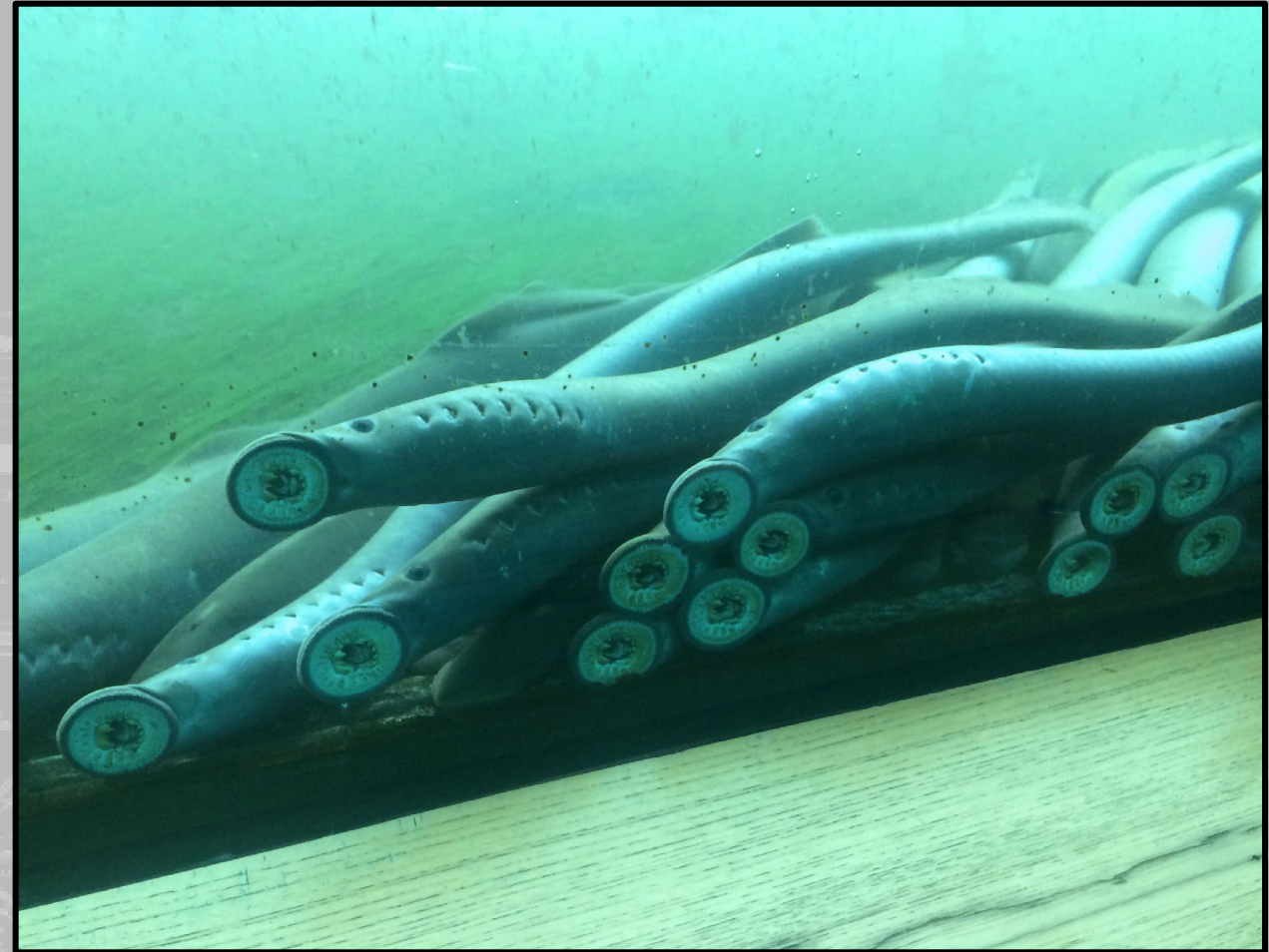


ADULT PACIFIC LAMPREY PASSAGE IMPROVEMENTS

2021 Anadromous Fish
Evaluation Program (AFEP)
Annual Review - 1/10/2022

Jacob Macdonald, Physical Scientist
U.S. Army Corps of Engineers, Portland District
Jacob.Macdonald@usace.army.mil



US Army Corps
of Engineers®

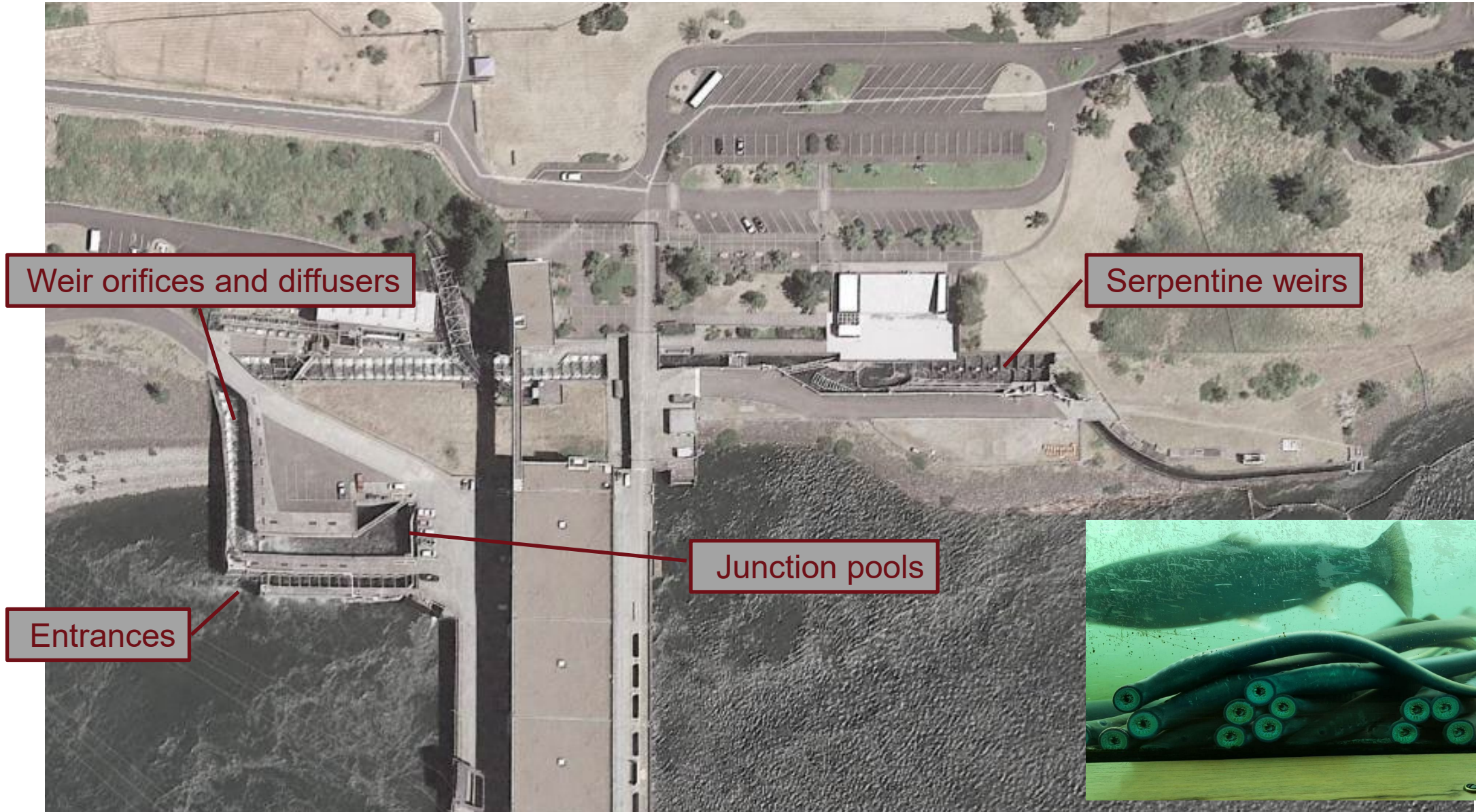


BACKGROUND

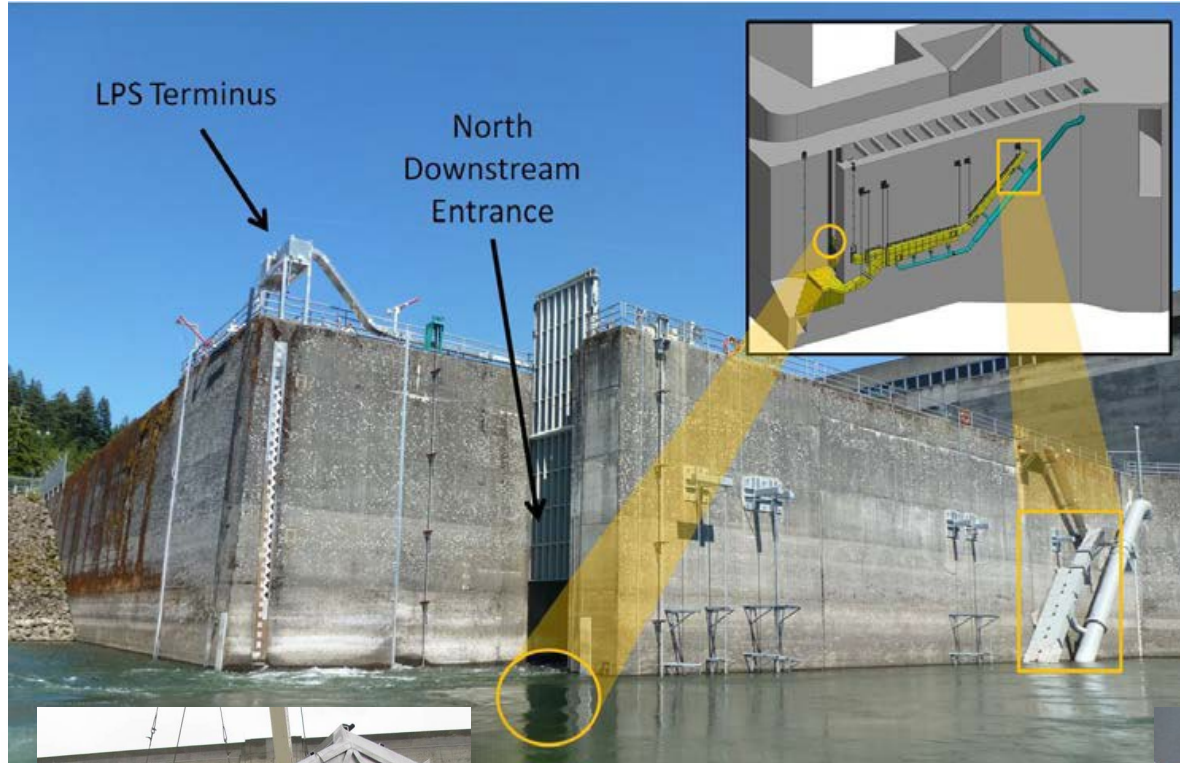


- 2008 Columbia Basin Fish Accords MOA
 - \$50M spent 2008-2018 researching fishway bottlenecks, monitoring lamprey passage behavior, and constructing/evaluating experimental passage structures
- 2018 Fish Accords extension MOA
 - Corps committed to seek funding to continue to improve Pacific Lamprey passage conditions at Corps dams
- 2018-2020
 - Coordinated with Tribes and CRITFC developing and prioritizing a list of actions, should funding be received to implement 2018 Accords extension
- 2020
 - Received funding to implement the measures from the 2018 Accords extension
- March 2021
 - Implementation plan finalized, including approx. \$10 million for adult lamprey passage improvements

ADULT LAMPREY PASSAGE BOTTLENECKS



FISHWAY ENTRANCE MODIFICATIONS



Bonneville WA Shore
Entrance Collectors

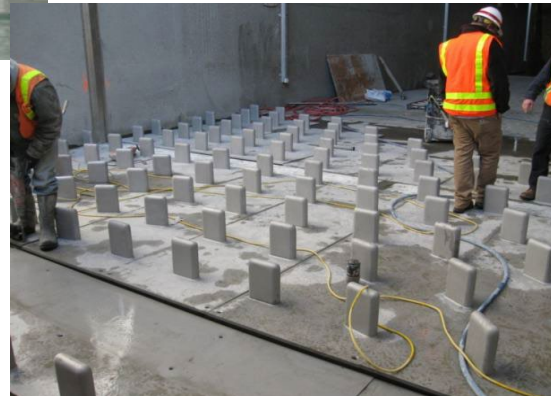


Variable width weir

Weir Design
Modifications



Rounded caps on overflow weirs

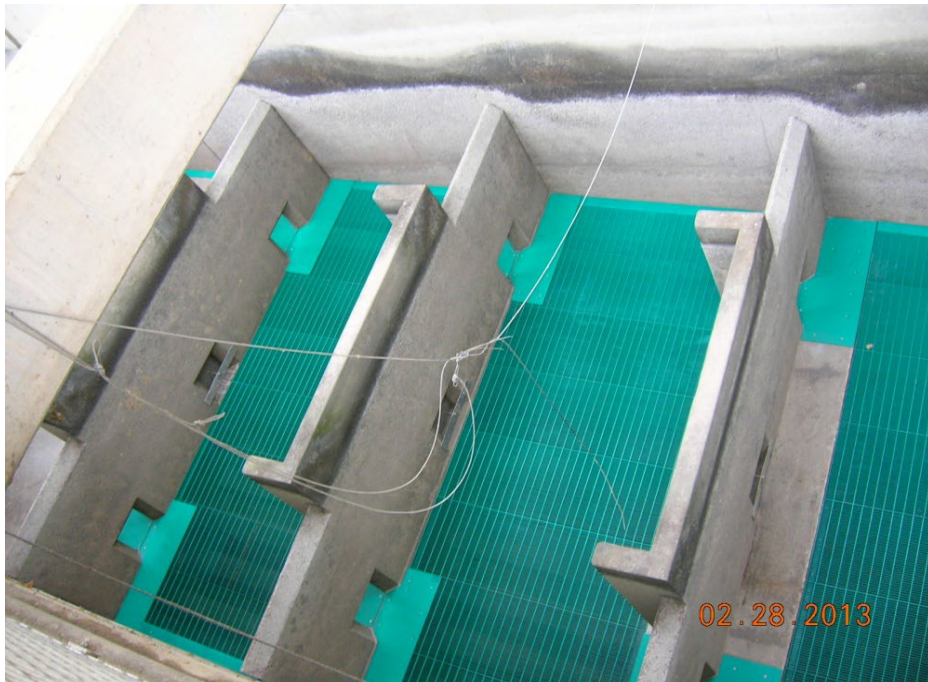


Hydraulic refuge
and attachment
points

LADDER WEIR AND DIFFUSER MODIFICATIONS



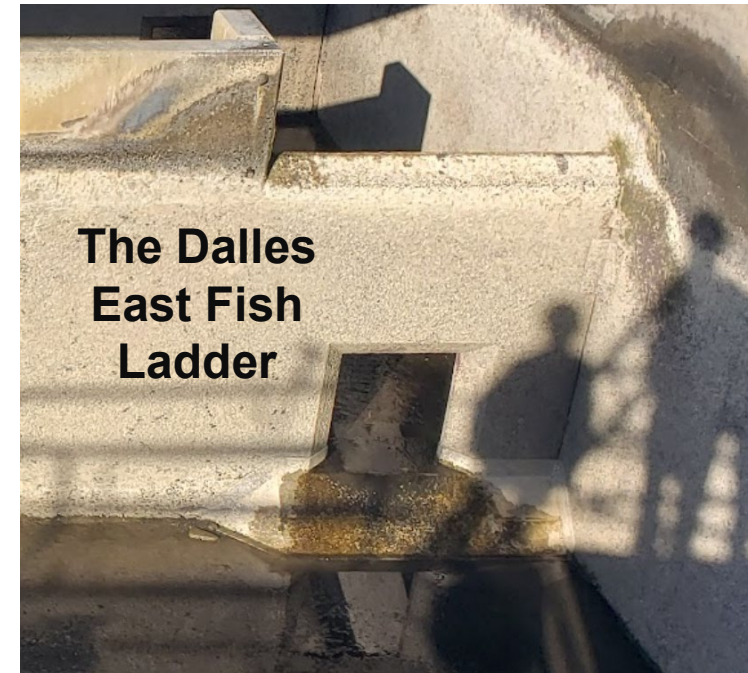
Plating over
diffuser grating
for attachment



Replace 1"
diffuser grating
with $\frac{3}{4}$ "



Ramps to
elevated
orifices



The Dalles
East Fish
Ladder

SERPENTINE (CONTROL) SECTION MODIFICATIONS



refuge boxes



lamprey orifices

Vertical slot & orifice configuration

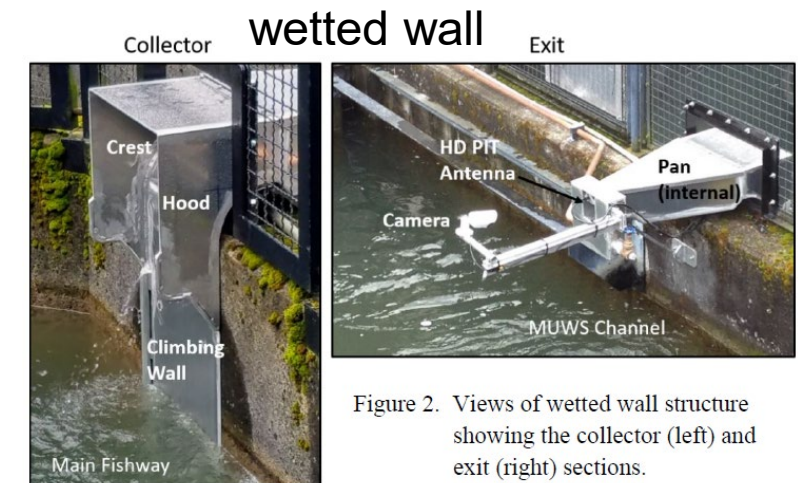


Figure 2. Views of wetted wall structure showing the collector (left) and exit (right) sections.

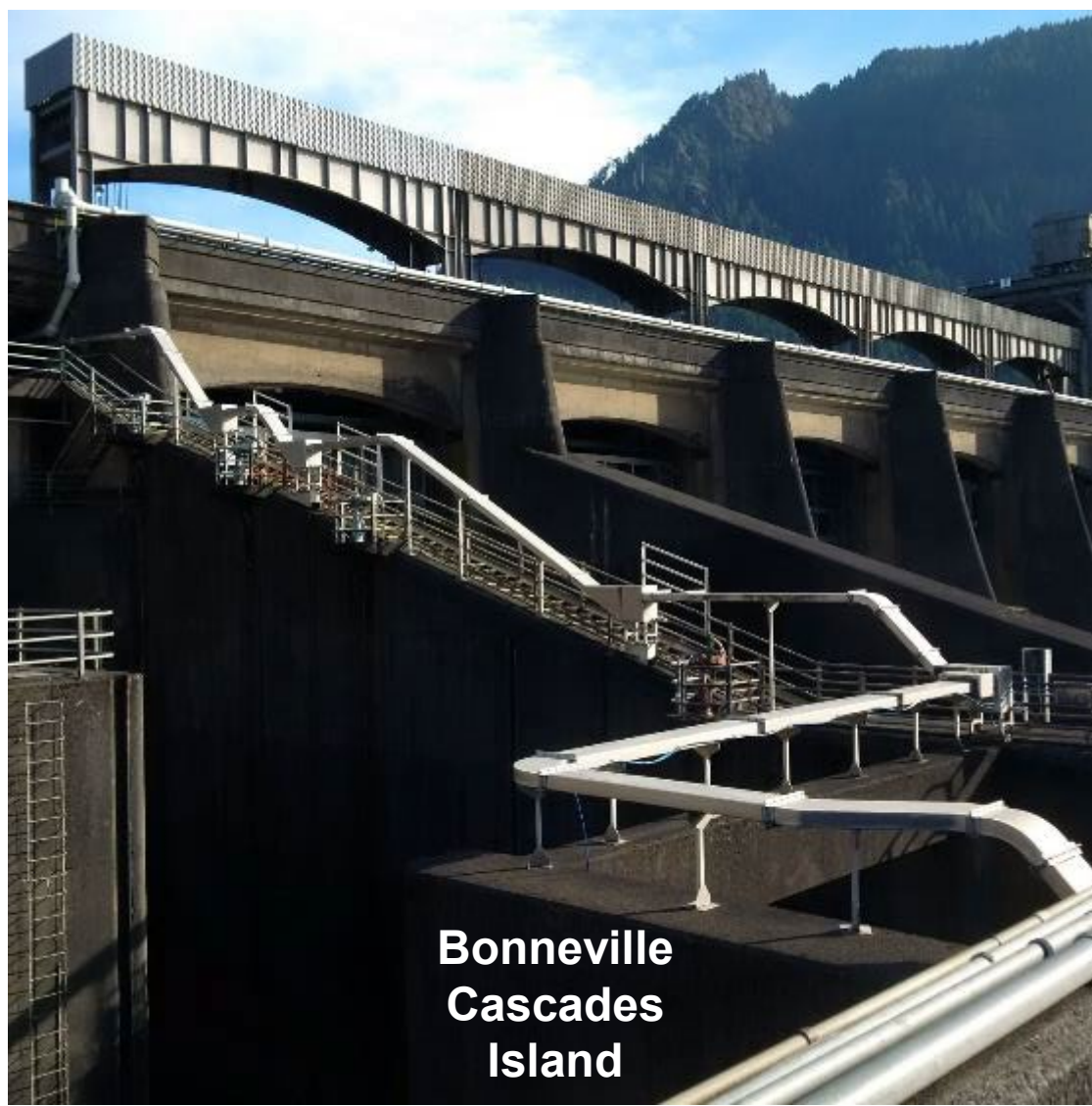


LAMPREY PASSAGE STRUCTURES (LPS)

7



**Bonneville
Bradford
Island**



**Bonneville
Cascades
Island**



**Bonneville
Washington
Shore**



BONNEVILLE 1PH LADDER SYSTEM ADULT PASSAGE PROJECT FORECAST

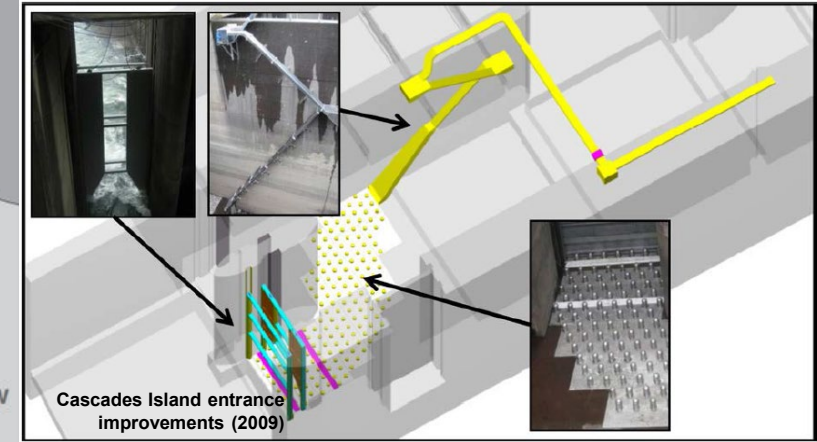
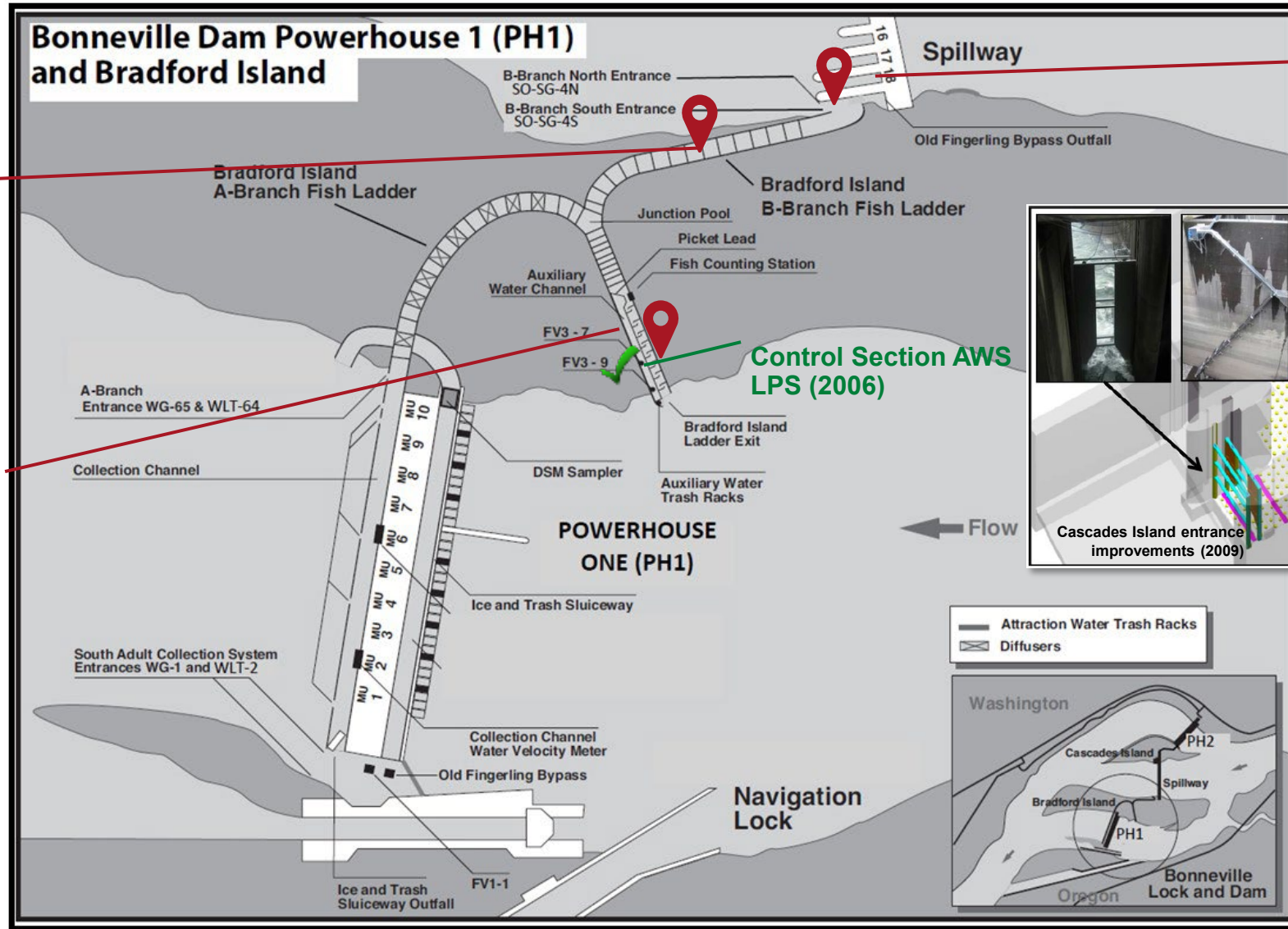
8



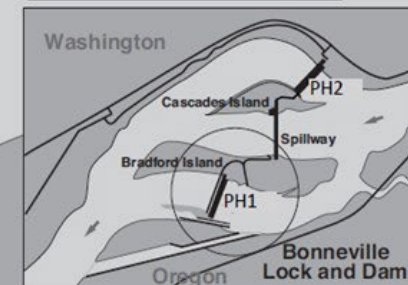
❖ Diffuser grating plating and ramps to elevated orifices where feasible in B-Branch

Extensive minor modifications to serpentine weir section

B-Branch entrance improvements



Attraction Water Trash Racks
Diffusers





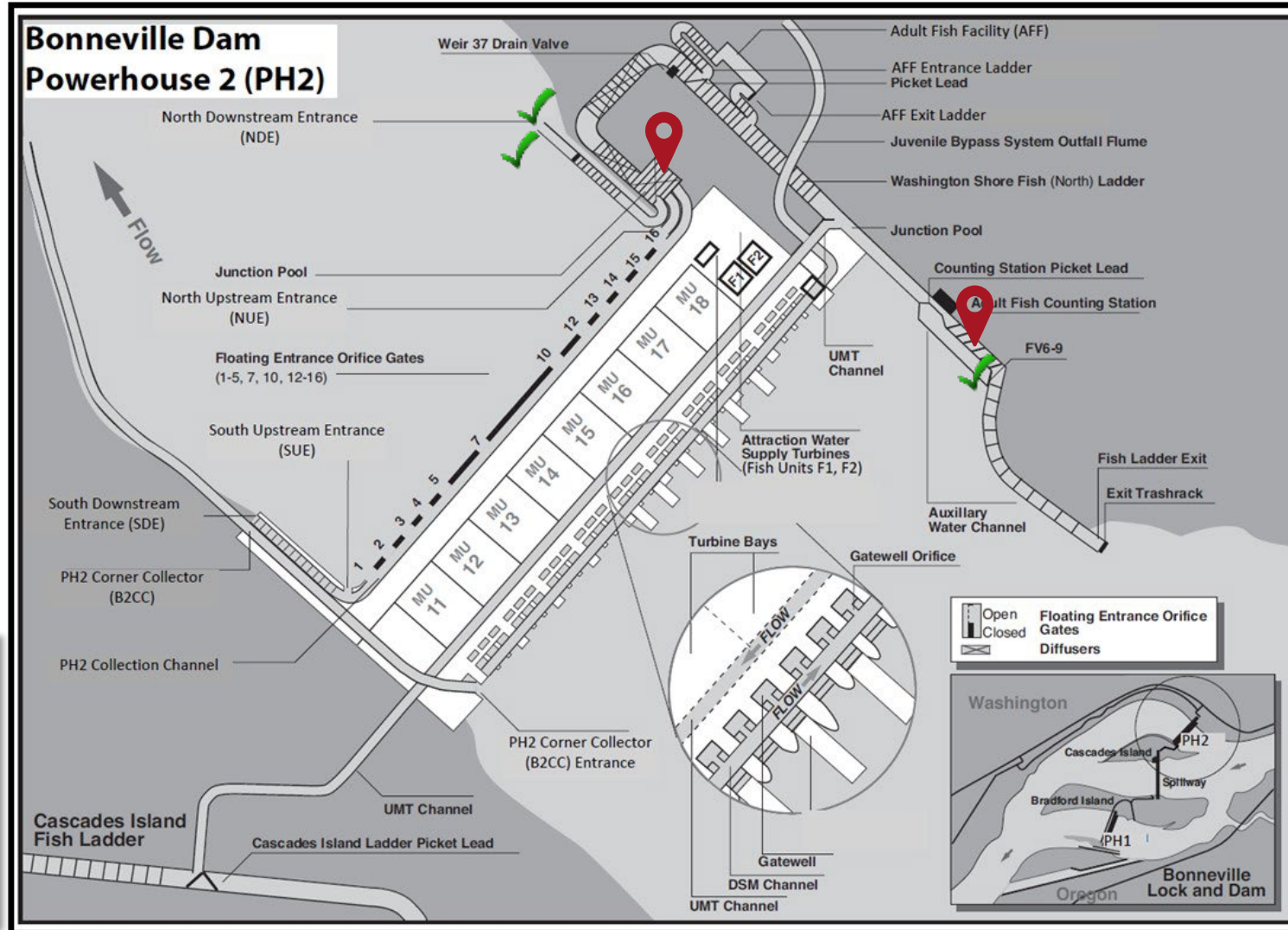
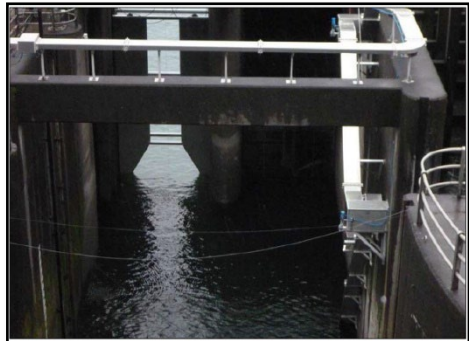
BONNEVILLE 2PH (CASCADES ISLAND & WA SHORE) LADDER SYSTEM PROJECT FORECAST



Projects completed

2008-2018

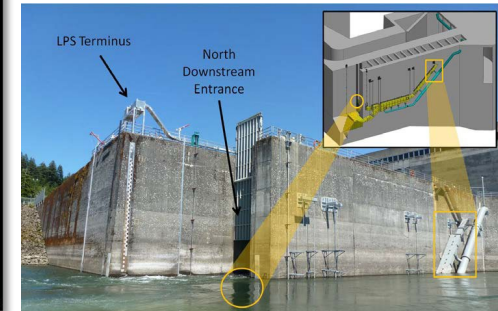
- ✓ Control Section AWS LPS (2007)
- ✓ Cascades Island Entrance modifications and LPS (2009)
- ✓ Lamprey Flume System (2013)
- ✓ WA Shore diffuser plating (2017)
- ✓ WA Shore entrance weir modifications (2019)



Projects planned

2020-2024

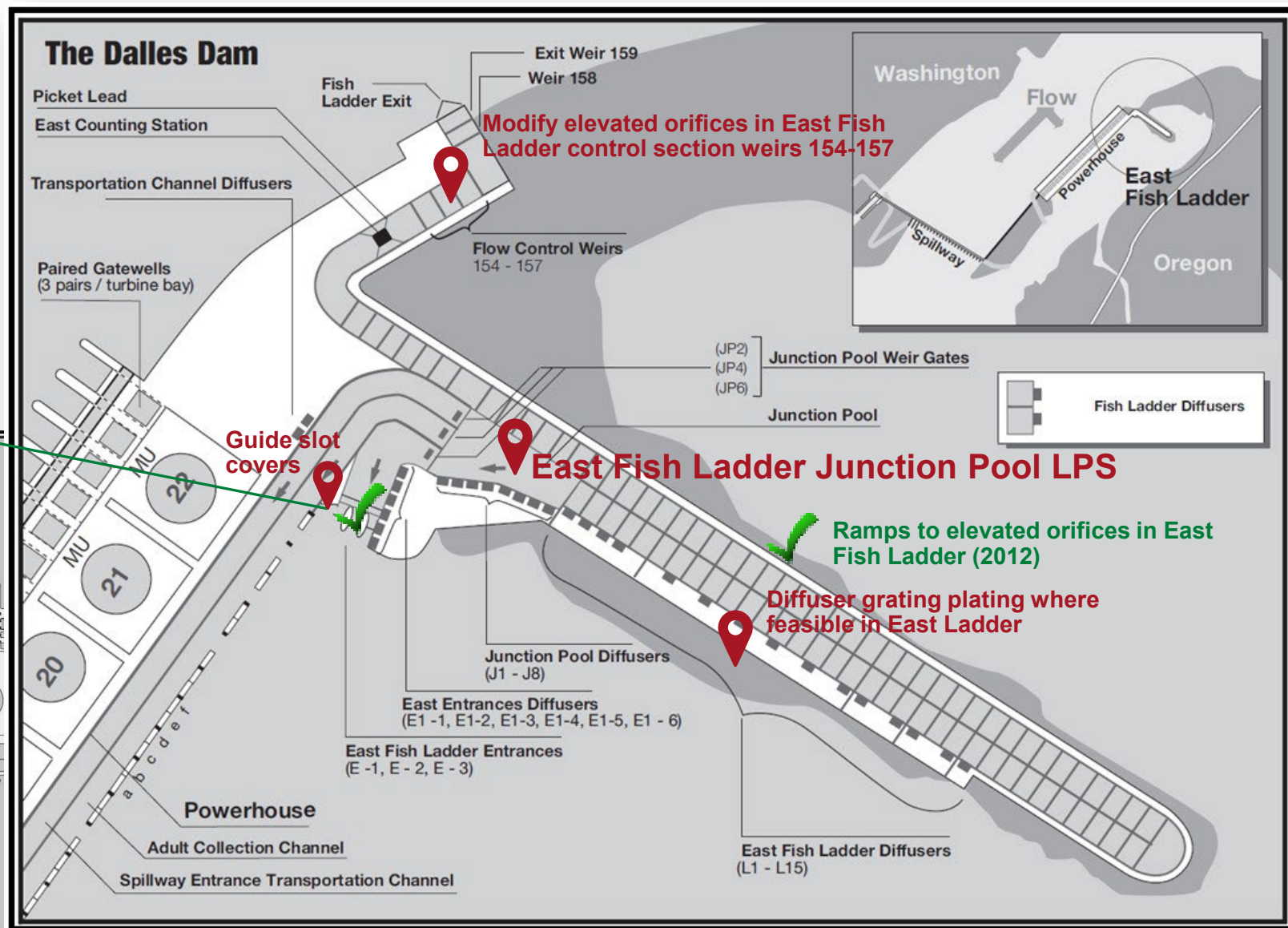
- WA Shore Serpentine Section Redesign
- WA Shore Junction Pool LPS



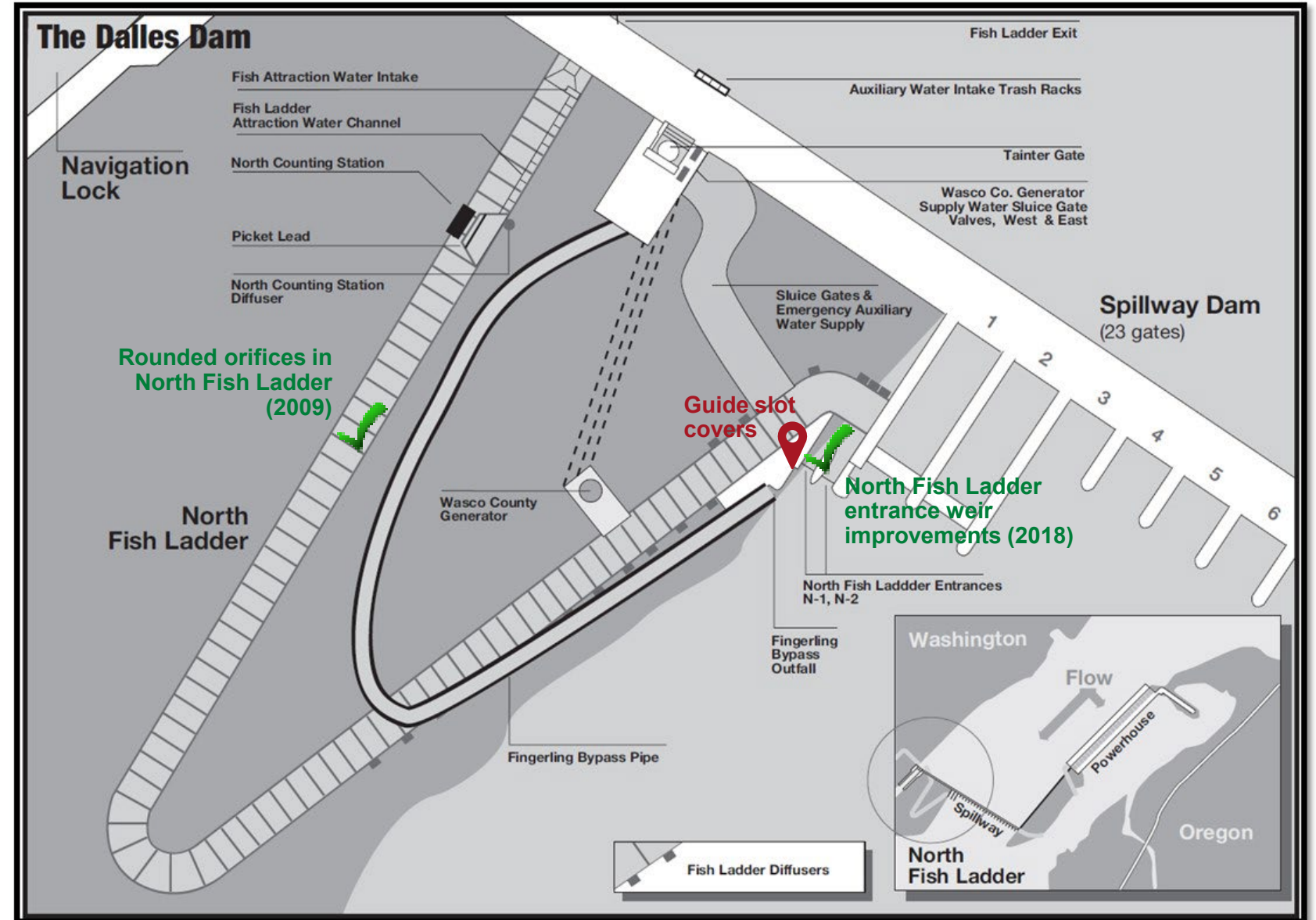
THE DALLES EAST LADDER SYSTEM



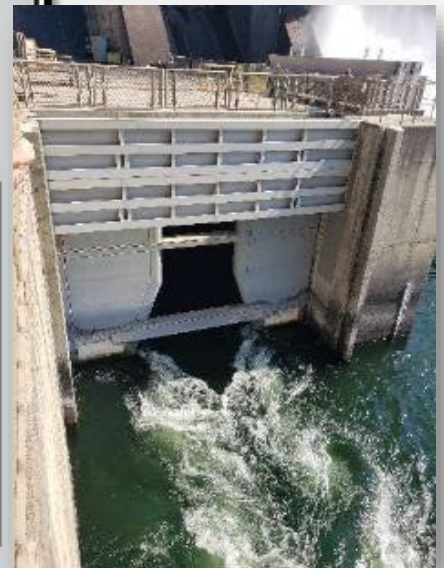
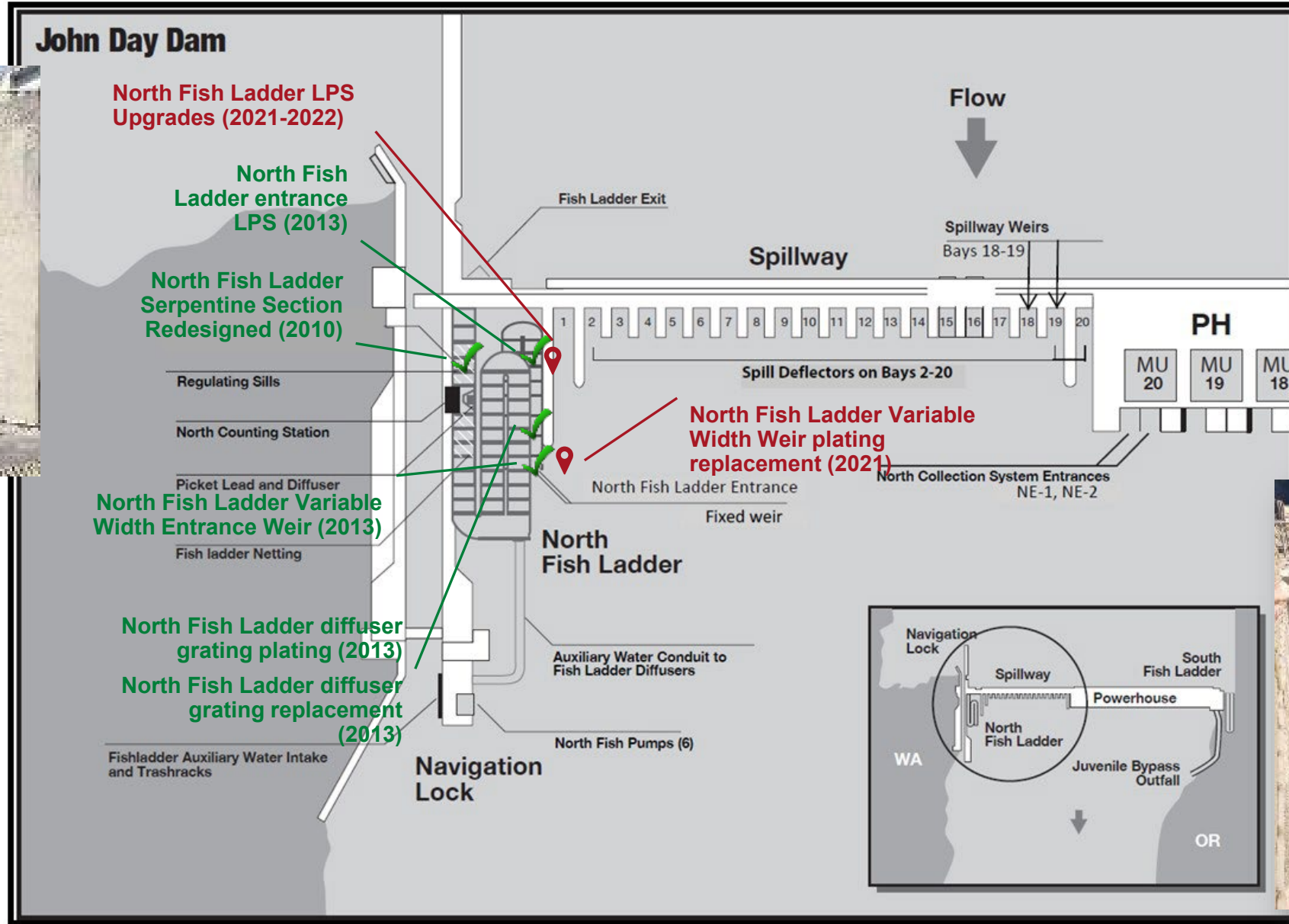
East Fish Ladder entrance weir improvements (2017-2019)



THE DALLES NORTH LADDER SYSTEM

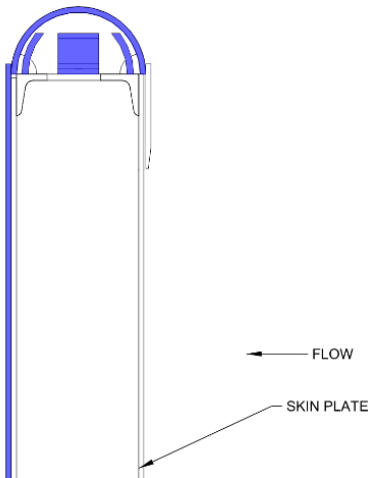
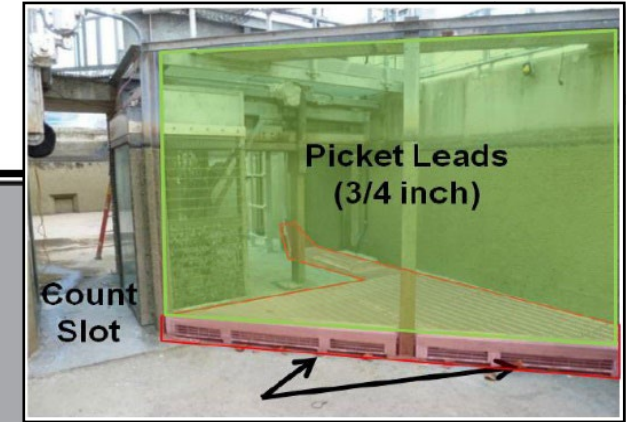
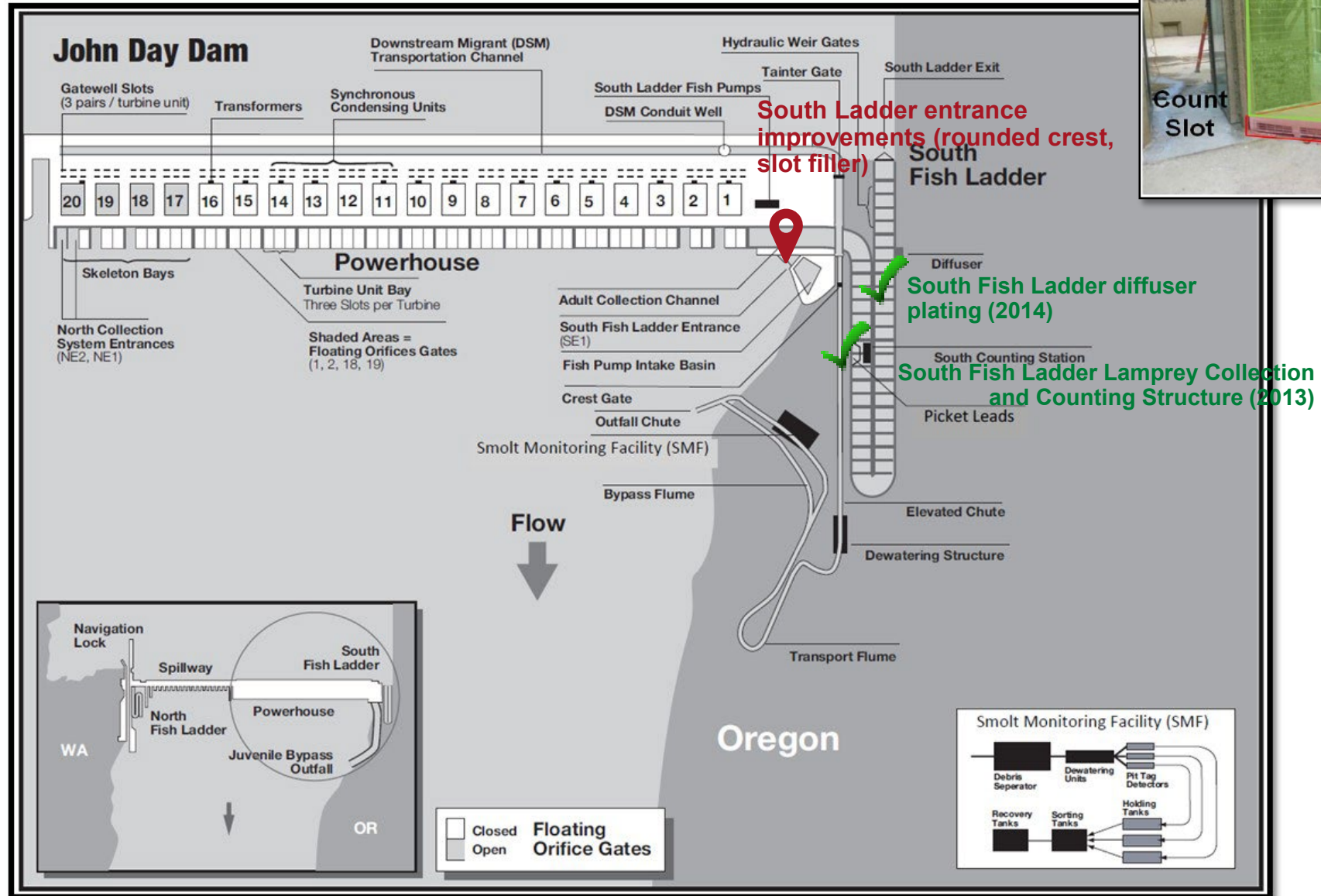


JOHN DAY NORTH LADDER SYSTEM



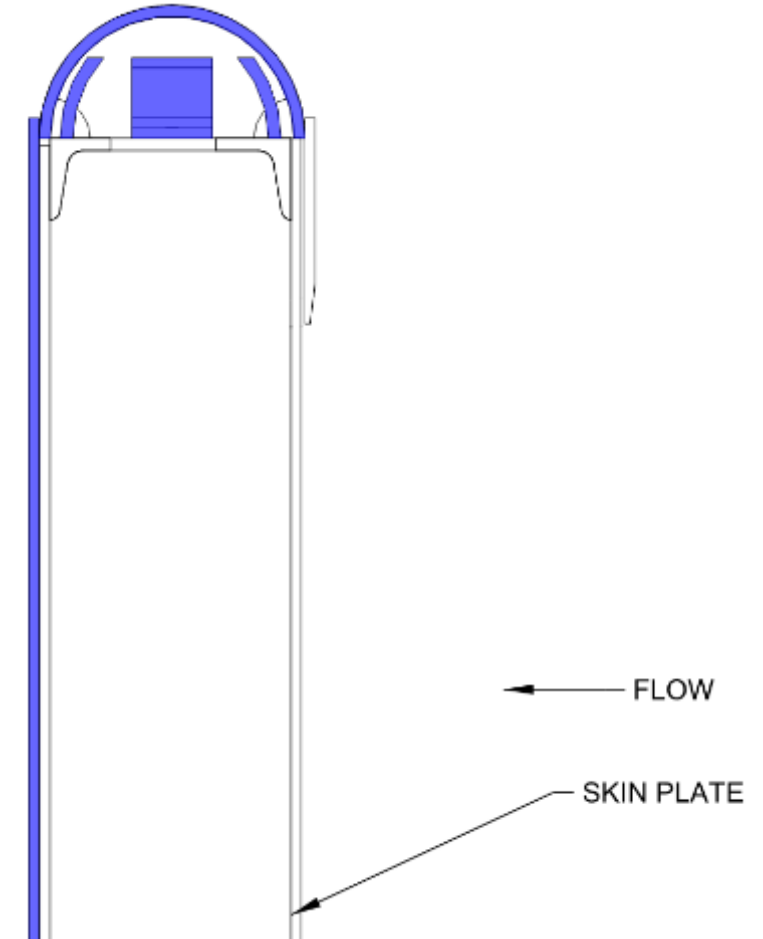
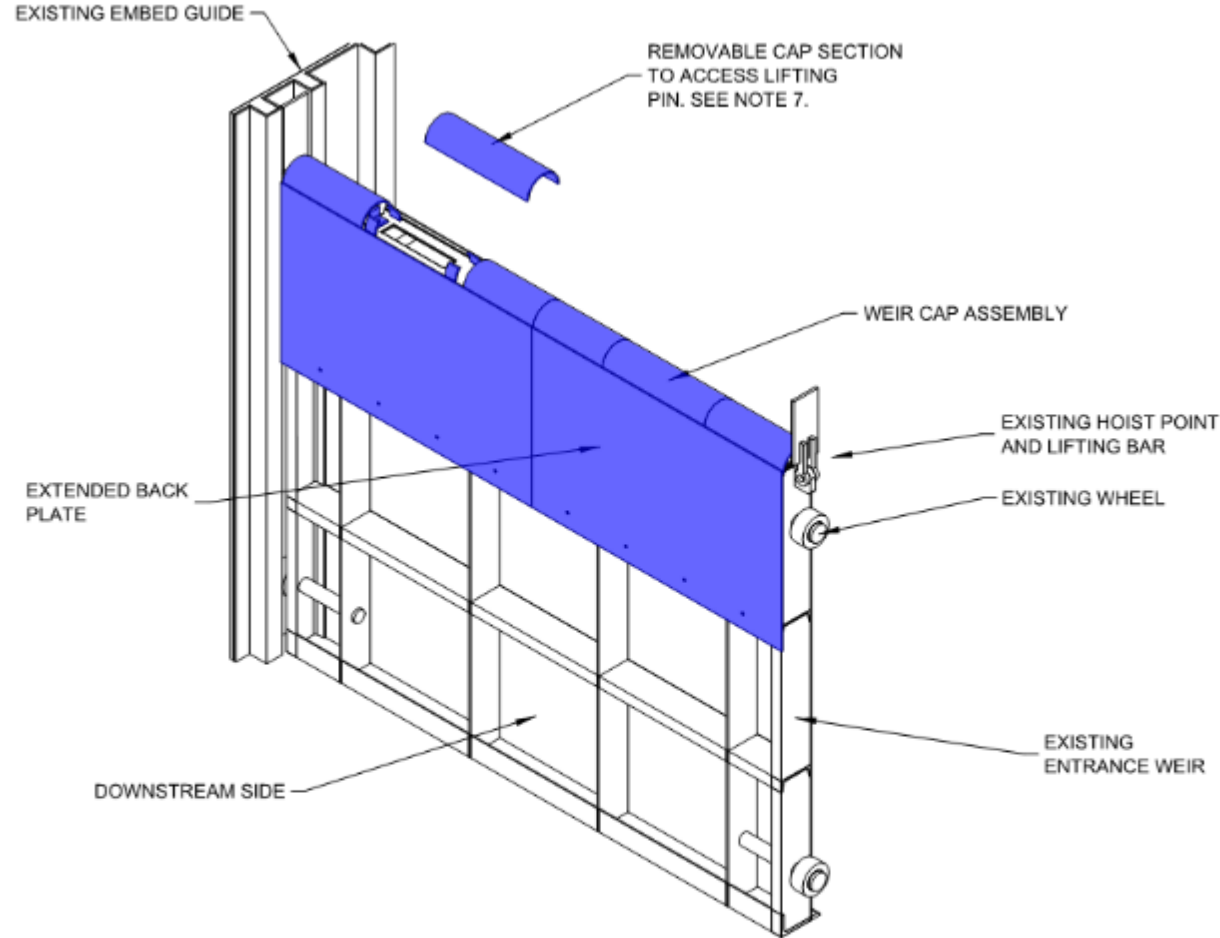


JOHN DAY SOUTH LADDER SYSTEM



JOHN DAY SOUTH AND MCNARY WEIR CAPS

The Dalles Design as a Starting Point



E & W WEIR CAP ASSEMBLY - ISOMETRIC

SCALE: NTS

NO. REQ'D : 8 TOTAL

MATERIAL: ASTM A36 (UNO)



ADULT PASSAGE IMPROVEMENTS PROJECT FORECAST

CTLWG

SRWG

FFDRWG

Research, Monitoring and Evaluation

- **Adult lamprey passage and migration RM&E (FY25)**
- Juvenile lamprey passage and migration RM&E (FY22-FY25)
- Improve adult counting (FY22-FY23)
- Diffuser grating replacement assessment (CRSO) (FY 22)

Bonneville 1PH (BON1) Adult Passage Improvements

- B-Branch entrance improvements (variable width entrance weir, bollards, and LPS) (Winter '23)
- Serpentine weir extensive minor modifications (Winter '23)
- B-Branch diffuser plating and orifice ramps (CRSO) (Winter '23)
- LPS pump upgrade (Winter '21)

Bonneville 2PH (BON2) Adult Passage Improvements

- **Control Section Redesign (CRSO) (Winter '24)**
- WA Shore Junction Pool LPS (Winter '24)
- Cascades Island lamprey flume modification (Winter '22)
- LPS pump upgrade (Winter '22)

The Dalles (TDA) Adult Passage Improvements

- East Fish Ladder Junction Pool LPS (CRSO) (Winter '23)
- Modify elevated orifices in East Fish Ladder control weirs (Winter '22)
- North ladder entrance slot fillers (Winter '22)
- East ladder entrance slot fillers (Winter '22)

John Day (JDA) Adult Passage Improvements

- North Fish Ladder LPS Upgrades (Winter '22)
- South Fish Ladder LPS upgrades (CRSO) (Winter '21)
- South Ladder SE1 weir caps (Winter '22)
- North Fish Ladder Variable Width Weir plating (Winter '22)

Walla Walla District Adult Passage Improvements

- MCN Washington ladder weir caps (CRSO) (Winter '23)
- MCN Oregon ladder weir caps (CRSO) (Winter '23)

QUESTIONS?

