Boneville Forebay Larval Lamprey Sampling 2016

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Method: Deepwater electrofishing/suction dredge, random-selected (GRTS) 10x10 m quadrats

Effort: 17 10x10 quadrats

Results

- The area in front of the Bradford Island Ladder exit was occupied with larval Pacific lamprey.
- 6/17 quadrats where larvae were collected (detection rate = 0.35)
- 9 total larval lamprey collected, 8 were PCL, 1 was UNID (30 mm TL)
- Size ranged from 30-120 mm TL (lengths were 30, 60, 65, 82, 84, 86, 112, 114, 120)
- Depth range 0.64-3.20 m
- Silty substrate observed that is suitable for burrowing
- This is the highest detection rate we have observed (the same as the Klickitat River mouth in 2013. Larvae are likely abundant.

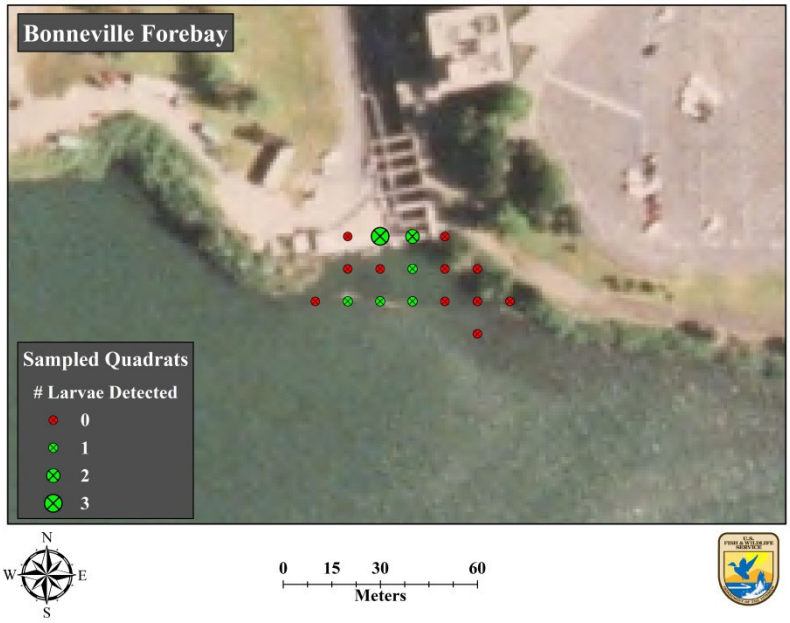

Figure 1. Sampled 10x10 m quadrats at the Bradford Island Ladder exit in Bonneville Forebay in 2016.

Abundance Estimate: 3,494 (95% credible interval: 2,419 – 5,106)

We estimated total abundance in the Bonneville forebay using count data from 17 deepwater electrofishing samples with a modified N-mixture model analyzed by Bayesian methods. This model has three parts. First, actual count in each electrofishing sample was assumed to be from a binomial distribution with estimated abundance for that electrofishing sample and capture efficiency of the deepwater electrofishing gear. Second, estimated abundance in each electrofishing sample was produced by a Poisson model with an expected value estimated from all electrofishing samples. Poisson models will produce non-negative integer values as expected values, which is appropriate since abundance must be a non-negative integer value. Thus, for each electrofishing sample, we estimated a non-negative integer value for abundance (with variance), which incorporates the estimated capture efficiency of our gear. Data on capture efficiency (expected value =0.70; 95% credible interval = 0.63 – 0.77) of our electrofishing gear for larval lamprey was from an experimental study we conducted at a fish hatchery and we assume that results from this hatchery study apply to wild systems. Third, we took the mean abundance in an electrofishing sample and scaled it up to the total area using data on area of an electrofishing sample (0.37 m^2) and the area in the Bonneville forebay (1,700 m^2). Our estimate of total abundance in the Bonneville forebay is 3,494 (95% credible interval: 2,419 – 5,106) individual larval lamprey. One assumption is that we collected a representative sample of the entire forebay in our 17 samples. Since we only sampled 0.37% of the area, results should be evaluated with some caution considering that larval lamprey density tends to be variable on multiple spatial scales; however, we believe that this estimate represents the general magnitude for total abundance.