers at top and bottom of tributaries
  - Discharge and stream temperature regimes
    - » [Link to habitat assessments](#)



# Task 2: Habitat assessment of tributaries to Yale Lake and Lake Merwin


3. (and 4) Assess tributary habitat and riparian conditions
  - Methods:
    - Utilize existing habitat protocols within the PNW (CHaMP)
    - Comparable with other systems

# Channel unit attributes

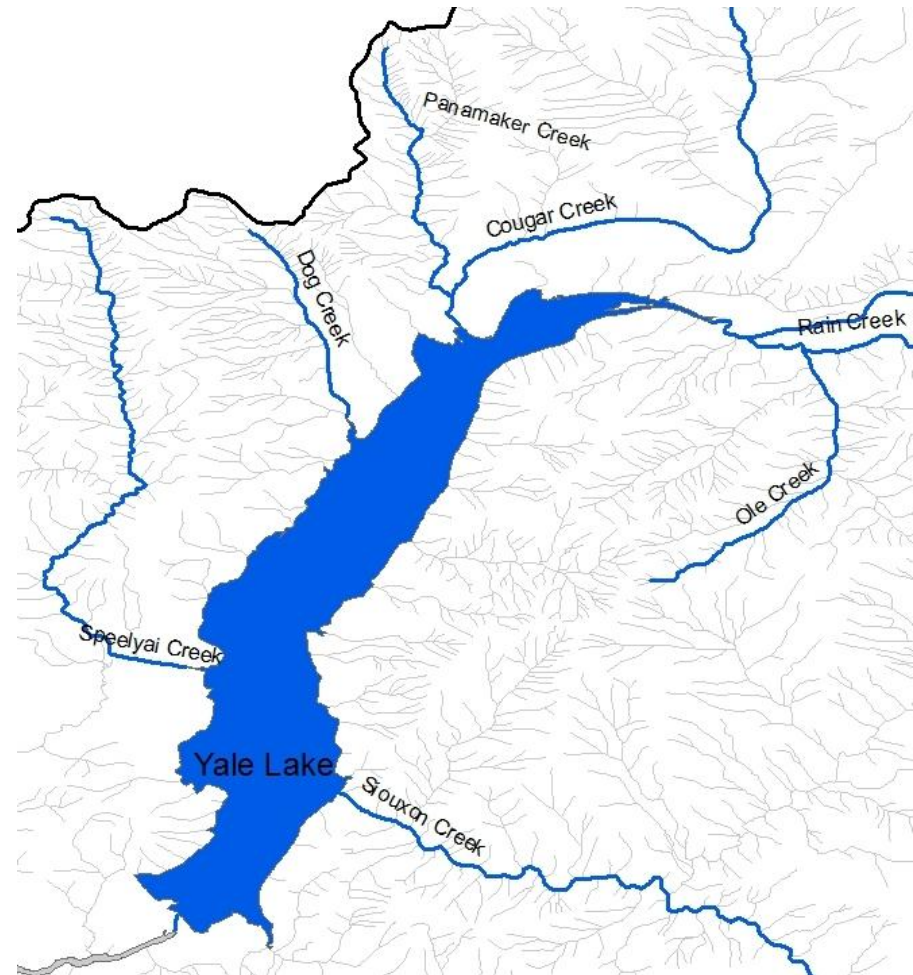
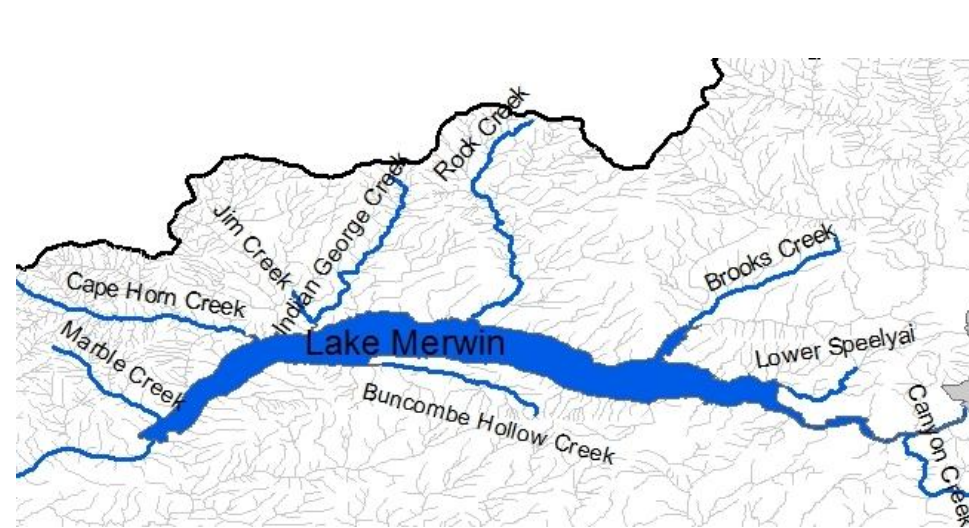
- Fish cover
- Ocular substrate composition
- Pebble counts
- Embeddedness
- LWD counts
- Channel complexity



# Topographic surveys

- Collection of (X,Y,Z) points relative to 2 known points
  - 500-1000 points/site
  - Points captured at grade breaks
- 
- DEM development to provide informative, accurate and precise information about channel topography
  - Link to stream gage information

# Task 2: Habitat assessment of tributaries to Yale Lake and Lake Merwin



- Study tributaries



# Task 2: Habitat assessment of tributaries to Yale Lake and Lake Merwin

## 5. Rerun EDT model

- Utilize inputs from empirical habitat data
- EDT modeling performed by Kevin Malone



# Task 2: Habitat assessment

- Timeline:
  - Fieldwork will begin in spring of 2013 and be completed by end of 2013
  - Habitat summarization completed by spring of 2014
  - EDT analyses will be completed by end of 2014

# Scope of Work: project tasks

1. Review information regarding fish transport into Lake Merwin and Yale Lake
2. Habitat assessment of tributaries to Yale Lake and Lake Merwin
- 3. Assessment of adult potential for spawning success in Yale and Merwin**
4. Assess juvenile production potential and emigration success
5. Evaluation of Lake Merwin predator impacts
6. Assess anadromous/resident interactions

# Task 3: Assessment of adult potential for spawning success

- Objectives and methods
  1. Evaluate the reproductive success
  2. Quantify ability of released adults to find suitable spawning sites and excavate and seed redds
  3. Quantify successful recruitment of juveniles to the system

# Task 3: Assessment of adult potential for spawning success: methods

## Methods

- Release a set of test adults into each reservoir
- Conduct comprehensive redd surveys within tributaries
  - Proportion successfully reproducing
  - Collect tissue samples for genetic analyses
  - Geo-reference redd locations

# Task 3: Assessment of adult potential for spawning success: methods

## Methods

- Subsequent years conduct YOY surveys for parentage analyses
- USFWS Fish Technology Center (Abernathy, WA)



# Task 3: Assessment of adult potential for spawning success: methods

- Timeline:
  - Potential adult releases to be conducted in 2013(?) and 2014
  - More efficient post habitat assessment
  - Parentage analyses to be completed in 2014 and 2015

# Scope of Work: project tasks

1. Review information regarding fish transport into Lake Merwin and Yale Lake
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- 4. Assess juvenile production potential and emigration success**
5. Evaluation of Lake Merwin predator impacts
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# Task 4: Assess juvenile production potential and emigration success

- Objectives and methods
  1. Determine emigration timing into Swift Reservoir for smolts
  2. Quantify relationships with streamflow, temperature, and interannual differences
  3. Quantify travel times and survival to collection facility
  4. Evaluate behavior near collection sites

# Task 4: Assess juvenile production potential and emigration success: methods

## 1. Determine emigration timing into Swift Reservoir for smolts

- Install a full duplex PIT-tag antennae in tributary to Swift (location TBD)
- Release PIT-tagged smolts in tributaries above antennae
- Integrate with screwtrap data for estimates of detection probability and migration timing

# Task 4: Assess juvenile production potential and emigration success: methods

2. Quantify relationships with streamflow, temperature, and interannual differences
  - Integrate migration data with streamflow and temperature data across years



# Task 4: Assess juvenile production potential and emigration success: methods

3. Quantify travel times and survival to collection facility
  - Integrate individual-specific data from PIT-tags, screw trap, and antennae at collection facility for estimates of travel times and survival



# Task 4: Assess juvenile production potential and emigration success: methods

## 3. Quantify travel times and survival to collection facility

- Integrate individual-specific data from PIT-tags, screw trap, and collection facility for estimates of travel times
- Survival in different phases (e.g., tributary, reservoir, etc.)
- Overall downstream survival



# Task 4: Assess juvenile production potential and emigration success: methods

3. Quantify travel times and survival to collection facility
  - PIT-tag juvenile wild fish in tributary (e.g., Clear Creek)
  - Survival comparisons with hatchery-reared fish



# Task 4: Assess juvenile production potential and emigration success: methods

4. Evaluate behavior near collection sites
  - Compliment PIT-tag data with radiotag data for assessments of variability of travel times
  - Habitat use near collection facility
  - Measures of collection efficiency

Swift  
Collection  
facility



# Task 4: Assess juvenile production potential and emigration success

- Timeline:
  - Full-duplex (FDX) PIT-tag antennae, streamflow, and stream temperature equipment will be installed in winter 2012-2013
  - Initial release of PIT-tagged smolts will begin in March-April 2013 and continue each year
  - Wild juvenile sampling will begin in 2013
  - Radiotelemetry fieldwork will begin in 2014



# Scope of Work: project tasks

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# Task 5: Evaluation of Lake Merwin predator impacts

## Objectives and methods

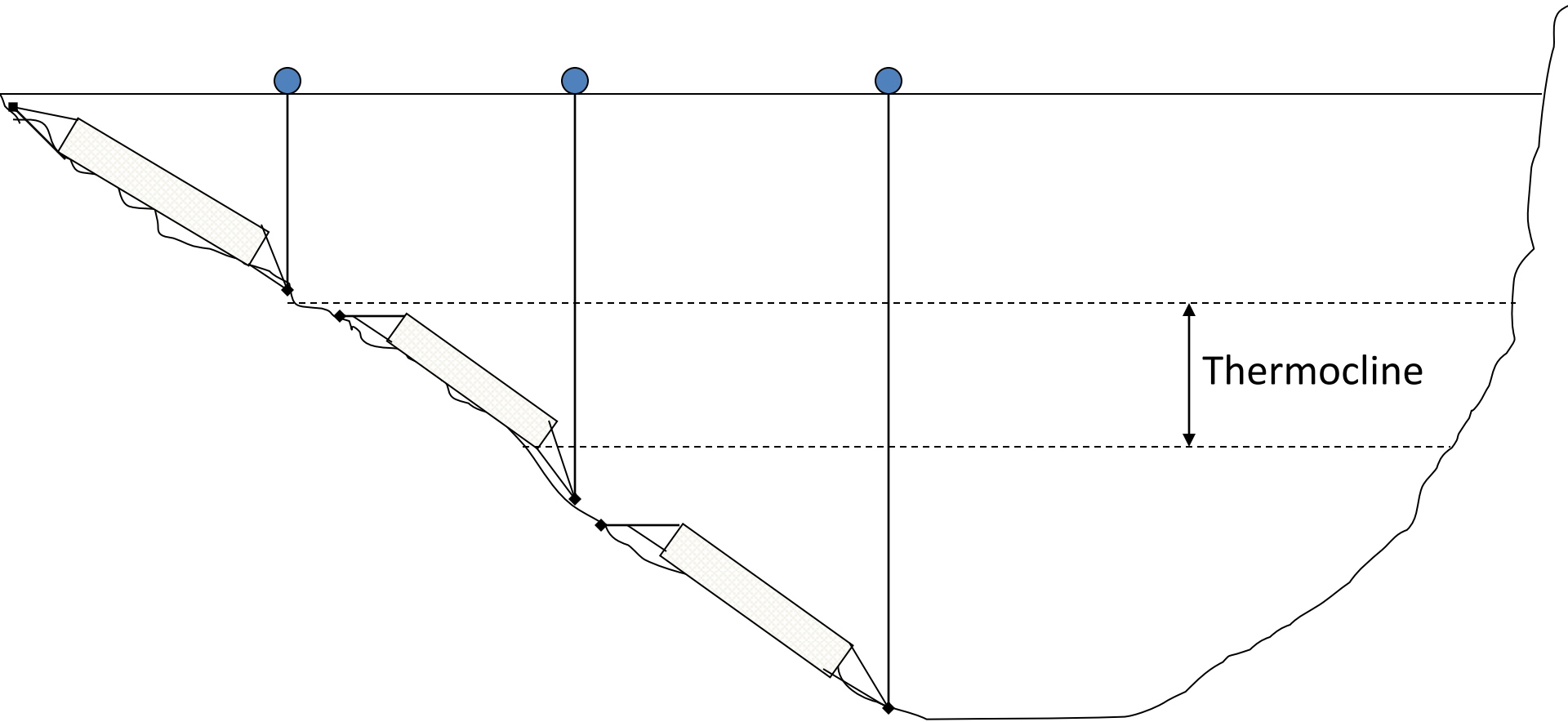
1. Estimate abundance and size structure of predators
2. Quantify predator-prey interactions and evaluate if predation will be a limiting factor for anadromous populations
3. Integrate information from foodweb and spatial and temporal distributions to direct predator control efforts, if needed

# Task 5: Evaluation of Lake Merwin predator impacts: methods

1. Estimate abundance and size structure of predators
  - Seasonal sampling
    - Short-set gill nets to avoid bull trout mortality
    - Variety of gill net sizes
    - Mesh sizes 2.5 – 17.5 cm stretch



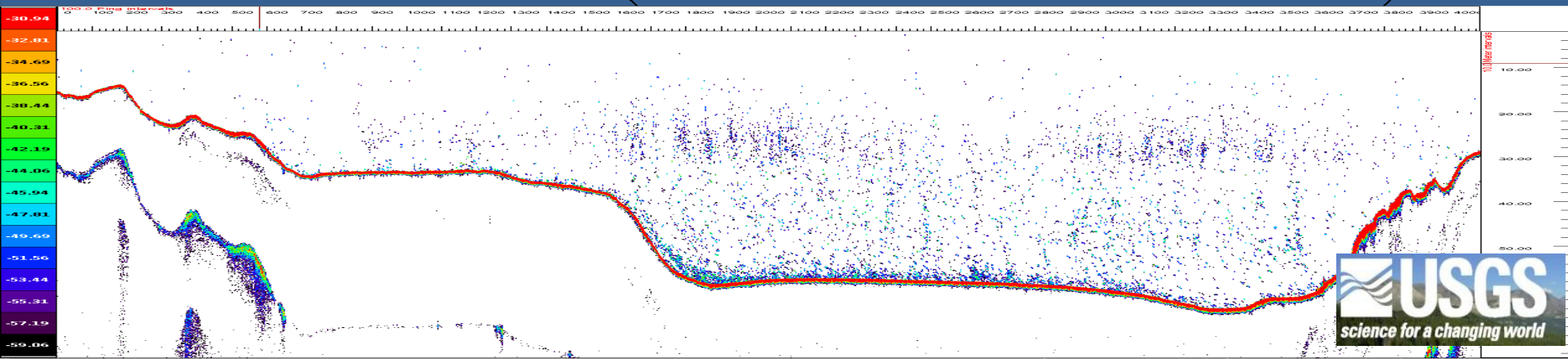
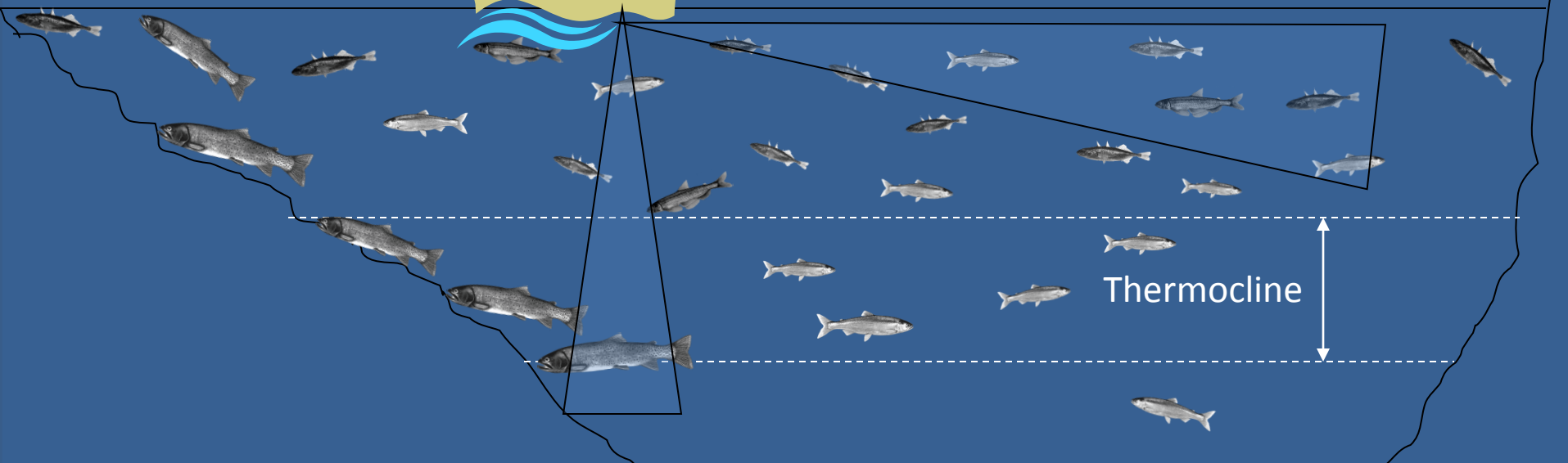
# Task 5: Evaluation of Lake Merwin predator impacts: methods



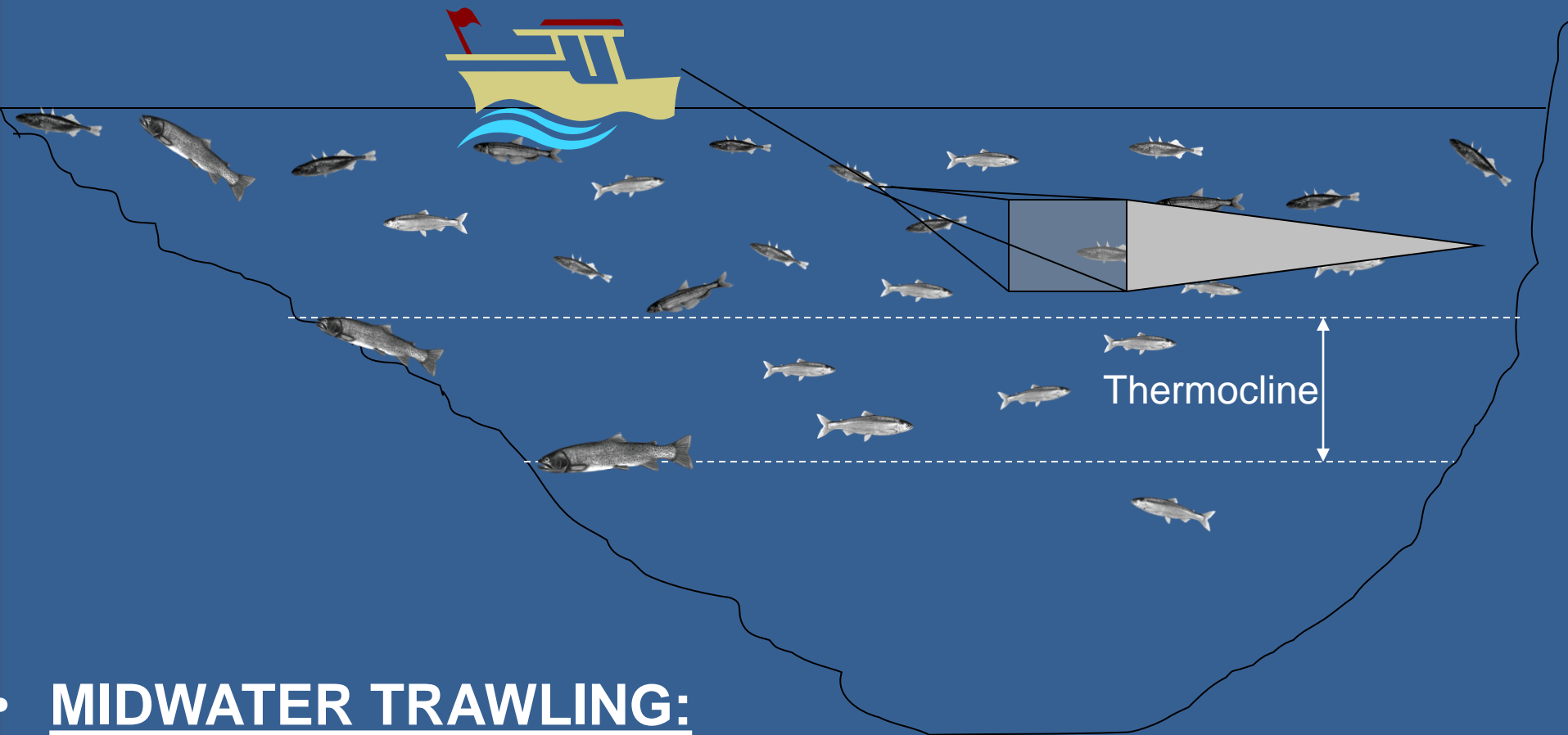
Depth-Stratified Sinking Gill Nets in Littoral and Slope Zones

# Task 5: Species distribution & abundance

- Hydroacoustics: to measure fish density & abundance:
  - For different size classes of fish
  - At each depth interval



# Task 5: Species distribution & abundance



## MIDWATER TRAWLING:

- Sample species composition by depth
- Size, growth, diet

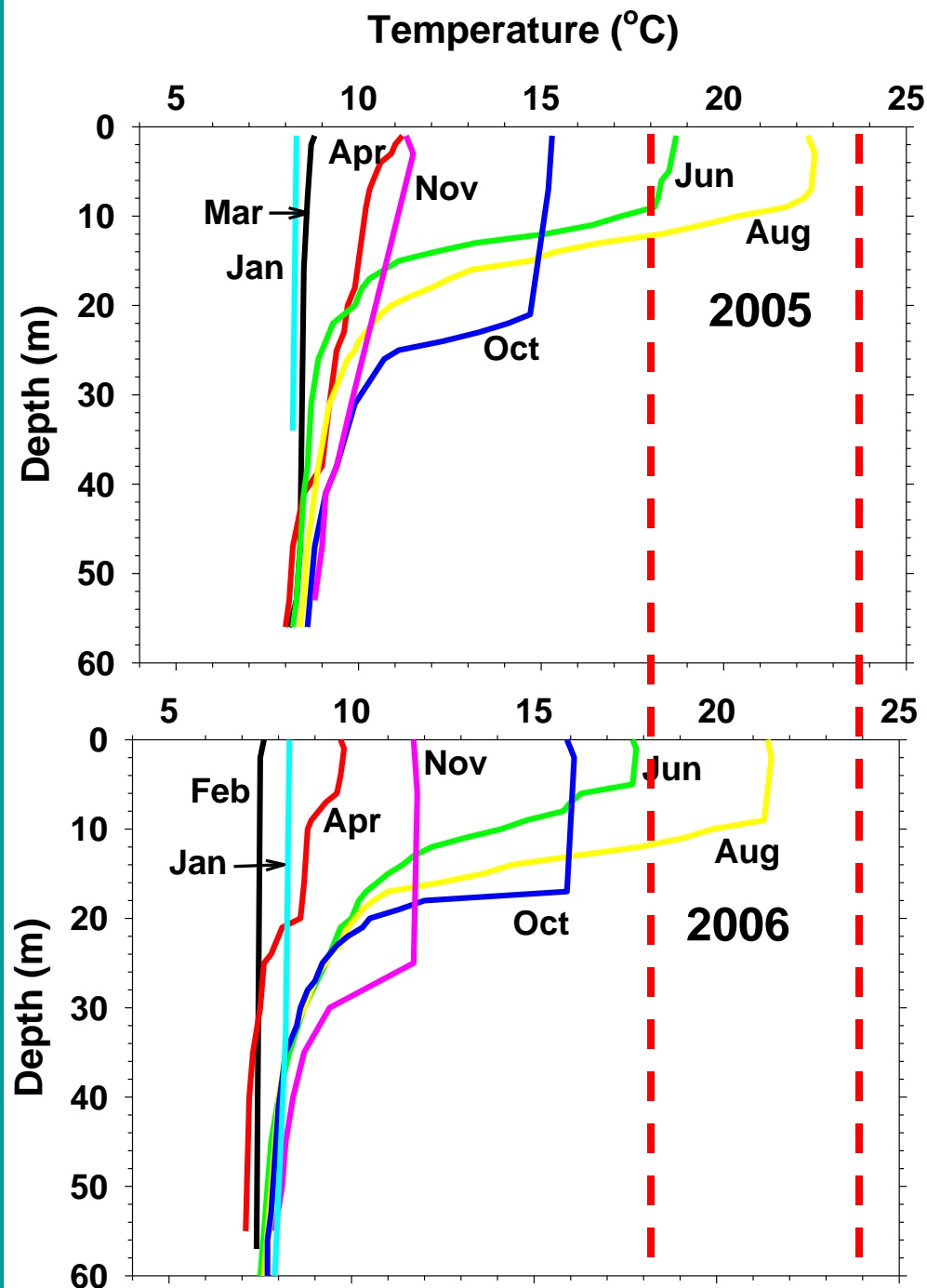
# Task 5: Thermal Environment

## Vertical temperature profiles structure:

- Depth Distributions
- Onshore-Offshore Distributions
- Affect Zooplankton & Benthic Prod.
- Separate OR Concentrate  
Predators & Prey  
Organisms & preferred habitat

## Warm surface waters during summer

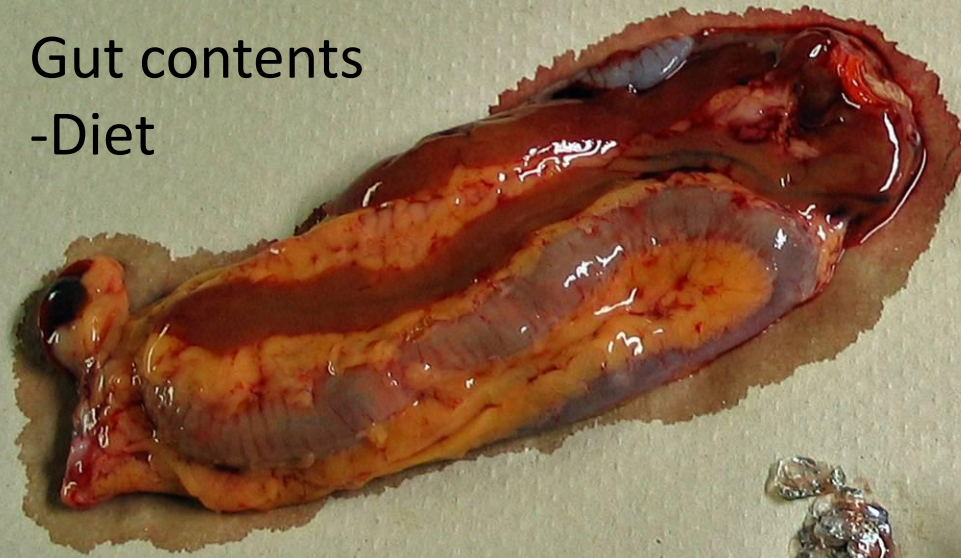
- Preclude Salmonids seasonally
- Epilimnion favorable to non-salmonids  
& higher zooplankton densities during  
summer



# Task 5: Biological and diet data

- Biological data
  - Size, age, growth, diet, energetic, trophic & reproductive status

Gut contents  
-Diet



Muscle tissue:  
-Stable isotopes

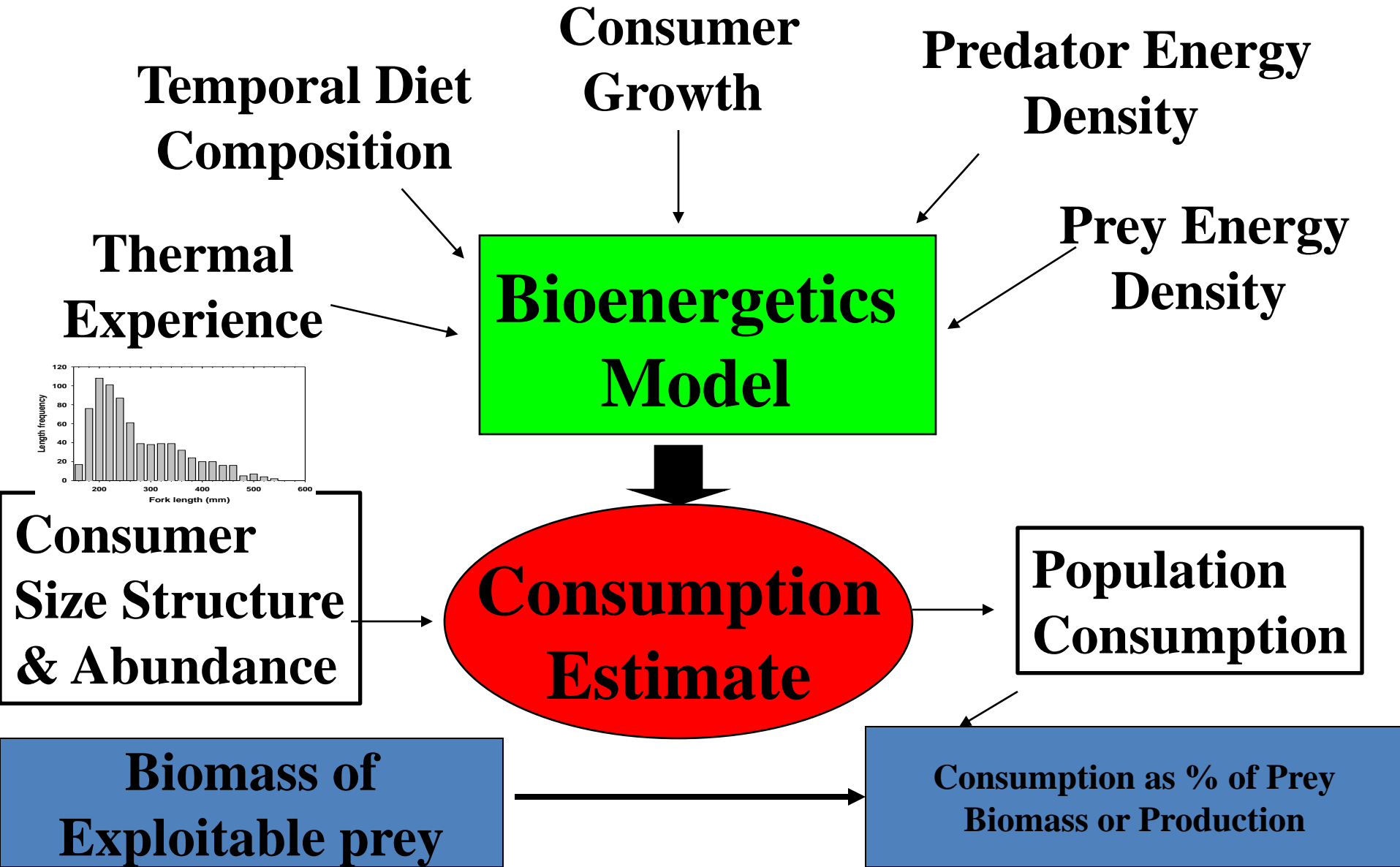


Scales & Otoliths:  
-Age & Back-calculate  
size-at-age





# Task 5: Lake Merwin predation potential



# Task 5: Evaluation of Lake Merwin predator impacts

- Timeline:
  - Reservoir sampling will begin in spring of 2013
  - Complete fieldwork in 2014
  - In early 2015, provide summary of potential predator impacts to anadromous species reintroduction success

# Scope of Work: project tasks

1. Review information regarding fish transport into Lake Merwin and Yale Lake
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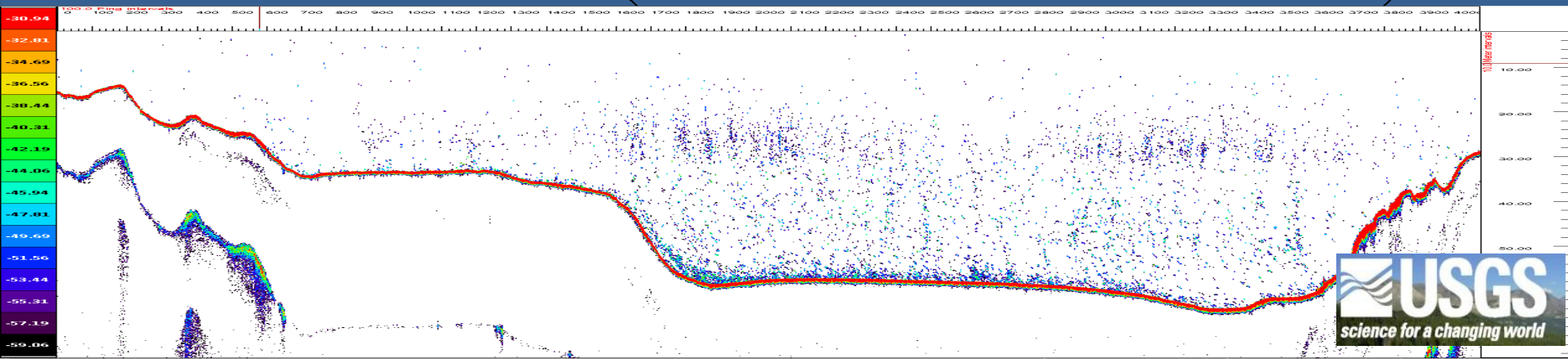
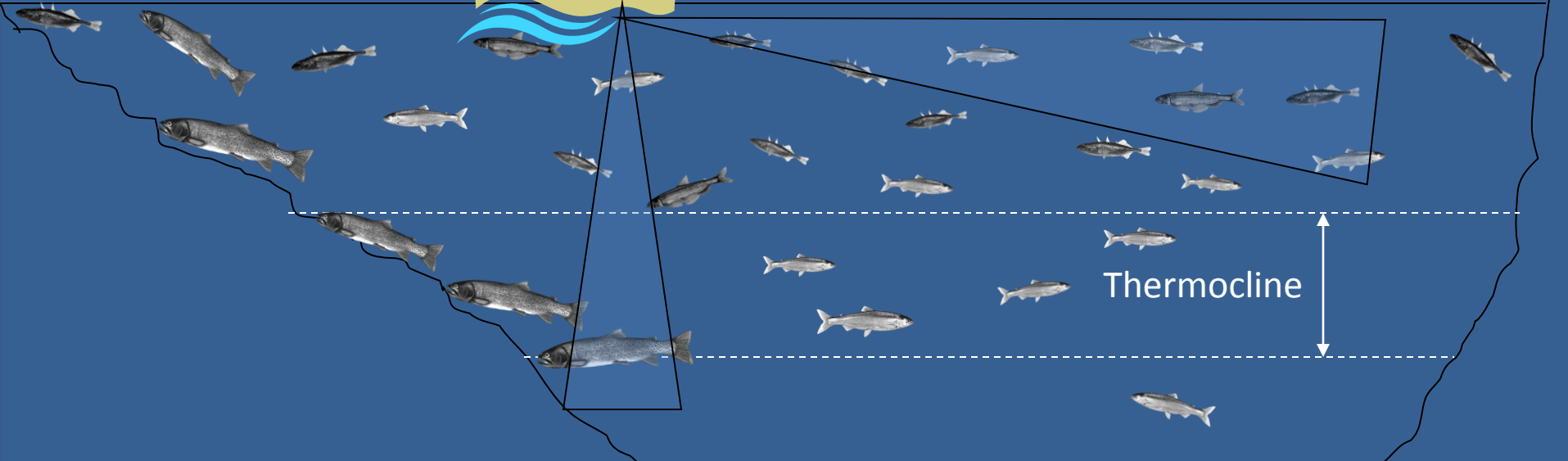
# Task 6: Assess anadromous/resident interactions

## Objectives and methods

1. Identify foodweb structure
2. Estimate predation potential and consumption of juvenile salmonids by species
3. Quantify existing and potential spatial overlap and habitat use across resident and anadromous species
4. Estimate potential competition among resident and anadromous salmonids

# Task 6: Food web and predation potential

- Hydroacoustics: to measure fish density & abundance:
  - Different seasons to capture smolt migration (Potential test smolts)



# Task 6: Assess anadromous/resident interactions: methods

3. Quantify existing and potential spatial overlap and habitat use across resident and anadromous species
- Reservoirs
    - Trawl, gillnet, and hydroacoustic data
  - Tributaries
    - Redd count data
    - Field sampling where species overlap
      - Across different seasons
      - Snorkeling and fish sampling



# Task 6: Assess anadromous/resident interactions

4. Estimate potential competition among resident and anadromous salmonids
  - Competition for forage
    - Reservoir and streams
      - Isotope sampling
        - Baseline data
          - Pre-anadromous reintroduction
  - Repeat sampling



# Task 6: Competition for food resources, food web structure

- Biological data
  - Size, age, growth, diet, energetic, trophic & reproductive status

Gut contents

-Diet



Muscle tissue:

- Stable isotopes
- Contaminants
- Genetics





# Task 6: Assess anadromous/resident interactions

- Timeline:
  - Reservoir work = 2013, 2014
  - Stream interactions will begin in 2013 and continue through 2015
  - Summary of anadromous/resident interactions by late 2015

# Questions



ACC						
Decision		Applicant	Project Title	WDFW	Fish First	LCFRB
	1	USDA Forest Service	Lewis River Side Channel near Little Creek			Project is located on a Tier 1 reach (Lewis 22) and a Tier 2 reach (Lewis 21). It would benefit a primary population (Spring Chinook) and 2 contributing populations (Coho, Winter Steelhead). Off-channel/side channel habitat is a high priority in the reach. To fully evaluate this project it is important to know if the side channels are currently functional and are they accessible year round or seasonally? In addition to providing greater habitat diversity, would large wood structures also enhance or maintain flows in the side channels? A diagram showing approximate structure locations and elaborating on the type, location and scale of expected habitat outcomes (sort gravel, provide juvenile rearing, etc...) should be included in a final proposal. A full description of existing habitat and the improvement resulting from this project would assist in evaluating this project. Project is dependent on LCFRB/SRFB funding (\$70,000 out of total value of \$164,000). While this project addresses primary populations and Tier 1 and Tier 2 reaches, further SRFB funding is not assured and depends upon the availability of funding and the benefits to fish, cost effectiveness, and certainty of success of a construction project relative to other project proposals under consideration. A decision by the LCFRB to recommend the project for funding would be made in August 2013 and a final SRFB funding decision would not be made until December 13. <b>Recommend this project move forward for final proposal.</b>
	2	USDA Forest Service	Muddy River Tributary near Hoo Hoo Bridge			This project is located on an untiered tributary stream to the Muddy River reach 2. Muddy River reach 2 is Tier 3 and has moderate value for Winter Steelhead and low value for Coho and Spring Chinook. The pre-proposal notes the presence of Coho. It may be reasonable to expect some usage by Coho and Winter Steelhead given the correction of a downstream passage barrier. The proposed project area appears to be upstream well above the tributary's confluence with the Muddy River, which makes the project's value in providing side-channel habitat for fish from the Muddy River somewhat questionable. Additionally, it appears from the pre-proposal that habitat may be functioning as is; therefore, there needs to be a full description of the current habitat conditions and the improvements in these conditions that will result from implementation of this project. A more complete description of existing stream in the project reach as well as watershed conditions is needed. The installation of 15 large wood structures (200 pieces of wood) over a mile of stream length is a fairly low density for wood placement. The final proposal should explain the rationale for the number of structures and provide a diagram showing approximate structure locations and elaborating on the type, location and scale of expected habitat outcomes. The project is not dependent on unsecured contributions from other sources. <b>Recommend this project move forward for final proposal.</b>
	3	USDA Forest Service	Little Creek Fish Habitat Restoration			Project is located on a Tier 3 reach (Little Creek) used principally by Coho and Winter Steelhead, both contributing populations. The project reach is adjacent to Lewis 22 (Tier 1) and Lewis 21 (Tier 2). In addition to Coho and Winter Steelhead the Lewis reaches are used by Spring Chinook, a primary population. Project would enhance 2,200 feet of Little Creek through the placement of approximately 20 large wood structures, each comprised of 8 to 10 pieces, thereby improving spawning and rearing habitat, particularly for Coho. The project would address stream channel habitat and bank stability, which are identified as high priority habitat needs in the LCFRB Habitat Strategy. A diagram showing approximate structure locations and elaborating on the type, location and scale of expected habitat outcomes should be included in a final proposal. The project cost seems reasonable. The project is not dependent on unsecured contributions from other sources. <b>Recommend this project move forward for final proposal.</b>
	4	USDA Forest Service	Survey of Bull Trout Stream habitat features to develop future habitat restoration projects			The LCFRB supports the development of a Bull Trout habitat strategy that assesses habitat needs and current conditions and identifies and prioritizes habitat restoration opportunities. A final proposal for this study needs to provide a clear plan to: 1) Identify and prioritize stream reaches; 2) Define Habitat Suitability Criteria; 3) Define the methodologies and protocols to be used in conducting the habitat surveys; and 4) Implement the survey and habitat strategy development, including identification of tasks, a schedule, management structure and partner responsibilities, needed skills and qualifications, and a detailed budget. The final proposal should provide additional information on which streams are being surveyed and what criteria was used to select these streams. Additionally, it will be important to describe how people conducting this work will be trained to collect the data necessary to guide future habitat restoration projects. Finally, we have concerns that the cost estimate may not be adequate to fully analyze the information resulting from this project. <b>Recommend this project move forward for final proposal.</b>

ACC					
Decision	Applicant	Project Title	WDFW	Fish First	LCFRB
5	Lower Columbia Regional Fisheries Enhancement Group	Cedar Creek Reach 1A Restoration			Project objectives and description are consistent with the SRFB application. The SRFB grant is pending at this time. While there is a high likelihood that the project will be funded, the SRFB will not make a final decision until December 2012. SFRB application estimates wood cost at \$53,000, but \$60,000 are being requested in this proposal. Funding for wood is being requested in the event adequate donated wood from PacifiCorp is not available. When will it be known whether sufficient donated wood is available? Should the grant funds for wood be contingent on donated wood not being available? Concerns about impacts to lamprey were discussed as part of the SRFB grant process and conducting lamprey monitoring is a condition of the SRFB grant; therefore, funding of lamprey monitoring through this ACC grant appears to be questionable. Project would benefit primary populations (Bright Fall Chinook, Chum) and contributing populations (Coho, Winter Steelhead). Given their relatively short tributary residence time, the project will provide limited rearing habitat for juvenile Chinook and chum. Cedar Creek Reach 1A is a Tier 3 reach. The LCFRB believes that the value of restoration in this reach would be the enhancement of off-channel habitat for the mainstem North Fork Lewis Reach 7A, which is a Tier 1 reach. <b>Recommend this project move forward for final proposal.</b>
6	Lower Columbia Regional Fisheries Enhancement Group	Eagle Island North Channel Restoration			Project is located on a Tier 1 reach and would benefit primary populations (Bright Fall Chinook, Spring Chinook, and Chum) and contributing populations (Coho, Winter and Summer Steelhead). Given its significance particularly to Fall Bright Chinook, maintenance of flows in the north channel is a high priority. Key limiting factors are flood plain function, channel migration processes and side channel habitat. Design work for this project has not been completed. The preliminary design report is scheduled to be completed in February 2013. Is this work on schedule and will the report be available in time to aid the ACC in evaluating the project proposal? The LCFRB/SFRB has provided design funding for this project, but no SRFB funding has been approved for construction at this time. Construction funds could be approved in December of 2013 at the earliest. While this project addresses primary populations and a Tier 1 reach, further SRFB funding is not assured and depends upon the availability of funding and the benefits to fish, cost effectiveness, and certainty of success of a construction project relative to other project proposals under consideration. Project designs will be needed to evaluate investing ACC grant funds in this project; therefore, <b>unless a preliminary design is provided to the ACC as part of the final proposal this project should be deferred until the next funding cycle.</b>

Yakama Nation	USFS	Cowlitz Indian Tribe	USFWS	Utilities	Next Step
	<p>Please expand on project need and current fish usage; Please explain why helicopter needed (vs ground based/use of current abandoned road); Please clarify what scenario is if SRFB helicopter costs are not received; Please show map of proposed structure locations (eg zoomed aerial map with asterisks or symbols where log placement); Please describe more on “opportunity to treat invasives”; Recommend describing how fits into and contributes to Forest restoration plans; <b>Proceed to full proposal</b></p>				
	<p>Please expand on project need and current fish usage; Please show map of proposed structure locations (eg zoomed aerial map with asterisks or symbols where log placement); Like the invasive plant treatment elements and consider as an appropriate riparian treatment; Recommend describing how fits into and contributes to Forest restoration plans; <b>Proceed to full proposal</b></p>				
	<p>Please expand on project need and current fish usage; Like the invasive treatment as part of appropriate stewardship; Recommend describing how fits into and contributes to Forest restoration plans; <b>Proceed to full proposal</b></p>				
	<p>Believe project is intended to inventory and characterize reference “bull trout used” reaches and develop quantitative inferences that can be applied to infer upon other streams that are not currently used by bull trout. This information would help transcend current Lewis ACC bull trout impasse; Not sure this will lead to prioritized restoration opportunities, but will help steer ACC group towards target “bull trout habitat elements” beyond temperature that could be used to develop restoration opportunities upon; Like the integrated WDFW/USFWS/USFS</p>				

Yakama Nation	USFS	Cowlitz Indian Tribe	USFWS	Utilities	Next Step
	<p>Please expand on project need and current fish usage...esp for bed re-configuration; Please show map of more specific proposed structure/treatment locations (eg zoomed aerial map with asterisks or symbols where log placement); Remaining concern and caution over altering mainstem Lewis system; <b>Proceed to full proposal</b></p>				
	<p>Like project; Like and encourage the incorporation of and consideration for neglected Lamprey species; <b>Proceed to full proposal</b></p>				

Lewis River Aquatic Fund - Utilities' Evaluation of 2012/2013 Project Proposals											
No.	Applicant	Project Title	Project Schedule	Benefit	Bull Trout	Project Partners	Funding	Cost Share?	Consistency with Fund Objectives	Utilities selected for Full-Proposal-Y or N	Comments - Utilities
1	USDA Forest Service	Lewis River Side Channel near Little Creek	2013 - 2015	This project will place 25 large wood structures in two side channels in the LR near the Little Creek confluence to maximize summer and winter rearing habitat for coho and spring Chinook salmon, winter steelhead and bull trout.	Yes	Gifford Pinchot National Forest, Mt. St. Helens Institute, LCFRB, Cowlitz Indian Tribe	\$ 52,000.00	Yes	1 Benefit Recovery Y 2 Support reintro. Y 3 Enhance habitat Y	Y	FS: Bull trout benefit uncertain. As far as we know there have been very few bull trout documented in the area of Little Creek. There were no signs of bull trout use when surveyed on October 11, 2012; however, there is prime spawning habitat in the lower reaches with plenty of braided channels and cover from LWD. Water temperatures are still uncertain for suitability. Coho should benefit. No ACC \$\$ for weed control. Only concern is channel movement in large flood plain.
2	USDA Forest Service	Muddy River Tributary near Hoo Hoo Bridge	2014/2015	Restore one mile of fish habitat on tributary of Muddy River that crosses the 8322 road at Hoo Hoo Bridge. Place 200 pieces of LWD with root wads to create 15 structures, creating rearing pools to enhance juvenile salmonid rearing habitat. Coho is the main species to benefit.	No	Gifford Pinchot National Forest, Mt. St. Helens Institute	\$ 38,000.00	Yes	1 Benefit Recovery Y 2 Support reintro. Y 3 Enhance habitat Y	? (more information is needed)	Coho and steelhead may benefit. Coho would benefit so long as the structures do not wash out under high flow. Egg survival would be a much larger question during flood stage via sediment load. It may be beneficial to assess whether or not the tributary's confluence with the Muddy River is in stable/acceptable condition. If an alluvial fan is present or forming an elevation control structure (log jam/scour logs) could degrade the fan, promoting upstream travel during the low summer/early-fall flows. No ACC \$\$ for weed control. Is there any known spawning or rearing in this section? Benefits should be specified prior to selection for full proposal. More information is needed regarding documentation of anadromous fish.
3	USDA Forest Service	Little Creek Fish Habitat Restoration	2013 - 2015	Enhance 2,200 feet of Little Creek with instream LWD structures. Place 20 structures into stream bank by trench excavating and backfilling; provide excellent potential rearing and refugia habitats. FS will spot-treat noxious weeds; collect temperature readings to establish likelihood of bull trout use.	No	Gifford Pinchot National Forest, Mt. St. Helens Institute	\$ 69,000.00	Yes	1 Benefit Recovery Y 2 Support reintro. Y 3 Enhance habitat Y	Y	If bull trout used Little Creek for spawning there might be some benefit to them. This will likely be most beneficial to coho. J. Samagaio recently surveyed Little Creek to the confluence and discovered that the lower reach already supports enough LWD and prime spawning habitat for salmon, steelhead, and bull trout. I would encourage LWD placement in the mid to upper watershed of Little Creek to reduce flow for easy fish passage and increase potential spawning habitat (see James for pictures). The lower portion of the proposed restoration reach displays a wide array of bedforms. This array of bedform types brings with it a high diversity of sediment "patches" and flow regimes. Many of the sediment "patches" differ from one another as they display unique particle size distributions. This promotes spawning potential for multiple species. Caution should be had when altering the channel of the lower portions of the restoration reach. There appears to be ample opportunity for side channel enhancement within Little Creek. Velocity breaks in the mid to upper reaches of the restoration reach would benefit. No ACC \$\$ for weed control. Agree that LWD should be placed in areas where it may be insufficient (e.g., upstream of proposed work area) as noted by James. Also, the lower end appears to move around and current maps are incorrect based on foot surveys (pers. comm. Jason Shappart).
4	USDA Forest Service	Survey of Bull Trout stream habitat features to develop future habitat restoration projects	2013/2014	Survey Rush Creek, Pine Creek, Little Creek and other cold NF Lewis tributaries to locate functional bull trout habitat features, identify degraded reaches and prioritize habitat restoration and improvement opportunities. Report will form the basis of a strategy for bull trout habitat restoration in the Lewis River.	Yes	Mt. St. Helens Institute, WDFW, Cowlitz Indian Tribe	\$ 50,000.00	Yes	1 Benefit Recovery Y 2 Support reintro. N 3 Enhance habitat N	N	It seems like these water bodies have been repeatedly surveyed by USFS and other entities. It is difficult to see the opportunity to extend the knowledge base. As in the past the Utilities do not favor funding projects that do not directly enhance fish habitat. Rush Creek would be a challenge as high flows and potential fish barriers limit fish access. In addition, large boulders and bed rock do not offer much in terms of spawning habitat. Pine Creek may be more suitable for potential spawning habitat among Coho salmon, but no information has been recorded thus far. With disregard to temperature data, the knowledge base of Bull Trout in these water systems seem to be largely qualitative. The qualitative data holds little value when implementing habitat requirements in a restoration project. There is opportunity to characterize known Bull Trout spawning and rearing grounds in a strictly quantitative manner. These known Bull Trout spawning and rearing grounds could then be defined as "reference reaches". If the quantitative data is made dimensionless (or relative) one could then extrapolate the reference reach to another location by matching the key parameters during construction of a restoration project. This is regular practice in the field of stream restoration and should benefit the upper Lewis restoration program. No ACC funding for studies. If there is a need for these data then it could be beneficial, but it seems there is a wealth of information on bull trout habitat preferences already that could be applied here.
5	Lower Columbia Regional Fisheries Enhancement Group	Eagle Island North Channel Restoration	2013 - 2015	This project involves construction funding to implement enhancement work to re-configure channel beds at the upstream end of Eagle Island and possibly within upper portion of the north channel. If primary flow continues to shift the north channel could become too low to support juvenile salmon rearing during certain times of year.	No	SRFB, WDFW, Clark County, Cowlitz Indian Tribe, USAC, LCFRB, DNR, USFWS, PacifiCorp and NOAA	\$ 150,000.00	Yes	1 Benefit Recovery Y 2 Support reintro. Y 3 Enhance habitat Y	Y	This project has the potential to support other species besides fall Chinook if successful. The nature of the bedrock foundation in the North Channel adds a lot of uncertainty to the success of this project but the benefits outweigh the risks. Restoration that works against historic channel migration may not be successful over the long term (MacDonald ok but with reservation)
6	Lower Columbia Regional Fisheries Enhancement Group	Cedar Creek Reach 1A Restoration	2013 - 2015	Acquire and install LWD in 1,525 feet of lower Cedar Creek to increase spawning and rearing habitat for ESA listed chum, Chinook, coho and steelhead. Also, monitoring component for impacts of restoration on the Pacific lamprey population in lower Cedar Creek.	No	WDFW, USFWS, Clark County Public Works	\$ 75,000.00	Yes	1 Benefit Recovery Y 2 Support reintro. Y 3 Enhance habitat Y	Y	Restoration in the lower reaches of Cedar Creek should be an item of priority to aid ESA listed fish. Low flows have deterred salmon from accessing the upper reaches in past years. Multiple species should benefit. No Lamprey studies (MacDonald ok but with reservation).
							<b>Totals</b>	<b>\$ 434,000.00</b>			
							<b>Total non-bull trout Funds</b>	<b>\$ 263,000.00</b>			
							<b>Bull Trout Funds</b>	<b>\$ 102,000.00</b>			
							<b>Possible BT Funds</b>	<b>\$ 69,000.00</b>			
Fund Objectives:	1. Benefit fish recovery throughout the North Fork Lewis River, priority to federal ESA-listed species										
	2. Support the re-introduction of anadromous fish throughout the basin										
	3. Enhance fish habitat in the Lewis River Basin, with priority given to North Fork Lewis River										

**Lewis River License Implementation**  
**Lewis River Aquatics Fund - Resource Projects**  
**Sections 7.5, 7.5.1, 7.5.3, 7.5.3.1 & 7.7**

Funding Start Date: 4/30/05

Release Date	Funds Received	Expense	Interest	Balance	Notes
12/31/05	\$ 161,327.11			\$ 161,327.11	Contributions in 2004 dollars, adjusted for inflation
4/30/06	\$ 212,172.03				
9/30/06		\$ 46,000.00			Muddy River Tributary Road Decommission - USDA FS*
<b>12/31/06</b>			\$ 24,305.00	\$ 351,804.14	
4/30/07	\$ 164,776.65	\$ 80,000.00			Fish Passage Culvert Replacement - USDA FS*
8/23/07		\$ 79,000.00			2007 Dispersed Camping & Day Use Road Restoration - USDA FS*
9/6/07		\$ 75,000.00			2007 Aquatic Funding Enhancement Projects - Cowlitz Indian Tribe*
<b>12/31/07</b>			\$ 29,964.05	\$ 312,534.84	
4/30/08	\$ 225,723.71				
7/3/08		\$ 34,000.00			2008 Clear Creek Road Decommission - USDA FS
7/3/08		\$ 117,000.00			2008 Muddy River Habitat Improvement - USDA FS
10/2/08		\$ 43,500.00			2008 Mud Creek Enhancement - Cowlitz Indian Tribe*
<b>12/31/08</b>			\$ 19,538.55	\$ 363,297.10	
4/30/09	\$ 374,275.05				
8/20/09		\$ 190,000.00			2009 NF RM 13.5 Habitat Enhancement - LCFEG*
9/16/09		\$ 106,000.00			2009 Clear Creek Instream - USDA FS*
9/24/09		\$ 33,000.00			2009 Spencer Peak Road Decommission - USDA FS*
9/25/09		\$ 41,000.00			2009 Nutrient Enhancement Pine Creek - USDA FS*
<b>12/31/09</b>			\$ 16,279.44	\$ 383,851.59	
4/30/10	\$ 375,965.20				
12/22/10		\$ 50,000.00			2009 Plas Newydd RM 2.0 Off-Channel Habitat Enhancement - Cowlitz Indian Tribe
<b>12/31/10</b>			\$ 20,932.67	\$ 730,749.57	
1/11/11		\$ 41,300.00			2010 Pepper-Lewis Side Channel Instream Habitat Restoration - USDA FS
1/26/11		\$ 32,500.00			2010 Pine Creek Instream and Floodplain Structures for BT & Steelhead - USDA FS
4/30/11	\$ 382,749.82				
7/21/11		\$ 39,000.00			2011 Muddy River Side Channel Restoration - USDA FS
8/19/11		\$ 42,000.00			2011 Lewis River Side Channel Near Muddy River Instream Habitat Restoration - USDA FS
9/21/11	\$ 1,695.65				<b>2009 Pine Creek Nutrient Enhancement funds not used - USDA FS</b>
<b>12/31/11</b>			\$ 29,240.92	\$ 989,635.96	
3/23/12	\$ 1,161.06				<b>2007 Dispersed Camping &amp; Day Use Road Restoration funds not used - USDA FS</b>
4/30/12	\$ 391,012.52				
6/15/12	\$ 34,000.00				<b>2008 Clear Creek Road Decommission funds not used - USDA FS</b>
9/4/12		\$ 74,300.00			2010 Eagle Island Site A - Cowlitz Indian Tribe
10/1/12		\$ 85,000.00			2011 Eagle Island Sites B & C - Cowlitz Indian Tribe
		\$ 128,000.00			2012 Clearwater Creek Instream Habitat Restoration - USDA FS
		\$ 50,000.00			2012 Lewis River Side Channel III Instream Habitat Restoration - USDA FS
					<b>11/8/12 - Balance includes deduction of 2012 FS awards</b>
<b>Total Spent to Date:</b>			<b>\$ 1,386,600.00</b>		
<b>Balance Remaining:</b>			<b>\$ 1,078,509.54</b>		

\* Project close out complete

Note: In August 2009, the Bureau of Economic Analysis (BEA) restated the index numbers in Table 1.1.9 (Implicit Price Deflators for Gross Domestic Product). The index numbers are now based on 2005 = 100. This changes the beginning adjustment number for year 2000, quarter 3.



## Lewis River License Implementation

Lewis River Aquatics Fund - Bull Trout

Sections 7.5, 7.5.1, 7.5.3, 7.5.3.1 & 7.7

Funding Start Date: 4/30/05

Release Date	Funds Received	Expense	Interest	Balance	Notes
12/31/05	\$ 161,327.11			\$ 161,327.11	Contributions in 2004 dollars, adjusted for inflation
4/30/06	\$ 106,086.01				
11/30/06		\$ 37,889.08			Pine Creek Nutrient Enhancement - USDA FS*
<b>12/31/06</b>			\$ 19,176.61	<b>\$ 248,700.65</b>	
4/30/07	\$ 164,776.65	\$ 25,000.00			Pine Creek Instream & Floodplain Structures for Bull Trout and Steelhead - USDA FS
7/31/07		\$ 20,000.00			Rush Creek Gravel Restoration - USDA FS
8/21/07		\$ 43,150.00			2007 Pine Creek Nutrient Enhancement - USDA FS*
<b>12/31/07</b>			\$ 26,521.44	<b>\$ 351,848.59</b>	
4/30/08	\$ 112,861.86				
7/3/08		\$ 13,578.84			2008 Panamaker Crk. Rd Close & Culvert Removal - PacifiCorp*
<b>12/31/08</b>			\$ 21,406.20	<b>\$ 472,537.81</b>	
3/25/09	\$ 19,269.66				Return of funds: Rush Creek Gravel Restoration - USDA FS
3/31/09	\$ 23,493.72				Return of funds: Pine Creek Instream & Floodplain Structures for Bull Trout and Steelhead - USDA FS
<b>12/31/09</b>			\$ 16,674.20	<b>\$ 531,975.39</b>	
<b>12/31/10</b>			\$ 17,549.06	<b>\$ 549,524.45</b>	
1/26/11		\$ 32,500.00			2010 Pine Creek Instream and Floodplain Structures for Bull Trout & Steelhead
<b>12/31/11</b>			\$ 17,130.39	<b>\$ 534,154.84</b>	
<b>Total Spent to Date:</b>				<b>\$ 172,117.92</b>	
<b>Balance Remaining:</b>				<b>\$ 534,154.84</b>	

Note: In August 2009, the Bureau of Economic Analysis (BEA) restated the index numbers in Table 1.1.9 (Implicit Price Deflators for Gross Domestic Product). The index numbers are now based on 2005 = 100. This changes the beginning adjustment number for year 2000, quarter 3.