

LAMPREY PASSAGE IN THE WILLAMETTE BASIN: CONSIDERATIONS/ CHALLENGES/EXAMPLES

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Passage Obstacles- the usual suspects

- ▣ Large flood control/hydropower dams
- ▣ Smaller Dams for diversion/ hydropower
- ▣ Fishways poorly designed for lamprey passage
- ▣ Perched Culverts
- ▣ Challenge: Limited data on current and historical distribution
 - Adults- protracted migration/holding periods
 - Juveniles- difficult to i.d. and track

Upstream Passage Considerations/ Problems

- Move mostly at night
- Travel deeper in the water column
- Seek lower velocity flows
- Poor swimming ability; unable to jump
 - False weirs / perched culverts are problematic
- Wedge into crevices; overwinter
- Can attach to smooth surfaces and climb ^
- Areas of congregation critical to providing passage, but poorly understood.

General Solutions for Upstream Passage Obstacles

- ▣ Rounding Corners
- ▣ Reducing velocities
- ▣ Continuous attachment areas
 - critical at salmonid fishway entrances, ladder orifices, & over floor grating
- ▣ Providing ramp structures



River Mill Dam- New Fishway

PGE's Clackamas River Project



Improvements for Lamprey

- ▣ Rounded corners
- ▣ Orifices close to wall and on floor
- ▣ Secondary entrance
- ▣ Minimized floor gratings
- ▣ Removable Trap



Lebanon Dam

South Santiam

- ▣ Rounded corners at orifices
- ▣ Orifices along the wall and floor



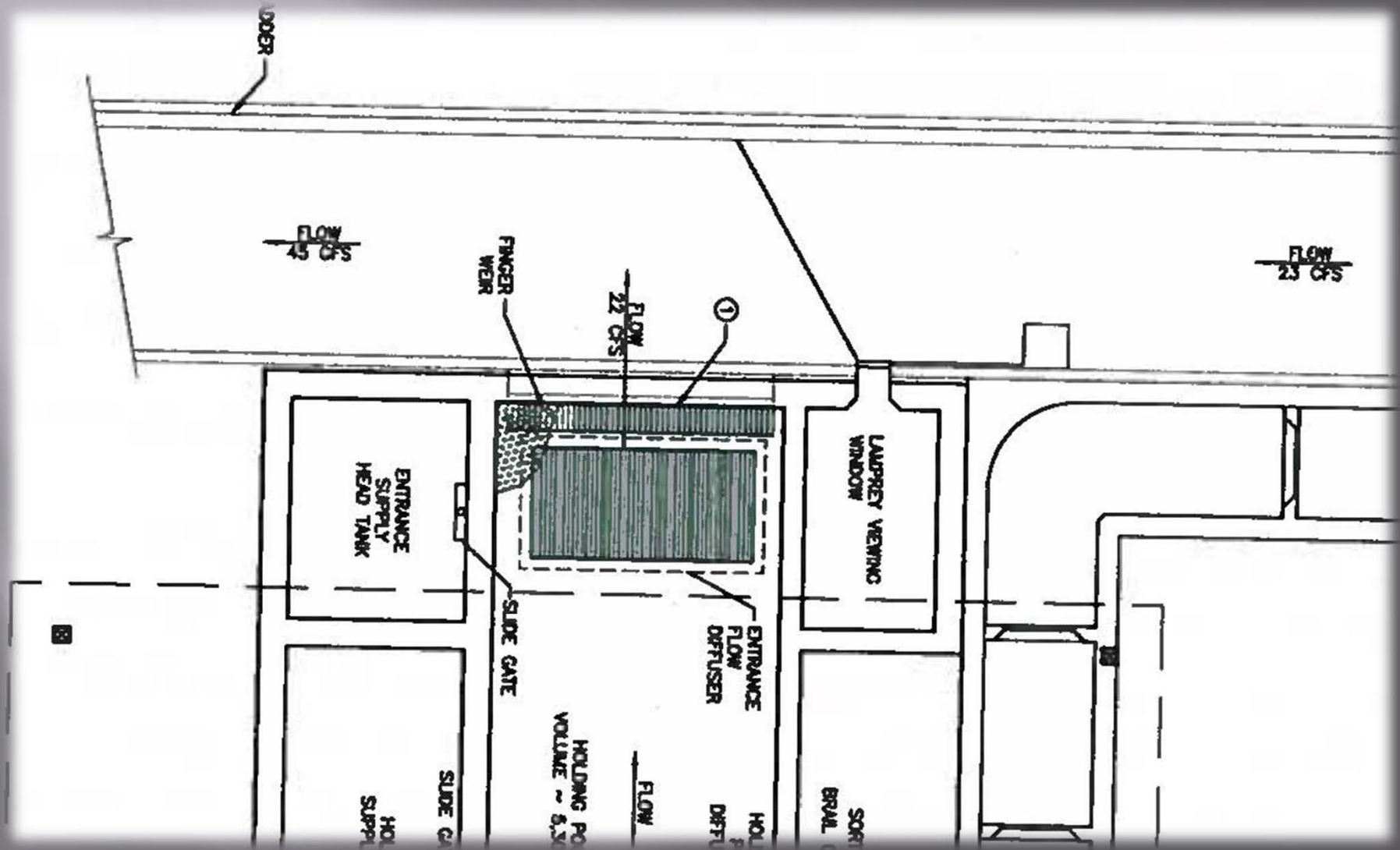
North Fork Dam

PGE's Clackamas River Project



New North Fork Sorter

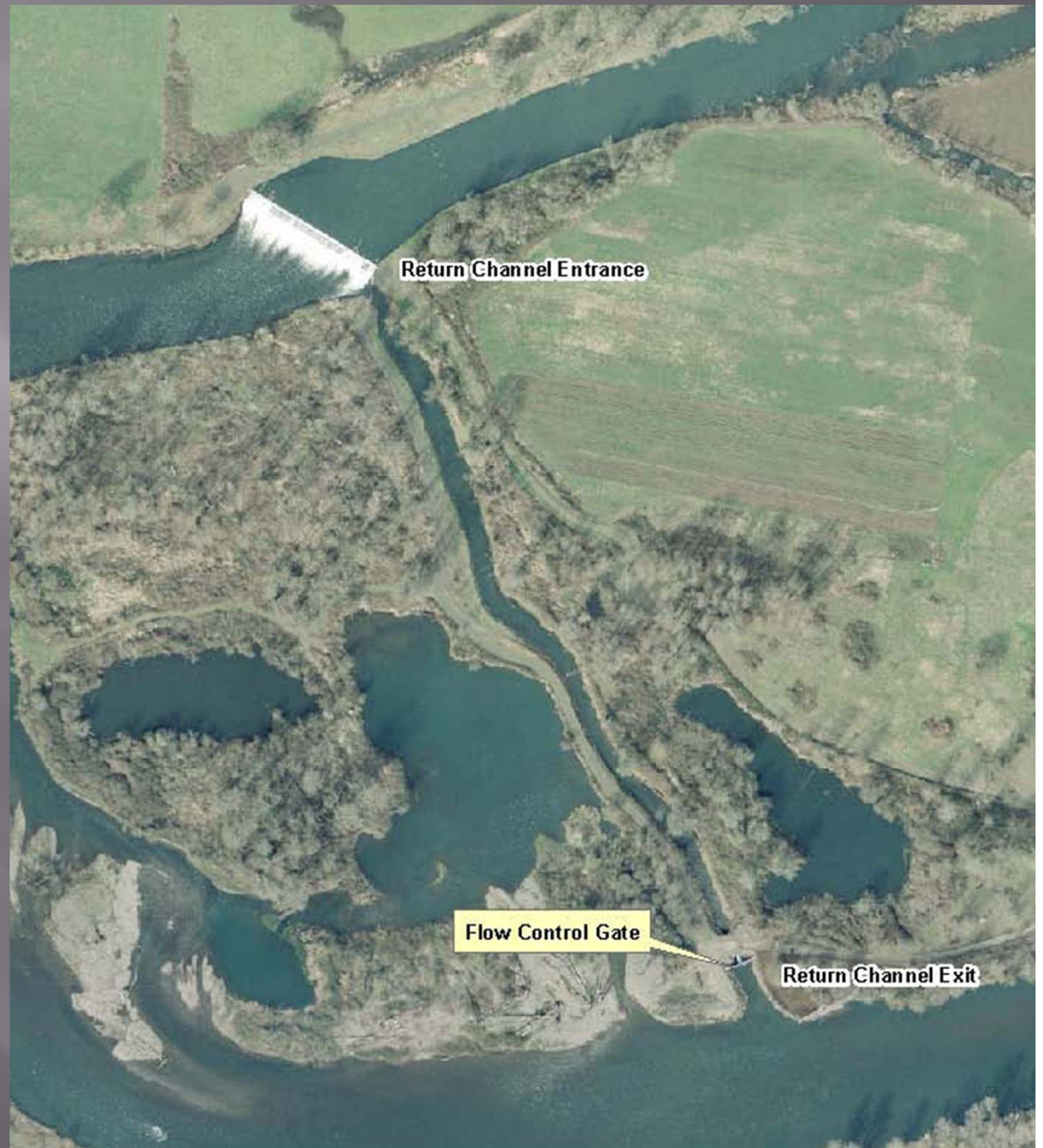
Coming soon!



Walterville Project

McKenzie River

- ▣ EWEB Project
- ▣ New Return Channel Entrance



Walterville Return Channel



Walterville Return Channel

- ▣ Entrance for resident fish and lamprey
- ▣ Rounded corners on wall and floor sill
- ▣ Bulkhead slots modified



Trail Bridge Dam

- ▣ McKenzie River
- ▣ EWEB Project
- ▣ Secondary resident fish entrance
- ▣ Rounded corners
- ▣ Additional openings at each pool for lamprey passage

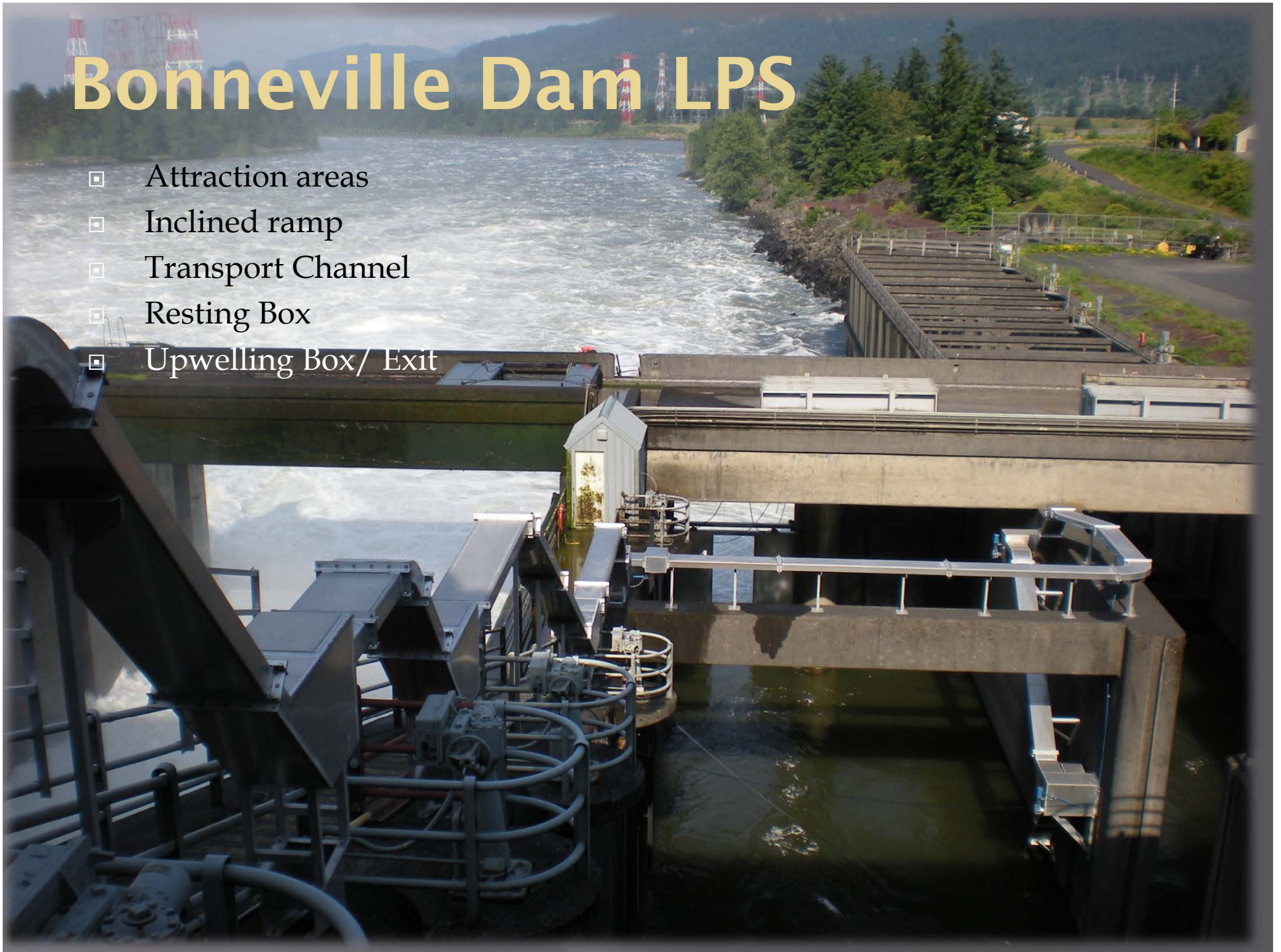






Bonneville Dam LPS

- ▣ Attraction areas
- ▣ Inclined ramp
- ▣ Transport Channel
- ▣ Resting Box
- ▣ Upwelling Box/ Exit



Threemile Dam

- ▣ Umatilla River
- ▣ Multiple partnership project
- ▣ Passage here and at two other locations upstream
- ▣ Monitoring





Threemile Dam Fishways



Culvert on 3 Mile Creek

- ▣ Columbia tributary
- ▣ Multiple partnership project
- ▣ Future monitoring



Culvert on 3 Mile Creek



Downstream Passage Challenges

- Screens designed for juvenile salmonids can not exclude all sizes of ammocoetes
 - Smaller sizes are entrained to agricultural fields or pass through turbines
 - Larger sizes may be impinged on screens
- Unscreened diversions for irrigation
 - Entrainment of all sizes to agricultural fields
- Unscreened turbine intakes pass juveniles through potentially harmful conditions
- Very limited ability to track juvenile migrants/ determine juvenile migration characteristics and attraction conditions

Inwater Work Challenges

- Dewatering ammocoete habitats-stranding
- Work windows don't apply



Lamprey May 2015

Upcoming developments?

- ▣ USGS work- examining different screens and their effectiveness at reducing entrainment of ammocoetes.
- ▣ Active tag size keeps decreasing- so sometime in the next decade perhaps to the size that macrathalmia could be tracked.



Thanks/Credit

- ▣ Aaron Jackson (CTUIR)
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- ▣ Matt Mesa (USGS)
- ▣ Mary Moser (NMFS)
- ▣ Tim Shibahara (PGE)
- ▣ Bianca Streif (USFWS)

Some Relevant Papers

- ▣ Jackson. 2011. Adult lamprey passage improvement report for the Umatilla River.
- ▣ Keefer et al. 2010. Testing adult pacific lamprey performance at structural challenges in fishways.
- ▣ Moser and Mesa. 2009. Passage considerations for anadromous lamprey.
- ▣ Moser et al. 2010. Development of Pacific lamprey fishways at a hydropower dam.
- ▣ Rose and Mesa. In progress. Effectiveness of common fish screen materials to prevent entrainment of Pacific lamprey ammocoetes.