Methow Subbasin Larval Lamprey Monitoring Report, 2017

[Cover Photo: Overview of a larval lamprey survey site on the Methow River (river km 59.3) where Western Brook Lamprey were identified in September, 2017]

Project No. 2008-470-00

Report was completed under BPA Contract No. 56662 REL 123

Report covers work performed from: August, 2017 - September, 2017

Tyler Beals and Ralph Lampman

Confederated Tribes and Bands of the Yakama Nation
Yakama Nation Fisheries Resource Management Program, Pacific Lamprey Project
P.O. Box 151, Toppenish, Washington 98948, USA

Report Created: March, 2018

This report was funded in part by the Bonneville Power Administration (BPA), U.S. Department of Energy, as part of BPA's program to protect, mitigate, and enhance fish and wildlife affected by the development and operation of hydroelectric facilities on the Columbia River and its tributaries. The views in this report are the author's and do not necessarily represent the views of BPA.

ABSTRACT

John Crandall (Methow Salmon Recovery) first established some long-term monitoring sites within the Methow and Chewuch rivers in 2008. Since then, Crandall has surveyed these sites each year. Since 2013, the Yakama Nation Pacific Lamprey Project has aided John Crandall with these surveys. The following is a summary of John Crandall's information he collected in 2017. Some of his survey methods are different from that of the Yakama Nation Fisheries, but the common information collected between Yakama Nation and John Crandall are presented in this report.

In the Methow River, a total of three index sites were surveyed by John Crandall and Yakama Nation Fisheries in August and September, 2017. The sites are located at river km 25.6, 59.3 and 74.7. Overall electrofishing densities were low, though highest at the most upstream survey site (0.5, 0.9 and 1.2 #/m^2 at river km 25.6, 59.3 and 74.7, respectively). The average length decreased as river km increased (64 mm, 45 mm, 32 mm, at river km 25.6, 59.3 and 74.7, respectively). No young of year (YOY) larvae were found at the surveyed sites. Western Brook Lamprey were morphologically identified at river km 59.3, although these samples are awaiting genetic confirmation. The warmest water temperature measured was at river km 25.6 (19.2˚C). At river km 25.6, the sediment temperature (measured a maximum of 10 cm below the sediment) was 6.3˚C cooler than the plot temperature (measured directly above the sediment). At all of the surveyed sites, the sediment temperature was cooler than the plot temperature (1.7 to 1.9˚C cooler).

In the Chewuch River, a total of five index sites were surveyed by John Crandall and Yakama Nation Fisheries in August and September, 2017. The sites are located at river km 0.8, 16.1, 23.9, 28.6 and 49.6. Lamprey were present at 3 of 5 (60%) surveyed sites. No lamprey were found upstream of river km 23.9. Electrofishing densities increased slightly from downstream to upstream sites (0.8, 2.6, and 3.5 #/m^2 at river km 0.8, 16.1 and 23.9, respectively). Young of year (YOY) larvae were only found at river km 16.1. The warmest temperature measured in the Chewuch River was 19.8˚C at river km 0.8. The sediment temperature was lower than the plot temperature at all surveyed sites in August, 2017. The differences in temperature under the sediment compared to the plot increased as river km increased (1.9 C, 2.7 and 4.7˚C cooler, at river km 0.8, 16.1 and 49.5, respectively).

INTRODUCTION

John Crandall (Methow Salmon Recovery) established some long-term monitoring sites within the Methow and Chewuch rivers in 2008. Since then, Crandall has surveyed these sites each year. Since 2013, the Yakama Nation Pacific Lamprey Project has aided John Crandall with these surveys. The following is a summary of John Crandall's information he collected in 2017. Some of his survey methods are different from that of the Yakama Nation Fisheries, but the common information collected between Yakama Nation and John Crandall are presented.

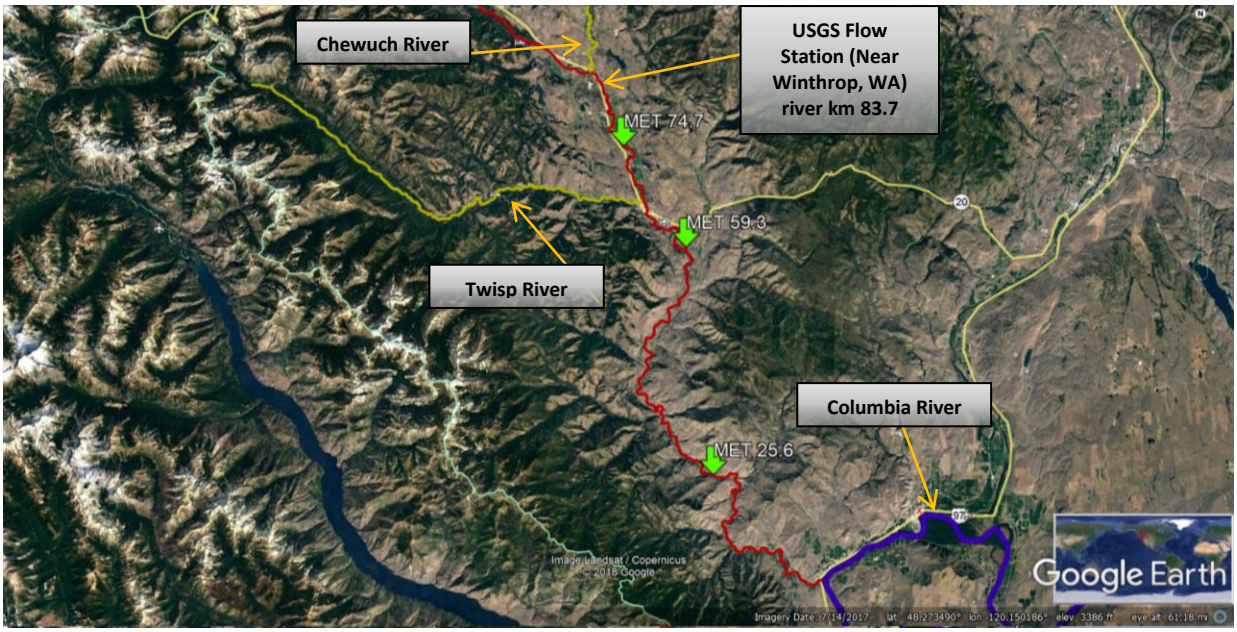
METHODS

In addition to John Crandall's survey information, sediment type (sand, silt or clay) was recorded for the specific area (1 m^2) where the most lampreys were observed (separate measurements for YOY and all other lampreys). The sediment depth (cm), water depth (cm), plot temperature (˚C) and sediment temperature (a max of 10 cm below the sediment) were also recorded at this location (separate measurements were taken for YOY larvae, if different). If no fish were observed, plot temperature was taken where the best available habitat was observed. Thalweg temperature was recorded to represent the main channel temperature.

RESULTS

Methow River Survey Summary of Index Sites Established by John Crandall, Methow Salmon Recovery.

In the Methow River, a total of three index sites (long term status and trend monitoring sites) were surveyed by John Crandall and Yakama Nation Fisheries in August and September, 2017 (Map 1). The sites are located at river km 25.6, 59.3 and 74.7.



Map 1. Overview of all surveyed sites in the Methow River (red line) in 2017, displaying surveyed index sites (green arrows) where electrofishing occurred. The location of a USGS Flow Station (near Winthrop, WA; river km 83.7) is also labeled. Tributaries (yellow lines) and Columbia River (blue line) are labeled accordingly.

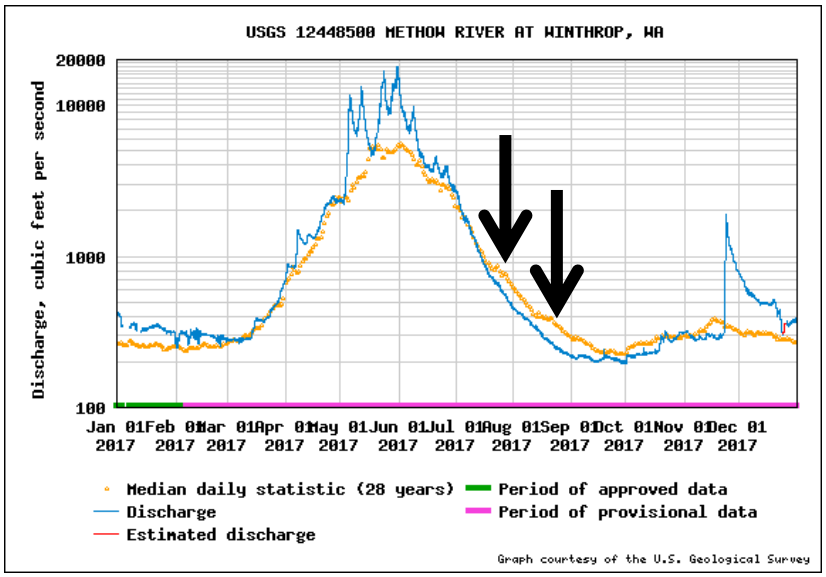


Figure 1. Discharge (cubic feet per second indicated by the narrow blue line) of the Methow River near Winthrop, WA (river km 83.7) in 2017; black arrow indicates survey period (August and September, 2017).

Methow River Survey Highlights

- The warmest water temperature measured was at river km 25.6 (19.2 C; Table 1). At river km 25.6, the sediment temperature (measured a maximum of 10 cm below the sediment)

was 6.3 C cooler than the plot temperature (measured directly above the sediment). At each of the surveyed sites, the sediment temperature was cooler than the plot temperature (1.7 to 1.9 C cooler).

- Overall electrofishing densities were low, though highest at the most upstream survey site (0.45, 0.88 and 1.18 #/m^2 at river km 25.6, 59.3 and 74.7, respectively; Table 2). The average length decreased with an increase in site distance upstream (64 mm, 45 mm, 32 mm, at river km 25.6, 59.3 and 74.7, respectively). No young of year (YOY) larvae were found at the surveyed sites.
- Western Brook Lamprey were morphologically identified at river km 59.3, although these samples are awaiting genetic confirmation (Figure 2).

Table 1. Summary habitat information collected from surveyed index sites in the Methow River in August and September, 2017. Under "Site Type", "JC Index" indicates that the surveyed sites are index sites originally established by John Crandall, Methow Salmon Recovery. Yakama Nation aided in the survey of John Crandall's index sites. Under "Primary Surveyed Habitat", "Type I" indicates that the electrofishing survey was focused on Type I (preferred) larval lamprey habitat. Plot temp was taken where the most lampreys were found. Sediment temp was taken where the most lampreys were found (a maximum of 10 cm under the sediment). "Sed. Temp Diff[erence]." was calculated by subtracting the plot temp from the sediment temp (a negative value indicates that the sediment temperature is cooler than the plot temperature). Thalwag temp was taken in the main channel flow.

Date	Site Type	Stream	River KM	Primary Surveyed Habitat	Plot Temp °C	Sed. Temp °C	Sed. Temp Diff. °C	Thal-weg Temp °C
8/8/2017	JC Index	Methow	25.6		19.2	12.9	-6.3	19.2
9/6/2017	JC Index	Methow	59.3	**Type I**	18.4	16.5	-1.9	12.1
8/8/2017	JC Index	Methow	74.7		12.1	10.4	-1.7	18.4

Table 2. Larval lamprey capture details at index sites surveyed in the Methow River in August and September, 2017. "Number (#) observed" is the total number of lampreys encountered (a total of captured and missed lampreys). "E-Fish Density" is calculated from the number (#) observed and the shocked area. * The shock area is estimated for river km 59.3 (no data recorded on site). The "Min", "Max" and "Mean" lengths are calculated from measured lampreys.

Date	Stream	River km	Shock Time (Sec)	Shock Area (m2)	# Captured	# Observed	E-Fish Density (#/m^2)	Min Length (mm)	Max Length (mm)	Mean Length (mm)
8/8/2017	Methow	25.6	2534	97	37	44	0.45	64	119	83
9/6/2017	Methow	59.3	2255	50*	42	44	0.88*	45	175	82
8/8/2017	Methow	74.7	3057	116	124	137	1.18	32	83	58

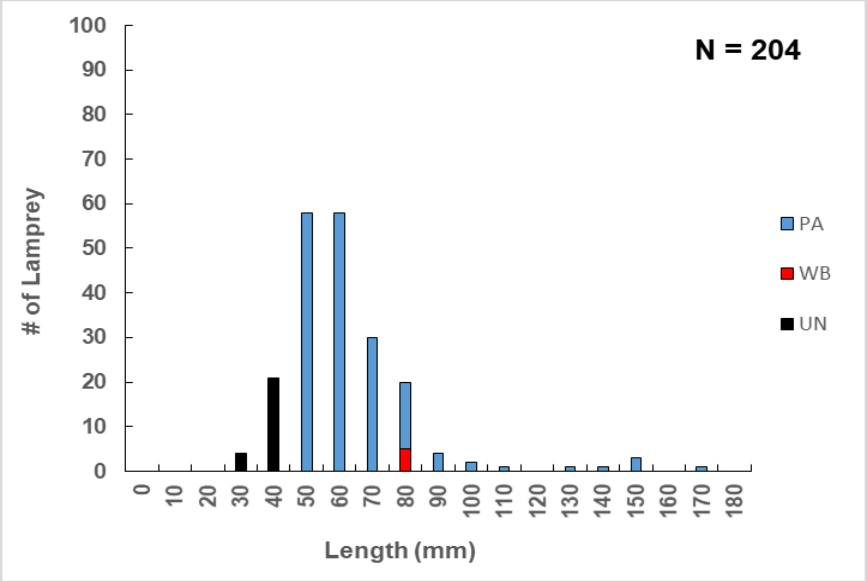


Figure 2. Histogram of all measured lampreys captured during electrofishing surveys, separated by species ("PA"= Pacific Lamprey (blue), "WB" Western Brook Lamprey (red), and "UN"=Unknown Lamprey <50 mm (black), in the Methow River in August and September, 2017.

Chewuch River Survey Summary of Index Sites (Chewuch confluence with Methow River at river km 84.0).

In the Chewuch River, a total of five index sites (long term status and trend monitoring sites) established by John Crandall, were surveyed by John Crandall and Yakama Nation in August and September, 2017 (Map 2). The sites are located at river km 0.8, 16.1, 23.9, 28.6 and 49.6.

Map 2. Overview of all surveyed sites in the Chewuch River (red line) in August and September, 2017, displaying surveyed index sites (green arrows) where electrofishing occurred. Nearby streams are labeled accordingly (yellow lines).

Chewuch River Survey Highlights

- The warmest temperature measured in the Chewuch River was 19.8 C at river km 0.8 (Table 3). The sediment temperature was lower than the plot temperature at all surveyed sites in August, 2017. The temperature under the sediment was increasingly cooler than the plot temperature from downstream to upstream sites in August, 2017 (1.9 C, 2.7 and 4.7 C cooler, at river km 0.8, 16.1 and 49.5, respectively).
- Lamprey were present at 3 of 5 (60%) surveyed sites (Table 4). No lamprey were found upstream of river km 23.9. Electrofishing densities increased from downstream to upstream sites (0.75, 2.55, and 3.51 #/m^2 at river km 0.8, 16.1 and 23.9, respectively).
- Young of year (YOY) larvae were found at river km 16.1.

Table 3. Summary habitat information collected from surveyed index sites in the Chewuch River in August and September, 2017. Under "Site Type", "JC Index" indicates that the surveyed sites are index sites originally established by John Crandall, Methow Salmon Recovery. Yakama Nation aided in the survey of John Crandall's index sites. Under "Primary Surveyed Habitat", "Type I" indicates that the electrofishing survey was focused on Type I (preferred) larval lamprey habitat. Plot temp was taken where the most lampreys were found. Sediment temp was taken where the most lampreys were found (a maximum of 10 cm under the sediment). "Sed. Temp Diff[erence]." was calculated by subtracting the plot temp from the sediment temp (a negative value indicates that the sediment temperature is cooler than the plot temperature). Thalwag temp was taken in the main channel flow.

Date	Survey Crew	Stream	River KM	Primary Surveyed Habitat	Plot Temp °C	Sed. Temp °C	Sed Temp Diff. °C	Thal-weg Temp °C
8/9/2017	JC Index	Chewuch	0.8		19.8	17.9	-1.9	19.8
8/9/2017	JC Index	Chewuch	16.1		16.2	13.5	-2.7	16.0
9/6/2017	JC Index	Chewuch	23.9	**Type I**	11.9	13.7	1.8	11.2
8/9/2017	JC Index	Chewuch	28.6		-	-	-	15.5
8/9/2017	JC Index	Chewuch	49.5		13.6	9.11	-4.5	13.6

Table 4. Larval lamprey capture details at index sites surveyed in the Chewuch River in August and September, 2017. "Number (#) observed" is the total number of lampreys encountered (a total of captured and missed lampreys). "E-Fish Density" is calculated from the number (#) observed and the shocked area. * The shock area is estimated for river km 59.3 (no data recorded on site). The "Min", "Max" and "Mean" lengths are calculated from measured lampreys.

Date	Stream	River km	Shock Time (Sec)	Shock Area (m2)	# Captured	# Observed	E-Fish Density (#/m2)	Min Length (mm)	Max Length (mm)	Mean Length (mm)
8/9/2017	Chewuch	0.8	3124	142	95	106	0.75	37	145	66
8/9/2017	Chewuch	16.1	6795	153	333	390	2.55	11	125	66
9/6/2017	Chewuch	23.9	1750	44	131	156	3.51	38	73	53
8/9/2017	Chewuch	28.6	2167	55	0	0	-	-	-	-
8/9/2017	Chewuch	49.5	1875	69	0	0	-	-	-	-

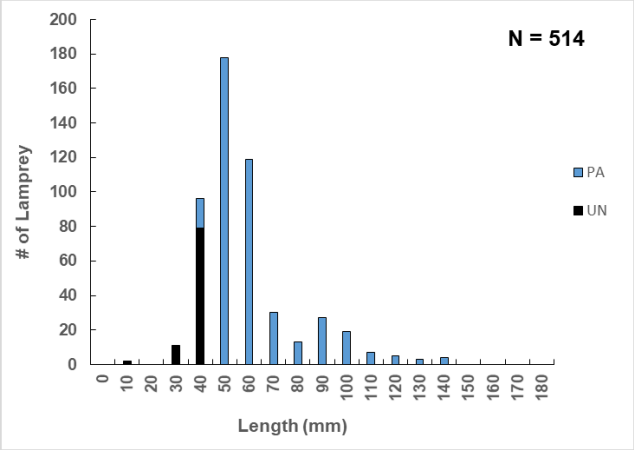


Figure 3. Histogram of all measured lampreys captured during electrofishing surveys, separated by species ("PA"= Pacific Lamprey (blue), and "UN"=Unknown Lamprey <50 mm (black), in the Chewuch River in August and September, 2017.