



Translocation of Adult Pacific Lamprey within the Upper Columbia, 2017-2018 Broodstock



(Cover Photo: Outreach event with Methow Valley Independent Learning Center students prior to releasing the adult Pacific Lamprey into Upper Methow River on April 12, 2017)

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Highlights

- A total of 694 adult 2017-2018 broodstock Pacific Lamprey from Lower Columbia (n=380) and Mid-Columbia (n=314) were translocated to Upper Columbia between August 16, 2017, and April 13, 2018.
- From the PITAGIS regional data base (<http://www.ptagis.org/>), using Query Builder2 Reports, the interrogation data of PIT tagged lamprey were summarized.
- Overall, 42% were detected from the Lower Columbia broodstock releases (which focused on Methow Subbasin releases) and only 18% were detected from the Mid-Columbia broodstock releases (which focused on mainstem Columbia releases).

Abstract

This report is composed of four parts: 1) summary of Lower Columbia 2017-2018 broodstock adult Pacific Lamprey releases within the Methow Subbasin, 2) analysis of migration data from Lower Columbia 2017-2018 PIT tagged adults, 3) summary of Mid-Columbia 2017-2018 broodstock adult Pacific Lamprey releases within the Upper Columbia, and 4) analysis of migration data from Mid-Columbia 2017-2018 PIT tagged adults. From the Lower Columbia 2017-2018 broodstock (adults collected in summer 2017 that primarily mature in 2018), a total of 285 adult Pacific Lamprey were released in the Methow Subbasin, plus 95 adults released in mainstem Columbia just downstream of Methow River confluence. Adults were released at eight locations between September 5, 2017, and April 13, 2018. This is the third year that adult Pacific Lamprey were translocated into the Methow Subbasin. Prior to translocation, larval numbers and distribution have steadily decreased in the recent years and the younger age classes were mostly absent, likely as a result of depressed numbers of adults moving into the subbasin. Translocation was implemented in 2015 out of concern for the possibility of species extinction in the near future within the entire subbasin. In addition, 314 adult Pacific Lamprey from Priest Rapids Dam were released in the Upper Columbia on August 16, 2017 (136 below Methow River confluence, 129 below Okanogan River confluence, and 49 into Similkameen River), as a result of collaboration between Yakama Nation Fisheries, Colville Tribes Fish and Wildlife, and Douglas and Grant County Public Utility districts. In total, 360 adults were released in mainstem Columbia, 285 in Methow Subbasin, and 49 in Okanogan Subbasin. From the PITAGIS regional data base (<http://www.ptagis.org/>), using Query Builder2 Reports, the interrogation data of PIT tagged lamprey were summarized. Overall, 42% were detected from the Lower Columbia broodstock releases (which focused on the Methow Subbasin releases) and only 18% were detected from the Mid-Columbia broodstock releases (which focused on mainstem Columbia releases). The largest number of detections were from Chewuch River (especially river km 1.6), and very few (n=3) were detected moving into Upper Methow River (upstream of Chewuch River confluence). As of now, most lamprey migrating in mainstem Upper Columbia appear to be entering Methow River and many of those entering Methow River appear to select Chewuch River as their final destination.

Part I: Release Summary (Adults from Lower Columbia)

From the 2017-2018 Lower Columbia broodstock (adults collected from Bonneville, The Dalles, and John Day dams in summer 2017, most of which mature in spring/summer 2018), a total of 380 adult Pacific Lamprey (375 PIT tagged) were released in the Upper Columbia upstream of Wells Dam between September 5, 2017, and April 13, 2018 (Fig. 1 and Table 1). Overall female ratio was estimated to be 32.0%, PIT tag ratio was 98.2% (8, 9, 12 mm tags; 0.4, 93.6, 6.1%, respectively), and genetic tag ratio was 98.2% (Table 2). Lamprey were originally captured from John Day Dam (25.3%), The Dalles Dam (17.2%), and Bonneville Dam (43.5%) or a mix of the aforementioned sources (14.0%) from the Lower Columbia River during the summer of 2017. Total length averaged 660 mm (min. 510 mm and max. 770 mm), weight averaged 458.1 g (min. 219.5 g and max. 727.6 g), and interdorsal length averaged 31.1 mm (min. 16 mm and max. 59 mm) during the PIT tagging operations between Summer 2017 and Spring 2018.

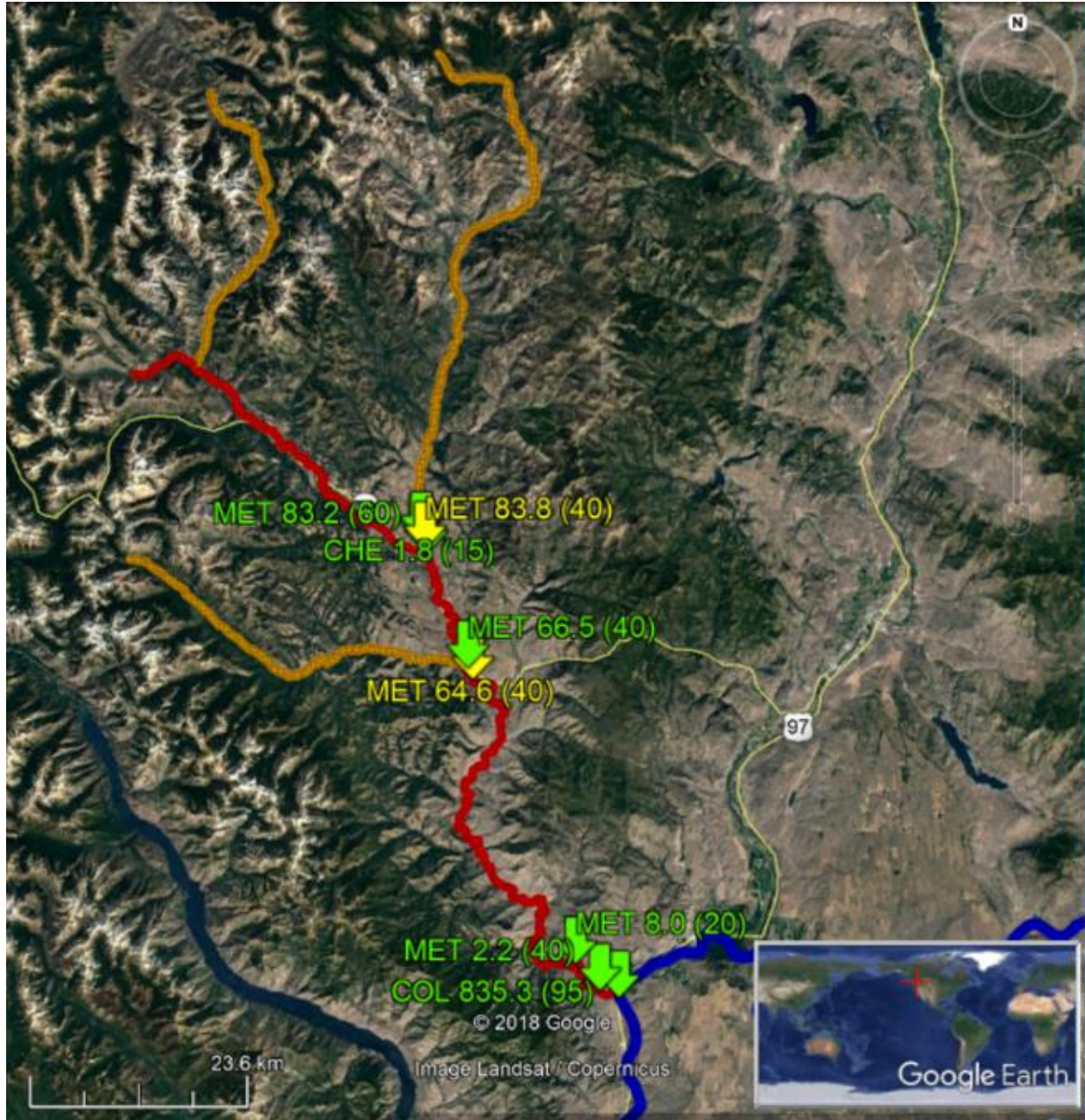


Figure 1. Overall aerial map of Lower Columbia 2017-2018 broodstock Pacific Lamprey translocation release sites in the Methow Subbasin (including one Columbia River release site). “MET” stands for Methow, “CHE” stands for Chewuch, “COL” stands for Columbia, the number next to the stream name is the river km, and the number in parenthesis is the total number of lamprey released. The red line represents mainstem Methow River, the orange lines represent its tributaries (Twisp, Chewuch, and Lost rivers from downstream to upstream), and the blue line represents the Columbia River.

Table 1. Summary of Lower Columbia 2017-2018 broodstock Pacific Lamprey translocation release information in the Methow Subbasin (including one Columbia River release site). Total number on the lower right is the sum of all Methow Subbasin releases and does not include Columbia mainstem releases.

Subbasin	River	RKM	Date	Location	Season	Time	Water Temp (C°)	#
Columbia	Columbia	835.3	9/5/2017	Below Methow R. confluence	Fall	12:40	20.6	95
Methow	Methow	2.2	9/5/2017	Side channel near river mouth	Fall	14:10	18.6	40
Methow	Methow	8.0	9/5/2017	Methow Valley Hwy Bridge	Fall	14:35	17.9	20
Methow	Methow	66.5	9/14/2017	Hwy 20 Bridge in Twisp, WA	Fall	14:30	14.7	40
Methow	Methow	83.2	9/14/2017	Heckendorn Park, Winthrop, WA	Fall	12:55	12.5	60
Methow	Chewuch	1.1	9/5/2017	downstream of Chewuch Lower PIT array	Fall	15:30	16.5	30
Methow	Chewuch	1.8	9/5/2017	upstream of Chewuch Lower PIT array	Fall	15:45	16.5	15
Methow	Methow	64.6	4/13/2018	Below Twisp R. confluence	Spring	11:20	6.1	40
Methow	Methow	83.8	4/13/2018	Riverside Road Bridge, Winthrop, WA	Spring	12:20	5.5	40
Methow	-	-	-	-	-	-	-	285

Table 2. Summary of Lower Columbia 2017-2018 broodstock Pacific Lamprey translocation release data in the Methow Subbasin (including one Columbia River release site). “# F” is “# of female lamprey”, and “# M” is “# of male lamprey.” “(?)” denotes lower certainty with the sex ID. Female Ratio includes “# F (?)” and “# M (?)” in the estimation. The source of the lamprey is also shown (BON=Bonneville Dam, TDA=The Dalles Dam, JDA=John Day Dam, PRO=Prosser Dam, Mix=mixed source).

River	RKM	Date	#	# F	# M	# (?)	# (?)	# UN	# BON	# TDA	# JDA	# PRO	# Mix	# w/ 8mm	# w/ 9mm	# w/ 12mm	# w/ Genetic	Est. Female Ratio	PIT Tag Ratio	Genetic Tag Ratio
Columbia	835.3	9/5/2017	95	16	68	8	3	0	45	20	0	0	30	0	47	48	95	25%	100%	100%
Methow	2.2	9/5/2017	40	7	24	3	3	3	8	17	0	0	15	0	37	0	37	27%	93%	93%
Methow	8.0	9/5/2017	20	5	11	1	3	0	10	5	0	0	5	0	20	0	20	30%	100%	100%
Methow	66.5	9/14/2017	40	9	23	6	1	1	39	0	0	0	1	0	39	0	39	38%	98%	98%
Methow	83.2	9/14/2017	60	14	36	3	7	0	42	9	2	0	7	0	60	0	60	28%	100%	100%
Chewuch	1.1	9/5/2017	30	7	22	1	0	0	7	14	0	0	9	0	15	15	30	27%	100%	100%
Chewuch	1.8	9/5/2017	15	3	11	0	1	0	9	4	0	0	2	0	14	1	15	20%	100%	100%
Methow	64.6	4/13/2018	40	10	23	5	2	0	2	0	38	0	0	0	40	0	40	38%	100%	100%
Methow	83.8	4/13/2018	40	14	22	2	2	0	7	0	32	0	1	1	37	1	39	40%	98%	98%
-	-	-	285	69	172	21	19	4	124	49	72	0	40	1	262	17	280	32.0%	98.2%	98.2%

Columbia Release (River KM 835.3)

A total of 95 lamprey (all PIT tagged) were released at river km 835.3 in the Columbia River downstream of the confluence with Methow River on September 5, 2017 (Fig. 2). Water temperature was 20.6°C during the release. For summer release, we target our releases to take place between 15-20°C.

The primary goal of the Columbia River release was two-fold: 1) to release them in the lower reach of the mainstem Upper Columbia River to allow them to determine their preferred spawning reaches and 2) to get an understanding of the ratio of lamprey that move into the Methow Subbasin from mainstem Columbia River based on detection from the PIT array sites in the Methow Subbasin.

Lower Methow Releases (River KM 2.2 and 8.0)

A total of 40 lamprey (37 PIT tagged) were released at river km 2.2 in Lower Methow River just downstream of the lowermost PIT array on September 5, 2017 (Fig. 2). An additional 20 tagged lamprey were released upstream of the PIT array on the same day. Water temperature was 18.6 and 17.9°C, respectively, during the release. For summer release, we target our releases to take place between 15-20°C.

The primary goal of the two lower releases was two-fold: 1) to release them in the lower reach of the mainstem to allow them to determine their preferred spawning reaches; and 2) to get an understanding of the detection efficiency of the instream PIT array located at river km 3.1 (LMR) and 46.4 (MRC).



Figure 2. Aerial map of Pacific Lamprey translocation in Columbia River at 835.3 and Lower Methow River at river km 2.2 and 8.0 (green arrows). The number next to the stream abbreviation is the river km and the number in parenthesis is the total number of lamprey released. Shown with the blue circle is the PIT tag array location (LMR). Also, 0.1 km points along the Methow River (red dots) and mainstem Columbia River (blue dots) are displayed.

Middle Methow Releases (River KM 66.5 and 64.6)

A total of 40 lamprey (39 PIT tagged) were released at river km 66.5 (immediately upstream of the East Methow Valley Highway 20 bridge) in the middle reach of Methow River downstream of the confluence with Twisp River on September 14, 2017. In addition, a total of 40 lamprey (all PIT tagged) were released at river km 64.6 (Haltermans Hole) several months later on April 13, 2018 (Fig. 3). Water temperature was 14.7 and 6.1°C, respectively. For summer release, we target

our releases to take place between 15-20°C, and for early spring release, we target our releases to take place when streams/rivers reach 7-12°C.

The primary goal of the middle releases was two-fold: 1) to release them in the middle reach of the mainstem to allow them to determine their preferred spawning reaches; and 2) to understand whether any portion of the adults would migrate into Twisp River on their own, taking advantage of the existing instream PIT array sites just upstream of the Methow/Twisp river confluence (MRT and TWR).

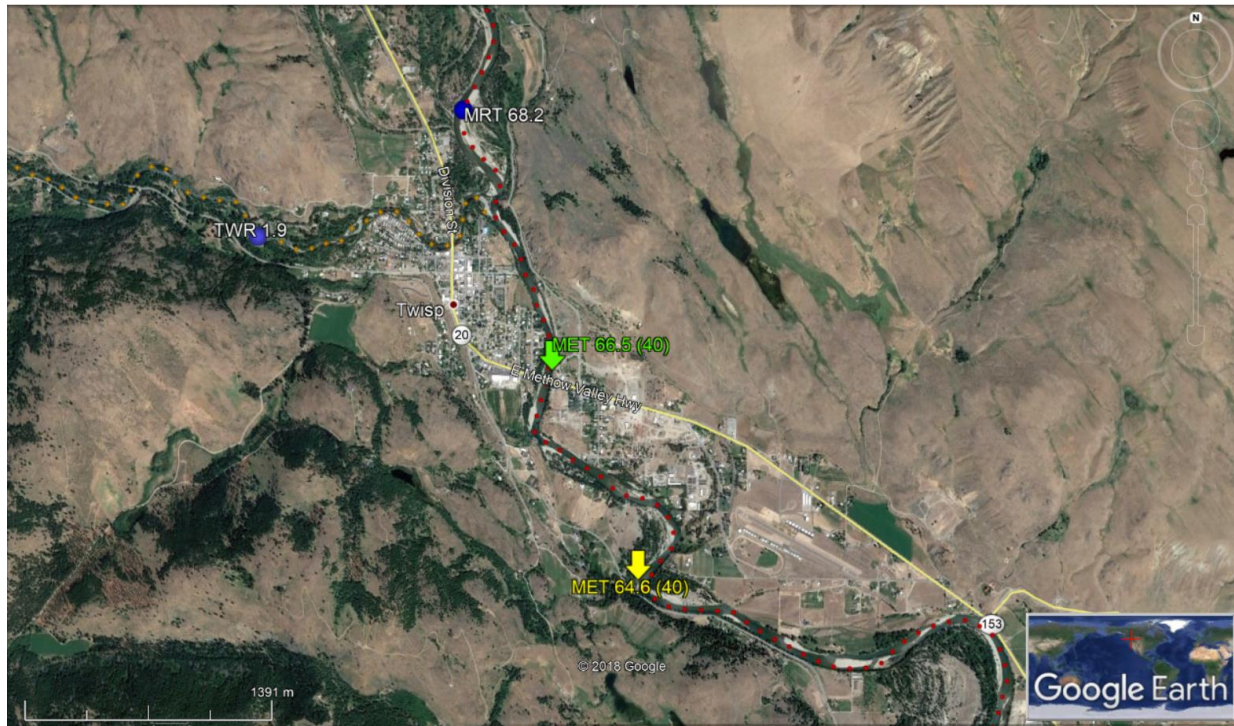


Figure 3. Aerial map of Pacific Lamprey translocation in Middle Methow River at river km 66.5 during summer 2017 (green arrow) and at river km 64.6 during spring 2018 (yellow arrow). The number next to the stream abbreviation is the river km and the number in parenthesis is the total number of lamprey released. Shown with the blue circle are the PIT tag array locations. Also, 0.1 km points along the Methow River are displayed as red dots and those along the Twisp River are orange dots.

Upper Methow (River KM 83.2 and 83.8) and Chewuch (River KM 1.1 and 1.8) Releases

A total of 60 lamprey (all PIT tagged) were released in Upper Methow River at river km 83.2 (Heckendorn Park, Winthrop, WA) downstream of Chewuch River confluence on September 14, 2017 (Fig. 4). In addition, a total of 40 lamprey (39 PIT tagged) were released at river km 83.8 downstream of Chewuch River confluence downstream of Riverside Road Bridge (Winthrop, WA) on April 13, 2018. Water temperature was 12.5 and 6.1°C, respectively. Finally, 30 and 15 lamprey (all PIT tagged) were also released in Lower Chewuch River at two sites (river km 1.1 and 1.8,

respectively) on September 5, 2017. Water temperature was 16.5°C at both of these sites. For summer release, we target our releases to take place between 15-20°C, and for early spring release, we target our releases to take place when streams/rivers reach 7-12°C.

The primary goal of the upper releases was two-fold: 1) to release them in the upper reach of the mainstem to allow them to determine their preferred spawning reaches; and 2) to understand the migration behavior of the lamprey in the upper reach, taking advantage of the existing instream PIT array sites just upstream of the Methow/Chewuch river confluence (MRW and CRW). Questions include whether any portion of the adults would migrate into Upper Methow River on their own and the detection efficiencies of the arrays.

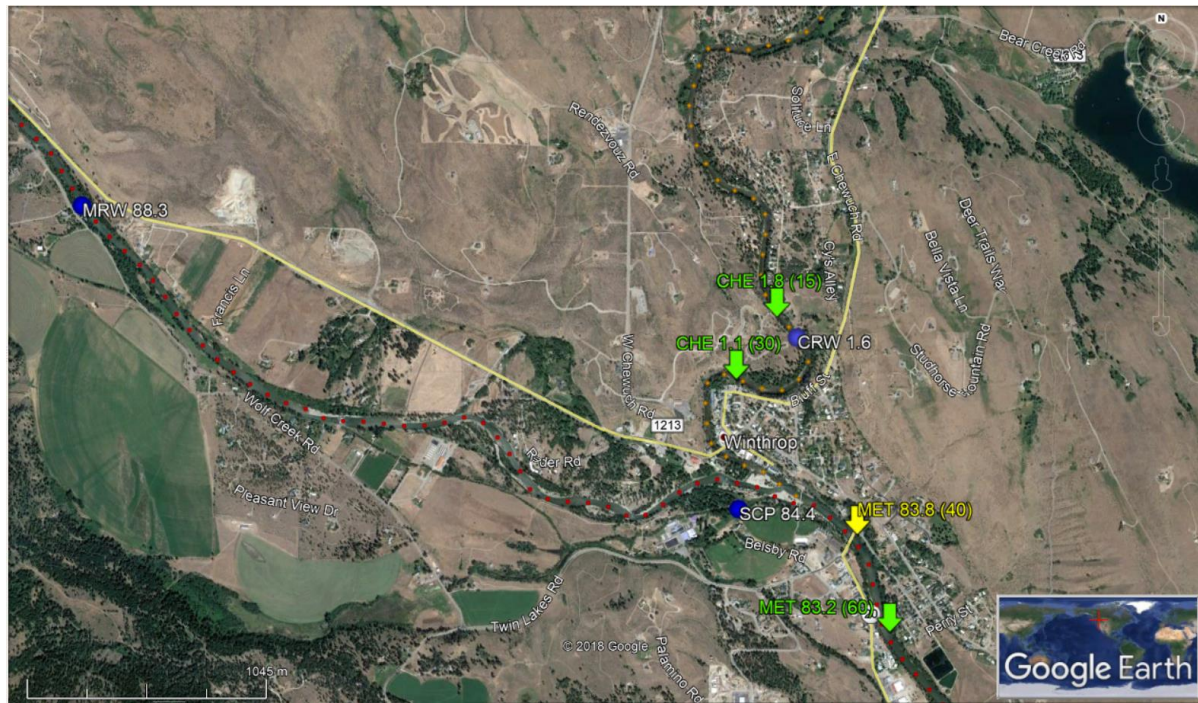


Figure 4. Aerial map of Pacific Lamprey translocation in the Upper Methow River at river km 83.2 and 83.8 and in the Chewuch River at river km 1.1 and 1.8. Green arrows display summer 2017 releases and yellow arrows display spring 2018 releases. The number next to the stream abbreviation is the river km and the number in parenthesis is the total number of lamprey released. Shown with the blue circle are the PIT tag array locations. Also, 0.1 km points along the Methow River are displayed as red dots and those along the Chewuch River are orange dots.

Part II: Pit Tag Detection and Analysis (Adults from Lower Columbia)

From the PITAGIS regional data base (<http://www.ptagis.org/>), using Query Builder2 Reports, the interrogation data of individual PIT tagged lamprey is summarized. Out of 375 total PIT tagged lamprey released, 158 lamprey (42.1%) were detected in at least one PIT array site, and 28 lamprey (7.5%) were detected at more than one site. The percent detection was slightly higher during the summer compared to the spring release (45.3% and 30.4%, respectively) possibly due to higher flow conditions. First detection was on September 5, 2017 (0 days after first release) and last detection was on July 20, 2018 (318 days after first release).

There are a total of five instream PIT array sites located on the mainstem Methow River (river km 3.1, 46.4, 68.2, 88.3) (Fig. 8). Additional array sites are present on a side channel (river km 80.2; Whitefish Side Channel) and a hatchery acclimation channel (river km 84.4; Spring Creek Acclimation Pond) along Methow River. There are two sites each on the Chewuch River (river km 1.6 and 28.1), and one site each on Twisp (river km 1.9) and Lost (river km 0.8) rivers. The array site at river km 68.2 (MRT) is immediately upstream of the Twisp River confluence on the Methow River. The array site at river km 88.3 (MRW) is immediately upstream of the Chewuch River confluence on the Methow River. Most sites have a pair of arrays, consisting of lower (downstream) and upper (upstream) arrays, except for MRC (Methow river km 46.4), which only has a single array. There are several more instream PIT arrays in side channels and next to acclimation ponds throughout the subbasin, but these represent the primary arrays on the mainstem and key tributaries that Pacific Lamprey will likely approach.

At the flow monitoring station near Pateros, WA (river km), Methow River water flow was approximately 275 cfs during the first release events between September 5 and 14, 2017, and 2750 cfs during the second release event on April 13, 2018 (Fig. 9). High flow discharge was observed primarily in May and water flow ranged between 6,000 and 20,000 cfs. The last detection was on July 20, 2018, when water flow was steadily decreasing to approximately 1,000 cfs.

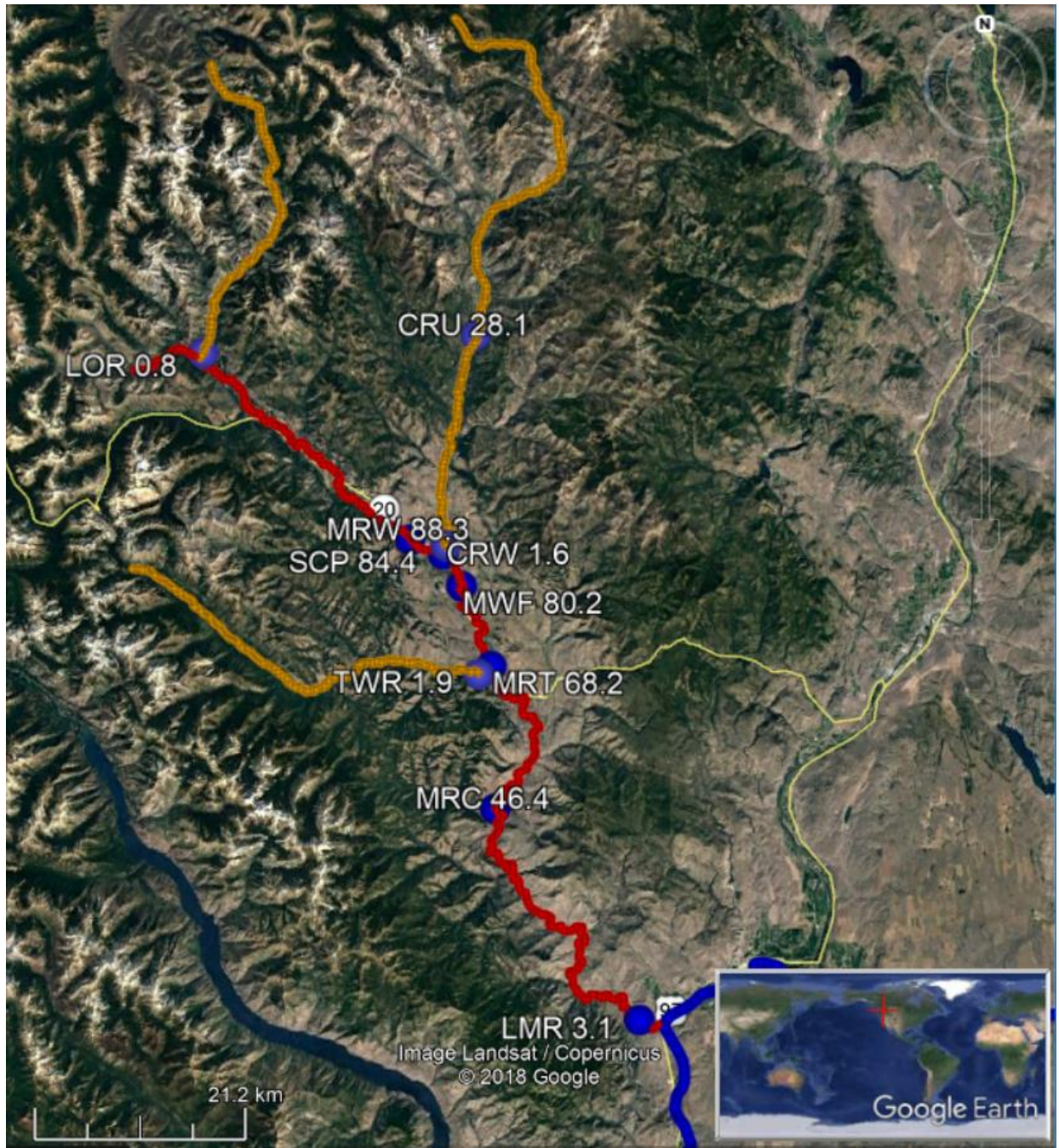


Figure 8. Overall aerial map of instream PIT array sites within the Methow Subbasin (blue circles). The three letter abbreviation and its associated river km is labeled. The red line represents mainstem Methow River, the orange lines represent its tributaries (Twisp, Chewuch, and Lost rivers from downstream to upstream), and the blue line represents the Columbia River.

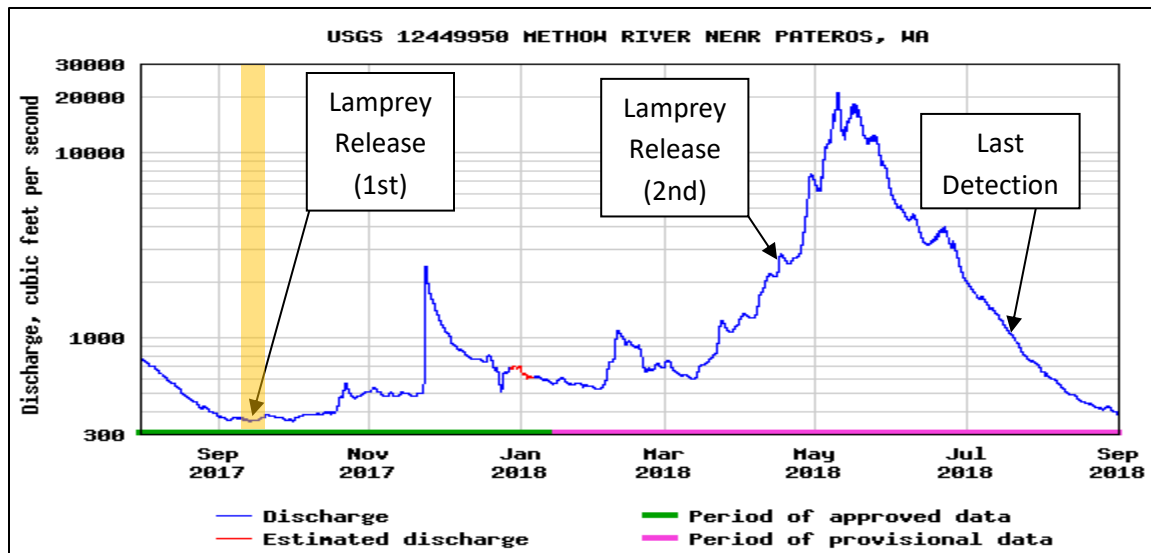


Figure 9. Discharge (cubic feet per second) data of the Methow River near Pateros, WA (river km) between August 1, 2017, and September 1, 2018 (US Geological Survey National Water Information System: Web Interface). First and second lamprey releases as well as last PIT array detection are also displayed.

The detection summary from each release groups are described below. The first bullet point summarizes the overall detection percentages, the second bullet point summarizes the location of first detections, and if there were any lamprey with multiple detections, the following bullet point summarizes those additional detection locations, and finally the last bullet point summarizes the overall detection from all detections, including multiple detections.

A table is also attached to provide summary data on first detection of all detected lamprey (ordered by detection site longitude primarily and by detection date secondarily), including the site name, first and last detection date/time, days since release (or days since last detection for second or third detections), distance traveled, migration speed, duration of detection, movement direction, first and last antenna, and total number of detections. Some of the columns are color coded to emphasize the high and low values (high values are blue and low values are red hued colors). If there were multiple detections by any individual lamprey, additional tables were provided. The primary purpose of these tables is to provide more information and data for readers that are interested in more than the simple overview of the detections, including specific antenna detections, movement speed, and temporal timing of the detections.

Summer - Columbia Release (River KM 835.3; 9/5/2017; n=95)

- Forty of 95 lamprey (42%) were detected, and nine (9%) were detected at two sites and 1 (1%) was detected at three sites.

- Of the 40 first detections, 38 detections (95%) were from lamprey moving upstream initially, including 32 detections (80%) at LMR (Lower Methow River at Pateros; river km 3.1), five detections (13%) at MRC (Methow River at Carlton; river km 46.4), and one detection (3%) at CRW (Chewuch River above Winthrop; river km 1.6). Two detections were from lamprey moving downstream initially, including one detection (3%) at RRJ [Rocky Reach Dam Juvenile (Bypass); river km 755.9], and one detection (3%) at ENL (Lower Entiat River; river km 1.9).

Table 3. Summary of first detections from Columbia River (river km 835.3) release on September 5, 2017. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all tables listed for this particular release.

Site					Days		River	Migration					First	Last			
Code	Site		River		Since		KM	Speed		Duration	Duration		Ant.	Ant.	#		
#	Value	#	River	KM	First Time	Value	Release	Travel	(km/day)	Last Time	Value	(Days)	(Sec)	Direction?	ID	ID	Reads
1	RRJ	1	Columbia	755.9	7/9/18 1:47	306.6	-79.4	-0.3		7/9/18 1:47	0.0	0.0		Down	1	1	1
2	ENL	1	Entiat	1.9	5/7/18 10:09	243.9	-63.3	-0.3		5/7/18 10:15	0.0	6.0		Up	24	21	2
3	LMR	1	Methow	3.1	9/6/17 2:20	0.6	4.0	6.5	9/6/17 2:20	0.0	0.0	0.0		Up	4	4	1
4	LMR	2	Methow	3.1	9/6/17 2:20	0.6	4.0	6.5	9/6/17 2:20	0.0	0.0	0.0		Up	8	8	1
5	LMR	3	Methow	3.1	9/6/17 2:27	0.6	4.0	6.5	9/6/17 2:27	0.0	0.0	0.0		Up	4	4	1
6	LMR	4	Methow	3.1	9/6/17 3:29	0.7	4.0	6.1	9/6/17 3:29	0.0	0.2	0.0		Up	0A	4	2
7	LMR	5	Methow	3.1	9/6/17 4:11	0.7	4.0	5.8	9/6/17 4:11	0.0	0.3	0.0		Up	7	2	2
8	LMR	6	Methow	3.1	9/6/17 4:51	0.7	4.0	5.6	9/6/17 4:53	0.0	2.1	0.0		Up	0A	5	2
9	LMR	7	Methow	3.1	9/6/17 21:36	1.4	4.0	2.8	9/6/17 21:36	0.0	0.2	0.0		Up	0A	4	2
10	LMR	8	Methow	3.1	9/6/17 21:49	1.4	4.0	2.8	9/6/17 21:50	0.0	0.1	0.0		Up	5	0B	2
11	LMR	9	Methow	3.1	9/6/17 22:36	1.5	4.0	2.7	9/6/17 22:36	0.0	0.0	0.0		Up	9	9	1
12	LMR	10	Methow	3.1	9/6/17 23:13	1.5	4.0	2.7	9/6/17 23:13	0.0	0.0	0.0		Up	4	4	1
13	LMR	11	Methow	3.1	9/7/17 1:50	1.6	4.0	2.5	9/7/17 1:50	0.0	0.0	0.0		Up	4	4	1
14	LMR	12	Methow	3.1	9/7/17 1:54	1.6	4.0	2.5	9/7/17 1:54	0.0	0.0	0.0		Up	4	4	1
15	LMR	13	Methow	3.1	9/7/17 2:07	1.6	4.0	2.5	9/7/17 2:07	0.0	0.0	0.0		Up	4	4	1
16	LMR	14	Methow	3.1	9/7/17 2:38	1.6	4.0	2.5	9/7/17 2:38	0.0	0.0	0.0		Up	3	3	1
17	LMR	15	Methow	3.1	9/7/17 3:20	1.7	4.0	2.4	9/7/17 3:20	0.0	0.1	0.0		Up	0A	4	2
18	LMR	16	Methow	3.1	9/7/17 20:06	2.4	4.0	1.7	9/7/17 20:06	0.0	0.0	0.0		Up	4	4	1
19	LMR	17	Methow	3.1	9/7/17 21:03	2.4	4.0	1.7	9/7/17 21:03	0.0	0.2	0.0		Up	0A	5	2
20	LMR	18	Methow	3.1	9/8/17 3:14	2.6	4.0	1.5	9/8/17 3:14	0.0	0.0	0.0		Up	4	4	1
21	LMR	19	Methow	3.1	9/8/17 23:01	3.5	4.0	1.2	9/8/17 23:01	0.0	0.2	0.0		Up	9	4	2
22	LMR	20	Methow	3.1	9/8/17 23:17	3.5	4.0	1.1	9/8/17 23:17	0.0	0.2	0.0		Up	0B	5	2
23	LMR	21	Methow	3.1	9/9/17 1:48	3.6	4.0	1.1	9/9/17 1:48	0.0	0.0	0.0		Up	4	4	1
24	LMR	22	Methow	3.1	9/11/17 2:32	5.6	4.0	0.7	9/11/17 2:32	0.0	0.0	0.0		Up	9	9	1
25	LMR	23	Methow	3.1	9/11/17 4:13	5.7	4.0	0.7	9/11/17 4:13	0.0	0.0	0.0		Up	5	5	1
26	LMR	24	Methow	3.1	9/11/17 21:19	6.4	4.0	0.6	9/11/17 21:19	0.0	0.2	0.0		Up	0B	4	2
27	LMR	25	Methow	3.1	9/11/17 23:22	6.5	4.0	0.6	9/11/17 23:22	0.0	0.0	0.0		Up	4	4	1
28	LMR	26	Methow	3.1	9/11/17 23:43	6.5	4.0	0.6	9/11/17 23:44	0.0	0.2	0.0		Up	9	3	2
29	LMR	27	Methow	3.1	9/12/17 3:17	6.7	4.0	0.6	9/12/17 3:17	0.0	0.0	0.0		Up	4	4	1
30	LMR	28	Methow	3.1	9/12/17 22:05	7.4	4.0	0.5	9/12/17 22:05	0.0	0.0	0.0		Up	3	3	1
31	LMR	29	Methow	3.1	9/12/17 22:10	7.4	4.0	0.5	9/12/17 22:10	0.0	0.1	0.0		Up	9	3	2
32	LMR	30	Methow	3.1	9/13/17 22:15	8.4	4.0	0.5	9/13/17 22:15	0.0	0.2	0.0		Up	0B	6	2
33	LMR	31	Methow	3.1	3/15/18 2:40	190.6	4.0	0.0	3/15/18 2:40	0.0	0.0	0.0		Up	6	6	1
34	LMR	32	Methow	3.1	3/18/18 2:32	193.6	4.0	0.0	3/18/18 2:32	0.0	0.0	0.0		Up	6	6	1
35	MRC	1	Methow	46.4	4/8/18 22:42	215.5	47.3	0.2	4/8/18 22:42	0.0	0.0	0.0		Up	2	2	1
36	MRC	2	Methow	46.4	4/26/18 12:01	233.0	47.3	0.2	4/26/18 12:01	0.0	0.0	0.0		Up	2	2	1
37	MRC	3	Methow	46.4	6/4/18 2:00	271.6	47.3	0.2	7/14/18 23:36	40.9	58895.7	0.0		Up / Down	2	3	3
38	MRC	4	Methow	46.4	6/6/18 23:30	274.5	47.3	0.2	6/6/18 23:30	0.0	0.0	0.0		Up	2	2	1
39	MRC	5	Methow	46.4	6/7/18 2:05	274.6	47.3	0.2	6/7/18 2:05	0.0	0.0	0.0		Up	1	1	1
40	CRW	1	Chewuch	1.6	4/26/18 4:17	232.7	86.7	0.4	4/26/18 4:22	0.0	5.0	0.0		Up	3	2	2

- Of the 32 first detected at LMR, four (13%) were later detected at MRC (Methow River at Carlton; river km 46.4) and four (13%) were later detected at CRW, and one (3%) was later detected at ENL.

Table 4. Summary of second detections from Columbia River (river km 835.3) release on September 5, 2017. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all tables listed for this particular release.

#	Site		River	KM	Days		River	Migration	Last Time Value	Duration	Duration	Direction	First	Last	#
	Code	Site			Since Last	Travel		Speed					Ant.	Ant.	
#	Value	#	River	KM	First Time Value	Detection	Travel	(km/day)	Last Time Value	(Days)	(Sec)	?	ID	ID	Reads
1	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
2	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
3	MRC	1	Methow	46.4	6/17/18 22:19	284.8	43.3	0.2	6/17/18 22:19	0.0	0.0	Up	2	2	1
4	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
5	CRW	1	Chewuch	1.6	9/16/17 20:18	10.7	-	#VALUE!	9/16/17 20:18	0.0	0.0	Up	5	5	1
6	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
7	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
8	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
9	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
10	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
11	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
12	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
13	ENL	1	Entiat	1.9	5/7/18 23:01	242.9	-	#VALUE!	6/4/18 14:44	27.7	39823.2	in / UP / D	26	21	2
14	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
15	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
16	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
17	CRW	2	Chewuch	1.6	4/9/18 0:18	213.9	-	#VALUE!	4/9/18 0:18	0.0	0.0	Up	6	6	1
18	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
19	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
20	CRW	3	Chewuch	1.6	9/26/17 20:41	18.7	-	#VALUE!	9/26/17 20:41	0.0	0.0	Up	6	6	1
21	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
22	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
23	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
24	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
25	CRW	4	Chewuch	1.6	9/25/17 21:55	14.7	86.7	5.9	9/25/17 21:56	0.0	1.5	Up	5	3	3
26	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
27	MRC	2	Methow	46.4	4/12/18 2:20	212.1	43.3	0.2	4/12/18 2:20	0.0	0.0	Up	2	2	1
28	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
29	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
30	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
31	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
32	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
33	MRC	3	Methow	46.4	4/12/18 23:47	28.9	43.3	1.5	4/12/18 23:47	0.0	0.0	Up	2	2	1
34	MRC	4	Methow	46.4	4/11/18 20:28	24.7	43.3	1.7	4/11/18 20:28	0.0	0.0	Up	2	2	1
35	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
36	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
37	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
38	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
39	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
40	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A

- Of the five lamprey last detected at CRW, one (20%) was later detected at CRU.

Table 5. Summary of third detections from Columbia River (river km 835.3) release on September 5, 2017. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all tables listed for this particular release.

#	Site		River	KM	First Time Value	Days Since Last Detection	River KM Travel	Migration Speed (km/day)	Last Time Value	Duration (Days)	Duration (Sec)	Direction ?	First Ant. ID	Last Ant. ID	# Reads
	Code	Site													
5	CRU	1	Chewuch	28.1	9/26/17 20:36	10.0	26.5	2.6	9/26/17 20:36	0.0	0.08	Up	4	1	2

- In the end, of the 95 lamprey, 32 (34%) were detected at LMR, 9 (9%) were detected at MRC, 5 (5%) were detected at CRW, 1 (1%) was detected at CRU, 2 (2%) were detected at ENL, and 1 (1%) was detected at RRJ.

Summer - Lower Methow Release #1 (River KM 2.2; 9/5/2017; n=37)

- Twenty-four of 37 lamprey (65%) were detected, and two (5%) were detected at two sites.
- Of the 24 first detections, all detections were from lamprey moving upstream, including eight detections (33%) at LMR (Lower Methow River at Pateros; river km 3.1), eleven detections (46%) at MRC (Methow River at Carlton; river km 46.4), three detections (13%) at CRW (Chewuch River above Winthrop; river km 1.6), and two detections (8%) at CRU (Upper Chewuch Instream Array; river km 28.1).

Table 6. Summary of first detections from Lower Methow River (river km 2.2) release on September 5, 2017. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

#	Site		River	KM	First Time Value	Days	River	Migration	Last Time Value	Duration (Days)	Duration (Sec)	Direction?	First	Last	#
	Code	Site				Since	KM	Speed					Ant. ID	Ant. ID	
#	Value	#	River	KM	Release	Travel	(km/day)						ID	ID	Reads
1	LMR	1	Methow	3.1	9/6/17 2:47	0.7	0.9	1.4	9/6/17 2:47	0.0	0.0	Up	0B	0B	1
2	LMR	2	Methow	3.1	9/6/17 3:02	0.7	0.9	1.4	9/6/17 3:02	0.0	0.0	Up	8	8	1
3	LMR	3	Methow	3.1	9/6/17 21:12	1.4	0.9	0.6	9/6/17 21:12	0.0	0.0	Up	4	4	1
4	LMR	4	Methow	3.1	9/7/17 22:50	2.5	0.9	0.4	9/7/17 22:50	0.0	0.0	Up	3	3	1
5	LMR	5	Methow	3.1	9/8/17 19:56	3.4	0.9	0.3	9/8/17 19:56	0.0	0.0	Up	4	4	1
6	LMR	6	Methow	3.1	9/10/17 19:53	5.4	0.9	0.2	9/10/17 19:53	0.0	0.0	Up	4	4	1
7	LMR	7	Methow	3.1	3/28/18 23:15	204.5	0.9	0.0	3/28/18 23:15	0.0	0.0	Up	6	6	1
8	LMR	8	Methow	3.1	3/29/18 4:42	204.7	0.9	0.0	3/29/18 4:42	0.0	0.0	Up	6	6	1
9	MRC	1	Methow	46.4	3/30/18 22:35	206.5	44.2	0.2	3/30/18 22:35	0.0	0.0	Up	3	3	1
10	MRC	2	Methow	46.4	3/30/18 22:48	206.5	44.2	0.2	3/30/18 22:48	0.0	0.0	Up	4	4	1
11	MRC	3	Methow	46.4	3/31/18 23:03	207.5	44.2	0.2	6/22/18 19:46	82.9	119324.0	Up / Down	4	2	2
12	MRC	4	Methow	46.4	4/7/18 14:38	214.1	44.2	0.2	4/7/18 14:39	0.0	1.5	Up	3	3	4
13	MRC	5	Methow	46.4	4/7/18 20:32	214.4	44.2	0.2	4/7/18 20:32	0.0	0.0	Up	2	2	1
14	MRC	6	Methow	46.4	4/7/18 22:13	214.5	44.2	0.2	4/7/18 22:13	0.0	0.0	Up	2	2	1
15	MRC	7	Methow	46.4	4/8/18 19:51	215.4	44.2	0.2	4/8/18 19:51	0.0	0.0	Up	2	2	1
16	MRC	8	Methow	46.4	4/9/18 0:12	215.5	44.2	0.2	4/9/18 0:12	0.0	0.0	Up	2	2	1
17	MRC	9	Methow	46.4	4/9/18 15:30	216.2	44.2	0.2	4/9/18 15:30	0.0	0.0	Up	2	2	1
18	MRC	10	Methow	46.4	6/11/18 22:59	279.5	44.2	0.2	6/11/18 23:03	0.0	3.4	Up	2	2	6
19	MRC	11	Methow	46.4	6/22/18 22:24	290.5	44.2	0.2	6/22/18 22:24	0.0	0.0	Up	2	2	1
20	CRW	1	Chewuch	1.6	9/13/17 20:21	8.4	83.6	10.0	9/13/17 20:23	0.0	1.5	Up	5	3	2
21	CRW	2	Chewuch	1.6	4/11/18 20:32	218.4	83.6	0.4	4/11/18 20:32	0.0	0.0	Up	3	3	1
22	CRW	3	Chewuch	1.6	7/14/18 22:29	312.5	83.6	0.3	7/14/18 22:29	0.0	0.0	Up	3	3	1
23	CRU	4	Chewuch	28.1	6/24/18 3:03	291.7	110.1	0.4	6/24/18 3:03	0.0	0.0	Up	1	1	1
24	CRU	5	Chewuch	28.1	7/14/18 2:59	311.7	110.1	0.4	7/14/18 2:59	0.0	0.0	Up	1	1	1

- Of the eight lamprey first detected at LMR, one (13%) was detected 23 days later at MRC.
Of the 11 lamprey first detected at MRC, one (13%) was detected 15 days later at CRW.

Table 7. Summary of second detections from Lower Methow River (river km 2.2) release on September 5, 2017. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

#	Site Code	Site #	River	River KM	First Time Value	Days Since Last Detection	River KM Travel	Migration Speed (km/day)	Last Time Value	Duration (Days)	Duration (Sec)	Direction ?	First Ant. ID	Last Ant. ID	# Reads
8	MRC	1	Methow	46.4	4/21/18 3:49	23.0	43.3	1.9	4/21/18 3:49	0.0	0.0	Up	2	2	1
19	CRW	1	Chewuch	1.6	7/7/18 23:45	15.1	39.4	2.6	7/7/18 23:45	0.0	0.0	Up	3	3	1

- In the end, of the 37 lamprey, eight (22%) were detected at LMR, 12 (32%) were detected at MRC, four (11%) were detected at CRW, and two (5%) were detected at CRU.

Summer - Lower Methow Release #2 (River KM 8.0; 9/5/2017; n=20)

- Eight of 20 lamprey (40%) were detected, and none were detected at more than one site.
- Of the eight first detections, six detections (75%) were from lamprey moving upstream initially, including one detection (13%) at MRC (Methow River at Carlton; river km 46.4), one detection (13%) at MWF (Whitefish Side Channel in Methow River; river km 80.2), three detections (38%) at CRW (Chewuch River above Winthrop; river km 1.6), and one detection (13%) at CRU (Upper Chewuch Instream Array; river km 28.1). Two detections (25%) were from lamprey moving downstream initially, including two detections (25%) at LMR (Lower Methow River at Pateros; river km 3.1).

Table 8. Summary of first detections from Lower Methow River (river km 8.0) release on September 5, 2017. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

#	Site Code	Site #	River	River KM	First Time Value	Days Since Release	River KM Travel	Migration Speed (km/day)	Last Time Value	Duration (Days)	Duration (Sec)	Direction?	First Ant. ID	Last Ant. ID	# Reads
1	LMR	1	Methow	3.1	9/5/17 13:47	0.1	-4.9	-53.4	9/5/17 13:52	0.0	5.0	Down	4	4	2
2	LMR	2	Methow	3.1	9/5/17 14:18	0.1	-4.9	-43.2	9/5/17 14:18	0.0	0.0	Down	4	4	1
3	MRC	1	Methow	46.4	6/9/18 21:56	277.4	38.4	0.1	6/9/18 21:56	0.0	0.0	Up	1	1	1
4	MWF	1	Methow	80.2	6/25/18 22:41	293.5	72.2	0.2	6/25/18 22:41	0.0	0.0	Up	E4	E4	1
5	CRW	1	Chewuch	1.6	9/18/17 23:12	13.5	77.8	5.8	9/18/17 23:14	0.0	2.4	Up	6	3	2
6	CRW	2	Chewuch	1.6	9/27/17 1:03	21.6	77.8	3.6	9/27/17 1:03	0.0	0.0	Up	5	5	1
7	CRW	3	Chewuch	1.6	7/17/18 3:09	314.6	77.8	0.2	7/17/18 3:09	0.0	0.0	Up	3	3	1
8	CRU	1	Chewuch	28.1	6/19/18 21:17	287.4	104.3	0.4	6/19/18 21:17	0.0	0.0	Up	1	1	1

- In the end, of the 20 released, one (5%) was detected at MRC, one (5%) at MWF, three (15%) at CRW, one (5%) at CRU, and two (10%) at LMR.

Summer - Middle Methow Release (River KM 66.5; 9/14/2017; n=39)

- Thirteen of 39 lamprey (33%) were detected, and three (8%) were detected at more than 1 site.
- Of the 13 lamprey first detections, twelve detections (92%) were from lamprey moving upstream initially, including two detections (15%) at M3R (3R side channel Methow River; river km 78.2), three detections (23%) at MRW (Methow River at Winthrop), six detections (46%) at CRW (Chewuch River above Winthrop; river km 1.6), and one detection (8%) at CRU (Upper Chewuch Instream Array; river km 28.1). One detection (8%) was from lamprey moving downstream to LMR (Lower Methow River at Pateros; river km 3.1).

Table 9. Summary of first detections from Middle Methow River (river km 66.5) release on September 14, 2017. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

#	Site Code	Site #	River	River KM	First Time Value	Days Since Release	River Travel KM	Migration Speed (km/day)	Last Time Value	Duration (Days)	Duration (Sec)	Direction?	First Ant. ID	Last Ant. ID	# Reads
	Value														
1	LMR	1	Methow	3.1	3/30/18 18:54	197.2	-63.4	-0.3	3/30/18 18:54	0.0	0.0	Down	0B	0B	1
2	M3R	1	Methow	78.2	5/3/18 21:36	231.3	11.7	0.1	5/3/18 21:36	0.0	0.0	Up	D2	D2	1
3	M3R	2	Methow	78.2	5/14/18 1:39	241.5	11.7	0.0	5/14/18 1:39	0.0	0.0	Up	D1	D1	1
4	CRW	1	Chewuch	1.6	9/28/17 18:57	14.2	19.3	1.4	9/28/17 18:58	0.0	1.2	Up	5	2	2
5	CRW	2	Chewuch	1.6	10/19/17 22:57	35.4	19.3	0.5	10/19/17 22:57	0.0	0.0	Up	3	3	1
6	CRW	3	Chewuch	1.6	4/20/18 22:00	218.4	19.3	0.1	4/20/18 22:04	0.0	3.6	Up	6	3	2
7	CRW	4	Chewuch	1.6	4/22/18 0:46	219.5	19.3	0.1	4/22/18 0:53	0.0	7.5	Up	6	3	2
8	CRW	5	Chewuch	1.6	4/27/18 1:06	224.5	19.3	0.1	4/27/18 1:24	0.0	17.5	Up	6	1	3
9	CRW	6	Chewuch	1.6	7/9/18 0:42	297.5	19.3	0.1	7/9/18 0:42	0.0	0.0	Up	3	3	1
10	MRW	1	Methow	88.3	9/16/17 22:32	2.4	21.8	9.2	9/16/17 22:33	0.0	0.7	Up	B6	B3	2
11	MRW	2	Methow	88.3	9/17/17 1:52	2.5	21.8	8.7	9/17/17 1:53	0.0	0.5	Up	B4	B1	2
12	MRW	3	Methow	88.3	9/22/17 23:06	8.4	21.8	2.6	9/22/17 23:06	0.0	0.0	Up	B5	B5	1
13	CRU	1	Chewuch	28.1	6/9/18 3:08	267.6	45.8	0.2	6/9/18 3:08	0.0	0.2	Up	6	3	2

- One of the two lamprey (50%) first detected at M3R, one was also detected later at CRU. One of the six lamprey (17%) first detected at CRW was also detected later at CRU. The one lamprey first detected at LWE was detected later at MRC (Methow River at Carlton; river km 46.4).

Table 10. Summary of second detections from Middle Methow River (river km 66.5) release on September 14, 2017. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

#	Site Code	Site #	River	River KM	First Time Value	Days Since Last Detection	River KM Travel	Migration Speed (km/day)	Last Time Value	Duration (Days)	Duration (Sec)	Direction ?	First Ant. ID	Last Ant. ID	# Reads
	Value	#													
1	MRC	1	Methow	46.4	4/22/18 1:32	22.3	43.3	1.9	4/22/18 1:34	0.0	2.1	Up	5	4	6
2	CRU	1	Chewuch	28.1	6/19/18 2:11	46.2	34.1	0.7	6/19/18 2:12	0.0	0.3	Up	6	3	2
3	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
4	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
5	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
6	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
7	CRU	2	Chewuch	28.1	7/12/18 2:16	81.1	26.5	0.3	7/12/18 2:16	0.0	0.0	Up	1	1	1
8	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
9	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
10	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
11	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
12	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
13	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A

- In the end, of the 39 lamprey, two (5%) were detected at M3R, three (8%) at MRW, six (15%) at CRW, three (8%) at CRU, one (3%) at MRC, and one (3%) at LMR.

Summer - Upper Methow Release (River KM 83.2; 9/14/2017; n=60)

- Thirty-one of 60 lamprey (52%) were detected, and four (7%) were detected at more than 1 site.
- Of the 31 lamprey first detections, 30 detections (97%) were from lamprey moving upstream to CRW (Chewuch River above Winthrop; river km 1.6) and one detection (3%) from lamprey moving upstream to CRU (Upper Chewuch Instream Array; river km 28.1).

Table 11. Summary of first detections from Upper Methow River (river km 83.2) release on September 14, 2017. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

#	Site Code	Site #	River	River KM	Days		River KM	Migration Speed (km/day)	Last Time Value	Duration		Direction?	First Ant. ID	Last Ant. ID	#
					Since	Release				(Days)	(Sec)				
1	CRW	1	Chewuch	1.6	9/14/17 21:33	0.4	2.6	6.8	9/14/17 21:33	0.0	0.0	Up	3	3	1
2	CRW	2	Chewuch	1.6	9/14/17 21:34	0.4	2.6	6.8	9/14/17 21:34	0.0	0.0	Up	1	1	1
3	CRW	3	Chewuch	1.6	9/14/17 21:41	0.4	2.6	6.7	9/14/17 21:42	0.0	1.5	Up	5	3	2
4	CRW	4	Chewuch	1.6	9/14/17 22:02	0.4	2.6	6.5	9/14/17 22:04	0.0	1.8	Up	6	3	2
5	CRW	5	Chewuch	1.6	9/14/17 22:13	0.4	2.6	6.4	9/14/17 22:15	0.0	1.7	Up	5	3	2
6	CRW	6	Chewuch	1.6	9/14/17 22:45	0.4	2.6	6.0	9/14/17 22:45	0.0	0.0	Up	2	2	1
7	CRW	7	Chewuch	1.6	9/14/17 22:54	0.4	2.6	5.9	9/14/17 22:54	0.0	0.0	Up	1	1	1
8	CRW	8	Chewuch	1.6	9/14/17 23:25	0.5	2.6	5.7	9/14/17 23:25	0.0	0.0	Up	3	3	1
9	CRW	9	Chewuch	1.6	9/14/17 23:29	0.5	2.6	5.6	9/14/17 23:29	0.0	0.0	Up	3	3	1
10	CRW	10	Chewuch	1.6	9/14/17 23:39	0.5	2.6	5.5	9/14/17 23:39	0.0	0.0	Up	6	6	1
11	CRW	11	Chewuch	1.6	9/21/17 20:22	7.3	2.6	0.4	9/21/17 20:25	0.0	3.3	Up	5	1	2
12	CRW	12	Chewuch	1.6	9/24/17 19:24	10.3	2.6	0.3	9/24/17 19:28	0.0	4.3	Up	6	2	3
13	CRW	13	Chewuch	1.6	11/24/17 1:20	70.5	2.6	0.0	11/24/17 1:30	0.0	10.2	Up	4	2	2
14	CRW	14	Chewuch	1.6	11/25/17 7:01	71.8	2.6	0.0	11/25/17 16:02	0.4	541.2	Up	5	3	2
15	CRW	15	Chewuch	1.6	1/14/18 22:23	122.4	2.6	0.0	1/14/18 22:23	0.0	0.0	Up	3	3	1
16	CRW	16	Chewuch	1.6	4/7/18 22:19	205.4	2.6	0.0	4/7/18 22:25	0.0	6.1	Up	6	2	2
17	CRW	17	Chewuch	1.6	4/8/18 20:46	206.3	2.6	0.0	4/8/18 20:46	0.0	0.0	Up	6	6	1
18	CRW	18	Chewuch	1.6	4/8/18 21:22	206.4	2.6	0.0	4/8/18 21:28	0.0	5.9	Up	6	3	2
19	CRW	19	Chewuch	1.6	4/21/18 20:49	219.4	2.6	0.0	4/21/18 20:56	0.0	7.1	Up	6	3	2
20	CRW	20	Chewuch	1.6	4/24/18 20:34	222.3	2.6	0.0	4/24/18 20:34	0.0	0.0	Up	6	6	1
21	CRW	21	Chewuch	1.6	4/25/18 19:24	223.3	2.6	0.0	4/25/18 19:24	0.0	0.0	Up	6	6	1
22	CRW	22	Chewuch	1.6	4/25/18 20:48	223.3	2.6	0.0	4/25/18 20:53	0.0	5.0	Up	3	3	2
23	CRW	23	Chewuch	1.6	4/25/18 21:31	223.4	2.6	0.0	4/25/18 21:31	0.0	0.0	Up	6	6	1
24	CRW	24	Chewuch	1.6	4/25/18 23:18	223.5	2.6	0.0	4/25/18 23:31	0.0	13.6	Up	6	3	2
25	CRW	25	Chewuch	1.6	4/26/18 1:30	223.5	2.6	0.0	4/26/18 1:30	0.0	0.0	Up	6	6	1
26	CRW	26	Chewuch	1.6	4/26/18 20:45	224.3	2.6	0.0	4/26/18 21:11	0.0	26.0	Up	4	1	2
27	CRW	27	Chewuch	1.6	4/26/18 21:31	224.4	2.6	0.0	4/26/18 21:44	0.0	13.1	Up	4	1	2
28	CRW	28	Chewuch	1.6	4/26/18 23:47	224.5	2.6	0.0	4/26/18 23:47	0.0	0.0	Up	3	3	1
29	CRW	29	Chewuch	1.6	4/27/18 3:04	224.6	2.6	0.0	4/27/18 3:04	0.0	0.0	Up	6	6	1
30	CRW	30	Chewuch	1.6	7/7/18 0:18	295.5	2.6	0.0	7/7/18 0:18	0.0	0.0	Up	3	3	1
31	CRU	1	Chewuch	28.1	6/25/18 21:58	284.4	29.1	0.1	6/25/18 21:58	0.0	0.0	Up	1	1	1

- Four of the 30 lamprey (13%) first detected at CRW were also detected later at CRU.

Table 12. Summary of second detections from Upper Methow River (river km 83.2) release on September 14, 2017. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

#	Site Code	Site #	River	River KM	Days		River KM	Migration Speed (km/day)	Last Time Value	Duration		Direction?	First Ant. ID	Last Ant. ID	#
					Since	Last				(Days)	(Sec)				
1	CRU	1	Chewuch	28.1	9/27/17 20:34	13.0	26.5	2.0	6/15/18 21:40	261.0	375906.2	Up	4	1	3
4	CRU	2	Chewuch	28.1	6/25/18 1:57	283.2	26.5	0.1	6/25/18 1:57	0.0	0.0	Up	1	1	1
6	CRU	3	Chewuch	28.1	9/27/17 22:30	13.0	26.5	2.0	9/27/17 22:30	0.0	0.1	Up	4	1	2
9	CRU	4	Chewuch	28.1	9/27/17 20:23	12.9	26.5	2.1	9/27/17 20:23	0.0	0.1	Up	4	1	2

- In the end, of the 60 lamprey, 30 (50%) were detected at CRW and five (8%) at CRU.

Summer - Chewuch Release #1 (River KM 1.1; 9/5/2017; n=30)

- Seventeen of 30 lamprey (57%) were detected, and two (7%) were detected at more than one site.
- Of the 17 lamprey first detections, 16 detections (94%) were from lamprey moving upstream to CRW (Chewuch River above Winthrop; river km 1.6) and one detection (6%) from lamprey moving upstream to CRU (Upper Chewuch Instream Array; river km 28.1).

Table 13. Summary of first detections from Chewuch River (river km 1.1) release on September 5, 2017. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

#	Site		River	KM	Days		River	Migration	Last Time Value	Duration		Direction?	First Ant. ID	Last Ant. ID	# Reads
	Code	Site			Since	Last				(Days)	(Sec)				
#	Value	#	River	KM	First Time Value	Release	Travel	(km/day)	Last Time Value	(Days)	(Sec)	Direction?	ID	ID	Reads
1	CRW	1	Chewuch	1.6	9/5/17 20:25	0.2	0.5	2.0	9/5/17 20:25	0.0	0.0	Up	5	5	1
2	CRW	2	Chewuch	1.6	9/5/17 20:29	0.2	0.5	2.0	9/5/17 20:29	0.0	0.0	Up	3	3	1
3	CRW	3	Chewuch	1.6	9/5/17 22:35	0.3	0.5	1.5	9/5/17 22:35	0.0	0.0	Up	3	3	1
4	CRW	4	Chewuch	1.6	9/5/17 23:02	0.4	0.5	1.4	9/5/17 23:02	0.0	0.0	Up	5	5	1
5	CRW	5	Chewuch	1.6	9/5/17 23:32	0.4	0.5	1.3	9/5/17 23:32	0.0	0.0	Up	4	4	1
6	CRW	6	Chewuch	1.6	9/5/17 23:47	0.4	0.5	1.3	9/5/17 23:49	0.0	1.7	Up	5	1	2
7	CRW	7	Chewuch	1.6	9/6/17 20:08	1.2	0.5	0.4	9/6/17 20:10	0.0	1.7	Up	5	3	2
8	CRW	8	Chewuch	1.6	9/7/17 20:02	2.2	0.5	0.2	9/7/17 20:03	0.0	1.4	Up	5	3	2
9	CRW	9	Chewuch	1.6	9/12/17 20:05	7.2	0.5	0.1	9/12/17 20:05	0.0	0.0	Up	5	5	1
10	CRW	10	Chewuch	1.6	9/12/17 20:19	7.2	0.5	0.1	9/12/17 20:21	0.0	2.4	Up	5	1	3
11	CRW	11	Chewuch	1.6	9/12/17 20:21	7.2	0.5	0.1	9/12/17 20:23	0.0	1.9	Up	6	3	2
12	CRW	12	Chewuch	1.6	9/13/17 19:38	8.2	0.5	0.1	9/13/17 19:40	0.0	1.2	Up	5	1	2
13	CRW	13	Chewuch	1.6	4/24/18 22:04	231.3	0.5	0.0	4/24/18 22:15	0.0	10.9	Up	6	3	2
14	CRW	14	Chewuch	1.6	4/25/18 22:40	232.3	0.5	0.0	4/25/18 22:40	0.0	0.0	Up	6	6	1
15	CRW	15	Chewuch	1.6	4/26/18 0:32	232.4	0.5	0.0	4/26/18 0:57	0.0	25.8	Up	6	3	3
16	CRW	16	Chewuch	1.6	5/4/18 22:55	241.4	0.5	0.0	5/4/18 22:55	0.0	0.0	Up	6	6	1
17	CRU	1	Chewuch	28.1	7/20/18 22:04	318.3	27.0	0.1	7/20/18 22:04	0.0	0.0	Up	1	1	1

- Two of the 16 lamprey (13%) first detected at CRW were also detected later at CRU.

Table 14. Summary of second detections from Chewuch River (river km 1.1) release on September 5, 2017. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

#	Site		River	KM	Days		River	Migration	Last Time Value	Duration		Direction?	First Ant. ID	Last Ant. ID	# Reads
	Code	Site			Since Last	Detection				(Days)	(Sec)				
#	Value	#	River	KM	First Time Value	Detection	Travel	(km/day)	Last Time Value	(Days)	(Sec)	?	ID	ID	Reads
9	CRU	1	Chewuch	28.1	9/16/17 23:09	4.1	26.5	6.4	10/8/17 2:10	21.1	30421.1	Up	4	5	10
11	CRU	2	Chewuch	28.1	6/13/18 2:49	273.3	26.5	0.1	6/13/18 2:49	0.0	0.2	Up	6	3	2

- In the end, of the 30 lamprey, 16 (53%) were detected at CRW and three (10%) at CRU.

Summer - Chewuch Release #2 (River KM 1.8; 9/5/2017; n=15)

- One of 15 lamprey (7%) was detected, and none were detected at more than one site.

- The one and only detection was from a lamprey moving downstream to CRW (Chewuch River above Winthrop; river km 1.6).

Table 15. Summary of first detections from Chewuch River (river km 1.8) release on September 5, 2017. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

#	Site Code	Site #	River	River KM	First Time Value	Days Since Release	River KM Travel	Migration Speed (km/day)	Last Time Value	Duration (Days)	Duration (Sec)	Direction?	First Ant. ID	Last Ant. ID	# Reads
1	CRW	1	Chewuch	1.6	4/27/18 0:17	233.4	-0.2	0.0	4/27/18 0:17	0.0	0.0	Down	6	6	1

- In the end, of the 15 lamprey, 1 (7%) were detected at CRW.

Spring - Middle Methow Release (River KM 64.6; 4/13/2018; n=40)

- Thirteen of 40 lamprey (33%) were detected, and six (15%) were detected at two sites.
- Of the 13 lamprey first detections, 12 detections were from lamprey moving upstream initially, including 10 detections (77%) at CRW (Chewuch River above Winthrop; river km 1.6), and two detections (15%) at CRU (Upper Chewuch Instream Array; river km 28.1). One detection (8%) was from lamprey moving downstream to WEA (Wells Dam, DCPUD Adult Ladders; river km 823.7).

Table 16. Summary of first detections from Middle Methow River (river km 64.6) release on April 13, 2018. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

#	Site Code	Site #	River	River KM	First Time Value	Days Since Release	River KM Travel	Migration Speed (km/day)	Last Time Value	Duration (Days)	Duration (Sec)	Direction?	First Ant. ID	Last Ant. ID	# Reads
1	WEA	1	Columbia	823.7	5/28/18 3:27	44.7	-64.6	-1.4	5/28/18 3:50	0.0	22.9	Down	7	5	4
2	CRW	1	Chewuch	1.6	4/24/18 21:47	11.5	21.2	1.8	4/24/18 21:52	0.0	5.4	Up	6	3	2
3	CRW	2	Chewuch	1.6	4/25/18 22:56	12.5	21.2	1.7	4/25/18 22:56	0.0	0.0	Up	2	2	1
4	CRW	3	Chewuch	1.6	4/25/18 23:13	12.5	21.2	1.7	4/25/18 23:13	0.0	0.0	Up	1	1	1
5	CRW	4	Chewuch	1.6	4/26/18 10:17	13.0	21.2	1.6	4/26/18 10:17	0.0	0.0	Up	3	3	1
6	CRW	5	Chewuch	1.6	4/26/18 14:29	13.2	21.2	1.6	4/26/18 14:29	0.0	0.0	Up	6	6	1
7	CRW	6	Chewuch	1.6	4/26/18 16:36	13.3	21.2	1.6	4/26/18 16:36	0.0	0.0	Up	1	1	1
8	CRW	7	Chewuch	1.6	4/26/18 21:16	13.5	21.2	1.6	4/26/18 21:29	0.0	12.6	Up	6	2	3
9	CRW	8	Chewuch	1.6	4/27/18 19:26	14.4	21.2	1.5	4/27/18 19:26	0.0	0.0	Up	6	6	1
10	CRW	9	Chewuch	1.6	5/3/18 11:21	20.0	21.2	1.1	5/3/18 11:42	0.0	20.1	Up	6	6	5
11	CRW	10	Chewuch	1.6	5/6/18 2:28	22.7	21.2	0.9	5/6/18 3:44	0.1	76.5	Up	6	6	2
12	CRU	1	Chewuch	28.1	6/7/18 2:04	54.7	47.7	0.9	6/7/18 2:04	0.0	0.2	Up	6	3	2
13	CRU	2	Chewuch	28.1	6/8/18 2:10	55.7	47.7	0.9	6/8/18 2:10	0.0	0.0	Up	6	6	1

- Five of the 10 lamprey (50%) first detected at CRW were also detected later at CRU. One lamprey detected at WEA (n=1) was also detected later at CRW.

Table 17. Summary of second detections from Middle Methow River (river km 64.6) release on April 13, 2018. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

#	Site Code	Site #	River	River KM	First Time Value	Days Since Last Detection	River KM Travel	Migration Speed (km/day)	Last Time Value	Duration (Days)	Duration (Sec)	Direction ?	First Ant. ID	Last Ant. ID	# Reads
	Value														
1	CRW	1	Chewuch	1.6	7/10/18 22:25	43.8	98.3	2.2	7/10/18 22:25	0.0	0.0	Up	3	3	1
2	CRU	1	Chewuch	28.1	6/24/18 0:46	60.1	26.5	0.4	6/24/18 0:46	0.0	0.0	Up	1	1	1
3	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
4	CRU	2	Chewuch	28.1	6/13/18 21:04	48.9	26.5	0.5	6/13/18 21:04	0.0	0.0	Up	1	1	1
5	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
6	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
7	CRU	3	Chewuch	28.1	5/30/18 19:30	34.1	26.5	0.8	5/30/18 19:30	0.0	0.0	Up	6	6	1
8	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
9	CRU	4	Chewuch	28.1	6/26/18 2:00	59.3	26.5	0.4	6/26/18 2:00	0.0	0.0	Up	1	1	1
10	CRU	5	Chewuch	28.1	7/8/18 2:20	65.6	26.5	0.4	7/8/18 2:20	0.0	0.0	Up	1	1	1
11	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
12	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
13	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A

- In the end, of the 40 lamprey, 11 (28%) were detected at CRW, seven (18%) at CRU, and one (3%) at WEA.

Spring - Upper Methow Release (River KM 83.8; 4/13/2018; n=37)

- Eleven of 37 lamprey (30%) were detected, and two (5%) were detected at two sites.
- Of the 11 lamprey first detections, three detections (%) were from lamprey moving upstream initially, including two detections (18%) at CRW (Chewuch River above Winthrop; river km 1.6), and one detection (9%) at CRU (Upper Chewuch Instream Array; river km 28.1). Eight detections (%) were from lamprey moving downstream initially, including five detections (45%) at MWF (Whitefish Side Channel in Methow River; river km 80.2), and three detections (27%) at M3R (3R side channel Methow River; river km 78.2).

Table 18. Summary of first detections from Upper Methow River (river km 83.8) release on April 13, 2018. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

	Site Code	Site		River		Days Since	River KM	Migration Speed			Duration	Duration		First Ant.	Last Ant.	#
#	Value	#	River	KM	First Time Value	Release	Travel	(km/day)	Last Time Value	(Days)	(Sec)	Direction?	ID	ID	Reads	
1	M3R	1	Methow	78.2	5/8/18 22:33	25.5	-5.6	-0.2	5/8/18 22:33	0.0	0.0	Down	D2	D2	1	
2	M3R	2	Methow	78.2	5/22/18 0:17	38.5	-5.6	-0.1	5/22/18 0:17	0.0	0.0	Down	D2	D2	1	
3	M3R	3	Methow	78.2	5/22/18 2:52	38.6	-5.6	-0.1	5/22/18 2:52	0.0	0.0	Down	D2	D2	1	
4	MWF	1	Methow	80.2	4/28/18 0:50	14.6	-3.6	-0.2	4/28/18 1:11	0.0	21.7	Down	E6	E4	3	
5	MWF	2	Methow	80.2	4/28/18 18:31	15.3	-3.6	-0.2	4/28/18 18:31	0.0	0.0	Down	E6	E6	1	
6	MWF	3	Methow	80.2	4/28/18 22:02	15.4	-3.6	-0.2	4/28/18 22:05	0.0	3.2	Down	E5	E2	2	
7	MWF	4	Methow	80.2	4/29/18 21:52	16.4	-3.6	-0.2	4/29/18 21:55	0.0	3.0	Down	E5	E2	3	
8	MWF	5	Methow	80.2	6/24/18 2:04	71.6	-3.6	-0.1	6/24/18 2:04	0.0	0.0	Down	E4	E4	1	
9	CRW	1	Chewuch	1.6	4/21/18 23:39	8.5	2.0	0.2	4/21/18 23:50	0.0	10.1	Up	6	3	2	
10	CRW	2	Chewuch	1.6	4/26/18 22:15	13.5	2.0	0.1	4/26/18 22:15	0.0	0.0	Up	3	3	1	
11	CRU	1	Chewuch	28.1	7/14/18 23:22	92.5	28.5	0.3	7/14/18 23:22	0.0	0.0	Up	1	1	1	

- One of the five lamprey (20%) first detected at MWF was also detected later at CRW on July 11, 2018, at 0:43 (17 days after previous detection). Duration of detection was 7.9 days (with three total detections). The detection moving downstream was on July 18, 2018, at 21:19.
- One of the five lamprey (20%) first detected at MWF was also detected later at CRU on July 8, 2018, at 23:42 (41 days after previous detection). Duration of detection was 0.22 seconds (with two total detections).

Table 19. Summary of first detections from Upper Methow River (river km 83.8) release on April 13, 2018. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

Site		Site	River	KM	First Time Value	Days	River	Migration	Last Time Value	Duration	Duration	Direction	First	Last	#
Code	Site					Since Last	KM	Speed					Ant.	Ant.	
#	Value	#	River	KM	First Time Value	Detection	Travel	(km/day)	Last Time Value	(Days)	(Sec)	?	ID	ID	Reads
1	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
2	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
3	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
4	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
5	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
6	CRU	1	Chewuch	28.1	6/8/18 23:42	41.1	32.1	0.8	6/8/18 23:42	0.0	0.2	Up	6	3	2
7	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
8	CRW	1	Chewuch	1.6	7/11/18 0:43	16.9	5.6	0.3	7/18/18 21:19	7.9	11316.2	Up	3	2	3
9	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
10	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A
11	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A

- In the end, of the 37 lamprey, three (8%) were detected at CRW, two (5%) at CRU, five (14%) at MWF, three (8%) at M3R.

Summary

Highlights from the Lower Columbia 2017-2018 broodstock Pacific Lamprey translocation monitoring are the following (Table 20 and 21, and Fig. 8):

- The overall detection percentage of PIT tagged lamprey was 42%, which is typically what we observe with the Methow Subbasin release.
- Sites that detected lamprey the most were CRW (Chewuch River above Winthrop; river km 1.6) at 21.1%, LMR (Lower Methow River at Pateros; river km 3.1) at 11.5%, CRU (Upper Chewuch Instream Array; river km 28.1) at 6.4%, MRC (Methow River at Carlton; river km 46.4) at 6.1%.
- The majority of lamprey were detected moving upstream initially, except the release at Methow River (river km 83.8) during spring and Chewuch River (river km 1.8) during summer displayed a high proportion of downstream movement.
- The proportion of lamprey moving to CRW (Lower Chewuch River) and CRU (Upper Chewuch River) generally increased as the release location moved further upstream. For example, only 5% were detected at CRW from Columbia release (river km 835.3), but from Upper Methow release (river km 83.2), 50% were detected at CRW.
- Only three lamprey were detected moving upstream into Upper Methow (upstream of Chewuch River confluence at river km 88.3). These lamprey were all from the Methow River release at river km 66.5 during the summer season.
- Of the nine detected at MRC, four (44%) were detected after being first detected at LMR. Of the five detected at CRW, four (80%) were detected after being first detected at LMR. The pooled data indicates that the detection efficiency of LMR is approximately 57%. However, most of the CRW detections were from the summer during low flow conditions and all MRC detections were from the spring high flow conditions, so the difference also likely reflects the seasonal difference in detection efficiency (~80% during the summer vs. ~44% during the spring).
- None of the five lamprey detected at CRW were detected at MRC; this indicates that either the detection efficiency at MRC is likely to be less than 17% (even during the summer season low flow conditions), or a more likely explanation may be that the PIT array was not in operation during the summer season.
- There was no significant difference in detections between the release below Chewuch River confluence (river km 82.2) and lower Chewuch River (river km 1.1) during the summer season, indicating that likely many approaching Chewuch River confluence are entering Chewuch River.
- Although summer migration is the primary migration timing observed at major hydro dams, many lamprey migrate considerable distances (>100 km) during the spring final migration within this type of tributary environments.
- The fastest upstream traveling lamprey detected was 10.0 km/day. This lamprey swam 83.6 km in 8.3 days (from Methow river km 2.2 release).

- Four lamprey were detected outside of the Methow Subbasin; two at lower Entiat River (river km 1.9), one at Wells Dam (Columbia river km 823.7), and one at Rocky Reach Dam Juvenile Bypass (Columbia river km 755.9).

Table 20. Summary of Lower Columbia 2017-2018 broodstock Pacific Lamprey translocation detection sites from the Methow Subbasin releases (including one Columbia River release).

Site Subbasin Name	Site Code Value	Site Name	River	River KM	# of Lamprey Detected	% of Lamprey Detected
Upper Columbia-Entiat	RRJ	RRJ - Rocky Reach Dam Juvenile	Columbia	755.9	1	0.3%
Chief Joseph	WEA	WEA - Wells Dam, DCPUD Adult Ladders	Columbia	823.7	1	0.3%
Upper Columbia-Entiat	ENL	ENL - Lower Entiat River	Entiat	1.9	2	0.5%
Methow	LMR	LMR - Lower Methow River at Pateros	Methow	3.1	43	11.5%
Methow	MRC	MRC - Methow River at Carlton	Methow	46.4	23	6.1%
Methow	M3R	M3R - 3R side channel Methow River	Methow	78.2	5	1.3%
Methow	MWF	MWF - Whitefish SC in Methow River	Methow	80.2	6	1.6%
Methow	MRW	MRW - Methow River at Winthrop	Methow	88.3	3	0.8%
Methow	CRW	CRW - Chewuch River above Winthrop	Chewuch	1.6	79	21.1%
Methow	CRU	CRU - Upper Chewuch Instream Array	Chewuch	28.1	24	6.4%
Total Detections	-	-	-	-	187	-
Total # of Lamprey	-	-	-	-	158	42.1%

Table 21. Summary of PIT array detections from each release events within the Methow Subbasin (including one release in Columbia River) for the Lower Columbia 2017-2018 broodstock Pacific Lamprey translocation.

Release \ Site	# Tagged	% Initially Upstream	RRJ	ENL	WEA	LMR	MRC	M3R	MWF	MRW	CRW	CRU	Undetected
COL 835.3 Fall	95	95%	1%	2%	0%	34%	9%	0%	0%	0%	5%	1%	58%
MET 2.2 Fall	37	100%	0%	0%	0%	22%	32%	0%	0%	0%	11%	5%	35%
MET 8.0 Fall	20	75%	0%	0%	0%	10%	5%	0%	5%	0%	15%	5%	60%
MET 66.5 Fall	39	92%	0%	0%	0%	3%	3%	5%	0%	8%	15%	8%	67%
MET 64.6 Spring	40	92%	0%	0%	3%	0%	0%	0%	0%	0%	28%	18%	68%
MET 83.2 Fall	60	100%	0%	0%	0%	0%	0%	0%	0%	0%	50%	8%	48%
MET 83.8 Spring	37	27%	0%	0%	0%	0%	0%	8%	14%	0%	8%	5%	70%
CHE 1.1 Fall	30	100%	0%	0%	0%	0%	0%	0%	0%	0%	53%	10%	43%
CHE 1.8 Fall	15	0%	0%	0%	0%	0%	0%	0%	0%	0%	7%	0%	93%

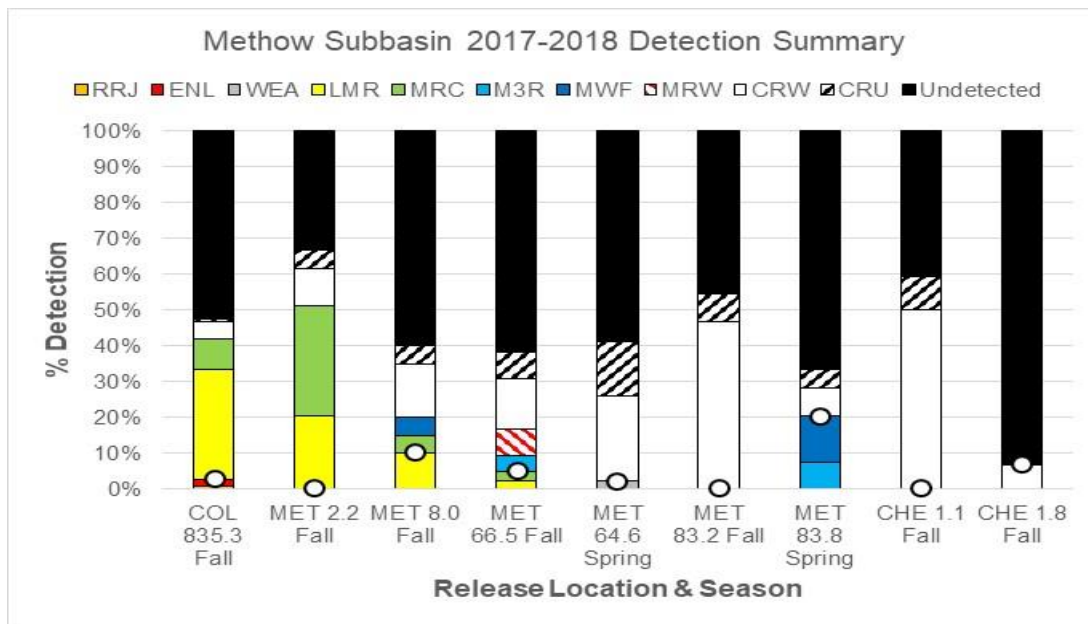


Figure 8. Summary of PIT array detections from each release events within the Methow Subbasin (including one release in Columbia River) for the Lower Columbia 2017-2018 broodstock Pacific Lamprey translocation. The white circle indicates the relative location of the release in relation to the respective detection sites (sites above are upstream of the release sites, whereas those below are downstream).

Part III: Release Summary (Adults from Mid-Columbia)

From the 2017-2018 Mid-Columbia broodstock (adults collected from Priest Rapids Dam in summer 2017, most of which mature in spring/summer 2018), a total of 314 adult Pacific Lamprey (309 PIT tagged) were released in the Upper Columbia upstream of Wells Dam on August 16, 2017 (Fig. 5 and Table 22). This translocation was a collaborative effort made possible by the Yakama Nation Fisheries, Colville Tribe, Douglas and Grant County Public Utility Districts (PUD). Lamprey were tagged by the Yakama Nation Fisheries and Colville Tribe staff, and tagged lamprey were transported by the Douglas County PUD and Colville Tribe staff. Adult Pacific Lamprey were collected from Priest Rapids Dam during a three day period between August 14 and August 16, 2017, using lamprey traps operated by Grant County PUD. Overall PIT tag ratio was 98.1% (12 mm tags; a few more tags may have been shed at release, but was not confirmed), and genetic tag ratio was 100% (Table 23). Total length averaged 655 mm (min. 545 mm and max. 742 mm), weight averaged 431.2 g (min. 249.1 g and max. 680.1 g), and interdorsal length averaged 29 mm (min. 14 mm and max. 59 mm) during the PIT tagging operation on August 16, 2017.

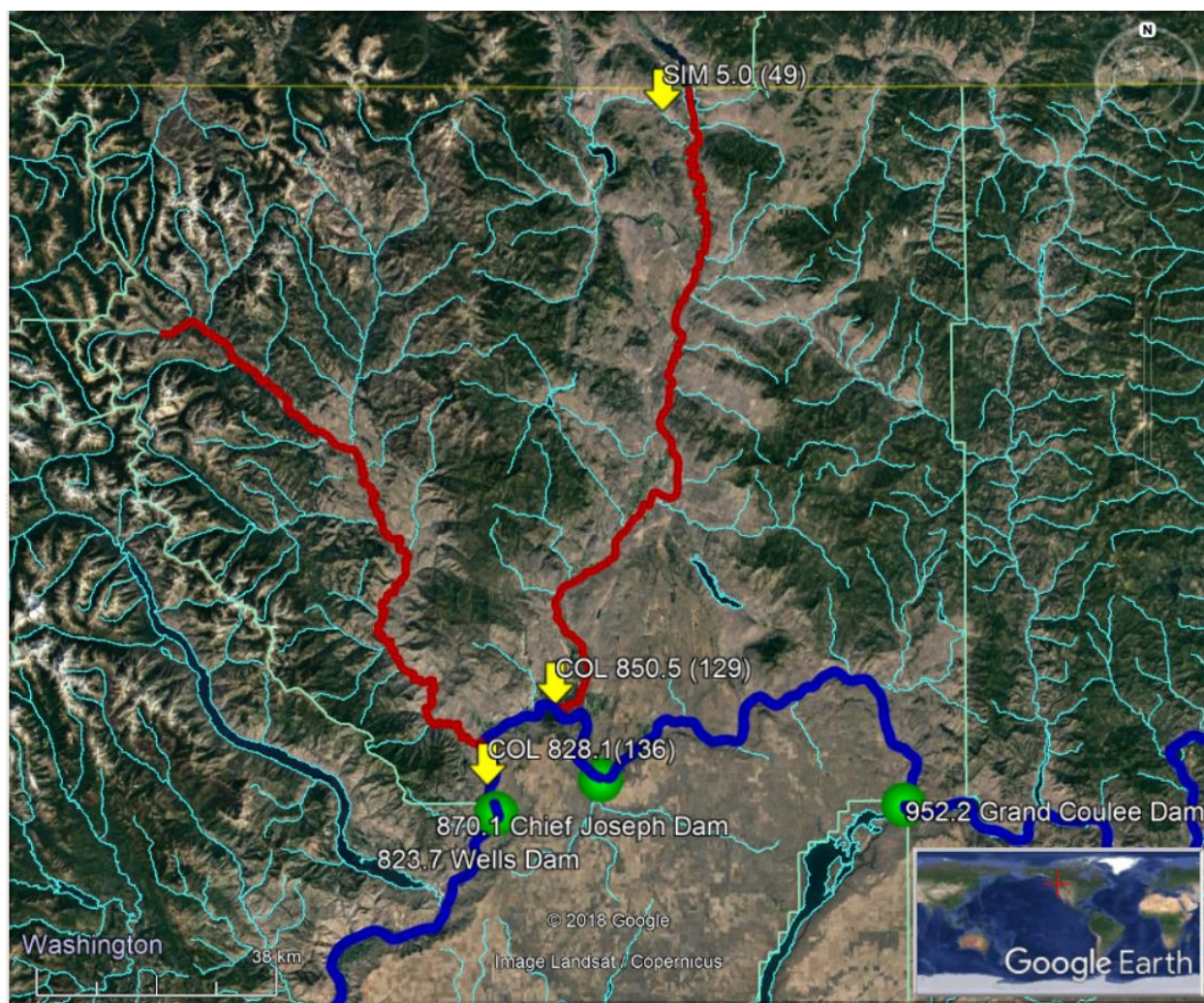


Figure 5. Overall aerial map of Mid-Columbia 2017-2018 broodstock Pacific Lamprey translocation release sites in the Upper Columbia Basin (yellow arrows). “COL” stands for Columbia, “SIM” stands for Similkameen, the number next to the stream name is the river km, and the number in parenthesis is the total number of lamprey released. The red line represents Methow (left) and Okanogan (right) rivers and the blue line represents the Columbia River. Upper Columbia River dams and their river km are also displayed (green circles).

Table 22. Summary of Mid-Columbia 2017-2018 broodstock Pacific Lamprey translocation release information in the Upper Columbia Basin. Total number on the lower right is the sum of all mainstem Columbia River releases and does not include the Similkameen release.

[illegible]

Table 23. Summary of Mid-Columbia 2017-2018 broodstock Pacific Lamprey translocation release data in the Upper Columbia Basin, including PIT tag and genetic sampling information.

River	RKM	Date	#	# w/ 12mm PIT	# w/ Genetic Tags	PIT Tag Ratio	Genetic Tag Ratio
Similkameen	5.0	8/16/2017	49	49	49	100%	100%
Columbia	828.0	8/16/2017	136	136	136	100%	100%
Columbia	850.8	8/16/2017	129	124	129	96%	100%
-	-	-	265	260	265	98.1%	100%

Upper Columbia Release #1 (River KM 828.0)

A total of 136 lamprey (all PIT tagged) were transported by Douglas County PUD and released at river km 828.0 in the Columbia River downstream of the confluence with Methow River on August 16, 2017 (Fig. 6). Water temperature was 22.6°C during the release. For summer release, we target our releases to take place between 15-20°C.

The primary goal of the Columbia River release was two-fold: 1) to release them in the lower reach of the mainstem Upper Columbia River to allow them to determine their preferred spawning reaches and 2) to get an understanding of the ratio of lamprey that move into the Methow Subbasin from mainstem Columbia River based on detection from the PIT array sites in the Methow Subbasin.

Upper Columbia Release #2 (River KM 850.8)

A total of 129 lamprey (124 PIT tagged) were transported by Colville Tribe and released at river km 850.8 in the Columbia River downstream of the confluence with Okanogan River on August 16, 2017 (Fig. 6). Water temperature was 20.0°C during the release. For summer release, we target our releases to take place between 15-20°C.

The primary goal of the Columbia River release was two-fold: 1) to release them in the mainstem Columbia River just downstream of the Okanogan River to allow them to determine their preferred spawning reaches and 2) to get an understanding of the ratio of lamprey that move into the Okanogan Subbasin from mainstem Columbia River based on detection from the PIT array sites in the Okanogan Subbasin.

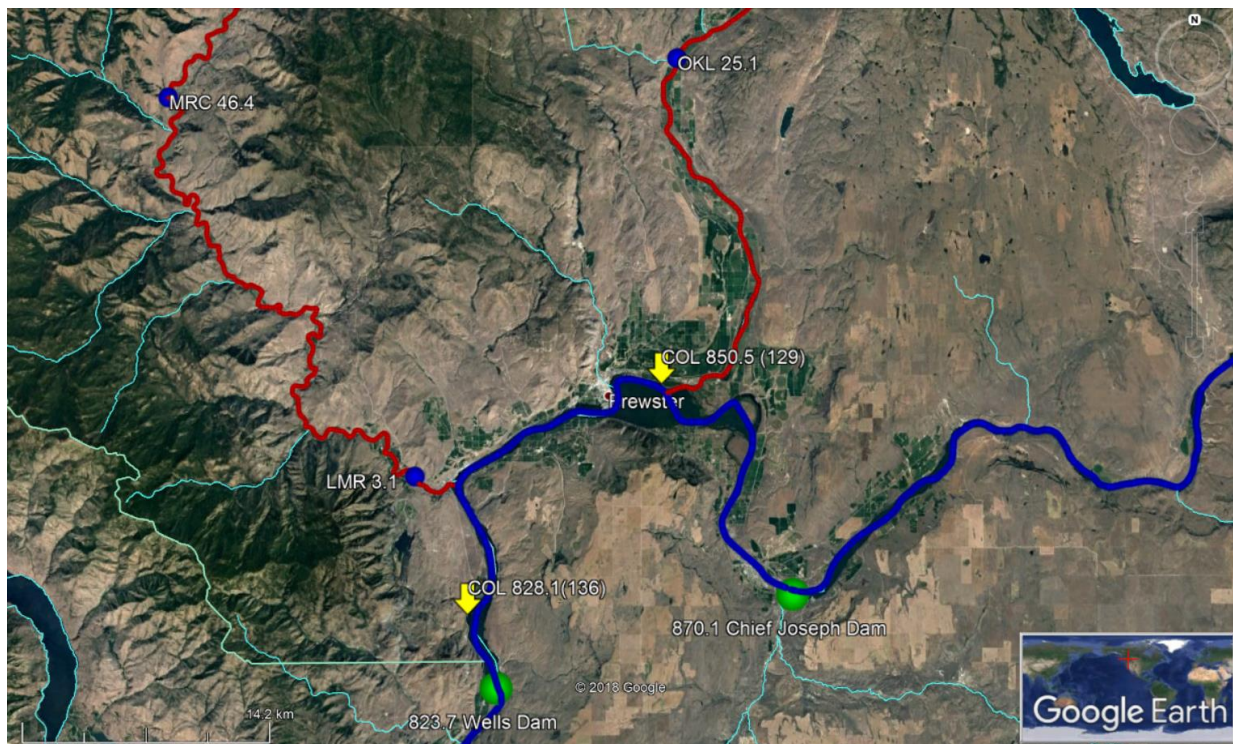


Figure 6. Aerial map of Pacific Lamprey translocation in Upper Columbia River at river km 828.0 and 850.8 (yellow arrows). The number next to the stream abbreviation is the river km and the number in parenthesis is the total number of lamprey released. Shown with the blue circles are the PIT tag array locations (LMR, MRC, and OKL). Also, 0.1 km points along the Methow and Okanogan rivers (red dots) and mainstem Columbia River (blue dots) are displayed.

Similkameen Release (River KM 5.0)

A total of 49 lamprey were transported by Colville Tribe and released at river km 5.0 in Similkameen River just downstream of the Enloe Dam on August 16, 2017 (Fig. 7). Water temperature was 21.4°C during the release (water temperature at Priest Rapids Dam during the tagging operation was 20.0 C). For summer release, we target our releases to take place between 15-20°C.

The primary goal of the release was to reintroduce Pacific Lamprey into prime Pacific Lamprey habitat within Okanagon Subbasin and Similkameen River was selected by Colville Tribes Fish and Wildlife as the first location for this reintroduction (water temperature is considerably high within the mainstem Okanogan River during the summer season, so tributaries are the high priority areas for release during the summer season).

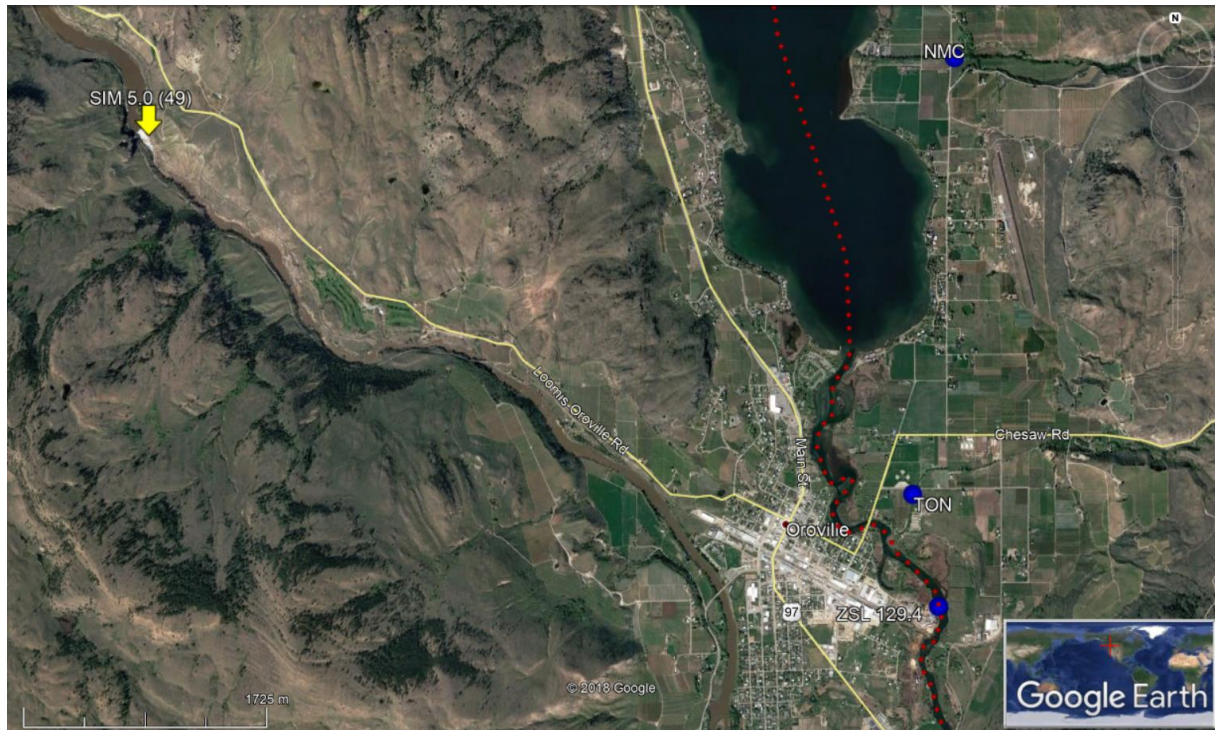


Figure 7. Aerial map of Pacific Lamprey translocation in Similkameen River at river km 5.0 (yellow arrow). The number next to the stream abbreviation is the river km and the number in parenthesis is the total number of lamprey released. Shown with the blue circles are the PIT tag array locations (ZSL, TON, and NMC). Also, 0.1 km points along the Okanogan River (red dots) are displayed.

Part IV: Pit Tag Detection and Analysis (Adults from Mid-Columbia)

From the PITAGIS regional data base (<http://www.ptagis.org/>), using Query Builder2 Reports, the interrogation data of individual PIT tagged lamprey is summarized. A total of 54 lamprey out of 309 total PIT tagged lamprey released (17.5%) were detected in at least one PIT array site, and none were detected at more than one site.

There are a total of five instream PIT array sites located on the mainstem Methow River (river km 3.1, 46.4, 68.2, 88.3) (Fig. 6). Additional array sites are present on a side channel (river km 80.2; Whitefish Side Channel) and a hatchery acclimation channel (river km 84.4; Spring Creek Acclimation Pond) along Methow River. There are two sites each on the Chewuch River (river km 1.6 and 28.1), and one site each on Twisp (river km 1.9) and Lost (river km 0.8) rivers. The array site at river km 68.2 (MRT) is immediately upstream of the Twisp River confluence on the Methow River. The array site at river km 88.3 (MRW) is immediately upstream of the Chewuch River confluence on the Methow River. Most sites have a pair of arrays, consisting of lower (downstream) and upper (upstream) arrays, except for MRC (Methow river km 46.4), which only has a single array. There are several more instream PIT arrays in side channels and next to acclimation ponds throughout the subbasin, but these represent the primary arrays on the mainstem and key tributaries that Pacific Lamprey will likely approach.

There are a total of two instream PIT array sites located on the mainstem Okanogan River (river km 25.1 and 129.4) (Fig. 6). There are 13 additional PIT array sites on 12 tributaries to Okanogan River: (listed from lower to upper Okanogan River confluence) Loup Loup, Salmon, Omak, Wanacut, Johnson, Tunk, Aeneas, Bonaparte, Antoine, Wildhorse Spring, Tonasket, and Ninemile creeks. There are two sites on Omak Creek (river km 0.3 and 9.3), and primarily one site each on the rest of the tributaries. Most sites have a pair of arrays, consisting of lower (downstream) and upper (upstream) arrays, but some only have a single array. There are several more instream PIT arrays in side channels and next to acclimation ponds throughout the subbasin, but these represent the primary arrays on the mainstem and key tributaries that Pacific Lamprey will likely approach.

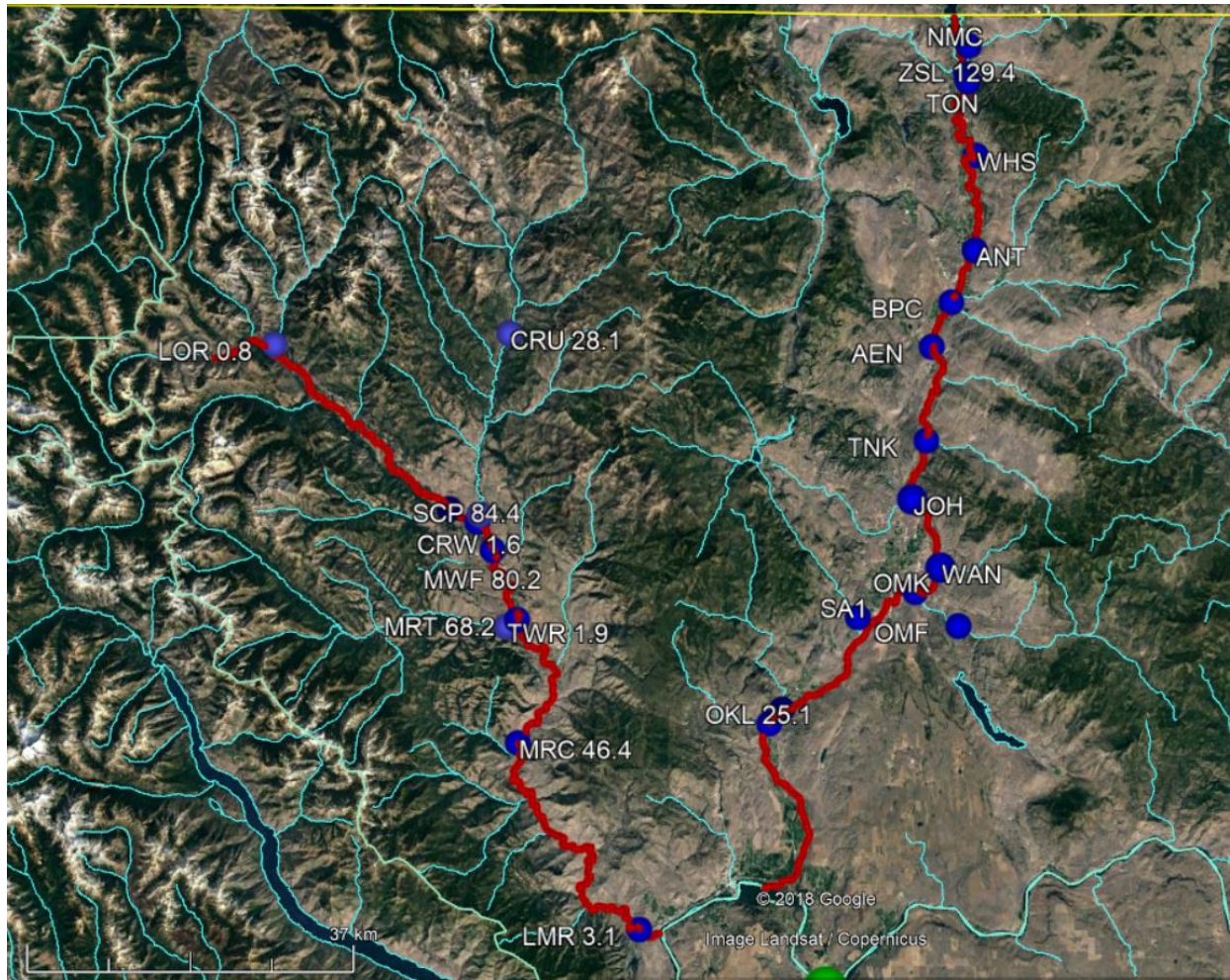


Figure 5. Overall aerial map of instream PIT array sites within the Methow and Okanogan subbasins (blue circles). The three letter abbreviation (and its associated river km for Methow Subbasin) is labeled. The red line represents mainstem Methow River, the light blue lines represent its tributaries as well as the Columbia River.

At Wells Dam Forebay near Chelan, WA (river km 823.7), Columbia River water flow was approximately 75 kcfs during the release event on August 16, 2017 (Figure 7). High flow discharge was observed primarily in May and water flow exceeded 300 kcfs. The last detection was on July 18, 2018, when water flow was steadily decreasing to approximately 125 kcfs.

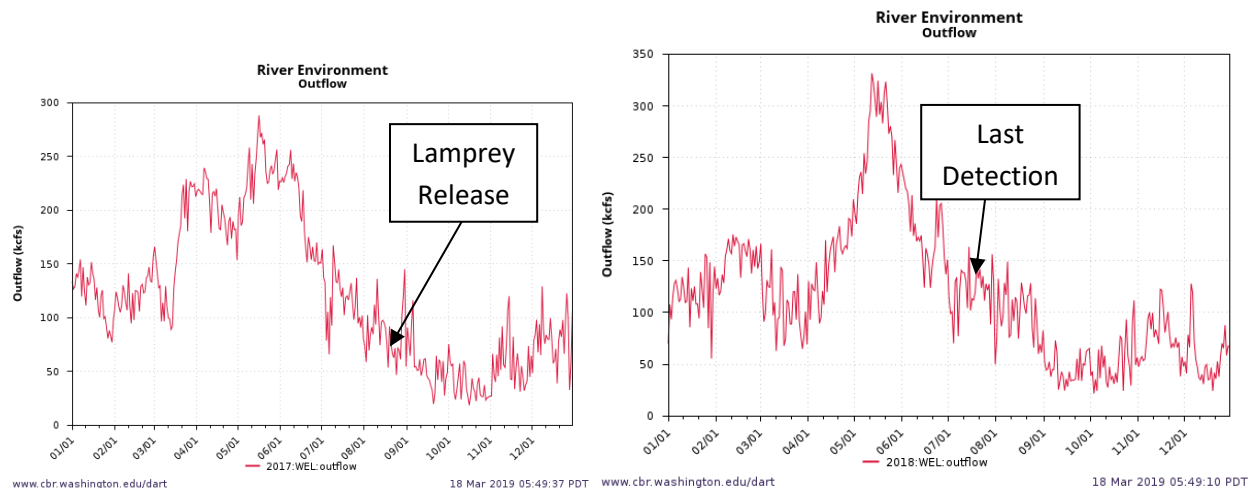


Figure 6. Discharge (kilo cubic feet per second) data of the Wells Dam forebay Chelan, WA (river km 823.7) between January 1, 2017, and December 31, 2018 (2017 data on left, 2018 data on right). Lamprey release as well as last PIT array detection are also displayed. Data from Columbia River DART (available from http://www.cbr.washington.edu/dart/query/river_graph_text).

The detection summary from each release groups are described below. The first bullet point summarizes the overall detection percentages, the second bullet point summarizes the location of first detections, and if there were any lamprey with multiple detections, the following bullet point summarizes those additional detection locations, and finally the last bullet point summarizes the overall detection from all detections, including multiple detections. A table is also attached to provide summary data on first detection of all detected lamprey, including the site name, first and last detection date/time, days since release (or days since last detection for second or third detections), distance traveled, migration speed, duration of detection, movement direction, first and last antenna, and total number of detections. Some of the columns are color coded to emphasize the high and low values (high values are blue and low values are red). If there were multiple detections by any individual lamprey, additional tables were provided.

Summer - Columbia Release (River KM 828.0; 8/16/2017; n=136)

- Twenty-nine of 136 lamprey (21%) were detected, and none were detected at more than one site.
- Of the 29 first detections, 26 (90%) were detected moving upstream, including eight (28%) at LMR (Lower Methow River at Pateros; river km 3.1), two (7%) at MRC (Methow River at Carlton; river km 46.4), 13 (45%) at CRW (Chewuch River above Winthrop; river km 1.6), two (7%) at CRU (Upper Chewuch Instream Array; river km 28.1), and one (3%) at OKL (Lower Okanogan Instream Array). Three (10%) were detected moving downstream (at least initially), including one (3%) at WEA (Wells Dam, DPUD Adult Ladders; river km), one (3%) at ENL (Lower Entiat River; river km 1.9), and one (3%) at LWE (Lower

Wenatchee River; river km 2.7). Overall, 25 of 29 (86%) were detected within the Methow Subbasin.

Table 24. Summary of first detections from Columbia (river km 828.0) release on August 16, 2017. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

#	Site		River	River	First Time	Days	River	Migration	Last Time	Duration	Duration	Direction?	First	Last	#
	Code	Site				Since	KM	Speed							
	Value	#		KM	Value	Release	Travel	(km/day)	Value	(Days)	(Sec)		ID	ID	Reads
1	LWE	1	Wenatchee	2.7	6/7/18 13:13	294.8	-81.1	-0.28	6/7/18 20:48	0.3	455.35	Down / Up	0B	5	13
2	ENL	1	Entiat	1.9	6/3/18 0:44	290.3	-56.0	-0.19	6/13/18 2:53	10.1	14529.20	Down / Up	21	21	2
3	WEA	1	Columbia	823.7	5/10/18 23:05	267.2	-4.3	-0.02	5/12/18 20:26	1.9	2720.63	Down / Up	A2	A2	11
4	LMR	1	Methow	3.1	8/18/17 21:05	2.2	11.3	5.24	8/18/17 21:05	0.0	0.20	Up	9	3	2
5	LMR	2	Methow	3.1	8/18/17 23:24	2.3	11.3	5.01	8/18/17 23:24	0.0	0.00	Up	3	3	1
6	LMR	3	Methow	3.1	8/18/17 23:53	2.3	11.3	4.97	8/18/17 23:53	0.0	0.00	Up	7	7	1
7	LMR	4	Methow	3.1	8/23/17 0:52	6.3	11.3	1.79	8/23/17 0:53	0.0	0.15	Up	0C	6	2
8	LMR	5	Methow	3.1	9/16/17 0:37	30.3	11.3	0.37	9/16/17 0:37	0.0	0.00	Up	3	3	1
9	LMR	6	Methow	3.1	9/18/17 1:22	32.3	11.3	0.35	9/18/17 1:22	0.0	0.22	Up	9	3	2
10	LMR	7	Methow	3.1	3/28/18 22:16	224.2	11.3	0.05	3/28/18 22:17	0.0	0.15	Up	7	1	2
11	LMR	8	Methow	3.1	4/11/18 22:14	238.2	11.3	0.05	4/11/18 22:14	0.0	0.00	Up	1	1	1
12	OKL	1	Okanogan	25.1	6/3/18 0:24	290.3	48.3	0.17	6/8/18 1:25	5.0	7260.92	Up	2	3	4
13	MRC	1	Methow	46.4	7/16/18 23:53	334.3	54.6	0.16	7/16/18 23:53	0.0	0.00	Up	3	3	1
14	MRC	2	Methow	46.4	7/18/18 20:51	336.2	54.6	0.16	7/18/18 20:51	0.0	0.00	Up	3	3	1
15	CRW	1	Chewuch	1.6	8/23/17 3:36	6.4	94.0	14.62	8/23/17 3:36	0.0	0.00	Up	5	5	1
16	CRW	2	Chewuch	1.6	8/24/17 20:10	8.1	94.0	11.57	8/24/17 20:10	0.0	0.00	Up	3	3	1
17	CRW	3	Chewuch	1.6	8/24/17 20:28	8.1	94.0	11.56	8/24/17 20:29	0.0	1.53	Up	5	1	2
18	CRW	4	Chewuch	1.6	8/24/17 21:32	8.2	94.0	11.50	8/24/17 21:34	0.0	1.75	Up	5	3	2
19	CRW	5	Chewuch	1.6	8/25/17 22:08	9.2	94.0	10.22	8/25/17 22:10	0.0	1.20	Up	5	1	2
20	CRW	6	Chewuch	1.6	8/25/17 22:33	9.2	94.0	10.20	8/25/17 22:35	0.0	1.75	Up	5	2	2
21	CRW	7	Chewuch	1.6	8/26/17 2:05	9.4	94.0	10.04	8/26/17 2:08	0.0	2.25	Up	6	3	2
22	CRW	8	Chewuch	1.6	8/26/17 2:25	9.4	94.0	10.02	8/26/17 2:29	0.0	4.13	Up	5	3	2
23	CRW	9	Chewuch	1.6	8/26/17 20:55	10.2	94.0	9.26	8/26/17 20:55	0.0	0.00	Up	1	1	1
24	CRW	10	Chewuch	1.6	8/26/17 21:45	10.2	94.0	9.23	8/26/17 22:03	0.0	18.27	Up	5	3	2
25	CRW	11	Chewuch	1.6	8/26/17 22:14	10.2	94.0	9.21	8/26/17 22:15	0.0	1.17	Up	6	3	2
26	CRW	12	Chewuch	1.6	8/27/17 0:49	10.3	94.0	9.11	8/27/17 0:51	0.0	1.92	Up	5	3	2
27	CRW	13	Chewuch	1.6	7/11/18 2:24	328.4	94.0	0.29	7/12/18 6:51	1.2	1706.75	Up	3	2	5
28	CRU	1	Chewuch	28.1	8/28/17 22:46	12.2	120.5	9.85	6/15/18 2:42	290.2	417835.65	Up	5	6	5
29	CRU	2	Chewuch	28.1	9/1/17 23:07	16.2	120.5	7.42	9/1/17 23:08	0.0	0.13	Up	4	1	2

- In the end, of the 136 lamprey, 8 (6%) were detected at LMR, 2 (1%) detected at MRC, 13 (10%) detected at CRW, 2 (1%) detected at CRU, 1 (2%) detected at OKL, 1 (2%) detected at WEA, 1 (2%) detected at ENL, and 1 (1%) was detected at LWE. Overall, 25 (18%) were detected within the Methow Subbasin.

Summer - Columbia Release (River KM 850.8; 8/16/2017; n=124)

- Thirteen of 124 lamprey (10%) were detected, and none were detected at more than one site.
- Of the 13 first detections, all were detected moving downstream (at least initially), including five (38%) at LMR (Lower Methow River at Pateros; river km 3.1), one (8%) at MWF (Whitefish side channel in Methow River; river km 80.2), and six (46%) at CRW

(Chewuch River above Winthrop; river km 1.6), and one (8%) at WEA (Wells Dam, DPUD Adult Ladders; river km). Overall, 12 of 13 (92%) were detected within Methow Subbasin.

Table 25. Summary of first detections from Columbia (river km 850.8) release on August 16, 2017. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

#	Site		River	River KM	First Time	Days Since	River	Migration	Last Time	Duration (Days)	Duration (Sec)	Direction?	First	Last	#
	Code	Site			Value	Release	KM	Speed					Ant	Ant	
#	Value	#	River	KM	Value	Release	Travel	(km/day)	Value	(Days)	(Sec)		ID	ID	Reads
1	WEA	1	Columbia	823.7	5/25/18 20:13	282.2	-27.1	-0.10	6/16/18 21:50	22.1	31776.95	Down / Up	A3	A3	5
2	LMR	1	Methow	3.1	8/19/17 3:10	2.5	-14.6	-5.93	8/19/17 3:10	0.0	0.00	Down / Up	5	5	1
3	LMR	2	Methow	3.1	8/22/17 20:32	6.2	-14.6	-2.37	8/22/17 20:32	0.0	0.00	Down / Up	3	3	1
4	LMR	3	Methow	3.1	8/27/17 3:46	10.5	-14.6	-1.39	8/27/17 3:46	0.0	0.00	Down / Up	0A	0A	1
5	LMR	4	Methow	3.1	9/3/17 19:52	18.1	-14.6	-0.80	9/3/17 19:52	0.0	0.00	Down / Up	0B	0B	1
6	LMR	5	Methow	3.1	7/8/18 11:32	325.8	-14.6	-0.04	7/8/18 11:32	0.0	0.00	Down / Up	2	2	1
7	MWF	1	Methow	80.2	6/23/18 22:42	311.3	80.2	0.26	6/23/18 23:55	0.1	72.70	Down / Up	F6	E4	2
8	CRW	1	Chewuch	1.6	8/24/17 0:32	7.3	85.8	11.68	8/24/17 0:32	0.0	0.00	Down / Up	2	2	1
9	CRW	2	Chewuch	1.6	8/26/17 20:37	10.2	85.8	8.44	8/26/17 20:38	0.0	1.53	Down / Up	5	3	2
10	CRW	3	Chewuch	1.6	8/26/17 20:41	10.2	85.8	8.44	8/26/17 20:43	0.0	1.70	Down / Up	5	2	3
11	CRW	4	Chewuch	1.6	8/26/17 21:28	10.2	85.8	8.41	8/26/17 21:30	0.0	1.52	Down / Up	5	3	2
12	CRW	5	Chewuch	1.6	8/26/17 22:13	10.2	85.8	8.38	8/26/17 22:15	0.0	2.80	Down / Up	6	3	2
13	CRW	6	Chewuch	1.6	9/1/17 1:16	15.4	85.8	5.58	9/1/17 1:17	0.0	1.53	Down / Up	5	3	2

- In the end, of the 124 lamprey, 5 (4%) were detected at LMR, 1 (1%) detected at MWF, 6 (5%) detected at CRW, 1 (1%) detected at WEA. Overall, 13 (10%) were detected within the Methow Subbasin.

Summer - Similkameen Release (River KM 5.0; 8/16/2017; n=49)

- Three of 49 lamprey (6%) were detected, and none were detected at more than one site.
- Of the 3 first detections, all (100%) were detected moving downstream (at least initially) at OKL (Lower Okanogan Instream Array; river km 25.1).

Table 26. Summary of first detections from Similkameen River (river km 5.0) release on August 16, 2017. See page 13 for the definition of the columns. The number displayed in the first “#” column is the unique identifier for all individual lamprey detected at least once and remains the same for all the tables listed for this particular release.

	Site Code	Site		River	First Time	Days Since Release	River KM Travel	Migration Speed (km/day)		Duration (Days)	Duration (Sec)		First Ant ID	Last Ant ID	
#	Value	#	River	KM	Value	Release	Travel	(km/day)	Last Time Value	(Days)	(Sec)	Direction?	ID	ID	# Reads
1	OKL	1	Okanogan	25.1	6/16/18 15:51	303.9	-111.4	-0.37	6/16/18 15:52	0.0	1.47	Down / Up	8	3	2
2	OKL	2	Okanogan	25.1	7/3/18 20:10	321.1	-111.4	-0.35	7/3/18 20:10	0.0	0.00	Down	8	8	1
3	OKL	3	Okanogan	25.1	7/4/18 4:36	321.5	-111.4	-0.35	7/4/18 4:37	0.0	0.20	Down	8	9	2

- In the end, of the 49 released, 3 (6%) were detected at OKL.

Summary

Highlights from the Mid-Columbia 2017-2018 broodstock Pacific Lamprey translocation monitoring are the following (Table 27 and 28 and Fig. 9):

- The overall detection percentage of PIT tagged lamprey was 17.5%, which is much lower than what was detected with the Methow Subbasin release (42.1%).
- Sites that detected lamprey the most were CRW (Chewuch River above Winthrop; river km 1.6) at 6.8%, LMR (Lower Methow River at Pateros; river km 3.1) at 4.9%, MRC (Methow River at Carlton; river km 46.4) at 2.3%, and OKL (Lower Okanogan Instream Array; river km 25.1) at 1.3%.
- The majority (90%) of those released downstream of Methow River confluence in the Columbia River were detected upstream from their release location, whereas none of the lamprey released downstream of Okanogan River confluence received detections upstream of the release location.
- The overall detection in Methow Subbasin from the Columbia River release (river km 835.3) compared to the Lower Methow release (river km 2.2) was 30% lower, indicating that approximately 70% of the lamprey from mainstem Columbia may have been entering Methow River (if we assume the movement behavior within the Methow Subbasin was similar between the two groups).
- The Columbia river km 828.0 release in mid-August only had 21% overall detection percentages – which is about half of the detection observed for the Columbia river km 835.3 release later in early September (42%). Most (86%) were detected within the Methow Subbasin, and a large portion of those (52%) were from Chewuch River.
- The fastest upstream traveling lamprey detected was 14.6 km/day. This lamprey swam 94.0 river km in 6.4 days (from Columbia river km 828.0 release).
- The three lamprey detected moving downstream at Lower Okanogan Instream Array were between June 16 and July 4, 2018, likely indicating post spawn drifting.
- Four lamprey were detected downstream of the Upper Columbia (downstream of Wells Dam): two at Wells Dam (Columbia river km 823.7), one at lower Entiat River (river km 1.9), and one at Lower Wenatchee River (river km 2.7).

Table 27. Summary of Mid-Columbia 2017-2018 broodstock Pacific Lamprey translocation detection sites from the Upper Columbia releases.

Site Subbasin Name	Site Code Value	Site Name	River	River KM	# of Lamprey Detected	% of Lamprey Detected
Wenatchee	LWE	LWE - Lower Wenatchee River	Wenatchee	2.7	1	0.3%
Upper Columbia-Entiat	ENL	ENL - Lower Entiat River	Entiat	1.9	1	0.3%
Chief Joseph	WEA	WEA - Wells Dam, DCPUD Adult Ladders	Columbia	823.7	2	0.6%
Methow	LMR	LMR - Lower Methow River at Pateros	Methow	3.1	15	4.9%
Methow	MRC	MRC - Methow River at Carlton	Methow	46.4	7	2.3%
Methow	MWF	MWF - Whitefish SC in Methow River	Methow	80.2	1	0.3%
Methow	CRW	CRW - Chewuch River above Winthrop	Chewuch	1.6	21	6.8%
Methow	CRU	CRU - Upper Chewuch Instream Array	Chewuch	28.1	2	0.6%
Okanogan	OKL	OKL - Lower Okanogan Instream Array	Okanogan	25.1	4	1.3%
Total	-	-	-	-	54	17.5%

Table 28. Summary of PIT array detections from each release event in the Upper Columbia for the Lower Columbia 2017-2018 broodstock Pacific Lamprey translocation.

Release \ Site	# Tagged	% Initially Upstream	LWE	ENL	WEA	LMR	MRC	MWF	CRW	CRU	OKL	Undetected
COL 828.0 Fall	136	90%	1%	1%	1%	6%	1%	0%	10%	1%	1%	79%
COL 850.8 Fall	124	0%	0%	0%	1%	4%	0%	1%	5%	0%	0%	90%
SIM 5.0 Fall	49	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%	94%

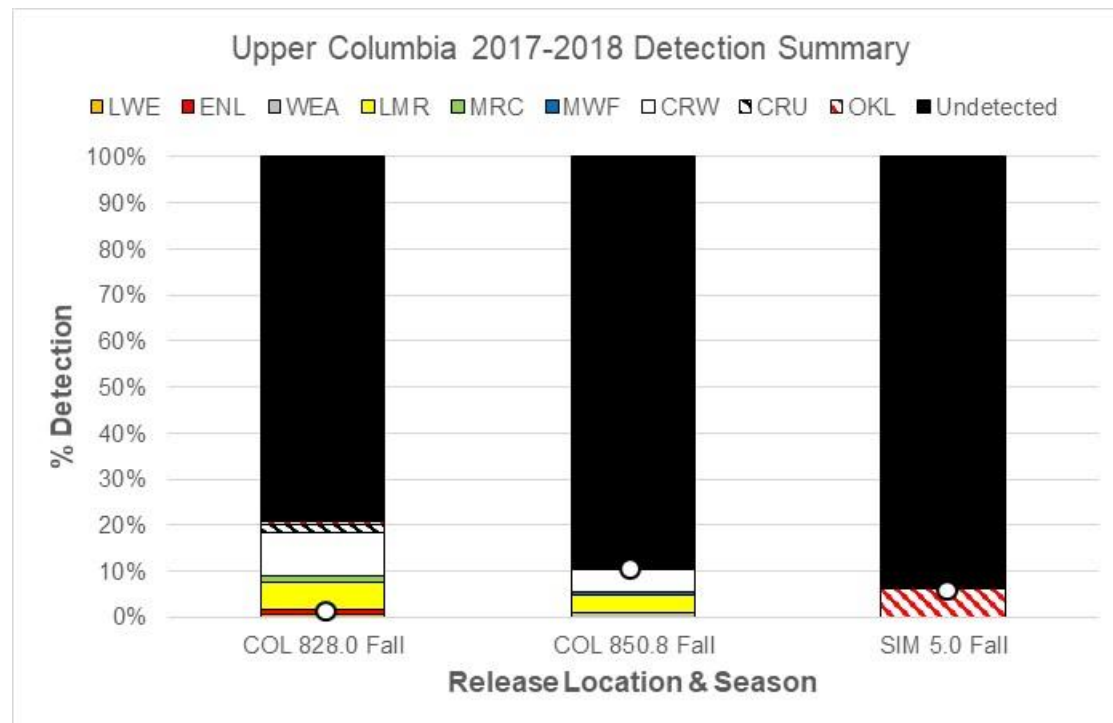


Figure 9. Summary of PIT array detections from each release event in Upper Columbia Basin for the Mid-Columbia 2017-2018 broodstock Pacific Lamprey translocation. The white circle indicates the relative location of the release in relation to the respective detection sites (sites above are upstream of the release sites, whereas those below are downstream).

Appendix: PIT Tag Information

“#” column below corresponds to the “#” displayed in the detection summary tables in Part II.

Lower Columbia PIT Tagged Lamprey

Total #	PIT Tag (Full ID)	#	Release Date	Release River	Release River KM	Latitude	Longitude
1	3DA.1A19B3914F	1	9/5/2017	Columbia	835.3	48.034149	-119.88807
2	3DA.1A19B392CB	2	9/5/2017	Columbia	835.3	48.034149	-119.88807
3	3DD.0077971C62	3	9/5/2017	Columbia	835.3	48.034149	-119.88807
4	3DD.007796383E	4	9/5/2017	Columbia	835.3	48.034149	-119.88807
5	3DA.1A19B3C984	5	9/5/2017	Columbia	835.3	48.034149	-119.88807
6	3DD.0077971C42	6	9/5/2017	Columbia	835.3	48.034149	-119.88807
7	3DD.00779691E9	7	9/5/2017	Columbia	835.3	48.034149	-119.88807
8	3DD.007797053B	8	9/5/2017	Columbia	835.3	48.034149	-119.88807
9	3DD.0077962BC0	9	9/5/2017	Columbia	835.3	48.034149	-119.88807
10	3DD.0077961C33	10	9/5/2017	Columbia	835.3	48.034149	-119.88807
11	3DD.0077966E2E	11	9/5/2017	Columbia	835.3	48.034149	-119.88807
12	3DD.007795A5E5	12	9/5/2017	Columbia	835.3	48.034149	-119.88807
13	3DA.1A19B39AB2	13	9/5/2017	Columbia	835.3	48.034149	-119.88807
14	3DD.0077962D00	14	9/5/2017	Columbia	835.3	48.034149	-119.88807
15	3DA.1A19B3C905	15	9/5/2017	Columbia	835.3	48.034149	-119.88807
16	3DA.1A19B396E4	16	9/5/2017	Columbia	835.3	48.034149	-119.88807
17	3DD.00779660FF	17	9/5/2017	Columbia	835.3	48.034149	-119.88807
18	3DD.007796A91C	18	9/5/2017	Columbia	835.3	48.034149	-119.88807
19	3DD.0077966C1F	19	9/5/2017	Columbia	835.3	48.034149	-119.88807
20	3DA.1A19B3222B	20	9/5/2017	Columbia	835.3	48.034149	-119.88807
21	3DD.007796C077	21	9/5/2017	Columbia	835.3	48.034149	-119.88807
22	3DA.1A19B3921A	22	9/5/2017	Columbia	835.3	48.034149	-119.88807
23	3DD.007796026B	23	9/5/2017	Columbia	835.3	48.034149	-119.88807
24	3DD.0077960DC2	24	9/5/2017	Columbia	835.3	48.034149	-119.88807
25	3DD.007796D589	25	9/5/2017	Columbia	835.3	48.034149	-119.88807
26	3DD.00779714E8	26	9/5/2017	Columbia	835.3	48.034149	-119.88807
27	3DD.007796545C	27	9/5/2017	Columbia	835.3	48.034149	-119.88807
28	3DD.007796BE88	28	9/5/2017	Columbia	835.3	48.034149	-119.88807
29	3DD.007795F84C	29	9/5/2017	Columbia	835.3	48.034149	-119.88807
30	3DA.1A19B392D9	30	9/5/2017	Columbia	835.3	48.034149	-119.88807
31	3DD.007796A4B6	31	9/5/2017	Columbia	835.3	48.034149	-119.88807
32	3DD.007796CF6A	32	9/5/2017	Columbia	835.3	48.034149	-119.88807
33	3DD.007796FB95	33	9/5/2017	Columbia	835.3	48.034149	-119.88807

34	3DA.1A19B39017	34	9/5/2017	Columbia	835.3	48.034149	-119.88807
35	3DD.007796F0D1	35	9/5/2017	Columbia	835.3	48.034149	-119.88807
36	3DA.1A19B38FA2	36	9/5/2017	Columbia	835.3	48.034149	-119.88807
37	3DD.0077962B75	37	9/5/2017	Columbia	835.3	48.034149	-119.88807
38	3DD.0077971E89	38	9/5/2017	Columbia	835.3	48.034149	-119.88807
39	3DD.0077960F78	39	9/5/2017	Columbia	835.3	48.034149	-119.88807
40	3DD.00779653D6	40	9/5/2017	Columbia	835.3	48.034149	-119.88807
41	3DA.1A19B3932D	41	9/5/2017	Columbia	835.3	48.034149	-119.88807
42	3DA.1A19B3C7A5	42	9/5/2017	Columbia	835.3	48.034149	-119.88807
43	3DA.1A19B3A3C5	43	9/5/2017	Columbia	835.3	48.034149	-119.88807
44	3DA.1A19B33C02	44	9/5/2017	Columbia	835.3	48.034149	-119.88807
45	3DA.1A19B38FBA	45	9/5/2017	Columbia	835.3	48.034149	-119.88807
46	3DA.1A19B390F0	46	9/5/2017	Columbia	835.3	48.034149	-119.88807
47	3DA.1A19B3392A	47	9/5/2017	Columbia	835.3	48.034149	-119.88807
48	3DA.1A19B3A685	48	9/5/2017	Columbia	835.3	48.034149	-119.88807
49	3DA.1A19B390EE	49	9/5/2017	Columbia	835.3	48.034149	-119.88807
50	3DA.1A19B328D8	50	9/5/2017	Columbia	835.3	48.034149	-119.88807
51	3DA.1A19B3249F	51	9/5/2017	Columbia	835.3	48.034149	-119.88807
52	3DA.1A19B3912C	52	9/5/2017	Columbia	835.3	48.034149	-119.88807
53	3DA.1A19B399CD	53	9/5/2017	Columbia	835.3	48.034149	-119.88807
54	3DA.1A19B390B1	54	9/5/2017	Columbia	835.3	48.034149	-119.88807
55	3DA.1A19B3928C	55	9/5/2017	Columbia	835.3	48.034149	-119.88807
56	3DA.1A19B3A311	56	9/5/2017	Columbia	835.3	48.034149	-119.88807
57	3DA.1A19B390A4	57	9/5/2017	Columbia	835.3	48.034149	-119.88807
58	3DA.1A19B33B8F	58	9/5/2017	Columbia	835.3	48.034149	-119.88807
59	3DA.1A19B390B7	59	9/5/2017	Columbia	835.3	48.034149	-119.88807
60	3DA.1A19B3A30A	60	9/5/2017	Columbia	835.3	48.034149	-119.88807
61	3DA.1A19B3A300	61	9/5/2017	Columbia	835.3	48.034149	-119.88807
62	3DA.1A19B3A47A	62	9/5/2017	Columbia	835.3	48.034149	-119.88807
63	3DA.1A19B398E4	63	9/5/2017	Columbia	835.3	48.034149	-119.88807
64	3DA.1A19B3942A	64	9/5/2017	Columbia	835.3	48.034149	-119.88807
65	3DA.1A19B3A439	65	9/5/2017	Columbia	835.3	48.034149	-119.88807
66	3DA.1A19B39103	66	9/5/2017	Columbia	835.3	48.034149	-119.88807
67	3DA.1A19B392E1	67	9/5/2017	Columbia	835.3	48.034149	-119.88807
68	3DA.1A19B39248	68	9/5/2017	Columbia	835.3	48.034149	-119.88807
69	3DA.1A19B3923B	69	9/5/2017	Columbia	835.3	48.034149	-119.88807
70	3DA.1A19B392E3	70	9/5/2017	Columbia	835.3	48.034149	-119.88807
71	3DA.1A19B39100	71	9/5/2017	Columbia	835.3	48.034149	-119.88807
72	3DA.1A19B3A4D8	72	9/5/2017	Columbia	835.3	48.034149	-119.88807
73	3DA.1A19B39684	73	9/5/2017	Columbia	835.3	48.034149	-119.88807
74	3DA.1A19B39094	74	9/5/2017	Columbia	835.3	48.034149	-119.88807
75	3DA.1A19B3986C	75	9/5/2017	Columbia	835.3	48.034149	-119.88807
76	3DD.007796E987	76	9/5/2017	Columbia	835.3	48.034149	-119.88807
77	3DD.007795F7F0	77	9/5/2017	Columbia	835.3	48.034149	-119.88807
78	3DD.0077966149	78	9/5/2017	Columbia	835.3	48.034149	-119.88807

79	3DD.0077965237	79	9/5/2017	Columbia	835.3	48.034149	-119.88807
80	3DD.0077960318	80	9/5/2017	Columbia	835.3	48.034149	-119.88807
81	3DD.0077962BF6	81	9/5/2017	Columbia	835.3	48.034149	-119.88807
82	3DD.007796D3E3	82	9/5/2017	Columbia	835.3	48.034149	-119.88807
83	3DD.00779662B3	83	9/5/2017	Columbia	835.3	48.034149	-119.88807
84	3DD.0077961B44	84	9/5/2017	Columbia	835.3	48.034149	-119.88807
85	3DD.00779724E6	85	9/5/2017	Columbia	835.3	48.034149	-119.88807
86	3DD.00779653ED	86	9/5/2017	Columbia	835.3	48.034149	-119.88807
87	3DD.0077961CE8	87	9/5/2017	Columbia	835.3	48.034149	-119.88807
88	3DD.007796D4C3	88	9/5/2017	Columbia	835.3	48.034149	-119.88807
89	3DD.00779704E0	89	9/5/2017	Columbia	835.3	48.034149	-119.88807
90	3DD.0077966384	90	9/5/2017	Columbia	835.3	48.034149	-119.88807
91	3DD.00779681A1	91	9/5/2017	Columbia	835.3	48.034149	-119.88807
92	3DD.00779637F6	92	9/5/2017	Columbia	835.3	48.034149	-119.88807
93	3DD.007796E3A8	93	9/5/2017	Columbia	835.3	48.034149	-119.88807
94	3DD.0077962C2A	94	9/5/2017	Columbia	835.3	48.034149	-119.88807
95	3DA.1A19B3922D	95	9/5/2017	Columbia	835.3	48.034149	-119.88807
96	3DA.1A19B3C923	1	9/5/2017	Methow	2.2	48.048403	-119.921782
97	3DA.1A19B32BDC	2	9/5/2017	Methow	2.2	48.048403	-119.921782
98	3DA.1A19B38F8D	3	9/5/2017	Methow	2.2	48.048403	-119.921782
99	3DA.1A19B3A67B	4	9/5/2017	Methow	2.2	48.048403	-119.921782
100	3DA.1A19B391BA	5	9/5/2017	Methow	2.2	48.048403	-119.921782
101	3DA.1A19B30F82	6	9/5/2017	Methow	2.2	48.048403	-119.921782
102	3DA.1A19B39141	7	9/5/2017	Methow	2.2	48.048403	-119.921782
103	3DA.1A19B39333	8	9/5/2017	Methow	2.2	48.048403	-119.921782
104	3DA.1A19B339BA	9	9/5/2017	Methow	2.2	48.048403	-119.921782
105	3DA.1A19B39206	10	9/5/2017	Methow	2.2	48.048403	-119.921782
106	3DA.1A19B392F8	11	9/5/2017	Methow	2.2	48.048403	-119.921782
107	3DA.1A19B39228	12	9/5/2017	Methow	2.2	48.048403	-119.921782
108	3DA.1A19B38FA8	13	9/5/2017	Methow	2.2	48.048403	-119.921782
109	3DA.1A19B3900E	14	9/5/2017	Methow	2.2	48.048403	-119.921782
110	3DA.1A19B38FCA	15	9/5/2017	Methow	2.2	48.048403	-119.921782
111	3DA.1A19B3C9BD	16	9/5/2017	Methow	2.2	48.048403	-119.921782
112	3DA.1A19B39323	17	9/5/2017	Methow	2.2	48.048403	-119.921782
113	3DA.1A19B39287	18	9/5/2017	Methow	2.2	48.048403	-119.921782
114	3DA.1A19B391FE	19	9/5/2017	Methow	2.2	48.048403	-119.921782
115	3DA.1A19B33B6E	20	9/5/2017	Methow	2.2	48.048403	-119.921782
116	3DA.1A19B38F96	21	9/5/2017	Methow	2.2	48.048403	-119.921782
117	3DA.1A19B390DA	22	9/5/2017	Methow	2.2	48.048403	-119.921782
118	3DA.1A19B3923C	23	9/5/2017	Methow	2.2	48.048403	-119.921782
119	3DA.1A19B3A422	24	9/5/2017	Methow	2.2	48.048403	-119.921782
120	3DA.1A19B391D2	25	9/5/2017	Methow	2.2	48.048403	-119.921782
121	3DA.1A19B3A4DD	26	9/5/2017	Methow	2.2	48.048403	-119.921782
122	3DA.1A19B3929E	27	9/5/2017	Methow	2.2	48.048403	-119.921782

123	3DA.1A19B39180	28	9/5/2017	Methow	2.2	48.048403	-119.921782
124	3DA.1A19B3921C	29	9/5/2017	Methow	2.2	48.048403	-119.921782
125	3DA.1A19B3990C	30	9/5/2017	Methow	2.2	48.048403	-119.921782
126	3DA.1A19B396FC	31	9/5/2017	Methow	2.2	48.048403	-119.921782
127	3DA.1A19B391DC	32	9/5/2017	Methow	2.2	48.048403	-119.921782
128	3DA.1A19B3A30F	33	9/5/2017	Methow	2.2	48.048403	-119.921782
129	3DA.1A19B39559	34	9/5/2017	Methow	2.2	48.048403	-119.921782
130	3DA.1A19B38FDF	35	9/5/2017	Methow	2.2	48.048403	-119.921782
131	3DA.1A19B3903C	36	9/5/2017	Methow	2.2	48.048403	-119.921782
132	3DA.1A19B390B8	37	9/5/2017	Methow	2.2	48.048403	-119.921782
133	3DA.1A19B3A5EF	1	9/5/2017	Methow	8.0	48.074906	-119.956582
134	3DA.1A19B390C0	2	9/5/2017	Methow	8.0	48.074906	-119.956582
135	3DA.1A19B390C8	3	9/5/2017	Methow	8.0	48.074906	-119.956582
136	3DA.1A19B396C6	4	9/5/2017	Methow	8.0	48.074906	-119.956582
137	3DA.1A19B2F741	5	9/5/2017	Methow	8.0	48.074906	-119.956582
138	3DA.1A19B39143	6	9/5/2017	Methow	8.0	48.074906	-119.956582
139	3DA.1A19B3905F	7	9/5/2017	Methow	8.0	48.074906	-119.956582
140	3DA.1A19B3A621	8	9/5/2017	Methow	8.0	48.074906	-119.956582
141	3DA.1A19B391E8	9	9/5/2017	Methow	8.0	48.074906	-119.956582
142	3DA.1A19B3912D	10	9/5/2017	Methow	8.0	48.074906	-119.956582
143	3DA.1A19B392EE	11	9/5/2017	Methow	8.0	48.074906	-119.956582
144	3DA.1A19B3C8CF	12	9/5/2017	Methow	8.0	48.074906	-119.956582
145	3DA.1A19B3909F	13	9/5/2017	Methow	8.0	48.074906	-119.956582
146	3DA.1A19B39000	14	9/5/2017	Methow	8.0	48.074906	-119.956582
147	3DA.1A19B39453	15	9/5/2017	Methow	8.0	48.074906	-119.956582
148	3DA.1A19B3268B	16	9/5/2017	Methow	8.0	48.074906	-119.956582
149	3DA.1A19B3916C	17	9/5/2017	Methow	8.0	48.074906	-119.956582
150	3DA.1A19B3918D	18	9/5/2017	Methow	8.0	48.074906	-119.956582
151	3DA.1A19B390D9	19	9/5/2017	Methow	8.0	48.074906	-119.956582
152	3DA.1A19B396D4	20	9/5/2017	Methow	8.0	48.074906	-119.956582
153	3DA.1A19B395C0	1	9/14/2017	Methow	66.5	48.359865	-120.11420
154	3DA.1A19B3935A	2	9/14/2017	Methow	66.5	48.359865	-120.11420
155	3DA.1A19B39686	3	9/14/2017	Methow	66.5	48.359865	-120.11420
156	3DA.1A19B394D6	4	9/14/2017	Methow	66.5	48.359865	-120.11420
157	3DA.1A19B39513	5	9/14/2017	Methow	66.5	48.359865	-120.11420
158	3DA.1A19B396D3	6	9/14/2017	Methow	66.5	48.359865	-120.11420
159	3DA.1A19B3903D	7	9/14/2017	Methow	66.5	48.359865	-120.11420
160	3DA.1A19B39501	8	9/14/2017	Methow	66.5	48.359865	-120.11420
161	3DA.1A19B3958C	9	9/14/2017	Methow	66.5	48.359865	-120.11420
162	3DA.1A19B3933E	10	9/14/2017	Methow	66.5	48.359865	-120.11420
163	3DA.1A19B39659	11	9/14/2017	Methow	66.5	48.359865	-120.11420
164	3DA.1A19B3911E	12	9/14/2017	Methow	66.5	48.359865	-120.11420
165	3DA.1A19B39404	13	9/14/2017	Methow	66.5	48.359865	-120.11420
166	3DA.1A19B3955A	14	9/14/2017	Methow	66.5	48.359865	-120.11420

167	3DA.1A19B393EC	15	9/14/2017	Methow	66.5	48.359865	-120.11420
168	3DA.1A19B39560	16	9/14/2017	Methow	66.5	48.359865	-120.11420
169	3DA.1A19B39461	17	9/14/2017	Methow	66.5	48.359865	-120.11420
170	3DA.1A19B395D7	18	9/14/2017	Methow	66.5	48.359865	-120.11420
171	3DA.1A19B39520	19	9/14/2017	Methow	66.5	48.359865	-120.11420
172	3DA.1A19B39573	20	9/14/2017	Methow	66.5	48.359865	-120.11420
173	3DA.1A19B396F4	21	9/14/2017	Methow	66.5	48.359865	-120.11420
174	3DA.1A19B393B5	22	9/14/2017	Methow	66.5	48.359865	-120.11420
175	3DA.1A19B39655	23	9/14/2017	Methow	66.5	48.359865	-120.11420
176	3DA.1A19B39618	24	9/14/2017	Methow	66.5	48.359865	-120.11420
177	3DA.1A19B3913E	25	9/14/2017	Methow	66.5	48.359865	-120.11420
178	3DA.1A19B3931B	26	9/14/2017	Methow	66.5	48.359865	-120.11420
179	3DA.1A19B3965F	27	9/14/2017	Methow	66.5	48.359865	-120.11420
180	3DA.1A19B38F93	28	9/14/2017	Methow	66.5	48.359865	-120.11420
181	3DA.1A19B39447	29	9/14/2017	Methow	66.5	48.359865	-120.11420
182	3DA.1A19B390FB	30	9/14/2017	Methow	66.5	48.359865	-120.11420
183	3DA.1A19B39369	31	9/14/2017	Methow	66.5	48.359865	-120.11420
184	3DA.1A19B39591	32	9/14/2017	Methow	66.5	48.359865	-120.11420
185	3DA.1A19B3928B	33	9/14/2017	Methow	66.5	48.359865	-120.11420
186	3DA.1A19B393C7	34	9/14/2017	Methow	66.5	48.359865	-120.11420
187	3DA.1A19B3965C	35	9/14/2017	Methow	66.5	48.359865	-120.11420
188	3DA.1A19B394BF	36	9/14/2017	Methow	66.5	48.359865	-120.11420
189	3DA.1A19B393D0	37	9/14/2017	Methow	66.5	48.359865	-120.11420
190	3DA.1A19B39403	38	9/14/2017	Methow	66.5	48.359865	-120.11420
191	3DA.1A19B39390	39	9/14/2017	Methow	66.5	48.359865	-120.11420
192	3DA.1A19B3943B	1	9/14/2017	Methow	83.2	48.469341	-120.175149
193	3DA.1A19B39377	2	9/14/2017	Methow	83.2	48.469341	-120.175149
194	3DA.1A19B322A7	3	9/14/2017	Methow	83.2	48.469341	-120.175149
195	3DA.1A19B39570	4	9/14/2017	Methow	83.2	48.469341	-120.175149
196	3DA.1A19B39603	5	9/14/2017	Methow	83.2	48.469341	-120.175149
197	3DA.1A19B33BF3	6	9/14/2017	Methow	83.2	48.469341	-120.175149
198	3DA.1A19B38BDC	7	9/14/2017	Methow	83.2	48.469341	-120.175149
199	3DA.1A19B39471	8	9/14/2017	Methow	83.2	48.469341	-120.175149
200	3DA.1A19B39614	9	9/14/2017	Methow	83.2	48.469341	-120.175149
201	3DA.1A19B394AF	10	9/14/2017	Methow	83.2	48.469341	-120.175149
202	3DA.1A19B39675	11	9/14/2017	Methow	83.2	48.469341	-120.175149
203	3DA.1A19B39624	12	9/14/2017	Methow	83.2	48.469341	-120.175149
204	3DA.1A19B39224	13	9/14/2017	Methow	83.2	48.469341	-120.175149
205	3DA.1A19B395F1	14	9/14/2017	Methow	83.2	48.469341	-120.175149
206	3DA.1A19B39485	15	9/14/2017	Methow	83.2	48.469341	-120.175149
207	3DA.1A19B394B8	16	9/14/2017	Methow	83.2	48.469341	-120.175149
208	3DA.1A19B396E5	17	9/14/2017	Methow	83.2	48.469341	-120.175149
209	3DA.1A19B394BA	18	9/14/2017	Methow	83.2	48.469341	-120.175149
210	3DA.1A19B39583	19	9/14/2017	Methow	83.2	48.469341	-120.175149

211	3DA.1A19B39638	20	9/14/2017	Methow	83.2	48.469341	-120.175149
212	3DA.1A19B397EA	21	9/14/2017	Methow	83.2	48.469341	-120.175149
213	3DA.1A19B38FB4	22	9/14/2017	Methow	83.2	48.469341	-120.175149
214	3DA.1A19B32464	23	9/14/2017	Methow	83.2	48.469341	-120.175149
215	3DA.1A19B390B4	24	9/14/2017	Methow	83.2	48.469341	-120.175149
216	3DA.1A19B39156	25	9/14/2017	Methow	83.2	48.469341	-120.175149
217	3DA.1A19B394C5	26	9/14/2017	Methow	83.2	48.469341	-120.175149
218	3DA.1A19B396E2	27	9/14/2017	Methow	83.2	48.469341	-120.175149
219	3DA.1A19B39607	28	9/14/2017	Methow	83.2	48.469341	-120.175149
220	3DA.1A19B39438	29	9/14/2017	Methow	83.2	48.469341	-120.175149
221	3DA.1A19B2FA4D	30	9/14/2017	Methow	83.2	48.469341	-120.175149
222	3DA.1A19B3A37F	31	9/14/2017	Methow	83.2	48.469341	-120.175149
223	3DA.1A19B3919A	32	9/14/2017	Methow	83.2	48.469341	-120.175149
224	3DA.1A19B390BC	33	9/14/2017	Methow	83.2	48.469341	-120.175149
225	3DA.1A19B39155	34	9/14/2017	Methow	83.2	48.469341	-120.175149
226	3DA.1A19B391D8	35	9/14/2017	Methow	83.2	48.469341	-120.175149
227	3DA.1A19B2F9C1	36	9/14/2017	Methow	83.2	48.469341	-120.175149
228	3DA.1A19B39249	37	9/14/2017	Methow	83.2	48.469341	-120.175149
229	3DA.1A19B3966A	38	9/14/2017	Methow	83.2	48.469341	-120.175149
230	3DA.1A19B3A4E7	39	9/14/2017	Methow	83.2	48.469341	-120.175149
231	3DA.1A19B392A1	40	9/14/2017	Methow	83.2	48.469341	-120.175149
232	3DA.1A19B393D6	41	9/14/2017	Methow	83.2	48.469341	-120.175149
233	3DA.1A19B39547	42	9/14/2017	Methow	83.2	48.469341	-120.175149
234	3DA.1A19B3DADA	43	9/14/2017	Methow	83.2	48.469341	-120.175149
235	3DA.1A19B3924F	44	9/14/2017	Methow	83.2	48.469341	-120.175149
236	3DA.1A19B392B8	45	9/14/2017	Methow	83.2	48.469341	-120.175149
237	3DA.1A19B39627	46	9/14/2017	Methow	83.2	48.469341	-120.175149
238	3DA.1A19B39825	47	9/14/2017	Methow	83.2	48.469341	-120.175149
239	3DA.1A19B3911C	48	9/14/2017	Methow	83.2	48.469341	-120.175149
240	3DA.1A19B396E8	49	9/14/2017	Methow	83.2	48.469341	-120.175149
241	3DA.1A19B3927A	50	9/14/2017	Methow	83.2	48.469341	-120.175149
242	3DA.1A19B38FA7	51	9/14/2017	Methow	83.2	48.469341	-120.175149
243	3DA.1A19B392C9	52	9/14/2017	Methow	83.2	48.469341	-120.175149
244	3DA.1A19B3916D	53	9/14/2017	Methow	83.2	48.469341	-120.175149
245	3DA.1A19B3946F	54	9/14/2017	Methow	83.2	48.469341	-120.175149
246	3DA.1A19B39344	55	9/14/2017	Methow	83.2	48.469341	-120.175149
247	3DA.1A19B3A365	56	9/14/2017	Methow	83.2	48.469341	-120.175149
248	3DA.1A19B38F8F	57	9/14/2017	Methow	83.2	48.469341	-120.175149
249	3DA.1A19B3951E	58	9/14/2017	Methow	83.2	48.469341	-120.175149
250	3DA.1A19B38FA1	59	9/14/2017	Methow	83.2	48.469341	-120.175149
251	3DA.1A19B3A557	60	9/14/2017	Methow	83.2	48.469341	-120.175149
252	3DA.1A19B39489	1	4/13/2018	Methow	64.6	48.348448	-120.10702
253	3DA.1A19B396A7	2	4/13/2018	Methow	64.6	48.348448	-120.10702
254	3DA.1A19B394D4	3	4/13/2018	Methow	64.6	48.348448	-120.10702

255	3DA.1A19B3946A	4	4/13/2018	Methow	64.6	48.348448	-120.10702
256	3DA.1A19B3A5E4	5	4/13/2018	Methow	64.6	48.348448	-120.10702
257	3DA.1A19B396A9	6	4/13/2018	Methow	64.6	48.348448	-120.10702
258	3DA.1A19B39410	7	4/13/2018	Methow	64.6	48.348448	-120.10702
259	3DA.1A19B3973B	8	4/13/2018	Methow	64.6	48.348448	-120.10702
260	3DA.1A19B3957C	9	4/13/2018	Methow	64.6	48.348448	-120.10702
261	3DA.1A19B39590	10	4/13/2018	Methow	64.6	48.348448	-120.10702
262	3DA.1A19B39115	11	4/13/2018	Methow	64.6	48.348448	-120.10702
263	3DA.1A19B396DB	12	4/13/2018	Methow	64.6	48.348448	-120.10702
264	3DA.1A19B396AF	13	4/13/2018	Methow	64.6	48.348448	-120.10702
265	3DA.1A19B3962B	14	4/13/2018	Methow	64.6	48.348448	-120.10702
266	3DA.1A19B395D1	15	4/13/2018	Methow	64.6	48.348448	-120.10702
267	3DA.1A19B394BB	16	4/13/2018	Methow	64.6	48.348448	-120.10702
268	3DA.1A19B3959F	17	4/13/2018	Methow	64.6	48.348448	-120.10702
269	3DA.1A19B3950D	18	4/13/2018	Methow	64.6	48.348448	-120.10702
270	3DA.1A19B39592	19	4/13/2018	Methow	64.6	48.348448	-120.10702
271	3DA.1A19B39537	20	4/13/2018	Methow	64.6	48.348448	-120.10702
272	3DA.1A19B394DE	21	4/13/2018	Methow	64.6	48.348448	-120.10702
273	3DA.1A19B3954F	22	4/13/2018	Methow	64.6	48.348448	-120.10702
274	3DA.1A19B39083	23	4/13/2018	Methow	64.6	48.348448	-120.10702
275	3DA.1A19B39476	24	4/13/2018	Methow	64.6	48.348448	-120.10702
276	3DA.1A19B396AE	25	4/13/2018	Methow	64.6	48.348448	-120.10702
277	3DA.1A19B395B9	26	4/13/2018	Methow	64.6	48.348448	-120.10702
278	3DA.1A19B39422	27	4/13/2018	Methow	64.6	48.348448	-120.10702
279	3DA.1A19B3904B	28	4/13/2018	Methow	64.6	48.348448	-120.10702
280	3DA.1A19B3911F	29	4/13/2018	Methow	64.6	48.348448	-120.10702
281	3DA.1A19B39742	30	4/13/2018	Methow	64.6	48.348448	-120.10702
282	3DA.1A19B38FF1	31	4/13/2018	Methow	64.6	48.348448	-120.10702
283	3DA.1A19B39608	32	4/13/2018	Methow	64.6	48.348448	-120.10702
284	3DA.1A19B3926A	33	4/13/2018	Methow	64.6	48.348448	-120.10702
285	3DA.1A19B395EF	34	4/13/2018	Methow	64.6	48.348448	-120.10702
286	3DA.1A19B394A6	35	4/13/2018	Methow	64.6	48.348448	-120.10702
287	3DA.1A19B390DB	36	4/13/2018	Methow	64.6	48.348448	-120.10702
288	3DA.1A19B3929F	37	4/13/2018	Methow	64.6	48.348448	-120.10702
289	3DA.1A19B3943D	38	4/13/2018	Methow	64.6	48.348448	-120.10702
290	3DA.1A19B39735	39	4/13/2018	Methow	64.6	48.348448	-120.10702
291	3DA.1A19B3A5C2	40	4/13/2018	Methow	64.6	48.348448	-120.10702
292	3DA.1A19B396F1	1	4/13/2018	Methow	83.8	48.473631	-120.17731
293	3DA.1A19B39719	2	4/13/2018	Methow	83.8	48.473631	-120.17731
294	3DA.1A19B3960C	3	4/13/2018	Methow	83.8	48.473631	-120.17731
295	3DA.1A19B38FB2	4	4/13/2018	Methow	83.8	48.473631	-120.17731
296	3DA.1A19B39680	5	4/13/2018	Methow	83.8	48.473631	-120.17731
297	3DA.1A19B3960E	6	4/13/2018	Methow	83.8	48.473631	-120.17731
298	3DA.1A19B39658	7	4/13/2018	Methow	83.8	48.473631	-120.17731

299	3DA.1A19B396BE	8	4/13/2018	Methow	83.8	48.473631	-120.17731
300	3DA.1A19B3940F	9	4/13/2018	Methow	83.8	48.473631	-120.17731
301	3DA.1A19B3937F	10	4/13/2018	Methow	83.8	48.473631	-120.17731
302	3DA.1A19B392F1	11	4/13/2018	Methow	83.8	48.473631	-120.17731
303	3DA.1A19B39702	12	4/13/2018	Methow	83.8	48.473631	-120.17731
304	3DA.1A19B393C2	13	4/13/2018	Methow	83.8	48.473631	-120.17731
305	3DA.1A19B3964E	14	4/13/2018	Methow	83.8	48.473631	-120.17731
306	3DA.1A19B3DCB9	15	4/13/2018	Methow	83.8	48.473631	-120.17731
307	3DA.1A19B39474	16	4/13/2018	Methow	83.8	48.473631	-120.17731
308	3DA.1A19B395B5	17	4/13/2018	Methow	83.8	48.473631	-120.17731
309	3DA.1A19B39505	18	4/13/2018	Methow	83.8	48.473631	-120.17731
310	3DA.1A19B39407	19	4/13/2018	Methow	83.8	48.473631	-120.17731
311	3DA.1A19B39540	20	4/13/2018	Methow	83.8	48.473631	-120.17731
312	3DA.1A19B39568	21	4/13/2018	Methow	83.8	48.473631	-120.17731
313	3DA.1A19B39374	22	4/13/2018	Methow	83.8	48.473631	-120.17731
314	3DA.1A19B39465	23	4/13/2018	Methow	83.8	48.473631	-120.17731
315	3DA.1A19B3942E	24	4/13/2018	Methow	83.8	48.473631	-120.17731
316	3D6.0018496C49	25	4/13/2018	Methow	83.8	48.473631	-120.17731
317	3DD.0077964445	26	4/13/2018	Methow	83.8	48.473631	-120.17731
318	3DA.1A19B39660	27	4/13/2018	Methow	83.8	48.473631	-120.17731
319	3DA.1A19B393F0	28	4/13/2018	Methow	83.8	48.473631	-120.17731
320	3DA.1A19B39585	29	4/13/2018	Methow	83.8	48.473631	-120.17731
321	3DA.1A19B39531	30	4/13/2018	Methow	83.8	48.473631	-120.17731
322	3DA.1A19B394F2	31	4/13/2018	Methow	83.8	48.473631	-120.17731
323	3DA.1A19B3936C	32	4/13/2018	Methow	83.8	48.473631	-120.17731
324	3DA.1A19B3942F	33	4/13/2018	Methow	83.8	48.473631	-120.17731
325	3DA.1A19B395C3	34	4/13/2018	Methow	83.8	48.473631	-120.17731
326	3DA.1A19B39018	35	4/13/2018	Methow	83.8	48.473631	-120.17731
327	3DA.1A19B39416	36	4/13/2018	Methow	83.8	48.473631	-120.17731
328	3DA.1A19B39385	37	4/13/2018	Methow	83.8	48.473631	-120.17731
329	3DA.1A19B396EE	38	4/13/2018	Methow	83.8	48.473631	-120.17731
330	3DA.1A19B396C4	39	4/13/2018	Methow	83.8	48.473631	-120.17731
331	3DA.1A19B39059	1	9/5/2017	Chewuch	1.1	48.480382	-120.185276
332	3DA.1A19B39283	2	9/5/2017	Chewuch	1.1	48.480382	-120.185276
333	3DA.1A19B39296	3	9/5/2017	Chewuch	1.1	48.480382	-120.185276
334	3DD.0077973D39	4	9/5/2017	Chewuch	1.1	48.480382	-120.185276
335	3DD.007796DEBD	5	9/5/2017	Chewuch	1.1	48.480382	-120.185276
336	3DD.0077966FBD	6	9/5/2017	Chewuch	1.1	48.480382	-120.185276
337	3DD.0077961E8E	7	9/5/2017	Chewuch	1.1	48.480382	-120.185276
338	3DD.00779610C1	8	9/5/2017	Chewuch	1.1	48.480382	-120.185276
339	3DA.1A19B39088	9	9/5/2017	Chewuch	1.1	48.480382	-120.185276
340	3DA.1A19B39034	10	9/5/2017	Chewuch	1.1	48.480382	-120.185276
341	3DD.0077966FC0	11	9/5/2017	Chewuch	1.1	48.480382	-120.185276
342	3DD.007796D808	12	9/5/2017	Chewuch	1.1	48.480382	-120.185276

343	3DD.007796988A	13	9/5/2017	Chewuch	1.1	48.480382	-120.185276
344	3DA.1A19B3C827	14	9/5/2017	Chewuch	1.1	48.480382	-120.185276
345	3DA.1A19B38FE7	15	9/5/2017	Chewuch	1.1	48.480382	-120.185276
346	3DA.1A19B39854	16	9/5/2017	Chewuch	1.1	48.480382	-120.185276
347	3DA.1A19B3A67E	17	9/5/2017	Chewuch	1.1	48.480382	-120.185276
348	3DA.1A19B391E4	18	9/5/2017	Chewuch	1.1	48.480382	-120.185276
349	3DA.1A19B317C0	19	9/5/2017	Chewuch	1.1	48.480382	-120.185276
350	3DA.1A19B3A6A3	20	9/5/2017	Chewuch	1.1	48.480382	-120.185276
351	3DA.1A19B394CB	21	9/5/2017	Chewuch	1.1	48.480382	-120.185276
352	3DA.1A19B39322	22	9/5/2017	Chewuch	1.1	48.480382	-120.185276
353	3DA.1A19B3C9B1	23	9/5/2017	Chewuch	1.1	48.480382	-120.185276
354	3DD.007796E2C3	24	9/5/2017	Chewuch	1.1	48.480382	-120.185276
355	3DD.0077971978	25	9/5/2017	Chewuch	1.1	48.480382	-120.185276
356	3DD.0077970BE8	26	9/5/2017	Chewuch	1.1	48.480382	-120.185276
357	3DD.007796A163	27	9/5/2017	Chewuch	1.1	48.480382	-120.185276
358	3DD.007796CC17	28	9/5/2017	Chewuch	1.1	48.480382	-120.185276
359	3DD.00779663A4	29	9/5/2017	Chewuch	1.1	48.480382	-120.185276
360	3DD.00779680AD	30	9/5/2017	Chewuch	1.1	48.480382	-120.185276
361	3DA.1A19B2FE69	1	9/5/2017	Chewuch	1.8	48.483078	-120.182579
362	3DA.1A19B3C975	2	9/5/2017	Chewuch	1.8	48.483078	-120.182579
363	3DA.1A19B38FC1	3	9/5/2017	Chewuch	1.8	48.483078	-120.182579
364	3DA.1A19B3A4E6	4	9/5/2017	Chewuch	1.8	48.483078	-120.182579
365	3DA.1A19B39280	5	9/5/2017	Chewuch	1.8	48.483078	-120.182579
366	3DA.1A19B3A364	6	9/5/2017	Chewuch	1.8	48.483078	-120.182579
367	3DA.1A19B3A51A	7	9/5/2017	Chewuch	1.8	48.483078	-120.182579
368	3DA.1A19B39197	8	9/5/2017	Chewuch	1.8	48.483078	-120.182579
369	3DD.0077962ADC	9	9/5/2017	Chewuch	1.8	48.483078	-120.182579
370	3DA.1A19B326EE	10	9/5/2017	Chewuch	1.8	48.483078	-120.182579
371	3DA.1A19B39263	11	9/5/2017	Chewuch	1.8	48.483078	-120.182579
372	3DA.1A19B3986F	12	9/5/2017	Chewuch	1.8	48.483078	-120.182579
373	3DA.1A19B31D6D	13	9/5/2017	Chewuch	1.8	48.483078	-120.182579
374	3DA.1A19B391FD	14	9/5/2017	Chewuch	1.8	48.483078	-120.182579
375	3DA.1A19B3227E	15	9/5/2017	Chewuch	1.8	48.483078	-120.182579

Mid Columbia PIT Tagged Lamprey

“#” column below corresponds to the “#” displayed in the detection summary tables in Part IV.

Total				Release		
#	PIT Tag ID	#	Release River	River KM	Latitude	Longitude
1	3DD.0077945634	1	Columbia	828.0	47.983379	-119.887833
2	3DD.007796B51A	2	Columbia	828.0	47.983379	-119.887833
3	3DD.0077973E94	3	Columbia	828.0	47.983379	-119.887833
4	3DD.0077967917	4	Columbia	828.0	47.983379	-119.887833
5	3DD.0077BB4267	5	Columbia	828.0	47.983379	-119.887833
6	3DD.00779646FE	6	Columbia	828.0	47.983379	-119.887833
7	3DD.00779639FB	7	Columbia	828.0	47.983379	-119.887833
8	3DD.0077B9D4D1	8	Columbia	828.0	47.983379	-119.887833
9	3DD.0077960F4B	9	Columbia	828.0	47.983379	-119.887833
10	3DD.0077970FA7	10	Columbia	828.0	47.983379	-119.887833
11	3DD.0077B9FA53	11	Columbia	828.0	47.983379	-119.887833
12	3DD.007796DC46	12	Columbia	828.0	47.983379	-119.887833
13	3DD.00779655C1	13	Columbia	828.0	47.983379	-119.887833
14	3DD.007795EF23	14	Columbia	828.0	47.983379	-119.887833
15	3DD.007796DF4B	15	Columbia	828.0	47.983379	-119.887833
16	3DD.0077BB3A9B	16	Columbia	828.0	47.983379	-119.887833
17	3DD.0077963A1E	17	Columbia	828.0	47.983379	-119.887833
18	3DD.00779652FF	18	Columbia	828.0	47.983379	-119.887833
19	3DD.0077968D5A	19	Columbia	828.0	47.983379	-119.887833
20	3DD.0077BAEFEB	20	Columbia	828.0	47.983379	-119.887833
21	3DD.00779646DB	21	Columbia	828.0	47.983379	-119.887833
22	3DD.007795EC20	22	Columbia	828.0	47.983379	-119.887833
23	3DD.007796F0F6	23	Columbia	828.0	47.983379	-119.887833
24	3DD.0077960228	24	Columbia	828.0	47.983379	-119.887833
25	3DD.007796F1B0	25	Columbia	828.0	47.983379	-119.887833
26	3DD.0077B9EF1B	26	Columbia	828.0	47.983379	-119.887833
27	3DD.007797B4E2	27	Columbia	828.0	47.983379	-119.887833
28	3DD.0077966F44	28	Columbia	828.0	47.983379	-119.887833
29	3DD.0077961038	29	Columbia	828.0	47.983379	-119.887833
30	3DD.007796B5ED	30	Columbia	828.0	47.983379	-119.887833
31	3DD.007796A5DF	31	Columbia	828.0	47.983379	-119.887833
32	3DD.0077971776	32	Columbia	828.0	47.983379	-119.887833
33	3DD.007795F6EA	33	Columbia	828.0	47.983379	-119.887833
34	3DD.007796955F	34	Columbia	828.0	47.983379	-119.887833
35	3DD.0077970B60	35	Columbia	828.0	47.983379	-119.887833
36	3DD.00779604E8	36	Columbia	828.0	47.983379	-119.887833

37	3DD.0077971EBA	37	Columbia	828.0	47.983379	-119.887833
38	3DD.007795F7E5	38	Columbia	828.0	47.983379	-119.887833
39	3DD.007797120A	39	Columbia	828.0	47.983379	-119.887833
40	3DD.007796F2C5	40	Columbia	828.0	47.983379	-119.887833
41	3DD.0077961E0D	41	Columbia	828.0	47.983379	-119.887833
42	3DD.0077BA20C0	42	Columbia	828.0	47.983379	-119.887833
43	3DD.0077BB091D	43	Columbia	828.0	47.983379	-119.887833
44	3DD.0077977397	44	Columbia	828.0	47.983379	-119.887833
45	3DD.007796371A	45	Columbia	828.0	47.983379	-119.887833
46	3DD.0077BB5F02	46	Columbia	828.0	47.983379	-119.887833
47	3DD.007797493B	47	Columbia	828.0	47.983379	-119.887833
48	3DD.0077B9C67C	48	Columbia	828.0	47.983379	-119.887833
49	3DD.007796777A	49	Columbia	828.0	47.983379	-119.887833
50	3DD.0077B9E141	50	Columbia	828.0	47.983379	-119.887833
51	3DD.0077B99974	51	Columbia	828.0	47.983379	-119.887833
52	3DD.0077970BBF	52	Columbia	828.0	47.983379	-119.887833
53	3DD.007796C11D	53	Columbia	828.0	47.983379	-119.887833
54	3DD.0077971C7E	54	Columbia	828.0	47.983379	-119.887833
55	3DD.0077BB6880	55	Columbia	828.0	47.983379	-119.887833
56	3DD.0077960229	56	Columbia	828.0	47.983379	-119.887833
57	3DD.0077964777	57	Columbia	828.0	47.983379	-119.887833
58	3DD.00779660DD	58	Columbia	828.0	47.983379	-119.887833
59	3DD.0077B9FAC9	59	Columbia	828.0	47.983379	-119.887833
60	3DD.007796354D	60	Columbia	828.0	47.983379	-119.887833
61	3DD.007796FD74	61	Columbia	828.0	47.983379	-119.887833
62	3DD.0077BAC490	62	Columbia	828.0	47.983379	-119.887833
63	3DD.007796E380	63	Columbia	828.0	47.983379	-119.887833
64	3DD.0077BB46D5	64	Columbia	828.0	47.983379	-119.887833
65	3DD.007796D2C4	65	Columbia	828.0	47.983379	-119.887833
66	3DD.0077BA0A42	66	Columbia	828.0	47.983379	-119.887833
67	3DD.007796B80B	67	Columbia	828.0	47.983379	-119.887833
68	3DD.0077BA5CA5	68	Columbia	828.0	47.983379	-119.887833
69	3DD.0077969614	69	Columbia	828.0	47.983379	-119.887833
70	3DD.007796FB23	70	Columbia	828.0	47.983379	-119.887833
71	3DD.0077BB0A5E	71	Columbia	828.0	47.983379	-119.887833
72	3DD.007796B34E	72	Columbia	828.0	47.983379	-119.887833
73	3DD.0077BAFB7D	73	Columbia	828.0	47.983379	-119.887833
74	3DD.007796E398	74	Columbia	828.0	47.983379	-119.887833
75	3DD.0077BB0348	75	Columbia	828.0	47.983379	-119.887833
76	3DD.0077BA6F36	76	Columbia	828.0	47.983379	-119.887833
77	3DD.007795F092	77	Columbia	828.0	47.983379	-119.887833
78	3DD.007794BF79	78	Columbia	828.0	47.983379	-119.887833
79	3DD.00779600B0	79	Columbia	828.0	47.983379	-119.887833
80	3DD.0077BAF5EE	80	Columbia	828.0	47.983379	-119.887833
81	3DD.007796E1A8	81	Columbia	828.0	47.983379	-119.887833

82	3DD.0077961FCB	82	Columbia	828.0	47.983379	-119.887833
83	3DD.0077BA4544	83	Columbia	828.0	47.983379	-119.887833
84	3DD.007796C182	84	Columbia	828.0	47.983379	-119.887833
85	3DD.0077BA0AD8	85	Columbia	828.0	47.983379	-119.887833
86	3DD.0077970CB9	86	Columbia	828.0	47.983379	-119.887833
87	3DD.007796B2E9	87	Columbia	828.0	47.983379	-119.887833
88	3DD.007796371B	88	Columbia	828.0	47.983379	-119.887833
89	3DD.0077963AB4	89	Columbia	828.0	47.983379	-119.887833
90	3DD.007794988D	90	Columbia	828.0	47.983379	-119.887833
91	3DD.007796A67A	91	Columbia	828.0	47.983379	-119.887833
92	3DD.007796A94A	92	Columbia	828.0	47.983379	-119.887833
93	3DD.00779653BB	93	Columbia	828.0	47.983379	-119.887833
94	3DD.0077964493	94	Columbia	828.0	47.983379	-119.887833
95	3DD.007796EDAB	95	Columbia	828.0	47.983379	-119.887833
96	3DD.00779639A8	96	Columbia	828.0	47.983379	-119.887833
97	3DD.007796F888	97	Columbia	828.0	47.983379	-119.887833
98	3DD.003D284B9C	98	Columbia	828.0	47.983379	-119.887833
99	3DD.0077970166	99	Columbia	828.0	47.983379	-119.887833
100	3DD.00779708AB	100	Columbia	828.0	47.983379	-119.887833
101	3DD.007796C3AB	101	Columbia	828.0	47.983379	-119.887833
102	3DD.007796521A	102	Columbia	828.0	47.983379	-119.887833
103	3DD.007796DF24	103	Columbia	828.0	47.983379	-119.887833
104	3DD.0077961B3B	104	Columbia	828.0	47.983379	-119.887833
105	3DD.00779708E5	105	Columbia	828.0	47.983379	-119.887833
106	3DD.0077971C37	106	Columbia	828.0	47.983379	-119.887833
107	3DD.007796C546	107	Columbia	828.0	47.983379	-119.887833
108	3DD.0077971E37	108	Columbia	828.0	47.983379	-119.887833
109	3DD.007796F921	109	Columbia	828.0	47.983379	-119.887833
110	3DD.0077969BFD	110	Columbia	828.0	47.983379	-119.887833
111	3DD.00779643A6	111	Columbia	828.0	47.983379	-119.887833
112	3DD.007796EE4A	112	Columbia	828.0	47.983379	-119.887833
113	3DD.0077BACC19	113	Columbia	828.0	47.983379	-119.887833
114	3DD.007796557F	114	Columbia	828.0	47.983379	-119.887833
115	3DD.007796C658	115	Columbia	828.0	47.983379	-119.887833
116	3DD.0077970DBF	116	Columbia	828.0	47.983379	-119.887833
117	3DD.0077971453	117	Columbia	828.0	47.983379	-119.887833
118	3DD.007796395F	118	Columbia	828.0	47.983379	-119.887833
119	3DD.007795EFEA	119	Columbia	828.0	47.983379	-119.887833
120	3DD.0077961C97	120	Columbia	828.0	47.983379	-119.887833
121	3DD.007796A96D	121	Columbia	828.0	47.983379	-119.887833
122	3DD.0077971979	122	Columbia	828.0	47.983379	-119.887833
123	3DD.0077B9EC9C	123	Columbia	828.0	47.983379	-119.887833
124	3DD.0077BB1D72	124	Columbia	828.0	47.983379	-119.887833
125	3DD.007796A6BE	125	Columbia	828.0	47.983379	-119.887833
126	3DD.0077BA613A	126	Columbia	828.0	47.983379	-119.887833

127	3DD.007795F0B0	127	Columbia	828.0	47.983379	-119.887833
128	3DD.007796E385	128	Columbia	828.0	47.983379	-119.887833
129	3DD.007795F035	129	Columbia	828.0	47.983379	-119.887833
130	3DD.0077961E32	130	Columbia	828.0	47.983379	-119.887833
131	3DD.0077979C97	131	Columbia	828.0	47.983379	-119.887833
132	3DD.007796E4D6	132	Columbia	828.0	47.983379	-119.887833
133	3DD.007796EAC0	133	Columbia	828.0	47.983379	-119.887833
134	3DD.0077B9B908	134	Columbia	828.0	47.983379	-119.887833
135	3DD.0077966D59	135	Columbia	828.0	47.983379	-119.887833
136	3DD.007796C473	136	Columbia	828.0	47.983379	-119.887833
137	3DD.0077BA986A	1	Columbia	850.8	48.101551	-119.739929
138	3DD.0077BB5EBC	2	Columbia	850.8	48.101551	-119.739929
139	3DD.0077BA20C5	3	Columbia	850.8	48.101551	-119.739929
140	3DD.0077BA14D1	4	Columbia	850.8	48.101551	-119.739929
141	3DD.0077966197	5	Columbia	850.8	48.101551	-119.739929
142	3DD.0077B9A07F	6	Columbia	850.8	48.101551	-119.739929
143	3DD.0077966E1E	7	Columbia	850.8	48.101551	-119.739929
144	3DD.0077BA5C51	8	Columbia	850.8	48.101551	-119.739929
145	3DD.007796E4F5	9	Columbia	850.8	48.101551	-119.739929
146	3DD.00779749BC	10	Columbia	850.8	48.101551	-119.739929
147	3DD.0077962B00	11	Columbia	850.8	48.101551	-119.739929
148	3DD.0077961BCD	12	Columbia	850.8	48.101551	-119.739929
149	3DD.007796AD1B	13	Columbia	850.8	48.101551	-119.739929
150	3DD.007796FFA8	14	Columbia	850.8	48.101551	-119.739929
151	3DD.007796EB00	15	Columbia	850.8	48.101551	-119.739929
152	3DD.007797AA12	16	Columbia	850.8	48.101551	-119.739929
153	3DD.0077966EA2	17	Columbia	850.8	48.101551	-119.739929
154	3DD.007796EA6B	18	Columbia	850.8	48.101551	-119.739929
155	3DD.0077966D8F	19	Columbia	850.8	48.101551	-119.739929
156	3DD.0077969AE7	20	Columbia	850.8	48.101551	-119.739929
157	3DD.0077967857	21	Columbia	850.8	48.101551	-119.739929
158	3DD.0077961AE0	22	Columbia	850.8	48.101551	-119.739929
159	3DD.0077BB1E75	23	Columbia	850.8	48.101551	-119.739929
160	3DD.0077BA1E85	24	Columbia	850.8	48.101551	-119.739929
161	3DD.0077967887	25	Columbia	850.8	48.101551	-119.739929
162	3DD.007796947A	26	Columbia	850.8	48.101551	-119.739929
163	3DD.0077BA149C	27	Columbia	850.8	48.101551	-119.739929
164	3DD.0077972677	28	Columbia	850.8	48.101551	-119.739929
165	3DD.007796A7C9	29	Columbia	850.8	48.101551	-119.739929
166	3DD.0077BA8A2B	30	Columbia	850.8	48.101551	-119.739929
167	3DD.0077B9A0F4	31	Columbia	850.8	48.101551	-119.739929
168	3DD.0077BA1F4A	32	Columbia	850.8	48.101551	-119.739929
169	3DD.0077B9ACC7	33	Columbia	850.8	48.101551	-119.739929
170	3DD.0077BA1509	34	Columbia	850.8	48.101551	-119.739929

171	3DD.0077961EDE	35	Columbia	850.8	48.101551	-119.739929
172	3DD.007796465F	36	Columbia	850.8	48.101551	-119.739929
173	3DD.0077BB6DDB	37	Columbia	850.8	48.101551	-119.739929
174	3DD.0077B9AD34	38	Columbia	850.8	48.101551	-119.739929
175	3DD.007796F6EB	39	Columbia	850.8	48.101551	-119.739929
176	3DD.0077964642	40	Columbia	850.8	48.101551	-119.739929
177	3DD.007796C66B	41	Columbia	850.8	48.101551	-119.739929
178	3DD.00779655DD	42	Columbia	850.8	48.101551	-119.739929
179	3DD.007796E778	43	Columbia	850.8	48.101551	-119.739929
180	3DD.0077966296	44	Columbia	850.8	48.101551	-119.739929
181	3DD.0077BAFD35	45	Columbia	850.8	48.101551	-119.739929
182	3DD.0077971290	46	Columbia	850.8	48.101551	-119.739929
183	3DD.0077966E4B	47	Columbia	850.8	48.101551	-119.739929
184	3DD.00779483EF	48	Columbia	850.8	48.101551	-119.739929
185	3DD.0077962B6F	49	Columbia	850.8	48.101551	-119.739929
186	3DD.007796E9A5	50	Columbia	850.8	48.101551	-119.739929
187	3DD.0077B9A0D5	51	Columbia	850.8	48.101551	-119.739929
188	3DD.007796DF76	52	Columbia	850.8	48.101551	-119.739929
189	3DD.007796E17F	53	Columbia	850.8	48.101551	-119.739929
190	3DD.0077966058	54	Columbia	850.8	48.101551	-119.739929
191	3DD.007794E5DA	55	Columbia	850.8	48.101551	-119.739929
192	3DD.0077962898	56	Columbia	850.8	48.101551	-119.739929
193	3DD.0077964634	57	Columbia	850.8	48.101551	-119.739929
194	3DD.0077B9EC22	58	Columbia	850.8	48.101551	-119.739929
195	3DD.007796B655	59	Columbia	850.8	48.101551	-119.739929
196	3DD.0077962A14	60	Columbia	850.8	48.101551	-119.739929
197	3DD.007796EE09	61	Columbia	850.8	48.101551	-119.739929
198	3DD.007796CD9E	62	Columbia	850.8	48.101551	-119.739929
199	3DD.007796D2C3	63	Columbia	850.8	48.101551	-119.739929
200	3DD.0077962AF2	64	Columbia	850.8	48.101551	-119.739929
201	3DD.00779603E5	65	Columbia	850.8	48.101551	-119.739929
202	3DD.007796605D	66	Columbia	850.8	48.101551	-119.739929
203	3DD.007796D533	67	Columbia	850.8	48.101551	-119.739929
204	3DD.007796E4CB	68	Columbia	850.8	48.101551	-119.739929
205	3DD.007796C45B	69	Columbia	850.8	48.101551	-119.739929
206	3DD.007796FED8	70	Columbia	850.8	48.101551	-119.739929
207	3DD.0077970522	71	Columbia	850.8	48.101551	-119.739929
208	3DD.0077972356	72	Columbia	850.8	48.101551	-119.739929
209	3DD.0077960209	73	Columbia	850.8	48.101551	-119.739929
210	3DD.00779661DE	74	Columbia	850.8	48.101551	-119.739929
211	3DD.007796FECE	75	Columbia	850.8	48.101551	-119.739929
212	3DD.0077978D3C	76	Columbia	850.8	48.101551	-119.739929
213	3DD.007795EF01	77	Columbia	850.8	48.101551	-119.739929
214	3DD.0077971711	78	Columbia	850.8	48.101551	-119.739929
215	3DD.007795F088	79	Columbia	850.8	48.101551	-119.739929

216	3DD.0077964789	80	Columbia	850.8	48.101551	-119.739929
217	3DD.0077942D4F	81	Columbia	850.8	48.101551	-119.739929
218	3DD.0077968FCD	82	Columbia	850.8	48.101551	-119.739929
219	3DD.0077963770	83	Columbia	850.8	48.101551	-119.739929
220	3DD.00779686FD	84	Columbia	850.8	48.101551	-119.739929
221	3DD.0077960F65	85	Columbia	850.8	48.101551	-119.739929
222	3DD.00779638DA	86	Columbia	850.8	48.101551	-119.739929
223	3DD.007796C84F	87	Columbia	850.8	48.101551	-119.739929
224	3DD.007796B70B	88	Columbia	850.8	48.101551	-119.739929
225	3DD.007797023A	89	Columbia	850.8	48.101551	-119.739929
226	3DD.0077966E64	90	Columbia	850.8	48.101551	-119.739929
227	3DD.00779653FA	91	Columbia	850.8	48.101551	-119.739929
228	3DD.007796DDBC	92	Columbia	850.8	48.101551	-119.739929
229	3DD.0077969CA7	93	Columbia	850.8	48.101551	-119.739929
230	3DD.007796D52B	94	Columbia	850.8	48.101551	-119.739929
231	3DD.007796C9E3	95	Columbia	850.8	48.101551	-119.739929
232	3DD.007797041A	96	Columbia	850.8	48.101551	-119.739929
233	3DD.0077971F16	97	Columbia	850.8	48.101551	-119.739929
234	3DD.0077966400	98	Columbia	850.8	48.101551	-119.739929
235	3DD.0077971A54	99	Columbia	850.8	48.101551	-119.739929
236	3DD.0077961E09	100	Columbia	850.8	48.101551	-119.739929
237	3DD.007797172B	101	Columbia	850.8	48.101551	-119.739929
238	3DD.00779636AC	102	Columbia	850.8	48.101551	-119.739929
239	3DD.0077965546	103	Columbia	850.8	48.101551	-119.739929
240	3DD.0077970686	104	Columbia	850.8	48.101551	-119.739929
241	3DD.0077BAADF5	105	Columbia	850.8	48.101551	-119.739929
242	3DD.00779646E8	106	Columbia	850.8	48.101551	-119.739929
243	3DD.007796E05D	107	Columbia	850.8	48.101551	-119.739929
244	3DD.0077BB0F8A	108	Columbia	850.8	48.101551	-119.739929
245	3DD.0077971C66	109	Columbia	850.8	48.101551	-119.739929
246	3DD.007797125B	110	Columbia	850.8	48.101551	-119.739929
247	3DD.007795F854	111	Columbia	850.8	48.101551	-119.739929
248	3DD.0077966415	112	Columbia	850.8	48.101551	-119.739929
249	3DD.0077BABD9D	113	Columbia	850.8	48.101551	-119.739929
250	3DD.0077BA3743	114	Columbia	850.8	48.101551	-119.739929
251	3DD.0077BB65AE	115	Columbia	850.8	48.101551	-119.739929
252	3DD.007796EA73	116	Columbia	850.8	48.101551	-119.739929
253	3DD.0077B99972	117	Columbia	850.8	48.101551	-119.739929
254	3DD.007796EABB	118	Columbia	850.8	48.101551	-119.739929
255	3DD.0077967B65	119	Columbia	850.8	48.101551	-119.739929
256	3DD.007796DF61	120	Columbia	850.8	48.101551	-119.739929
257	3DD.0077BA61A0	121	Columbia	850.8	48.101551	-119.739929
258	3DD.0077BA1662	122	Columbia	850.8	48.101551	-119.739929
259	3DD.0077BB53E0	123	Columbia	850.8	48.101551	-119.739929
260	3DD.0077BB01BC	124	Columbia	850.8	48.101551	-119.739929

261	3DD.007796B6A2	125	Columbia	850.8	48.101551	-119.739929
262	3DD.0077957CB7	126	Columbia	850.8	48.101551	-119.739929
263	3DD.007796934A	127	Columbia	850.8	48.101551	-119.739929
264	3DD.0077962A8B	128	Columbia	850.8	48.101551	-119.739929
265	3DD.007796461D	129	Columbia	850.8	48.101551	-119.739929
266	3DD.00779697F3	1	Similkameen	5.0	48.965222	-119.501122
267	3DD.007796AAB3	2	Similkameen	5.0	48.965222	-119.501122
268	3DD.007796818C	3	Similkameen	5.0	48.965222	-119.501122
269	3DD.0077960FB0	4	Similkameen	5.0	48.965222	-119.501122
270	3DD.0077BB1E54	5	Similkameen	5.0	48.965222	-119.501122
271	3DD.007796D0A3	6	Similkameen	5.0	48.965222	-119.501122
272	3DD.0077962B53	7	Similkameen	5.0	48.965222	-119.501122
273	3DD.0077BAD76E	8	Similkameen	5.0	48.965222	-119.501122
274	3DD.0077BA09EE	9	Similkameen	5.0	48.965222	-119.501122
275	3DD.00779677AA	10	Similkameen	5.0	48.965222	-119.501122
276	3DD.0077968CC0	11	Similkameen	5.0	48.965222	-119.501122
277	3DD.007796549D	12	Similkameen	5.0	48.965222	-119.501122
278	3DD.0077965F3E	13	Similkameen	5.0	48.965222	-119.501122
279	3DD.0077BAFE2A	14	Similkameen	5.0	48.965222	-119.501122
280	3DD.0077961011	15	Similkameen	5.0	48.965222	-119.501122
281	3DD.0077962B90	16	Similkameen	5.0	48.965222	-119.501122
282	3DD.007796FFE0	17	Similkameen	5.0	48.965222	-119.501122
283	3DD.007796FFE4	18	Similkameen	5.0	48.965222	-119.501122
284	3DD.0077966CA4	19	Similkameen	5.0	48.965222	-119.501122
285	3DD.007796C3A7	20	Similkameen	5.0	48.965222	-119.501122
286	3DD.007796DE58	21	Similkameen	5.0	48.965222	-119.501122
287	3DD.0077B9B8B7	22	Similkameen	5.0	48.965222	-119.501122
288	3DD.0077969B5B	23	Similkameen	5.0	48.965222	-119.501122
289	3DD.0077962B26	24	Similkameen	5.0	48.965222	-119.501122
290	3DD.007796C170	25	Similkameen	5.0	48.965222	-119.501122
291	3DD.0077BB1CF2	26	Similkameen	5.0	48.965222	-119.501122
292	3DD.0077965235	27	Similkameen	5.0	48.965222	-119.501122
293	3DD.0077BA28F6	28	Similkameen	5.0	48.965222	-119.501122
294	3DD.007796B3DB	29	Similkameen	5.0	48.965222	-119.501122
295	3DD.007795F6E9	30	Similkameen	5.0	48.965222	-119.501122
296	3DD.007796636E	31	Similkameen	5.0	48.965222	-119.501122
297	3DD.007796FBAB	32	Similkameen	5.0	48.965222	-119.501122
298	3DD.0077B9A1D0	33	Similkameen	5.0	48.965222	-119.501122
299	3DD.007796F4D7	34	Similkameen	5.0	48.965222	-119.501122
300	3DD.007796B6B4	35	Similkameen	5.0	48.965222	-119.501122
301	3DD.00779662CD	36	Similkameen	5.0	48.965222	-119.501122
302	3DD.0077BAD722	37	Similkameen	5.0	48.965222	-119.501122
303	3DD.007796B28C	38	Similkameen	5.0	48.965222	-119.501122
304	3DD.0077971265	39	Similkameen	5.0	48.965222	-119.501122

305	3DD.007796EF10	40	Similkameen	5.0	48.965222	-119.501122
306	3DD.0077962BA2	41	Similkameen	5.0	48.965222	-119.501122
307	3DD.0077963952	42	Similkameen	5.0	48.965222	-119.501122
308	3DD.007795B4D6	43	Similkameen	5.0	48.965222	-119.501122
309	3DD.007797202F	44	Similkameen	5.0	48.965222	-119.501122
310	3DD.007796C79A	45	Similkameen	5.0	48.965222	-119.501122
311	3DD.007796B63E	46	Similkameen	5.0	48.965222	-119.501122
312	3DD.0077BB0FF4	47	Similkameen	5.0	48.965222	-119.501122
313	3DD.00779639EB	48	Similkameen	5.0	48.965222	-119.501122
314	3DD.00779677B1	49	Similkameen	5.0	48.965222	-119.501122
