

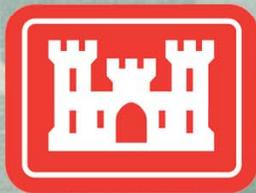


Adult Pacific Lamprey Passage at Mainstem Columbia and Snake River Dams: *An Overview of Efforts by the U.S. Army Corps of Engineers*

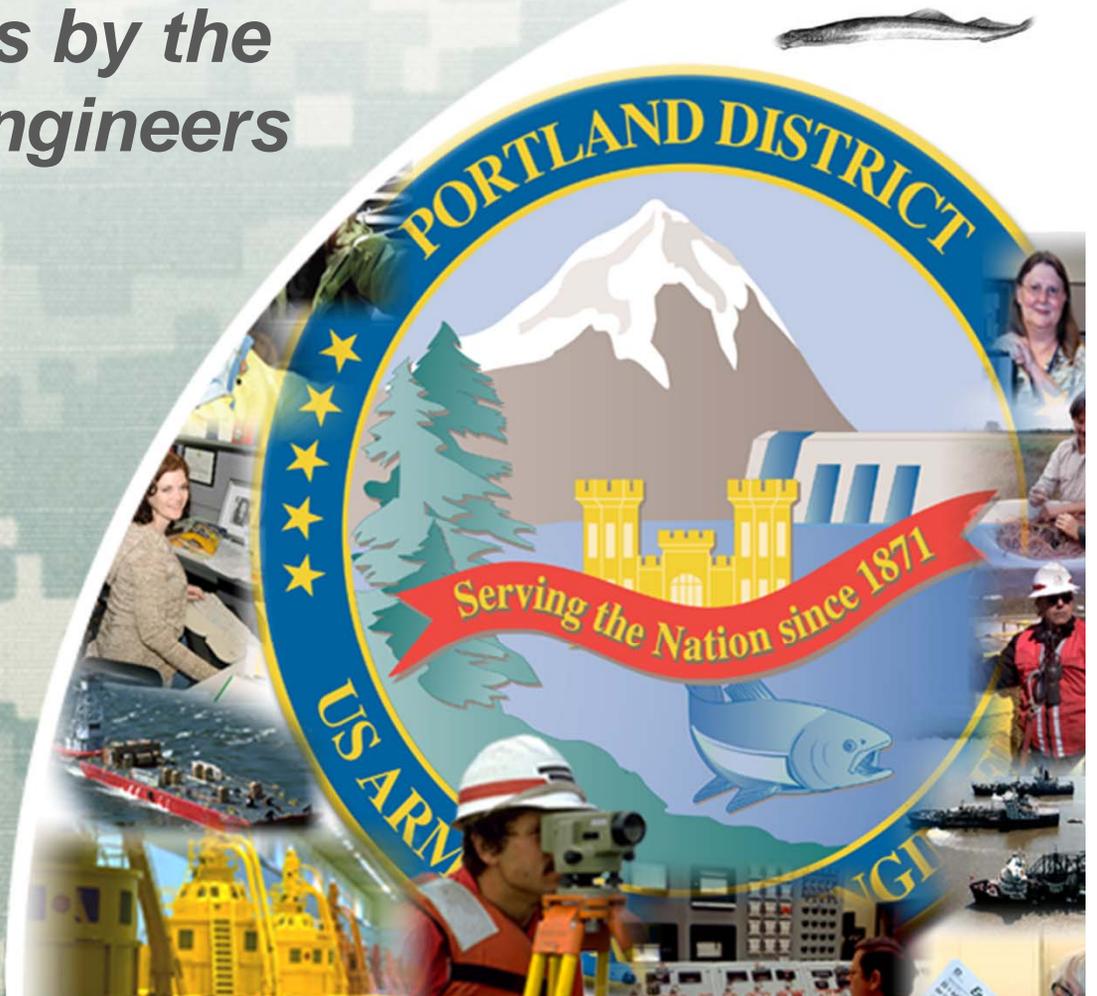
Sean C. Tackley

Fishery Biologist
Lamprey Passage Program
USACE Portland District

March 19, 2013

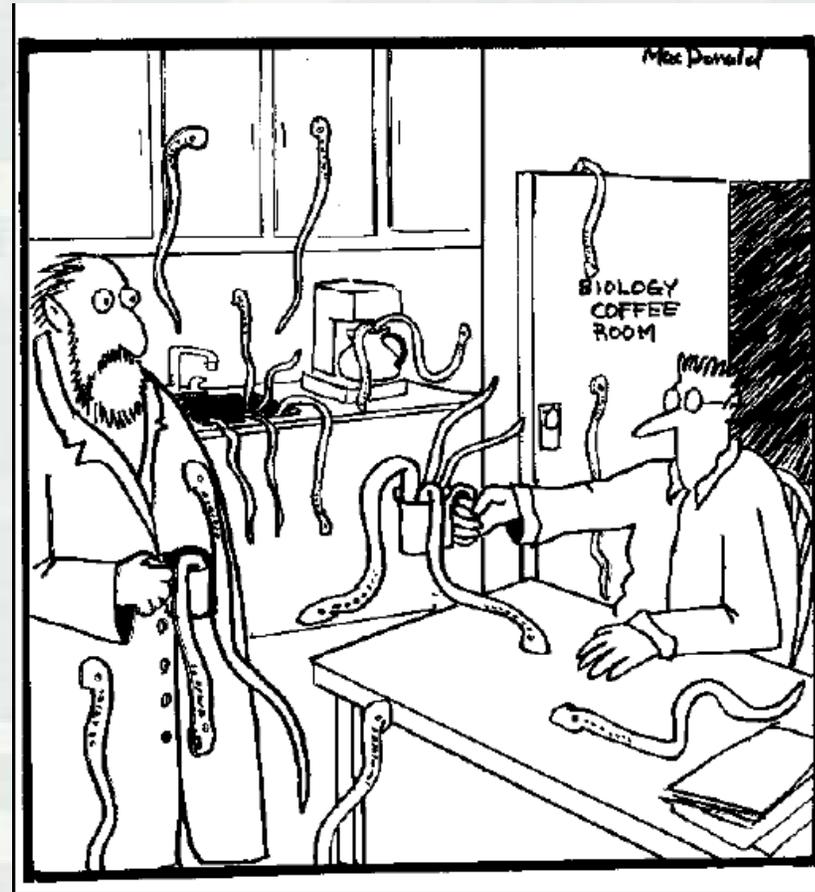


US Army Corps of Engineers
BUILDING STRONG



Presentation Outline

- Pre-Accord lamprey passage efforts
- Progress since 2008
- Outline future work



The short story...

818—FISH LADDERS, NORTH SIDE BONNEVILLE DAM, WASHINGTON-OREGON

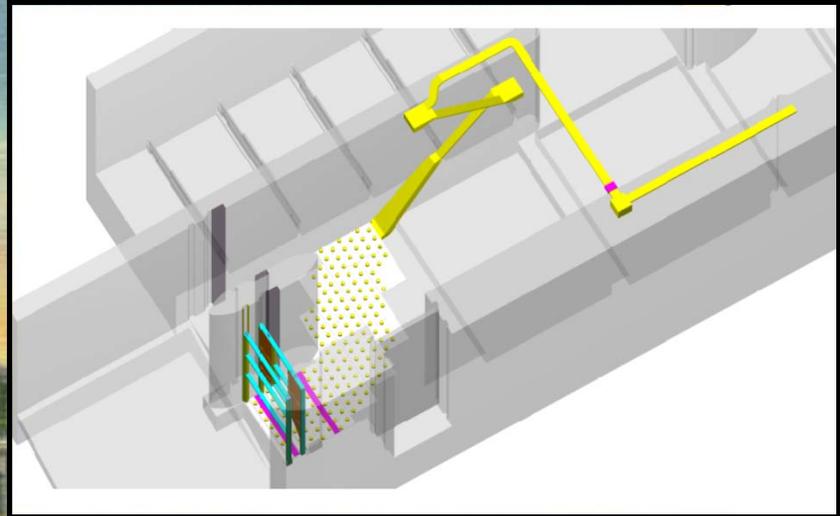
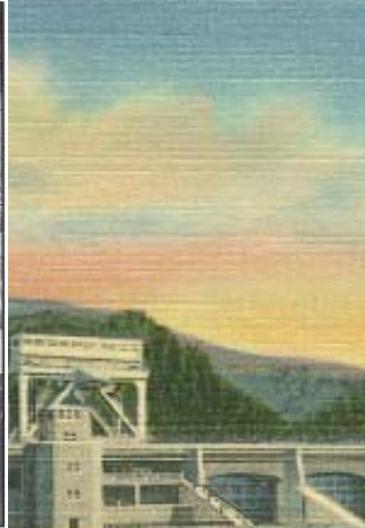


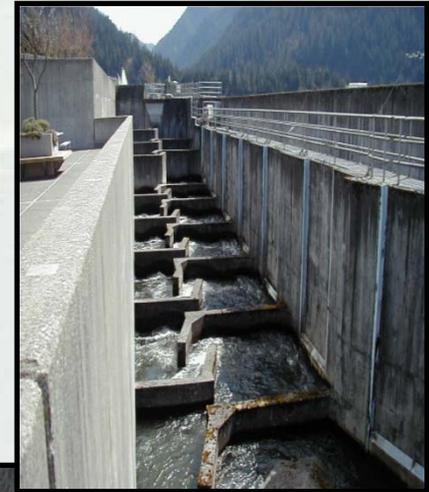
PHOTO BY WESLEY ANDREWS

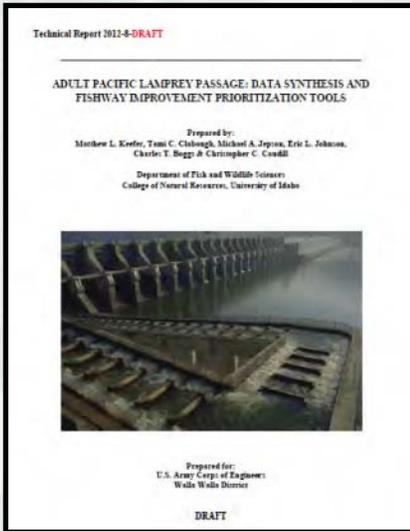
8A-H706



Pre-Accord Passage Studies

- Low passage success rates at Bonneville
- 30-40% tagged fish successfully ascended the ladders at Bonneville
- High attrition rates as fish move upstream
- Problem areas:
 - ▶ Entrances
 - ▶ Collection Channels & Transition Pools
 - ▶ Count Stations
 - ▶ Upper Ladder Flow Control Sections





Identified bottlenecks =



Developed design features
in Bonneville test flume

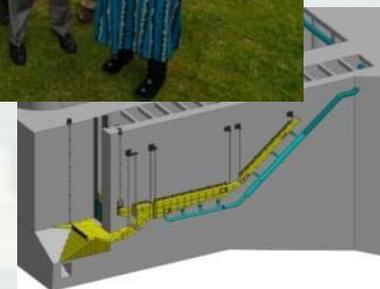
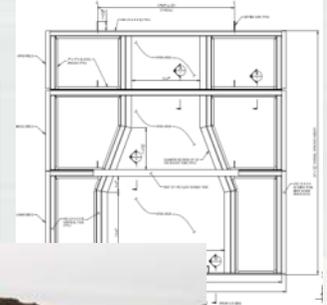


Installed and modified prototype Lamprey
Passage Structures (LPSs)



2008 Fish Accords & 10 Year Plan

- Included MOAs regarding lamprey passage improvements
- \$50M commitment over 10 years to address lamprey MOAs
- *Pacific Lamprey Passage Improvements Implementation Plan* (“10 Year Plan”) developed
- Work adaptively with tribes on actions



6 Principles of the Approach

1. Ensure that lamprey actions do not conflict with salmonid recovery efforts
2. Acknowledge and apply what we *do* know
3. Think strategically, focus scope, and engage region (piggy back on salmon efforts)
4. Lean forward to achieve MOA goals – More risk that we're used to
5. Fix known problems as funding allows
6. Focus where *passage is worst* and the *greatest number* of fish are affected



Since 2008...



Bonneville & McNary Dams

Nighttime Flow Reductions

- Trade-off between entrance velocity and attraction
- Tested at Bonneville Spillway and Powerhouse 2
- Implemented as standard operation at Powerhouse 2 in 2010
- Implemented as standard operation at McNary in 2011
- Planning to test elsewhere



Bonneville Dam

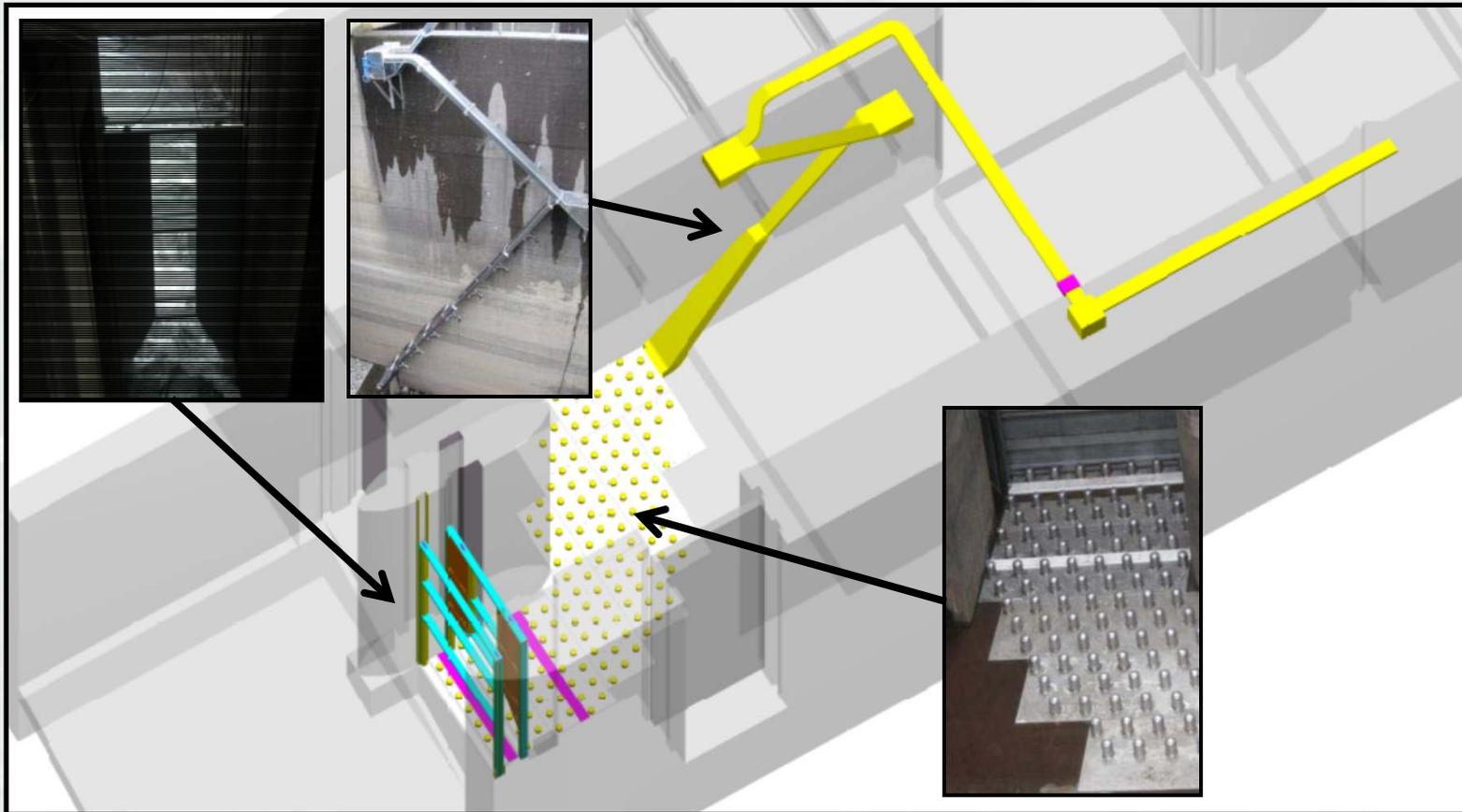
Lamprey Passage Structures (LPSs)

- Systems operating at OR and WA shore ladders and Cascades Island Ladder
- Pass about the same number of fish as through the count windows in some years
- Most effective if installed in 'dead ends' in fishways



Bonneville Dam

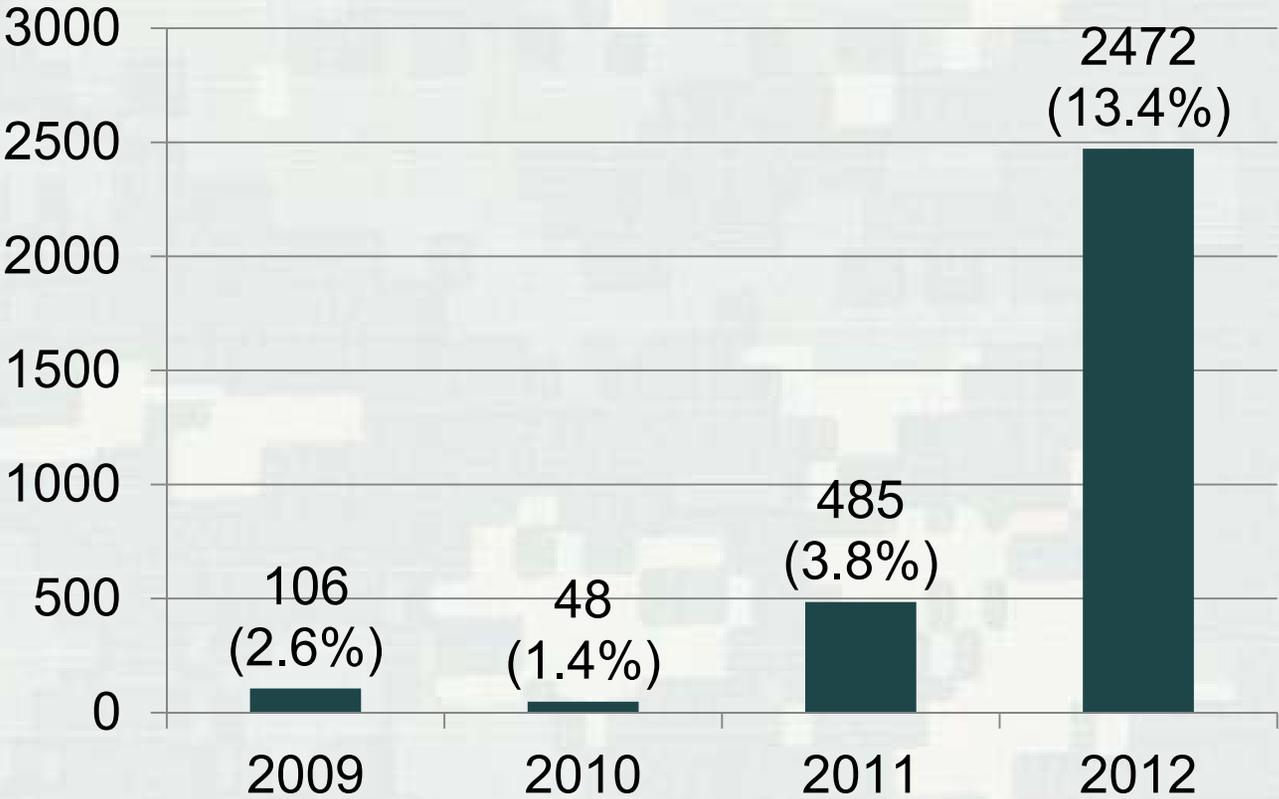
Cascades Island Fish Ladder Entrance (2009)



Bonneville Dam

Cascades Island Fish Ladder Entrance (2009)

Cascades Island LPS Passage (% of Bonneville Daytime Window Count)



John Day Dam

Upper North Fish Ladder & Count Station (2010)



- Ladder redesign to meet salmon criteria
- Lamprey features incorporated into count station and upper ladder modifications
- $\frac{3}{4}$ " grating, rounded corners, plating, etc



John Day Dam

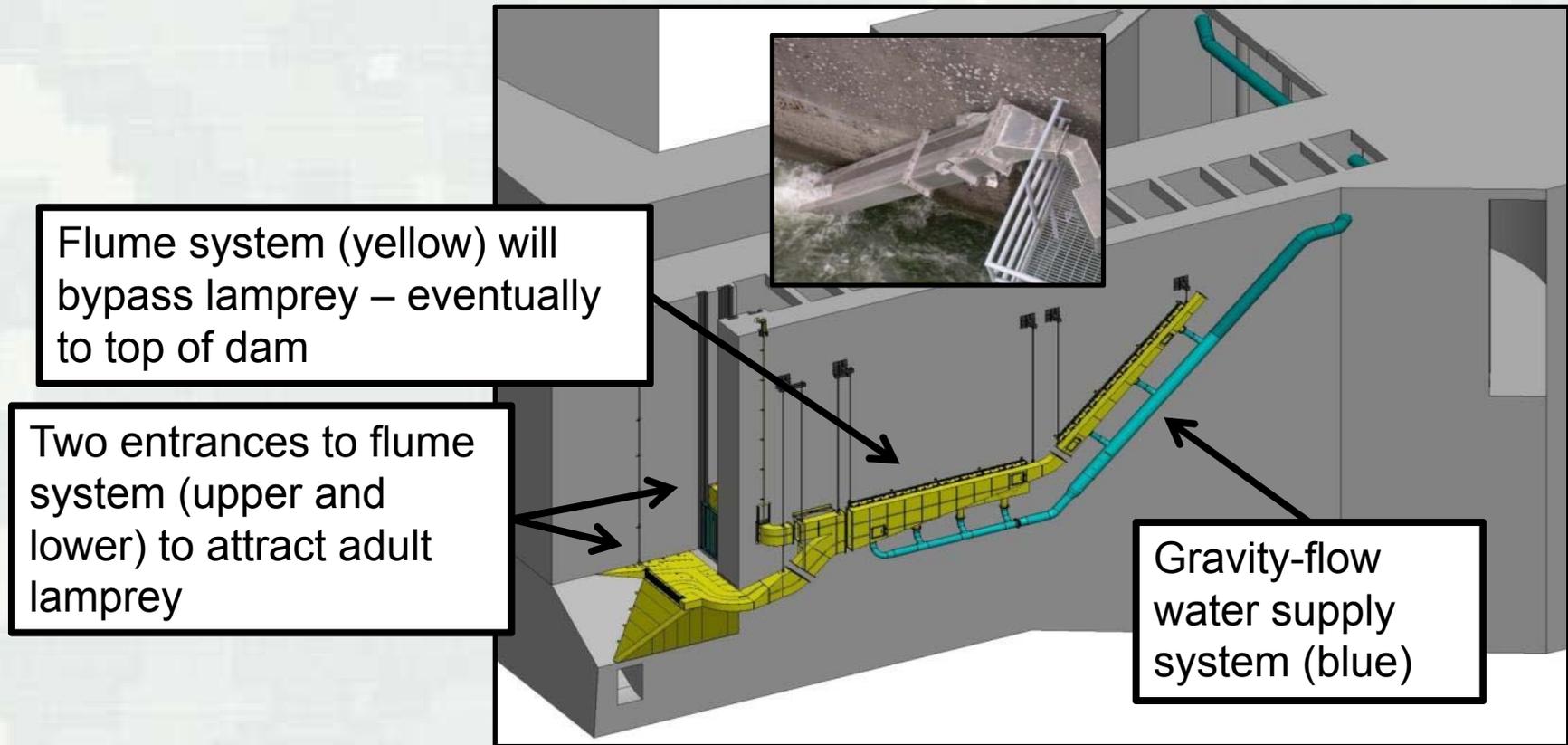
North Fish Ladder Entrance Improvements (2013)

- New AWS pumps, removal of lower ladder weirs improve hydraulics
- Variable width weir
- Bollards on entrance floor slow velocities
- Rounded edges, diffuser plating for attachment
- LPS (like Cascades Is.)
- 3/4-inch diffuser grating



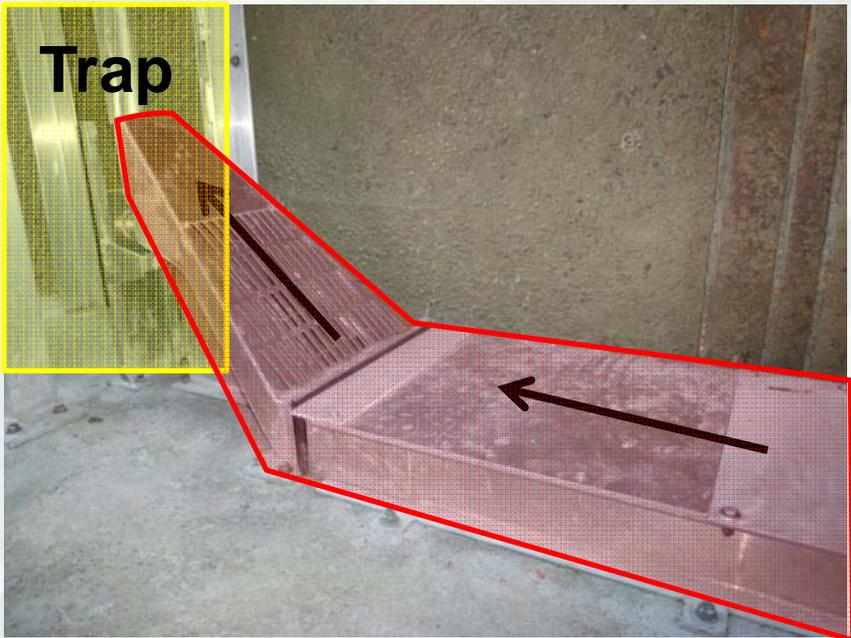
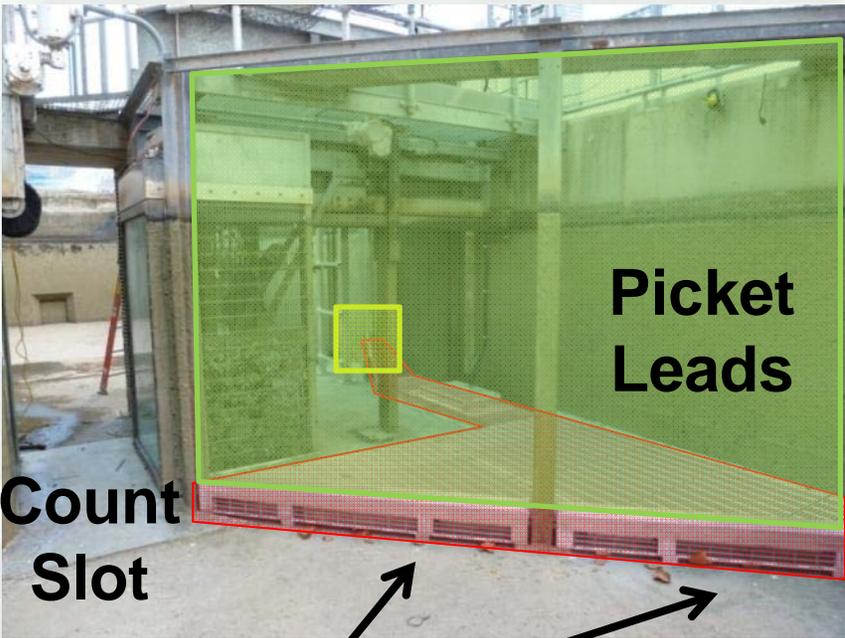
Bonneville Dam

Washington Shore Lamprey Flume System (2013)



John Day Dam

South Fish Ladder Lamprey Trap (2013)

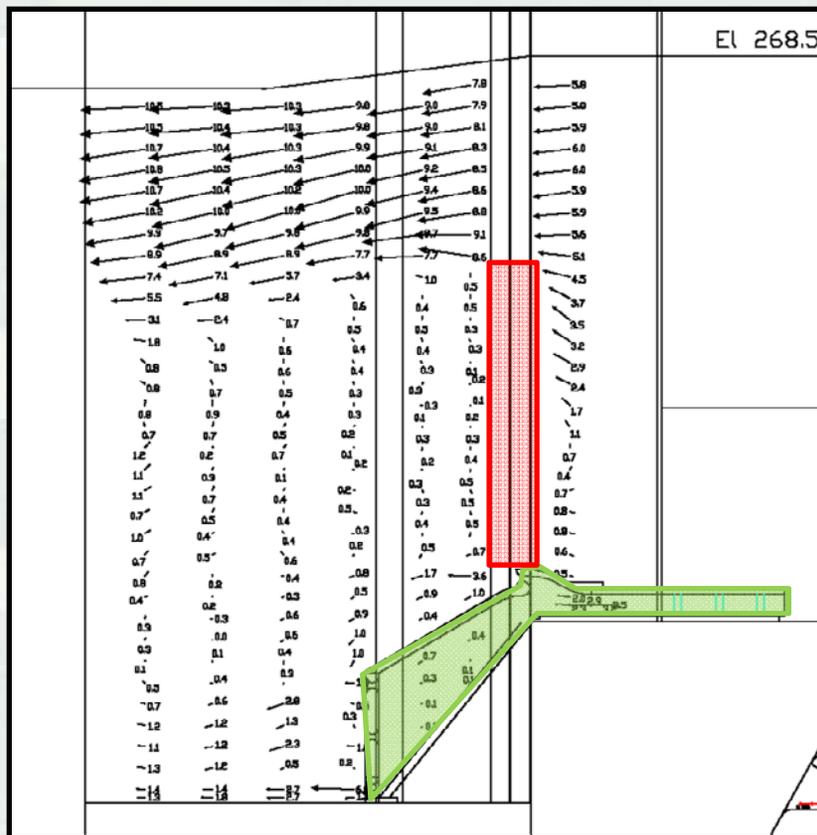


Enter here!



McNary Dam

Oregon Shore Fish Ladder Entrance

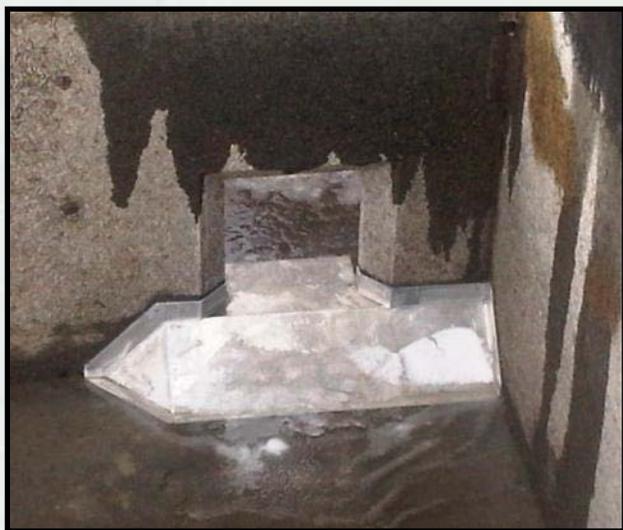


- “Ported Hood Box” concept sits below entrance weir
- Designed to exclude salmon; provide alternative entrance for lamprey
- Scheduled for Winter 2013-2014 install



Smaller-Scale Fishway Improvements

- Low cost, low risk modifications
- Listed in 10 Year Plan; updated annually
- Implement when resources and funding allow



Overflow weir orifice ramp



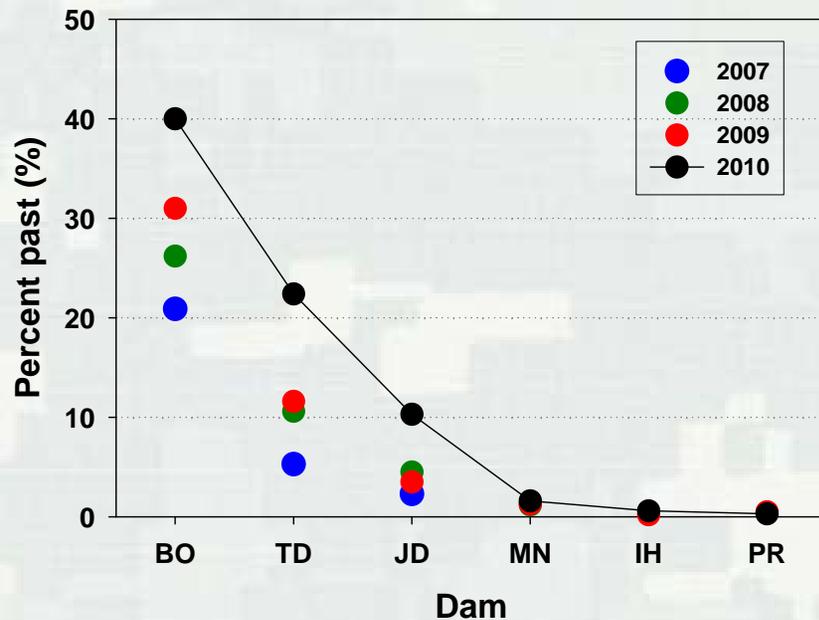
Diffuser plating at weir orifices



But is it working?

Escapement of Radio-Tagged Lamprey

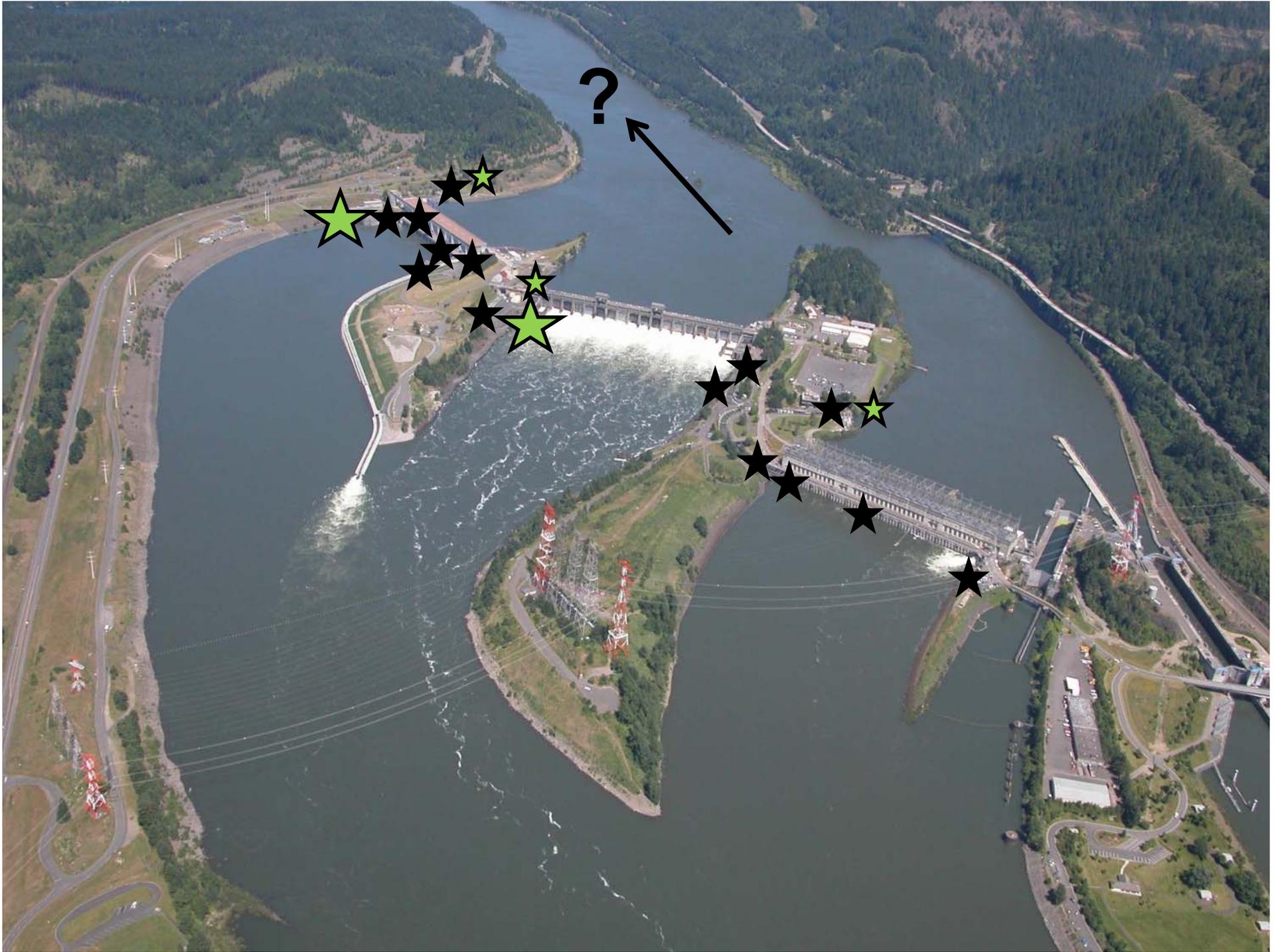
From release past dams



Ladder top – ladder top

| | BO-TD | TD-JD |
|------|-------|-------|
| 2007 | 25% | 43% |
| 2008 | 40% | 43% |
| 2009 | 34% | 32% |
| 2010 | 55% | 46% |



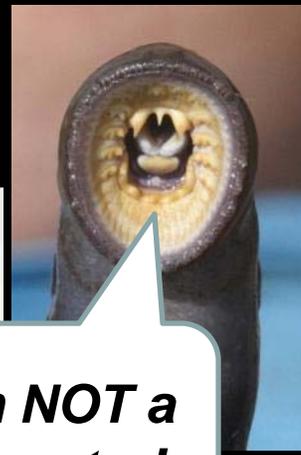
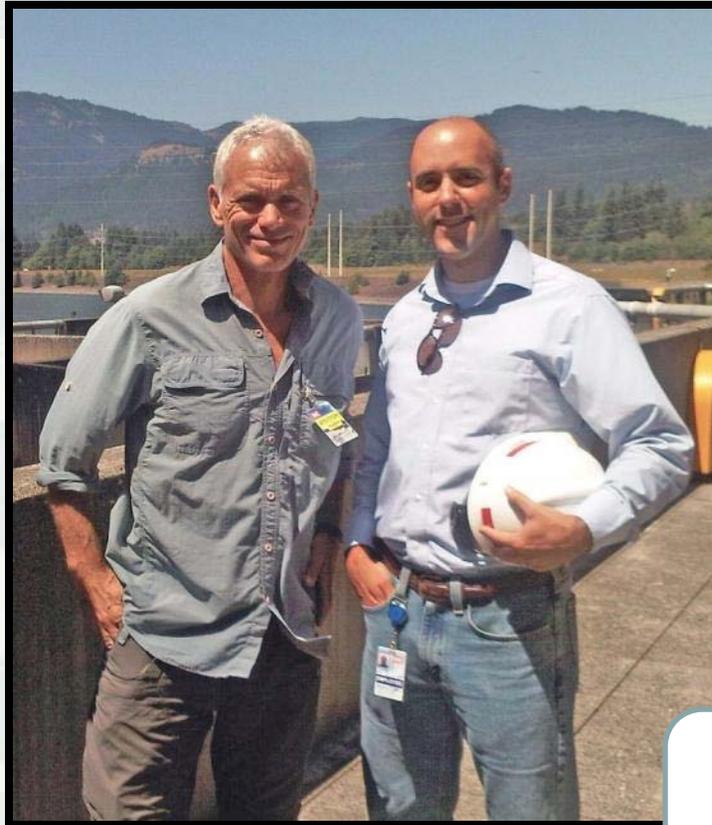


Future Actions

- 3 Major Fishway Entrance Concepts – *Build & Evaluate*
 - ▶ John Day North Fish Ladder Entrance (2011-2013)
 - ▶ Bonneville WA Shore Entrance System (2012-2013)
 - ▶ McNary South Fish Ladder Entrance (2013-2014)
- Shift to minor fishway modifications in 2013 at Lower Columbia River dams (BON, TDA, JDA)
- Using synthesis of passage data to inform future *prioritization* decisions. *What do we modify next?*
- New flume studies, experimental structures, and DIDSON to guide *design* decisions
- Continue to assist Tribes with adult lamprey collection



Coming Spring-Summer 2013...



I'm NOT a monster!

