

# ROCKY REACH PACIFIC LAMPREY MANAGEMENT PLAN

## Distribution, Composition, and Abundance of Juvenile Lampreys (*Lampetra* sp.) within the Observed Operating Range of Rocky Reach Reservoir, 2011

### STUDY REPORT

March 2012

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The goal of the Rocky Reach Pacific Lamprey Management Plan (PLMP) is “...to achieve No Net Impact (NNI) on Pacific lamprey by measuring ongoing Project-related impacts, if any, on Pacific lamprey; implementing appropriate and reasonable measures to reduce or eliminate such impacts; and implementing on-site or off-site measures to address unavoidable impacts.” One component of the PLMP for achieving NNI is to implement Section 4.3, which states:

***4.3 Objective 3: Measure Any Ongoing Project Impacts on the Existing Reservoir Habitat Used Currently by Juvenile Pacific Lamprey, and Eliminate Those Impacts to the Extent Appropriate and Reasonable.***

Within three years of the effective date of the New License, Chelan PUD shall measure juvenile lamprey presence and relative abundance in habitat areas that may be affected by ongoing Project operations. As part of this measure, Chelan PUD shall use existing aerial photographs, bathymetry, shoreline slope, velocity, and substrate characteristics to segregate habitat types into those areas with high, medium, and low potential for use by juvenile lamprey, and assess presence/absence in areas that may be affected by Project operations using electroshocking sampling (if permitted). If electroshocking is not permitted, alternative measures will be evaluated (Moser and Close 2003a; 2003b).

Chelan PUD shall, in consultation with the Rocky Reach Fish Forum (RRFF), develop a plan and implement appropriate and reasonable measures, if any, to address effects determined through evaluations in this subsection. If appropriate and reasonable measures cannot be determined to address such effects, Chelan PUD, in consultation with the RRFF, will identify and implement measures to address unavoidable impacts.

The intent of this study report is to document implementation of Section 4.3, Objective 3 of the PLMP.

## Objectives

1. Assess frequency, magnitude, and duration of Rocky Reach Reservoir fluctuations.
2. Identify shoreline shallow water habitat that is consistent with desired juvenile lamprey habitat that may be dewatered by ongoing Project operations.
3. Document presence of juvenile lamprey within and adjacent to habitat.
4. Determine potential effects of Project operations on juvenile lamprey.

## Methods

Existing aquatic habitat within the Rocky Reach Reservoir with juvenile lamprey rearing characteristics was identified using aerial photographs, bathymetry, shoreline slope, velocity, and substrate characteristics to segregate habitat types into those areas with high (Type 1), medium (Type 2), and low (Type 3) potential for use by juvenile lamprey. The magnitude, frequency, and duration of reservoir elevations in reference to habitats identified were assessed in order to identify potential sampling locations.

Juvenile lamprey presence was assessed in wadeable areas that may be affected by Project operations as well as deeper areas that likely remain watered during normal Project operations. Sampling areas were selected based on lamprey habitat types categorized by Hansen et al. (2003). Type 1 is the preferred habitat for juvenile lamprey and consists of sand, fine organic material, detritus, and/or aquatic vegetation. Type 2 habitat is suitable for juvenile lamprey and consists of shifting sand or gravel with little fine organic material. Type 3 habitat is composed of bedrock or hardpan clay along with larger gravel and is unsuitable for juvenile lamprey.

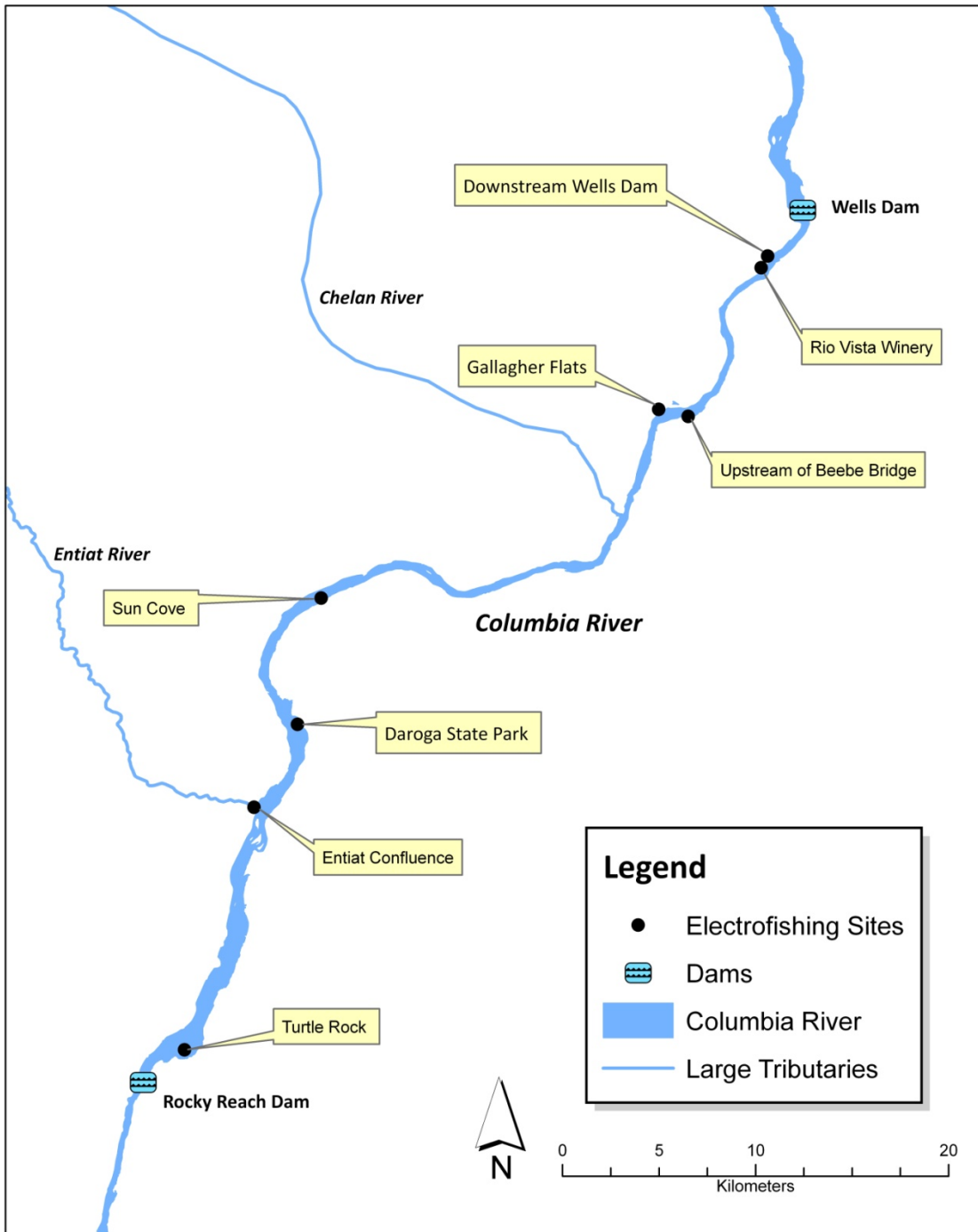
Electrofishing was conducted using an ABP-2 backpack electrofisher set at 125 volts (DC), 3 pulses per second, a 25% duty cycle, and a 3:1 pulse train. Sampling was conducted at a slow walking pace in wadeable water depths for a minimum of 8 minutes. Total length (mm) was measured for each captured juvenile lamprey. Following recovery, captured juveniles were released at the location of capture.

Sampling station reconnaissance and location identification was conducted on 14 November 2011. Electrofishing for juvenile lamprey at identified sampling stations was conducted on 18 November 2011.

## Results

Juvenile lamprey sampling was conducted at sampling sites identified in Figure 1. Details of juvenile lamprey sampling locations, duration, and time of day are shown in Table 1.

# Rocky Reach Reservoir Juvenile Lamprey Sampling



**Figure 1.** Juvenile lamprey electrofishing sampling locations.

**Table 1.** Juvenile lamprey sampling locations, duration, and time of day.

Site Name	Latitude	Longitude	Electrofishing Time	Time of Day
Turtle Rock (east side)	47.54682971	-120.2655617	10 min, 45 sec.	8:45
Entiat Confluence	47.66098251	-120.2243807	13 min.	9:30
Daroga State Park	47.70040801	-120.1967424	11 min, 42 sec.	10:01
Sun Cove	47.7595498	-120.1838521	11 min, 45 sec.	10:30
Gallagher Flats	47.8533302	-119.9555106	12 min, 58 sec.	11:59
Rio Vista Winery	47.9209587	-119.8880906	8 min, 10 sec.	12:15
Downstream of Wells Dam	47.9264806	-119.8839092	11 min, 49 sec.	12:30
Upstream of Beebe Bridge	47.8505602	-119.9348802	10 min, 15 sec.	13:30

Substrate was generally Type 1 habitat in all areas sampled. Substrate at the Daroga Park site exhibited more gravel/cobble composition close to shore, with Type 1 habitat more prevalent in water deeper than could be electrofished affectively. Substrate at the site upstream of Beebe Bridge was comprised of fine sand, but also contained large growths of aquatic vegetation.

Juvenile lamprey were captured only at the Sun Cove site. Five juvenile lamprey were captured, anesthetized, measured for total length, allowed to recover, and released at the location of capture. Lengths of the five juvenile lamprey were: 113 mm, 115 mm, 120 mm, 138 mm, and 142 mm.

## Discussion

1. Assess frequency, magnitude, and duration of Rocky Reach Reservoir fluctuations.

Assessment of Rocky Reach Reservoir fluctuations was conducted during the Bull Trout Stranding Investigation conducted in 2005, 2006, and 2007, and reported in 2008 (Chelan PUD 2008). Headwater elevations were compiled to create headwater duration curves that were then used to identify shallow-water habitat that may be dewatered on a regular basis. Headwater duration curves demonstrated little reservoir habitat was subject to dewatering due to very stable conditions provided by the operation of Rocky Reach. However, sampling stations were established in shallow-water habitat areas identified with the potential for dewatering and containing typical juvenile lamprey substrate size.

2. Identify shoreline shallow-water habitat that is consistent with desired juvenile lamprey habitat that may be dewatered by ongoing Project operations.

Shoreline shallow-water habitat (Type 1) preferred by juvenile lamprey was identified in the Rocky Reach Reservoir by reviewing aerial photographs, the Rocky Reach Aquatic Habitat Mapping Study Report (DES 2001), and by conducting a boat survey of the reservoir for suitable sampling locations in November 2011.

3. Document presence of juvenile lamprey within and adjacent to habitat.

Juvenile lamprey captured at the Sun Cove site were found along the outside edge of a fairly steep drop-off, going from about 2-feet deep to about 4-feet deep, on the upstream side of a point.

No juveniles were captured further toward the inner part of the bay inside the point in shallower water. Substrate was comprised primarily of fine sand, but also contained a considerable amount of leaf litter, more so than any other sample site. The size of the juveniles indicated that they were older year classes, and the larger specimens may be approaching the size at transformation.

4. Determine potential effects of Project operations on juvenile lamprey.

The sampling crew believed that the location at which the juveniles were collected was deeper than the lowest point of reservoir fluctuation, thus protecting the juveniles from becoming dewatered or stranded. If true, than the sampling conducted in 2011 indicates that juvenile lamprey were not present within suitable habitat within the area of reservoir fluctuations.

## Acknowledgements

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## References

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