HIGH HEAD BYPASS – TRUCK TRANSPORT VS. BYPASS STUDY: YEAR 1 – PRELIMINARY RESULTS SUMMARY

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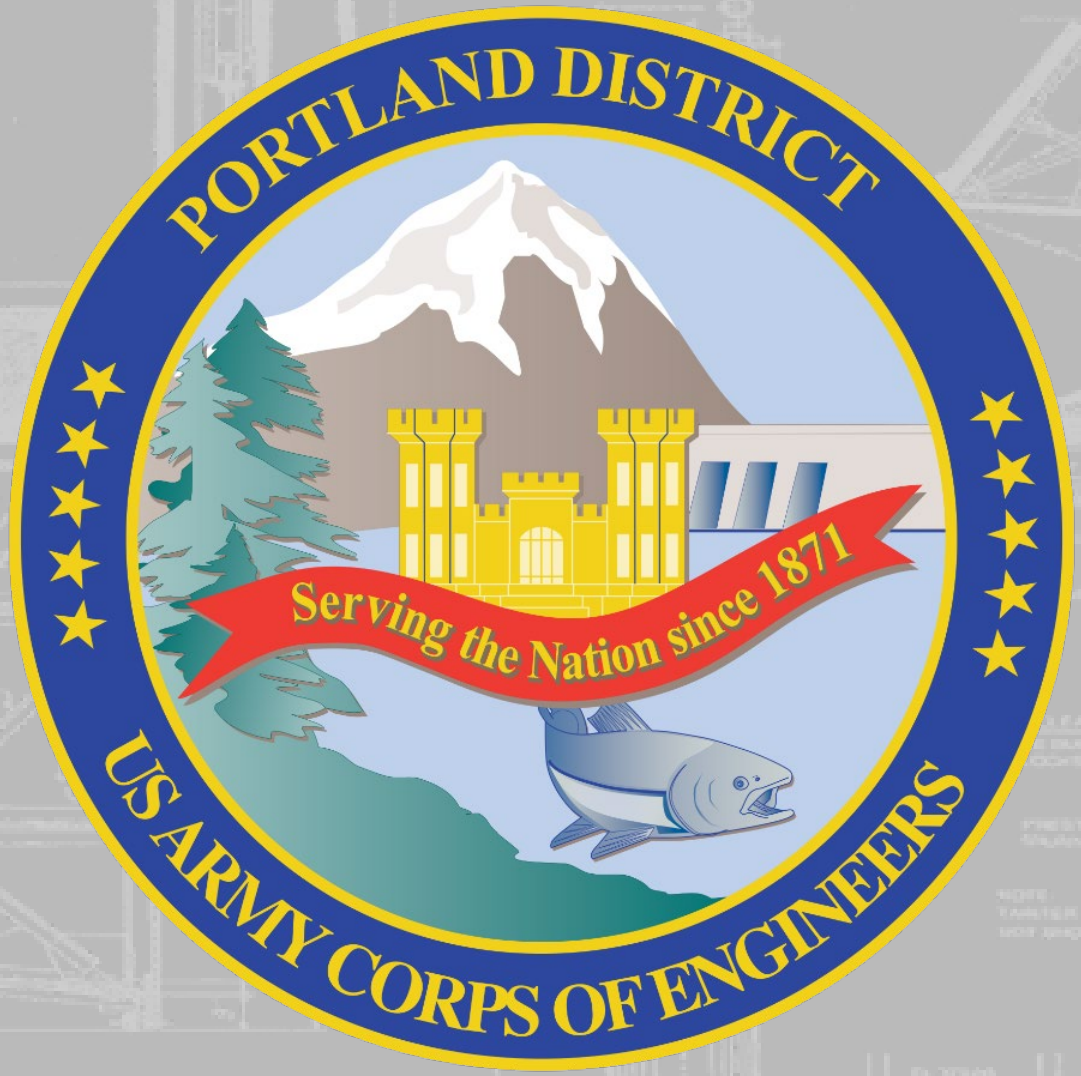
RME Update
23 July 2020



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ACKNOWLEDGEMENTS

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Study was conducted by Pacific Northwest National Laboratory.

- Principal Investigator/Study Lead: Stephanie Liss.
- Co-PI: James Hughes.
- Field Leads: Eric Fischer and Jarrod Ver Steeg.
- Many others (field, lab, data).

Collaboration with Oregon State University (study fish, cortisol analysis, peer review).

Project support from Foster Project staff (pipe installation, forklift operator, electrician, operations and general support).

OBJECTIVES OF THE YEAR 1 STUDY (FALL 2019)

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1. Conduct a feasibility study to evaluate fish stress and survival via truck transport (imitating the Cougar FSS trap and haul stressors) and bypass conveyances – fall 2019.
   - Can we do a full scale study with healthy and infected fish?

2. Healthy Fish Passage Evaluation.
   - Evaluate cortisol (a stress hormone) levels in fish during bypass and transport simulations.

3. Infected Fish Relocation Evaluation Feasibility Study.
   - Evaluate practicality of using copepod-infected fish for a full study of bypass pipe and transport simulations.

MITIGATION MEASURES FOR BYPASS PIPE AND TRANSPORT EVALUATIONS

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Not an exact 1:1 comparison → a laboratory study performed in the field.

– Logistical constraints:
  - FSS and pod.
  - Bypass pipe.

– Timing of transport:
  - Monorail, boat, and truck driving times.

– Specific mitigations measures:
  - Minimize disturbance to fish.
  - Minimal human contact once in holding tanks.
  - Acclimation to net presence.

– Collaborated with experts (OSU and others) to better understand stress physiology and response.

SIMULATIONS OF BYPASS AND TRUCK TRANSPORT

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Bypass Pipe Simulation

Real world	Simulation
1. --	1. Relocate fish
2. --	2. Acclimate (2wk)
3. Enter FSS	3. Pull pipe from tank to release fish
4. Chute passage from FSS into bypass pipe	4. Flex pipe from tank to bypass pipe
5. Bypass pipe passage	5. Bypass pipe passage
6. Release into river	6. Release into fish collector Blood sampling

Transport Simulation

Real world	Simulation
1. --	1. Relocate fish
2. --	2. Acclimate (2wk)
3. Enter FSS	3. Forklift tank
4. Passage from FSS to pod	4. Pipe from tank to pod
5. Pod holding	5. Pod holding
6. Floating lid, monorail trip	6. Floating lid, forklift driving
7. Crane lifts pod onto boat	7. Forklift lifts pod to truck
8. Boat driving	8. Truck driving
9. Pod from boat to truck	9. Forklift R&R pod on truck
10. Truck transport	10. Truck transport
11. Pipe attached to pod, fish released into river	11. Flex hose from pod to release fish to collector Blood sampling

BLOOD AND PLASMA SAMPLING FOR CORTISOL

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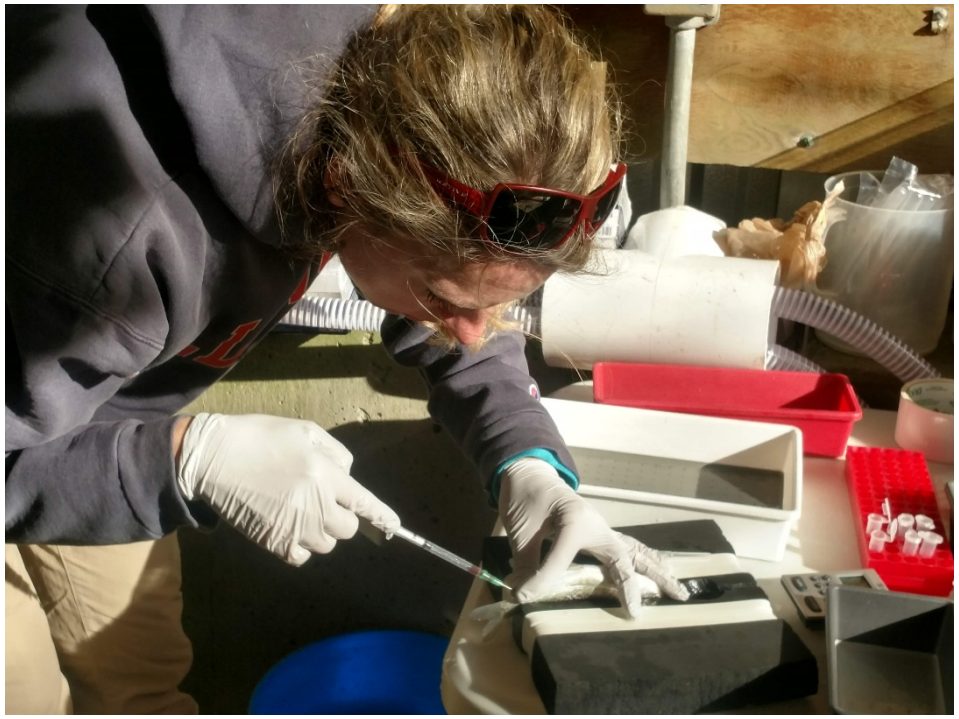

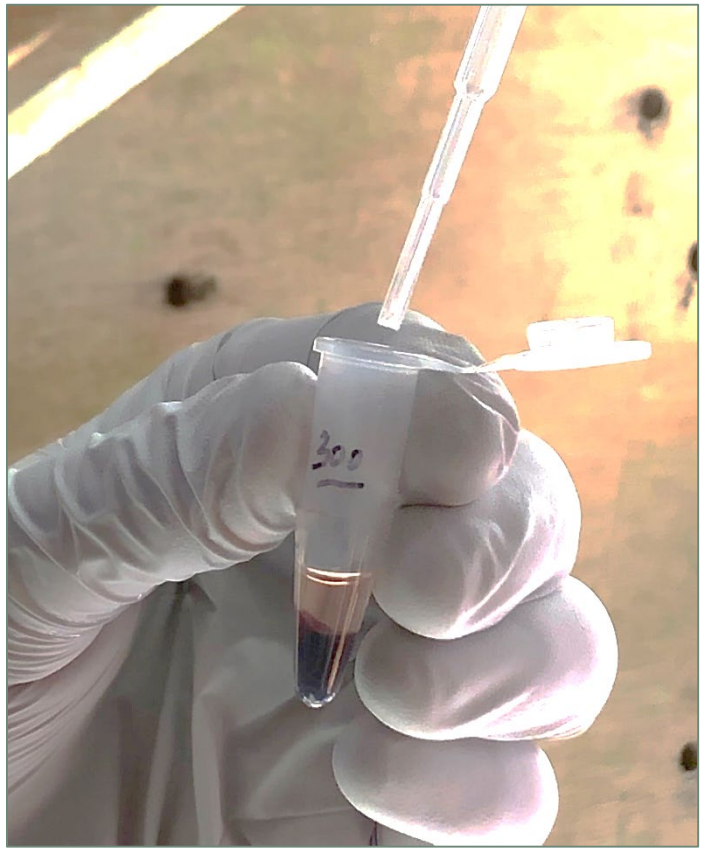

PRELIMINARY RESULTS

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1. Conduct a feasibility study – fall 2019:
   - Can we do a full scale study with healthy and infected fish?
   - **Yes.** The results informed it is feasible to conduct a full scale study with healthy and infected fish to evaluate truck transport (imitating the Cougar FSS trap and haul stressors) and bypass conveyances.

2. Healthy Fish Passage Evaluation:
   - All test fish were stressed for all treatments – bypass pipe and truck transport.
   - Highest levels of stress occurred during 0-1 hr. post treatment.
   - Stress levels began declining between 3-6 hrs. and all fish were nearing recovery by 24 hr.
   - Bypass pipe and 1 hr. holding (pre-transport) had similar levels of stress and recovered similarly.
   - 12- and 24 hr. holding (pre-transport) had higher levels of stress than bypass and 1 hr. holding (pre-transport).
     - Recovered similarly to the bypass and 1 hr. holding fish by 24 hrs.
   - **Key note:** this test may indicate the longer fish are held in a facility (pod) prior to transport and release, the more stressful it will be for fish.

     - **<u>These results are preliminary and subject to change.</u>**

PRELIMINARY RESULTS

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3. Infected Fish Relocation Evaluation Feasibility Study:
   - Evaluate practicality of using copepod-infected fish for a full study of bypass pipe.

- **Yes.** The results informed we can transport and test infected fish.
  - It is feasible to conduct a full scale study with healthy and infected fish to evaluate truck transport and bypass conveyances.

❖ **<u>These results are preliminary and subject to change.</u>**

NEXT STEPS

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– Year 2 Truck Transport vs Bypass conveyances study planned for this fall with healthy and copepod infected fish.

– The PDT is wrapping up the EDR for a potential bypass at Cougar Dam.

QUESTIONS

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