Detection of PIT-Tagged Juvenile Salmonids Using a Surface Pair-Trawl in the Columbia River Estuary, 2014

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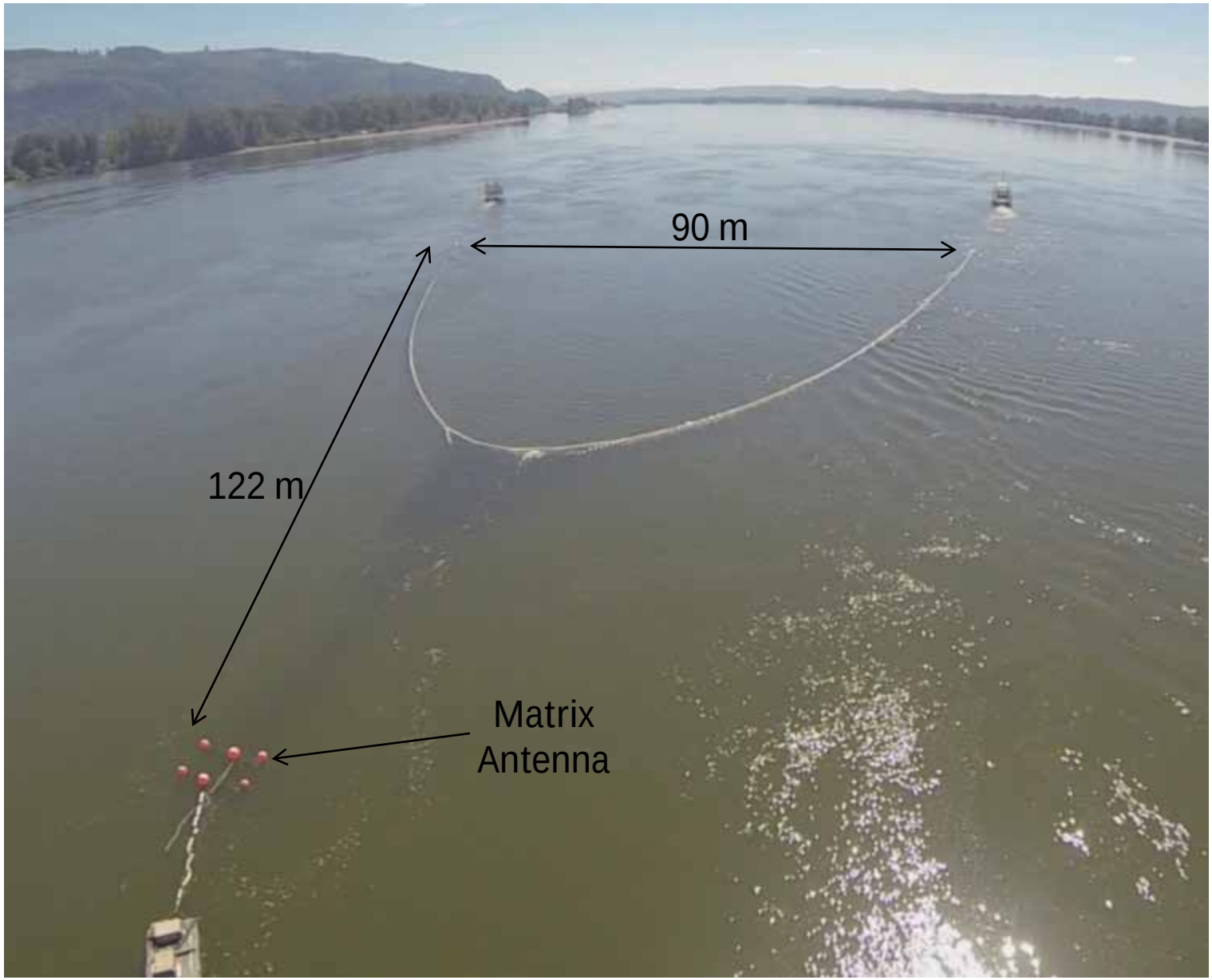
Objectives

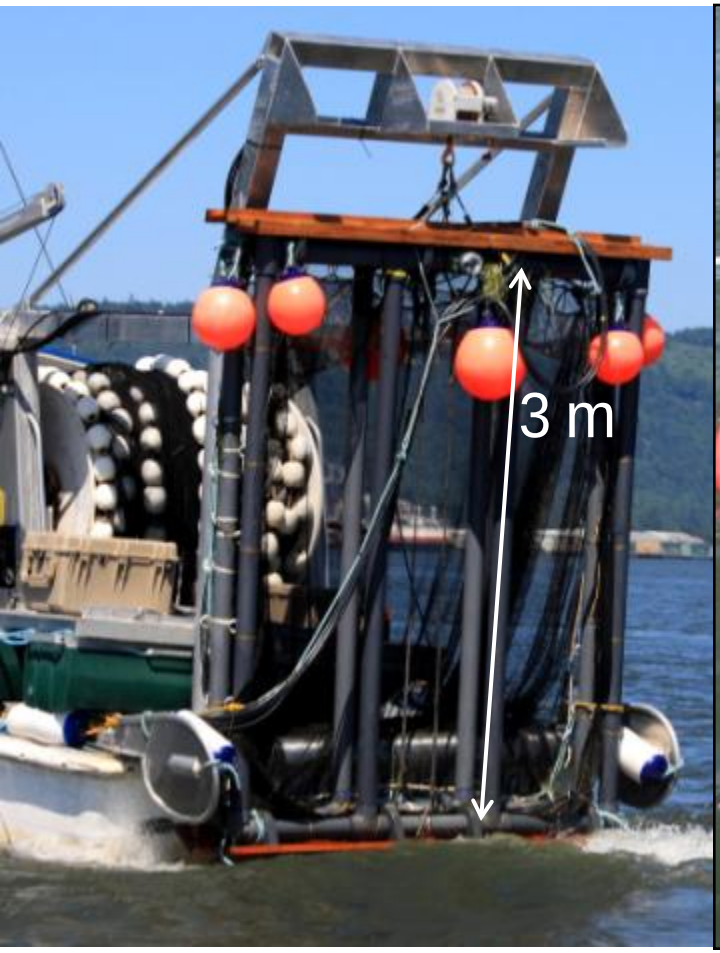
- Complete reach survival estimates to the tailrace of Bonneville Dam
- Compare timing and recovery rates of transported and inriver migrating juvenile salmonids
- Continue developing a new towed array

The Trawl Detection System

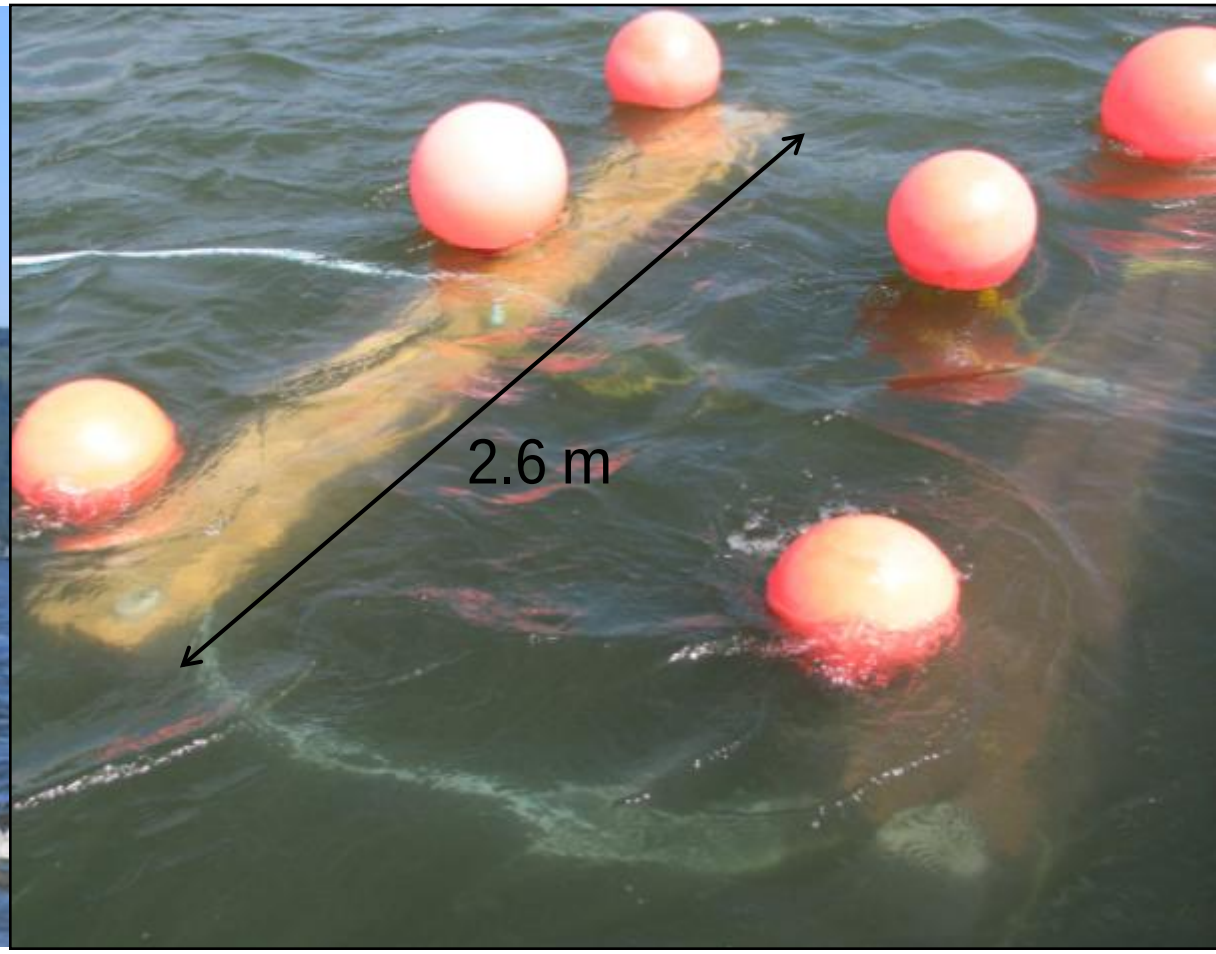


The Matrix Antenna

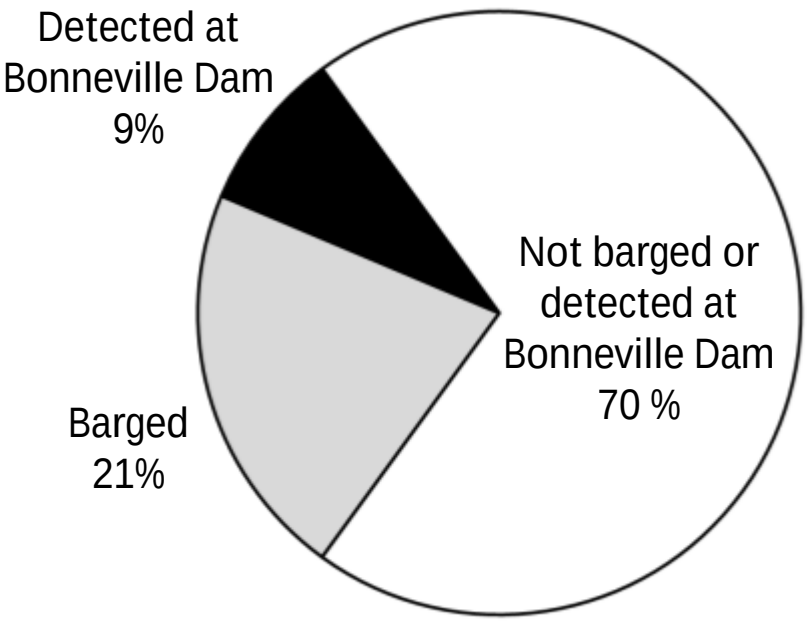
Pre-Deployment



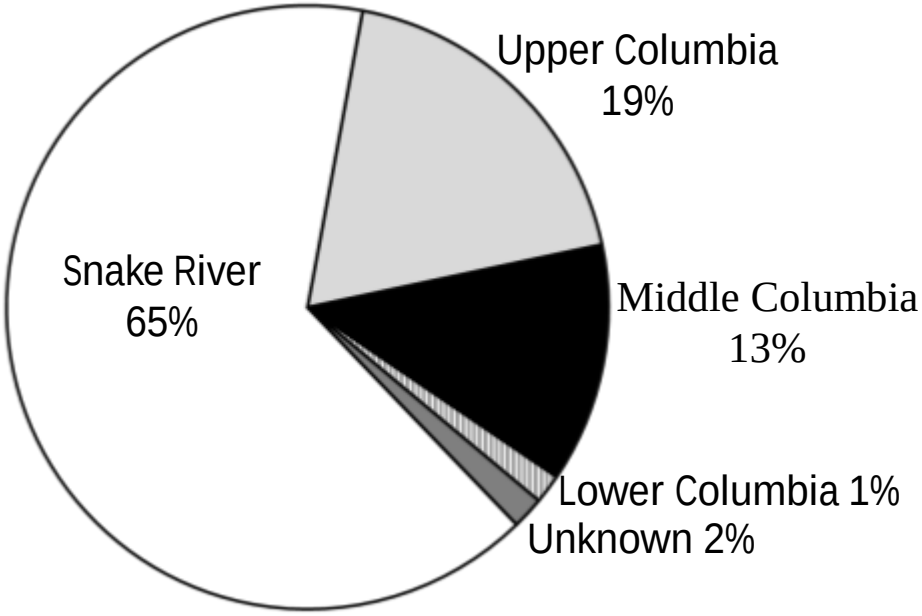
Under Tow



PIT-tagged Juvenile Salmonids Detected in the Estuary, 2014
N= 15,904

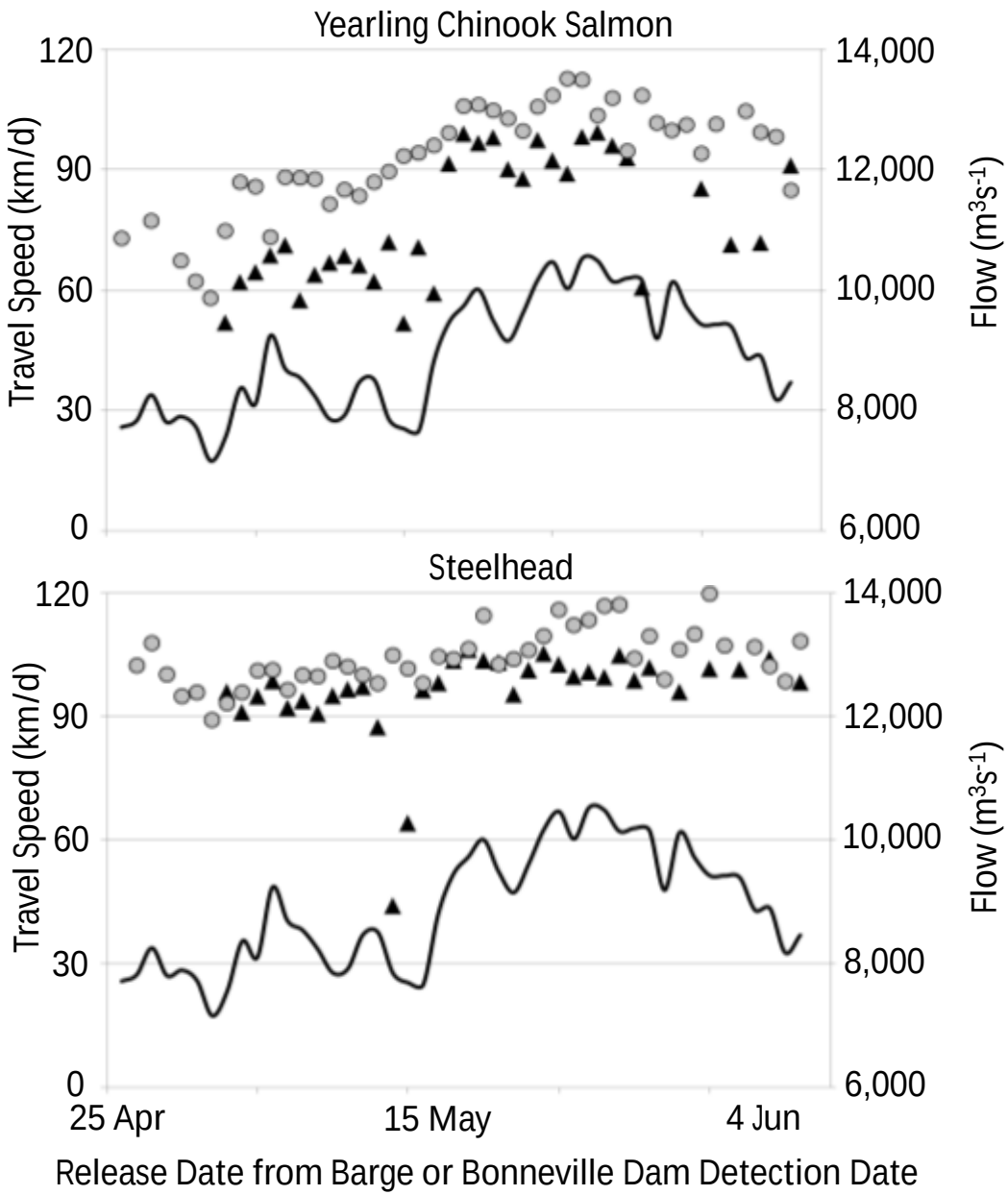


Migration History



Basin of Origin

Travel Speed, 2014

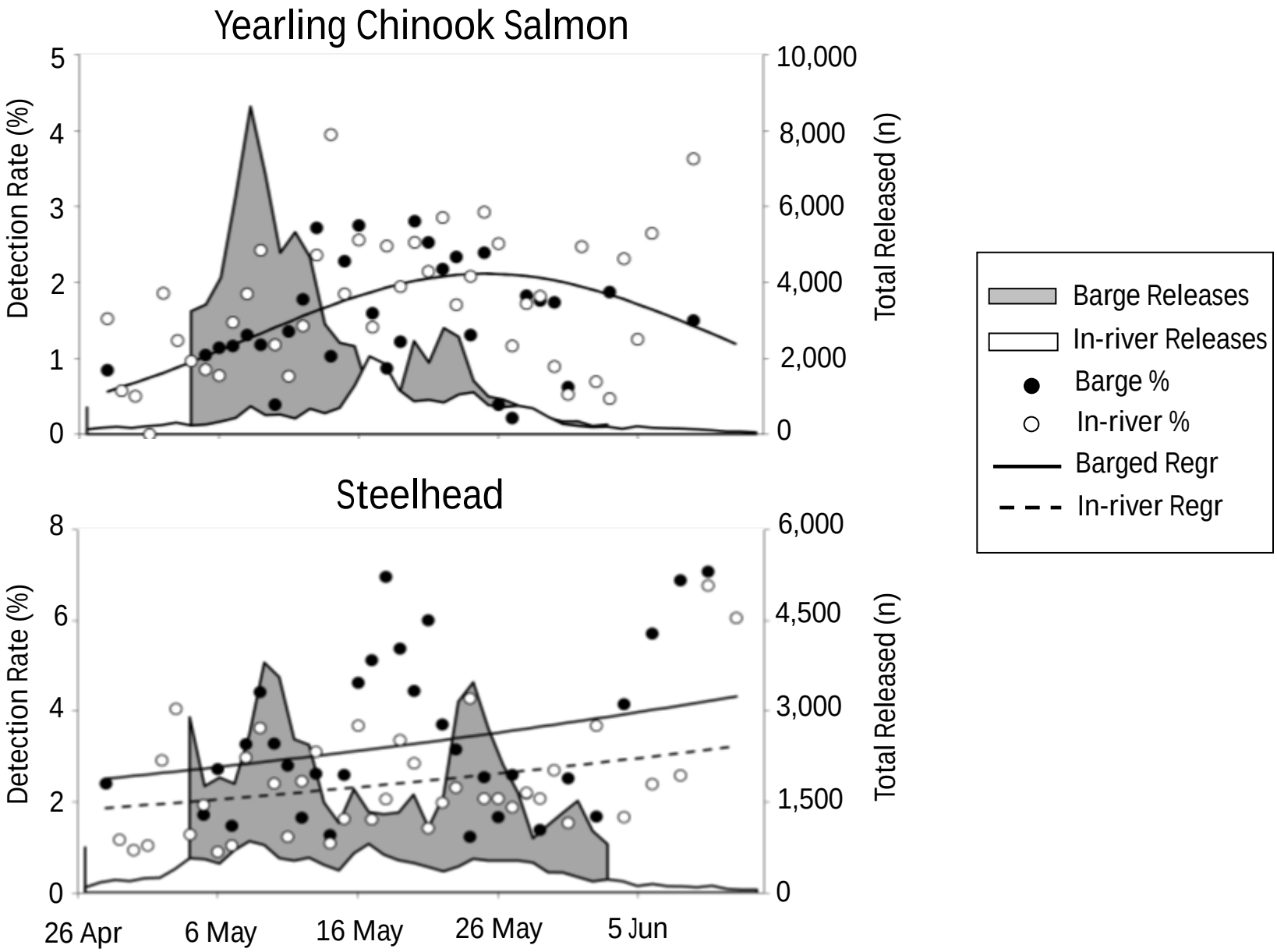


Inriver mean = 93 km/d
Barged mean = 78 km/d

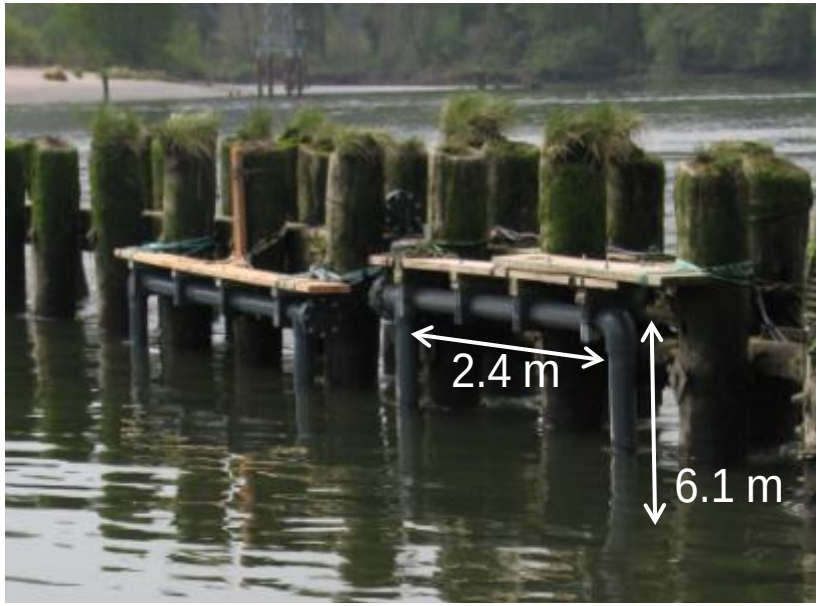
▲ Barged ● In-river
— Flow at Bonneville Dam

Inriver mean = 104 km/d
Barged mean = 96 km/d

Trawl Detection Rates, 2014



Designing a New Mobile Detection System



Can we utilize new reader and antenna technology to:

- Reduce project costs
- Increase detection rates
- Increase applicability of detection system design to other sites and systems

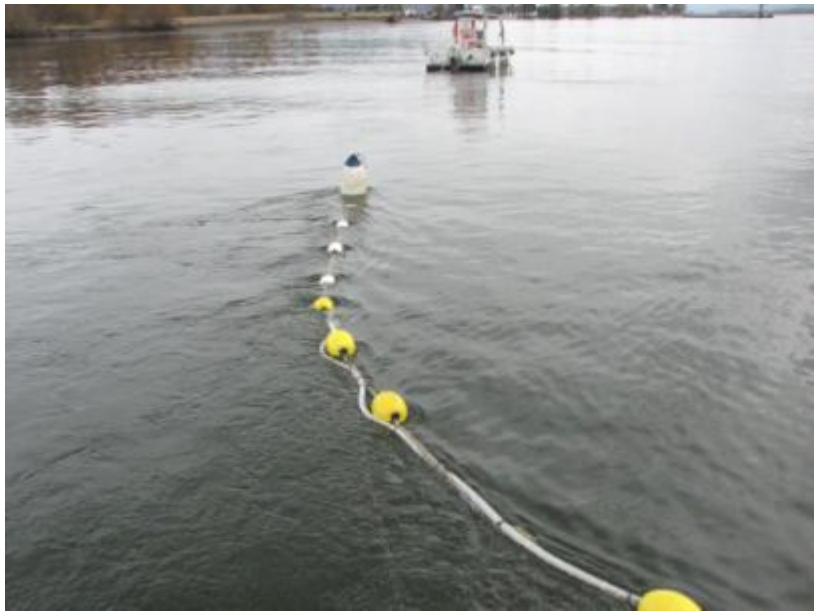
- Could they be towed or deployed in the thalweg to detect juveniles?

Antenna Development, 2013

Flexible Antennas

- Designed in conjunction with pile dike site
- 1.9-cm-diameter flexible hose
- Attached to a non-stretch rope frame for towing
- Could be towed by two skiffs

Flexible Antennas Under Tow



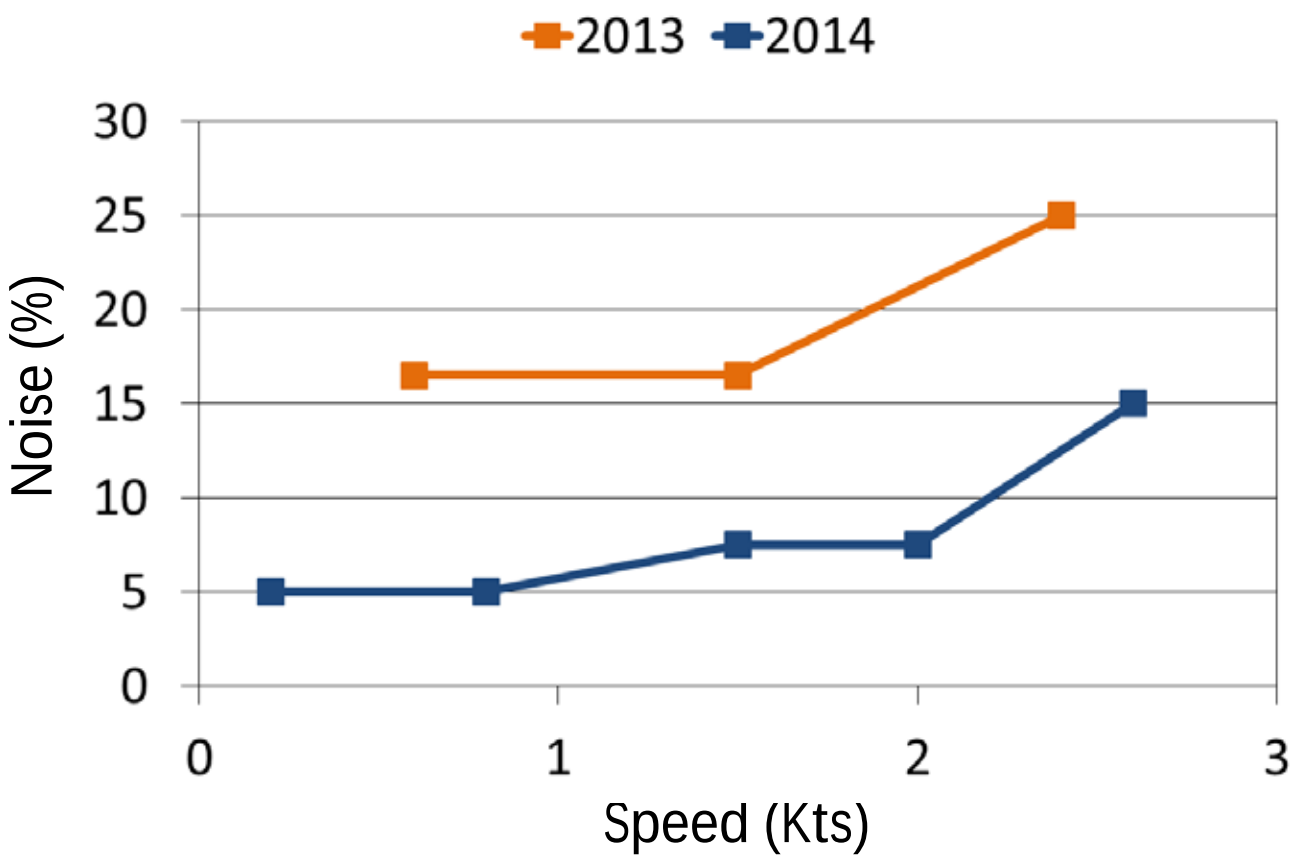
2013 Results:

- High noise and electronic variability from vibration
- Speed limited by tethering electronics (similar to trawl)

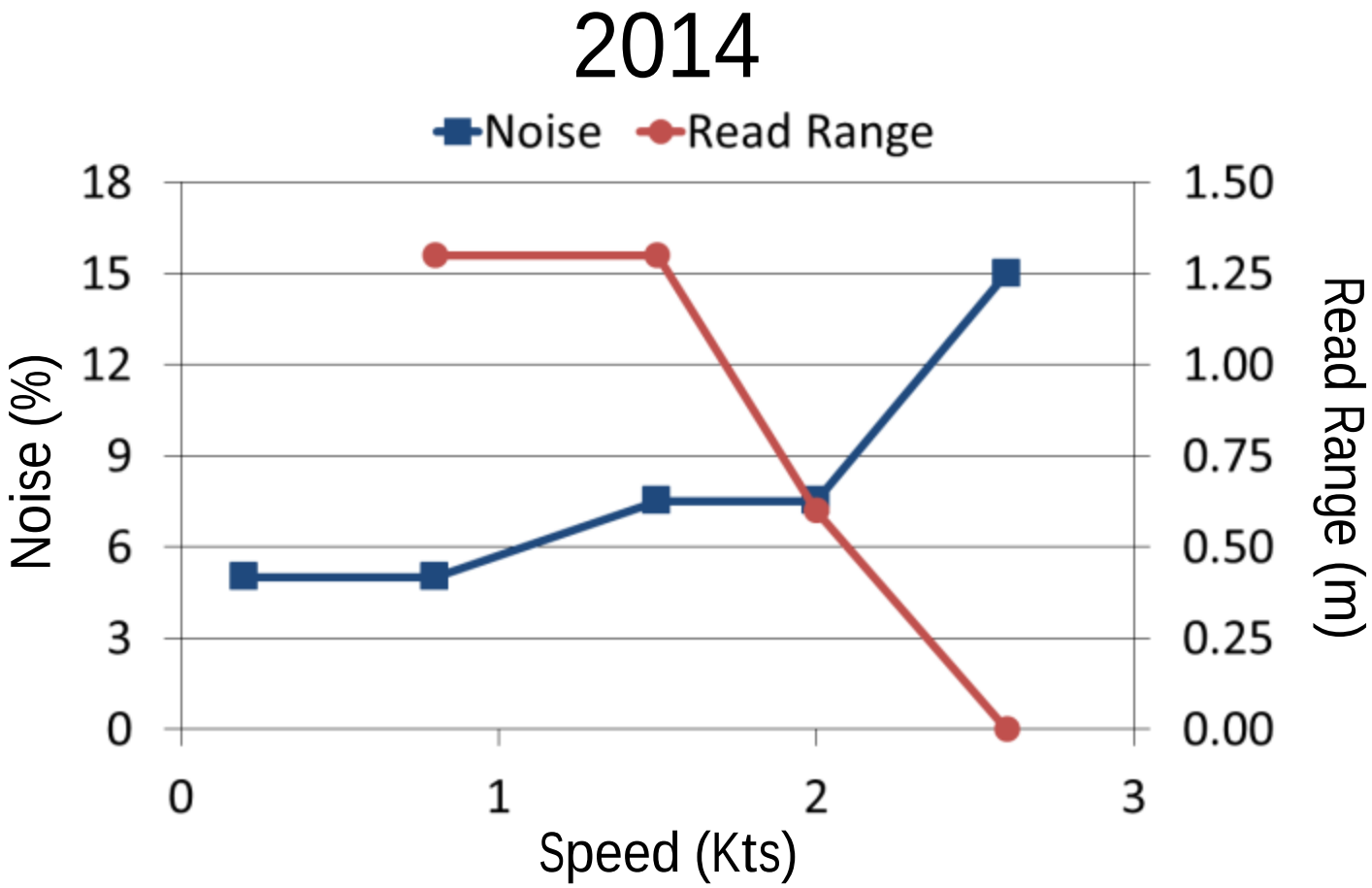
2014 Primary objectives:

- Test a single antenna design to evaluate system modifications
- Deploy antenna during spring migration
- Test a modular antenna design

Towed Flexible Antenna Results



Towed Flexible Antenna Results



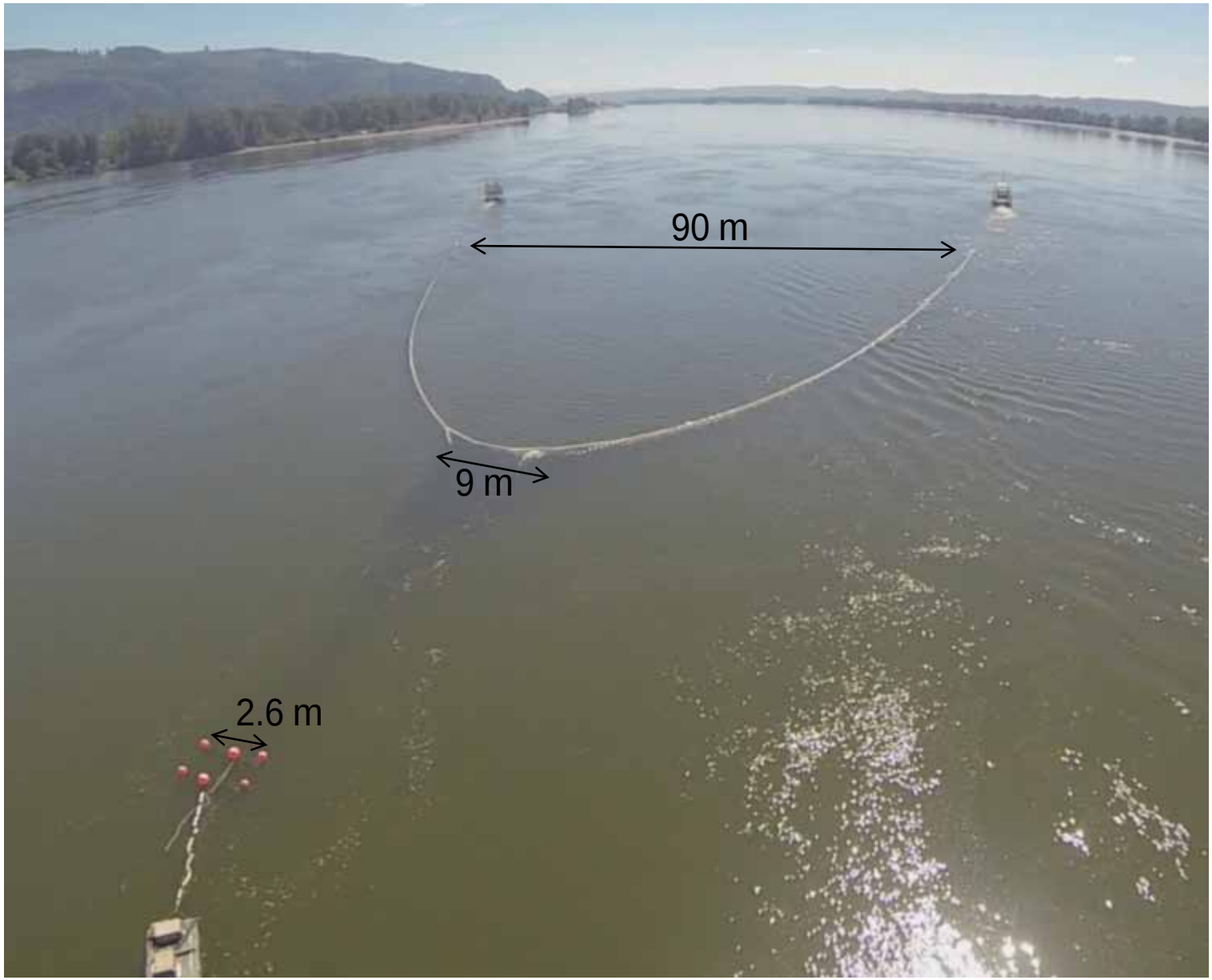
Towed Flexible Antenna Results

- Reduced vibration at all speeds
- Improved system design
- Improved electronic stability
- Detected 9 fish during short single-antenna tests
- Deployed two antennas in a modular design

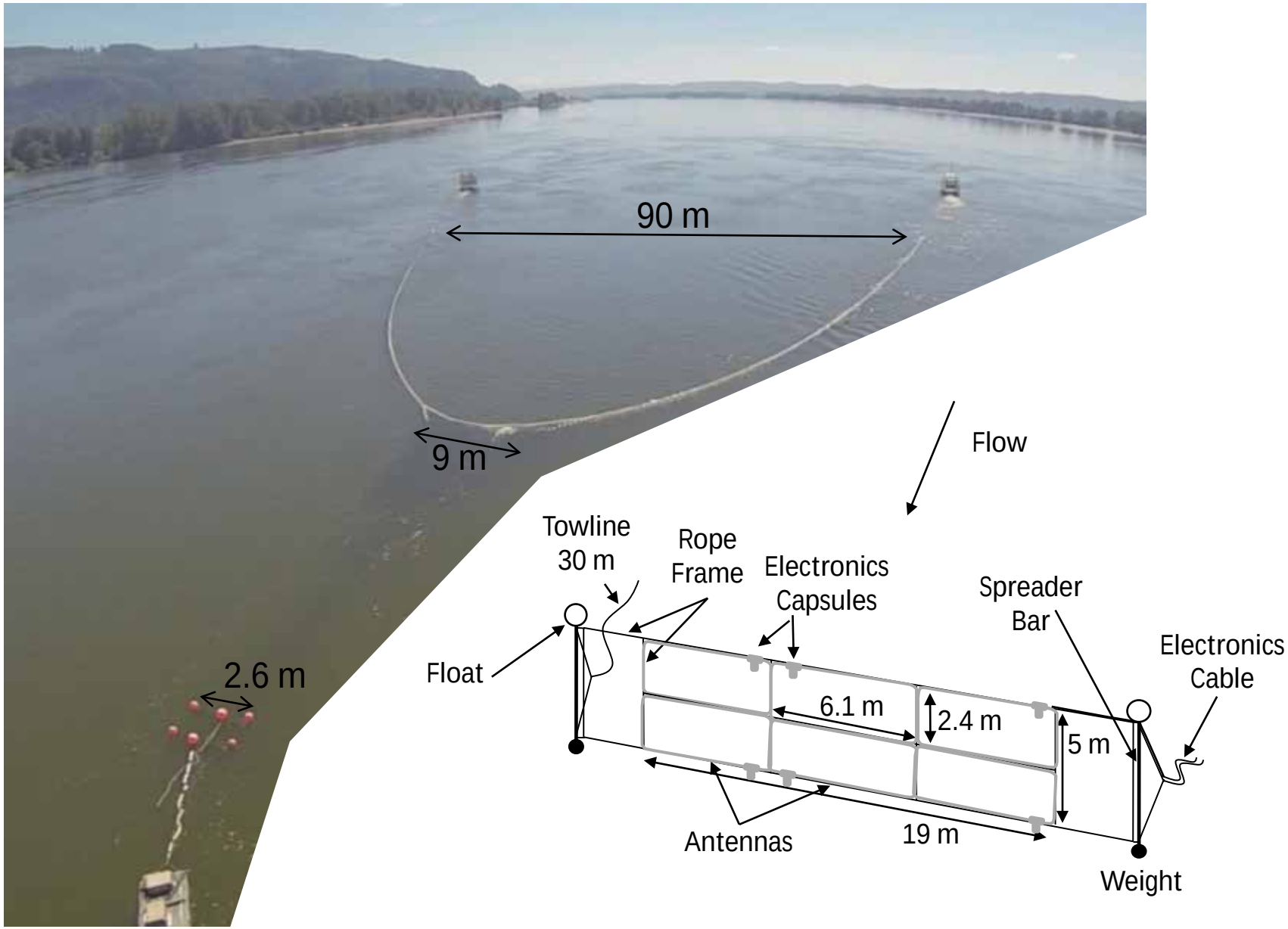
Plans for 2015

- Test modular design during spring migration- up to six antennas (5 x 19 m or 2.5 x 38 m)
- Test a towed vs. stationary array
- Sample in tandem with trawl for a direct comparison of n/h
- Further reduce system vibration for increased speed and electronic stability
- Continue researching and testing new antenna materials

Plans for 2015



Plans for 2015



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