



Fish Passage Center

Weekly Report #18–23

August 10, 2018

This Week's Highlights

Water Supply

Precipitation throughout the Columbia Basin has varied between 0% and 19% of average at individual sub-basins over early August. Precipitation above The Dalles has been 13% of average over August. Over the 2018 water year, precipitation has ranged between 86% and 107% of average.

Table 1. Summary of August precipitation and cumulative October through August precipitation with respect to average (1981-2010), at select locations within the Columbia and Snake River Basins.

Location	Water Year 2018 August 1-08, 2018		Water Year 2018 October 1, 2017 to August 8, 2018	
	Observed (inches)	% Average	Observed (inches)	% Average
Columbia Above Coulee	0.08	18	33.3	96
SNAKE RIVER ABOVE ICE HARBOR	0.01	4	19.1	90
Columbia Above The Dalles	0.04	13	23.3	92
Kootenai	0.09	19	32.4	94
Clark Fork	0.04	9	27.2	107
Flathead	0.01	2	34.0	103
Pend Oreille River Basin above Waneta Dam	0.02	5	30.7	102
Salmon River Basin	0.00	1	25.4	95
Upper Snake Tributaries	0.04	13	22.9	93
Clearwater	0.00	0	41.1	107
Willamette River above Portland	0.00	0	54.2	86

Grand Coulee Reservoir is at 1282.6 feet (8-09-18) and has drafted 0.5 feet over the last week. Outflows at Grand Coulee have ranged between 85.1 Kcfs and 120.1 Kcfs over the last week.

The Libby Reservoir is currently at elevation 2447.2 feet (8-09-18) and has drafted 0.6 feet over the past week. Daily average outflows at Libby Dam have 9.0 over the last week.

Hungry Horse is currently at an elevation of 3557.2 feet (8-09-18) and has drafted 0.9 feet last week. Outflows at Hungry Horse have been 2.7 Kcfs over the last week.

Dworshak is currently at an elevation of 1558.5 feet (8-09-18) and has drafted 9.8 feet over the last week. Dworshak outflows have been 10.4 – 13.0 Kcfs.

The Brownlee Reservoir was at an elevation of 2057.0 feet on August 9th, 2018 and has drafted 2.0 feet over the last week. Outflows at Hells Canyon have ranged between 9.4 and 21.6 Kcfs over the last four days.

The Biological Opinion flow period began on April 3rd in the lower Snake River (Lower Granite). According to the April Final Water Supply Forecast (April 4th, 2018), the flow objective this spring was 100 Kcfs at Lower Granite. Flows at Lower Granite Dam averaged 111.3 Kcfs over the spring season. The summer biological flow period began on June 21st, 2018 at Lower Granite (Flow Objective = 53.3 Kcfs), flows have averaged 41.5 Kcfs over the summer period and 31.4 Kcfs last week.

Based on the April Final Water Supply Forecast, the Spring Biological Opinion Flow Objective is 260 Kcfs at McNary Dam and 135 Kcfs at Priest Rapids Dam. Flows at McNary averaged 343 Kcfs over the spring season; at Priest Rapids flows averaged 229.6 Kcfs over the spring season. The summer flow period began on July 1, 2018 at McNary Dam, with a flow objective of 200 Kcfs. Flows at McNary have averaged 173.8 Kcfs since the start of the summer period.

Spill

Flows in the Lower Snake River this week were similar to the previous week. Daily average flows at Lower Granite Dam ranged from 27.9 to 36.0 Kcfs this week. Flows in the mid-and Upper Columbia River decreased slightly this week, when compared to the previous week. Daily average flows at McNary and Rock Island dams ranged from 121.1 to 163.3 Kcfs and 90.6 to 122.5 Kcfs this week, respectively. Current forecasts for Lower Granite and McNary dams show flows in the 26.0 to 36.0 Kcfs and 118.0 to 160.0 Kcfs range over the next week, respectively.

Dworshak continued its summer draft operation, with daily average discharge ranging from 10.4 to 13.0 Kcfs over the last week. Hells Canyon Complex flows this week were similar to the previous week, with daily average outflows at Hells Canyon Dam ranging from 9.8 to 14.2 Kcfs over the last week. The daily average temperature in the Lower Granite tailrace remained below 68 °F all of this week.

The 2018 spill for fish passage program at the lower Snake River and Mid-Columbia FCRPS projects began just after midnight on April 3rd and April 10th, respectively. Spring spill operations at these projects ran through June 15th in the Mid-Columbia and June 20th in the Snake River. According to the Fish Operations Plan, summer spill operations began at 0001 on June 16th at the Mid-Columbia River sites and 0001 on June 21st at the Snake River sites. These summer spill operations will run through August 31st at all eight FCRPS projects. A summary of summer spill operations is provided in Table 2.

Table 2. Summer spill operations at FCRPS projects.

Project	Summer Spill Level (Day/Night)
Lower Granite	18 Kcfs/18 Kcfs
Little Goose	30%/30%
Lower Monumental	17 Kcfs/17 Kcfs
Ice Harbor	Jun. 21-Jul. 13: 45 Kcfs/Gas Cap or 30%/30% Jul. 13-Aug. 31: 45 Kcfs/Gas Cap
McNary	50%/50%
John Day	Jun. 16-Jul. 20: 30%/30% or 40%/40% Jul. 20-Aug. 31: 30%/30%
The Dalles	40%/40%
Bonneville	95 Kcfs/95 Kcfs or 85 Kcfs/121 Kcfs

The summer spill operation for Lower Granite Dam is 18 Kcfs, 24-hours per day. Summer spill volumes

at Lower Granite Dam were generally met this week. There were a few instances when flows were sufficiently low that 18 Kcfs spill was not possible. Spill during these times was all flows in excess of powerhouse minimum requirements. There were no exceedences in total dissolved gas (TDG) waiver limits in the LGR tailrace or the Little Goose (LGS) forebay this week. The RSW at LGR was closed on the afternoon of August 8th. This closure was coordinated in TMT, as the Fish Passage Plan criteria for RSW closure had not yet been met. From August 3rd through August 5th, flows at LGS were sufficiently low to warrant a set spill volume operation. This spill volume ranged from 9 Kcfs to 11 Kcfs, depending on daily average flows from the previous day. LGS underwent Doble testing from August 6th through August 9th. During the testing, spill at LGS was all flows in excess of station service, which equated to hourly spill proportions in the 0.8 to 0.9 range for some hours. There were no exceedences in TDG waiver limits in the LGS tailrace or Lower Monumental (LMN) forebay. The RSW at LGS was closed on the afternoon of August 3rd and has remained closed since. The summer spill operation for LMN is 17 Kcfs, 24-hours per day. Summer spill volumes at LMN were generally met this week. There were a few instances when flows were sufficiently low that 17 Kcfs spill was not possible. Spill during these times was all flows in excess of powerhouse minimum requirements. There were no exceedences in TDG waiver limits in the LMN tailrace or the Ice Harbor (IHR) forebay this week. The RSW at LMN was closed on the afternoon of August 8th. This closure was also coordinated in TMT. The summer spill operation for IHR is 45 Kcfs during the day and gas cap spill at night for the remainder of the season. Summer spill volumes at IHR were met this week. However, due to low flows, the 45 Kcfs daytime spill and/or nighttime spill to the gas cap was not possible. Instead, spill during these periods was all flows in excess of powerhouse minimum requirements. There were no exceedences in TDG waiver limits in the IHR tailrace or the McNary (MCN) forebay this week.

The summer spill operation at McNary (MCN), John Day (JDA), and The Dalles (TDA) dams is 50%, 30%, and 40% of instantaneous flows, respectively. These summer spill operations were met at all three projects this week and there were no exceedences of TDG waiver limits in their respective tailraces or downstream

forebays. The summer spill operation at BON alternates between 95 Kcfs (24-hours) and 85 Kcfs during the day and 121 Kcfs at night. These two “treatments” will alternate in 2-day blocks through the end of the summer spill season. This summer spill operation has been met this week. It is worth noting that there were some periods when flows were sufficiently low that these spill levels were not always possible. During these times, spill was all flows in excess of powerhouse minimum requirements. Total dissolved gas in the BON tailrace (at Cascades Island) has remained below the 120% waiver limit.

Note: The State of Oregon TDG waiver only requires compliance with 120% TDG in the tailrace, while the State of Washington requires compliance with both a 115% TDG forebay requirement and a 120% tailrace TDG requirement. The State of Oregon and the State of Washington also use different methodologies to estimate the 12-hour average TDG. For Oregon, the 12-hour average is based on the 12 highest hourly TDG measurements in a single calendar day (not necessarily consecutive). For Washington, the 12-hour average is based on 12-hour rolling averages. The highest of the rolling averages is what is reported as the 12-hour average for a given day. The location of a TDG monitor will dictate which of these methodologies is used for compliance monitoring. The Washington methodology will apply to all the lower Snake River projects, as well as the middle Columbia River forebay monitors. On any given day the compliance of the tailrace monitors at the middle Columbia River projects will be determined using either the Washington or Oregon methodology, whichever is the most restrictive, and spill will be decreased if needed.

Gas bubble trauma (GBT) monitoring in smolts took place at Rock Island, McNary, and Bonneville dams this week. Due to high temperatures and generally low TDG levels in their respective forebays, GBT sampling at Bonneville and McNary was reduced from twice-per-week to once-per-week. Bonneville and McNary observed zero signs of fin GBT in their samples on August 5th and August 8th, respectively. Rock Island observed one fish with Rank 1 signs of fin GBT in their sample on August 7th. The action criteria for interruption of the voluntary spill for fish passage program is defined as either 15% of examined fish showing signs of GBT in their non-paired fins, or 5% of the fish examined showing severe signs of GBT in their non-paired fins. Severe signs of GBT are defined

as more than 25% of the surface area of the fin is occluded by gas bubbles, which corresponds to a rank of 3 or 4. Neither of these action criteria were met this week. It is worth noting that the samples at Bonneville, McNary, and Rock Island did not meet the sample size requirement. In fact, the GBT samples at Bonneville and Rock Island included less than ten fish. Given the low sample sizes observed this week, and generally low TDG in the forebays, GBT monitoring at these three sites is likely finished for the 2018 season.

Temperature

Forebay temperatures are now being reported for Lower Granite, Ice Harbor, McNary and Bonneville dams. Currently, forebay temperatures at Bonneville, McNary, and Lower Granite dams are all approximately 1 to 3 °F higher than their respective 10-year averages for this time of year. The daily average temperature for August 9th was 73.3 °F at Bonneville, 71.1 °F at McNary, and 68.6 °F at Lower Granite. The current 10-year averages for these three projects are 70.2 °F, 69.8 °F, and 66.6 °F, respectively. The forebay temperature at Ice Harbor Dam is similar to the current 10-year average. The daily average temperature for August 9th in the Lower Granite forebay was 71.0 °F and the current 10-year average for that date is 70.5 °F.

Smolt Monitoring

Smolt Monitoring Program (SMP) activities continued at all bypass facilities this week. This week’s samples were dominated by subyearling Chinook at all seven SMP bypass facilities. When compared to last week, passage of subyearling Chinook decreased at all bypass facilities.

Sampling at Bonneville Dam (BON) remained in the high temperature protocol this week, where sampling is reduced to a 24-hour sample every-other-day. In addition, sampling was suspended for the August 7, August 8, and August 9 samples due to an outage in the second powerhouse for roof repairs. As a result, there were only two samples at BON this week. The expectation is that sampling will resume by 0700 on August 10th, for the August 11 sample. Once sampling resumes, the high temperature sampling protocol will still be in effect and is expected to remain in effect until daily average temperatures in the Bonneville forebay drop below 69.5 °F. This week’s samples at BON were dominated by subyearling

Chinook. This week's daily average passage index for subyearling Chinook was about 1,500 per day, which is a large decrease from last week's daily average passage index of about 14,150 per day. No spring migrants were encountered in this week's samples. No Pacific lamprey macrophthalmia were encountered this week but Pacific lamprey ammocoetes were encountered in one of this week's samples (August 6th).

Sampling at John Day Dam (JDA) remained in the high temperature protocol this week, where sampling is reduced to a 6-hour sample, twice per week, for condition only. The condition only samples will be conducted on Monday and Thursday and data from these samples will be transmitted to FPC on Tuesday and Friday of each week. This high temperature sampling protocol will remain in effect until daily average temperatures in the John Day forebay drop below 69.5 °F. Subyearling Chinook dominated the two samples at JDA this week. The only other species that were encountered in this week's samples were sockeye.

McNary (MCN) has been operating under the high temperature sampling protocol since mid-July. Under the high temperature sampling protocol, sampling remains every-other-day but the target sample size is reduced from 300-500 fish per day to approximately 100 fish per day. This protocol will remain in effect until daily average forebay temperatures drop below 68 °F. Subyearling Chinook dominated this week's samples at MCN. This week's daily average passage index for subyearling Chinook was nearly 1,500 per day, which is a large decrease from last week's daily average passage index of about 9,100 per day. No spring migrants were encountered in this week's samples. Pacific lamprey macrophthalmia were encountered in two of this week's four samples and no ammocoetes were encountered this week.

Subyearling Chinook continued to dominate the samples at Lower Granite Dam (LGR) this week. This week's daily average passage index for subyearling Chinook was about 760 per day, which is a decrease from last week's daily average passage index of nearly 2,000 per day. It is worth noting that the samples on August 8th and 9th were reduced samples, due to flume hydraulic testing. However, these samples were only reduced by 2-3 hours per day. The only spring migrants that were encountered in this week's samples were steelhead. Pacific lamprey macrophthalmia were encountered in two of this week's samples and Pacific

lamprey ammocoetes were encountered in five of this week's samples at LGR.

Similar to recent years, sampling at Little Goose Dam (LGS) began as every-other-day but was increased to every day when transportation started on April 23rd. Subyearling Chinook continued to dominate the samples at LGS this week. This week's daily average passage index for subyearling Chinook was about 670 per day, which is a decrease from last week's daily average passage index of about 900 per day. Very few spring migrants were encountered in this week's samples. Pacific lamprey macrophthalmia were encountered in four of this week's samples and ammocoetes were encountered in six of this week's samples.

Sampling at Lower Monumental Dam (LMN) was every-third-day through April 14th, transitioned to every-other-day through April 23rd, and then transitioned to every day with the start of transportation. This week's samples at LMN were dominated by subyearling Chinook. This week's daily average passage index for subyearling Chinook was about 130 per day, which is a decrease from last week's daily average passage index of about 450 per day. The only spring migrants that were encountered this week were coho, which were encountered in only one (August 8th) of this week's samples. Finally, Pacific lamprey macrophthalmia were encountered in two of this week's samples and Pacific ammocoetes were encountered in only one of this week's samples..

Subyearling Chinook continued to dominate the samples at Rock Island Dam (RIS). This week's daily average passage index for subyearling Chinook was nearly 100 per day, which is a decrease from last week's daily average passage index of about 200 per day. Passage of spring migrants was very low this week. Pacific lamprey macrophthalmia were encountered in two of this week's samples but no ammocoetes were encountered this week.

Hatchery Releases

FPC has not received all data from some hatcheries as of 08/10/18, therefore, this hatchery release schedule represents the most up to date accounting that are available, but should not be considered a finalized record of hatchery releases.

Snake River Zone:

The Snake River Zone encompasses the Snake River and its tributaries from its confluence with the Columbia River to Hells Canyon Dam. In the past week there were no scheduled releases into this zone, nor are there any scheduled for the next two.

Upper Columbia Zone:

The Upper Columbia Zone encompasses the area of the Columbia River and its tributaries from Priest Rapids Dam to Chief Joseph Dam. In the past week there were no scheduled releases into this zone, nor are there any scheduled for the next two.

Middle Columbia Zone:

The Middle Columbia Zone is defined as the Columbia River and its tributaries from Bonneville Dam to Priest Rapids Dam (excluding the Snake River). In the past week there were no scheduled releases into this zone, nor are there any scheduled for the next two.

Lower Columbia Zone:

The Lower Columbia Zone is defined as the Columbia River and its tributaries below Bonneville Dam. In the past week there were no scheduled releases into this zone, nor are there any scheduled for the next two.

Adult Passage

Adult Passage Daily passage numbers at Bonneville Dam ranged between 27 and 49 adult Chinook in the last week. The 2018 Bonneville Dam adult fall Chinook count of 1991 is about 81% of the 2017 count and 40% of the 10-year average. At Willamette Falls, 24,513 adult spring Chinook have been counted so far this year. In 2017, 34,117 adult spring Chinook were counted at Willamette Falls. This year's count is about 71.8% of the 2017 count and 68.7% of the 10-year average count of 35,660. As of August 9th, a total of 42,649 adult summer Chinook have been counted at McNary Dam and 7,135 have been counted at Lower Granite Dam. The 2018 McNary Dam adult summer Chinook count is about 74.5% of the 2017 count and 59.5% of the 10-year average count. The 2018 Lower Granite Dam adult summer Chinook count is about 80.7% of the 2017 count and 41.9% of the 10-year average count.

The 2018 Bonneville Dam adult steelhead count of 46,239 is about 1.4 times greater than the 2017 count

of 33,994, while being about 33.9% of the 10-year average count of 136,387. The 2018 Bonneville Dam adult unclipped steelhead count of 19,960 is about 1.3 times greater than the 2017 count of 15,887, while being 33.6% of the 10-year average count of 59,456. Daily adult steelhead counts at Lower Granite Dam ranged from 25 to 50 adults per day last week. This year's Lower Granite steelhead count of 5,916 has 1,779 fewer fish than the 2017 count of 7,695 and is about 43.4% of the 10-year average count of 13,636. The 2018 Lower Granite Dam adult unclipped steelhead count of 2,019 has 1,290 fewer fish than the 2017 count of 3,309 and 3,784 fewer fish than the 10-year average count of 5,803. At Willamette Falls, the 2018 count for steelhead was 10,449 as of August 7th. This year's steelhead count is about 3.9 times greater than the 2017 count of 2,678, while being 51.2% of the 10-year average count of 20,396.

Daily adult sockeye passage numbers at Bonneville Dam ranged between 14 and 37 last week. The 2018 adult sockeye count at Bonneville Dam of 193,731 is about 2.2 times greater than the 2017 count, while being 60.2% of the 10-year average count. The 2018 adult sockeye count at McNary Dam of 155,361 is about 2.7 times greater than the 2017 count, while being 67.5% of the 10-year average count. The Lower Granite Dam 2018 adult sockeye count of 269 has 43 more fish than the 2017 count of 226 and 895 fewer fish than the 10-year average count of 1,064. As of August 9th at Bonneville Dam, the adult shad count was 6,055,598. This year's shad count is about 1.9 times greater than the 2017 count of 3,132,556 and 2.9 times greater than the 10-year average count of 2,100,457. A total of 39,109 lampreys have been counted at Bonneville Dam so far this year. The Bonneville 2018 lamprey count is about 51.1% of the 2017 count of 76,531, while being about 1.5 times greater than the 10-year average count of 26,317.

Hatchery Releases Last Two Weeks

Hatchery Release Summary
From: 7/28/2018 **to** 08/10/18

Agency	Hatchery	Species	Race	MigYr	NumRel	RelStart	RelEnd	RelSite	RelRiver	Zone
Oregon Dept. of Fish and Wildlife	Clatsop County Fisheries	CH0	FA	2018	1,000,000	07-28-18	07-28-18	Youngs Bay	Youngs River	LCOL
Oregon Dept. of Fish and Wildlife Total					1,000,000					
Grand Total					1,000,000					

CH = Chinook, ST = Steelhead, CO = Coho, SO = Sockeye, CT = Cutthroat Trout, CM = Chum

Hatchery Releases Next Two Weeks

Hatchery Release Summary
From: 8/11/2018 **to** 8/24/2018

Agency	Hatchery	Species	Race	MigYr	NumRel	RelStart	RelEnd	RelSite	RelRiver	Zone
No Planned Releases										
Grand Total					0					

Daily Average Flow and Spill (in Kcfs) at Mid-Columbia Projects

Date	Grand Coulee		Chief Joseph		Wells		Rocky Reach		Rock Island		Wanapum		Priest Rapids	
	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill
07/27/2018	119.4	0.1	123.9	0.0	129.4	12.5	128.6	12.3	132.3	27.2	136.0	18.9	132.9	19.8
07/28/2018	130.3	0.1	118.0	0.0	118.6	18.3	114.2	9.1	115.9	24.8	132.1	18.6	128.4	18.9
07/29/2018	103.7	0.1	105.7	0.0	113.7	10.0	116.5	9.1	123.8	21.0	141.0	18.7	135.4	19.0
07/30/2018	136.3	0.1	128.6	0.0	133.2	12.9	123.8	12.1	126.0	27.2	133.6	17.5	128.4	19.6
07/31/2018	121.2	0.1	127.5	0.0	128.1	16.1	128.4	12.2	133.3	25.7	127.4	18.4	125.7	19.9
08/01/2018	86.5	0.1	88.3	0.0	89.2	8.9	95.0	6.5	100.3	16.7	121.2	18.6	117.3	19.8
08/02/2018	79.4	0.1	75.2	0.0	76.2	10.2	74.3	6.4	76.8	17.0	82.8	17.7	83.1	19.3
08/03/2018	97.0	0.1	97.8	0.0	102.5	16.7	91.6	8.6	92.3	18.2	67.2	19.6	63.7	20.3
08/04/2018	100.7	0.1	102.3	0.0	109.8	17.8	109.9	17.5	111.3	18.2	120.2	30.0	118.3	22.5
08/05/2018	85.1	0.1	82.8	0.0	95.5	9.3	96.1	8.6	104.4	18.2	118.0	24.5	113.1	19.8
08/06/2018	94.9	0.1	96.8	0.0	90.7	8.6	89.3	9.1	90.6	20.9	109.9	18.6	109.5	19.0
08/07/2018	115.3	0.1	109.3	0.0	113.2	19.6	108.0	0.1	109.8	22.5	107.2	18.6	104.0	18.7
08/08/2018	119.8	0.1	118.3	0.0	118.9	21.8	116.9	0.0	122.5	22.2	126.8	18.9	123.4	19.0
08/09/2018	120.1	0.1	118.2	0.0	119.4	24.5	114.5	0.0	118.4	20.5	130.3	18.3	123.5	19.6

Daily Average Flow and Spill (in Kcfs) at Snake Basin Projects

Date	Dworshak		Brownlee Inflow	Hells Canyon Outflow	Lower Granite		Little Goose		Lower Monumental		Ice Harbor	
	Flow	Spill			Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill
07/27/2018	11.0	2.8	---	---	34.7	17.3	35.2	10.6	37.0	15.8	39.9	29.9
07/28/2018	13.1	3.3	---	---	34.2	17.3	31.8	9.6	30.1	16.3	30.5	20.4
07/29/2018	13.0	3.2	---	---	31.8	17.3	36.1	10.4	34.9	16.7	38.0	28.0
07/30/2018	11.4	2.8	---	---	31.7	17.3	31.3	9.3	30.2	16.7	30.3	20.6
07/31/2018	12.9	3.1	---	---	33.4	17.3	35.2	10.6	35.9	16.3	38.0	28.1
08/01/2018	12.9	3.0	---	---	35.8	17.6	35.3	10.6	34.8	17.0	36.9	26.9
08/02/2018	12.9	3.0	---	---	32.1	17.8	30.1	9.0	29.6	16.6	31.6	21.9
08/03/2018	12.9	3.0	---	---	31.7	17.7	32.1	10.9	33.5	17.0	35.6	25.6
08/04/2018	10.6	0.6	---	---	30.7	17.6	30.3	9.1	30.2	16.5	32.9	22.9
08/05/2018	10.4	0.6	---	---	28.8	15.7	31.0	10.5	30.3	16.9	32.3	22.5
08/06/2018	11.9	1.9	---	---	27.9	14.7	28.1	16.8	27.9	14.5	27.8	18.2
08/07/2018	13.0	3.0	---	---	32.4	17.6	31.0	18.7	30.8	16.9	35.3	25.7
08/08/2018	13.0	2.9	---	---	32.2	17.4	32.4	20.2	33.3	16.4	33.4	23.6
08/09/2018	12.3	2.9	---	---	36.0	17.6	33.5	21.8	33.9	17.0	36.9	26.9

Daily Average Flow and Spill (in Kcfs) at Lower Columbia Projects

Date	McNary		John Day		The Dalles		Bonneville			
	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	PH1	PH2
07/27/2018	183.6	91.9	169.4	50.6	159.6	63.9	164.3	96.1	5.8	50.0
07/28/2018	171.9	85.8	159.6	48.0	144.1	57.8	162.4	90.7	5.1	54.2
07/29/2018	173.0	86.6	168.5	50.6	155.9	62.4	175.4	94.4	1.5	67.1
07/30/2018	185.3	92.7	181.1	54.4	166.1	67.0	173.6	100.0	0.0	61.2
07/31/2018	180.3	90.1	169.2	51.1	157.6	62.5	162.8	95.9	0.1	54.4
08/01/2018	151.5	75.9	139.0	41.7	127.0	50.5	146.6	88.5	0.0	45.7
08/02/2018	149.9	75.0	134.2	40.0	121.3	48.5	132.0	87.5	0.0	32.1
08/03/2018	121.1	60.7	114.8	34.4	106.4	42.6	123.9	80.0	0.0	31.5
08/04/2018	138.2	69.2	131.5	39.4	122.2	48.9	130.9	85.3	0.0	33.2
08/05/2018	136.0	68.1	125.9	37.3	116.2	46.3	151.0	90.2	0.0	48.5
08/06/2018	156.5	78.3	155.8	46.6	149.0	59.6	161.8	96.1	41.3	12.0
08/07/2018	159.5	79.8	147.4	44.1	126.8	50.7	153.4	100.6	40.3	0.0
08/08/2018	148.8	74.5	145.4	43.5	135.7	54.2	138.6	95.4	30.8	0.0
08/09/2018	163.6	81.8	147.2	43.9	133.3	52.9	140.3	91.5	22.1	14.3

Gas Bubble Trauma Monitoring Results from Representative Sites on the Snake River and Columbia River

Site	Date & Species	Number of Fish	Number w/ GBT signs	Number w/ Fin Signs	% Fin GBT	% Severe Fin GBT	Number of Fish with Fin GBT Listed by Highest Rank			
							Rank 1	Rank 2	Rank 3	Rank 4
Lower Granite Dam										
Little Goose Dam										
Lower Monumental Dam										
McNary Dam										
	07/29/18 Chinook + Steelhead	100	0	0	0.00%	0.00%	0	0	0	0
	08/08/18 Chinook + Steelhead	61*	0	0			0	0	0	0
Bonneville Dam										
	08/01/18 Chinook + Steelhead	100	0	0	0.00%	0.00%	0	0	0	0
	08/05/18 Chinook + Steelhead	6*	0	0			0	0	0	0
Rock Island Dam										
	07/27/18 Chinook + Steelhead	100	3	3	3.00%	0.00%	3	0	0	0
	07/31/18 Chinook + Steelhead	89*	5	5			5	0	0	0
	08/07/18 Chinook + Steelhead	9*	1	1			1	0	0	0

Samples marked with an asterisk indicate the sample size criteria of 100 fish was not met due to insufficient numbers of fish to sample that day. The inability to collect an adequate sample precludes the accurate estimation of the percentage of fish with GBT, and no estimate is provided.

The action criteria for interruption of the voluntary spill for fish program is defined as either 15% of examined fish showing signs of gas bubble trauma in their non-paired fins, or 5% of the fish examined showing severe signs of gas bubble trauma in their non-paired fins where severe signs constitute >25% of the surface area of the fin is occluded by gas bubbles, corresponding to ranks of 3 or 4.

FISH PASSAGE CENTER

**Total Dissolved Gas Saturation(%) - Average of
12 Highest Hours, 24 Hours Average and 24 Hours High
(Washington Calculation)**

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Total Dissolved Gas Data at Upper Columbia Sites

Hungry H. Dnst		Boundary				Grand Coulee				Grand C. Tlwr				Chief Joseph				Chief J. Dnst				Date							
Date	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	Date				
07/27									108.3	108.6	108.8	24	107.8	108.1	109.3	24	108.3	108.6	109.0	24	107.9	108.4	108.9	24					07/27
07/28									108.2	108.5	108.6	24	107.6	108.1	109.0	24	107.9	108.3	108.7	24	107.5	108.0	108.4	24					07/28
07/29									107.6	108.2	108.0	24	107.3	107.8	108.8	24	107.3	108.1	108.3	17	107.0	107.5	107.5	17					07/29
07/30									107.6	107.9	108.1	24	106.9	107.1	107.7	24	107.8	108.3	108.7	24	107.2	107.7	108.1	24					07/30
07/31									108.0	108.2	108.5	24	107.2	107.6	108.9	24	107.9	108.5	108.7	24	107.7	108.3	108.7	24					07/31
08/01									108.0	108.2	108.6	24	107.9	108.4	109.4	24	107.9	108.4	109.1	24	107.7	108.1	108.5	24					08/01
08/02									108.0	108.3	108.4	24	108.3	109.2	110.9	24	107.3	108.1	107.8	24	107.1	107.5	107.6	24					08/02
08/03									107.6	108.0	108.0	24	107.6	108.4	109.7	24	107.1	107.6	107.7	24	106.7	107.4	107.8	24					08/03
08/04									107.3	107.4	107.9	24	107.1	107.7	108.7	24	107.1	107.5	107.8	24	106.5	107.0	107.5	24					08/04
08/05									107.0	107.4	107.4	24	107.0	107.9	109.5	24	107.3	107.5	107.7	24	106.8	107.1	107.5	24					08/05
08/06									106.8	107.1	107.2	24	106.6	107.3	109.1	24	107.1	107.5	107.6	24	106.7	107.0	107.2	24					08/06
08/07									107.0	107.2	107.3	24	106.4	107.1	108.8	24	107.3	107.5	107.7	24	106.8	106.9	107.3	24					08/07
08/08									107.2	107.4	107.6	24	106.3	106.9	108.3	24	107.4	107.8	108.4	24	107.0	107.2	107.9	24					08/08
08/09									107.2	107.4	107.6	23	106.4	107.0	109.0	23	106.8	107.6	107.7	23	106.3	107.0	107.1	23					08/09

Total Dissolved Gas Data at Upper Columbia Sites

Wells		Wells Dwnstrm				Rocky Reach				Rocky R. Tlwr				Rock Island				Rock I. Tlwr				Date							
Date	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	Date				
07/27	109.1	109.5	110.1	24	111.4	114.1	113.9	24	112.2	112.7	113.1	23	115.4	116.2	116.5	21	112.3	113.0	113.6	23	116.7	117.1	117.6	21					07/27
07/28	109.0	109.6	110.5	24	112.0	113.9	117.6	24	112.0	112.8	113.4	23	114.6	116.2	116.9	22	111.7	113.0	113.4	22	116.4	117.2	117.6	22					07/28
07/29	108.6	109.2	109.8	22	110.4	113.9	112.2	22	110.9	112.6	111.9	24	113.9	115.9	115.9	23	111.2	112.3	113.0	23	115.5	116.2	116.8	23					07/29
07/30	108.4	109.3	109.8	24	110.8	112.0	113.3	24	112.0	113.1	114.0	23	115.0	116.4	116.9	21	111.4	112.4	113.9	23	115.8	116.3	117.5	21					07/30
07/31	108.8	109.4	110.1	24	111.5	113.1	115.3	24	111.1	113.0	111.9	24	114.9	116.4	115.9	20	112.2	113.3	113.7	23	116.4	117.0	117.3	20					07/31
08/01	108.6	109.4	110.0	24	110.3	113.0	111.2	24	111.3	111.6	112.1	23	112.8	115.3	114.7	22	110.6	112.0	111.3	22	115.0	116.4	118.0	20					08/01
08/02	107.9	109.0	108.7	24	110.1	110.4	111.0	24	110.9	111.4	111.8	23	111.6	113.2	112.7	22	110.0	111.0	110.9	24	115.0	115.4	116.6	23					08/02
08/03	106.9	107.9	107.3	23	110.6	110.7	120.7	23	110.2	111.5	111.4	24	112.4	113.7	114.6	23	109.2	109.8	109.9	23	114.4	114.7	116.3	23					08/03
08/04	107.0	107.9	108.7	23	112.0	113.0	120.7	23	108.5	109.7	109.5	24	114.2	115.8	122.8	20	110.0	111.7	115.2	23	114.6	115.8	117.9	20					08/04
08/05	107.0	107.8	108.4	20	108.9	114.0	111.8	20	109.5	110.2	111.5	24	112.3	113.5	114.3	24	109.1	111.6	109.9	24	113.7	115.4	114.6	22					08/05
08/06	107.2	108.2	108.7	24	108.5	109.2	109.6	24	110.8	111.3	113.1	24	112.9	114.8	115.9	24	110.0	111.1	111.5	24	115.2	115.4	116.2	20					08/06
08/07	108.0	108.6	109.1	24	111.8	114.6	119.7	24	111.3	112.6	113.1	24	111.3	115.0	115.4	22	111.2	112.2	112.8	23	115.8	116.1	116.8	22					08/07
08/08	108.0	108.4	109.3	24	112.5	115.1	119.4	24	109.5	110.4	110.2	24	109.0	110.3	110.0	22	108.9	111.9	110.2	23	113.8	115.9	115.3	21					08/08
08/09	108.1	108.7	109.2	22	113.2	116.2	124.1	22	111.8	113.6	114.5	23	111.4	113.1	114.0	22	109.2	110.5	112.9	23	113.9	114.1	115.6	22					08/09

FISH PASSAGE CENTER

**Total Dissolved Gas Saturation(%) - Average of
12 Highest Hours, 24 Hours Average and 24 Hours High
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Total Dissolved Gas Data at Upper and Mid-Columbia Sites

Wanapum				Wanapum Tlwr				Priest Rapids				Priest R. Dnstr				Pasco				Date	
Date	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	Date
07/27	115.8	117.1	117.7	24	114.7	114.9	115.4	24	113.3	113.7	114.3	24	113.2	113.6	113.9	24					07/27
07/28	116.1	117.1	118.0	24	114.6	115.0	115.5	24	113.8	114.1	114.2	24	113.2	113.6	114.1	24					07/28
07/29	115.9	117.1	117.5	24	114.5	114.8	115.1	24	113.4	114.0	114.1	24	113.0	113.5	113.7	24					07/29
07/30	115.8	116.7	118.1	24	114.4	114.6	114.8	24	113.9	114.1	114.4	24	113.6	113.9	114.1	24					07/30
07/31	116.1	117.4	118.3	24	114.6	114.8	115.7	24	114.3	114.4	114.8	24	113.8	114.0	114.3	24					07/31
08/01	111.3	116.3	113.1	24	112.9	114.5	114.6	24	112.2	114.3	113.4	24	112.3	113.9	113.0	24					08/01
08/02	109.9	111.4	111.0	24	112.4	112.9	113.4	24	109.4	111.9	110.6	24	110.8	112.2	112.2	24					08/02
08/03	106.1	109.1	107.9	24	112.1	112.3	113.4	24	106.8	109.0	107.5	24	111.3	112.2	114.4	24					08/03
08/04	108.4	110.5	111.5	24	112.8	115.1	124.3	24	108.5	111.3	116.7	24	111.2	112.6	115.1	24					08/04
08/05	110.8	112.3	113.4	24	113.4	114.5	121.5	24	110.8	112.1	115.7	24	111.7	113.0	113.9	24					08/05
08/06	110.7	112.9	113.7	24	112.7	113.5	114.5	24	112.2	112.9	113.1	24	112.7	113.1	114.5	24					08/06
08/07	112.5	113.8	115.3	24	113.4	113.9	115.3	24	111.8	112.5	113.1	24	112.7	113.3	115.1	24					08/07
08/08	113.1	114.6	115.9	24	113.5	113.5	114.9	24	112.7	113.0	113.6	24	112.9	112.9	114.7	24					08/08
08/09	114.3	115.5	116.5	24	113.8	113.8	114.9	24	112.6	113.2	113.6	24	112.9	113.4	113.7	24					08/09

Total Dissolved Gas Data at Snake and Clearwater Sites

Dworshak				Clrwr Peck				Anatone				Clrwr-Lewiston				Lower Granite				Lower G. Tlwr				Date	
Date	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	Date
07/27	108.6	114.6	113.9	24	107.3	112.3	109.1	24	102.3	103.7	105.1	24	106.3	108.2	109.9	24	103.4	103.7	104.1	24	115.4	115.7	116.6	24	07/27
07/28	109.1	109.3	109.6	24	107.9	108.9	109.7	24	102.2	103.6	105.0	24	105.8	108.2	109.9	24	103.2	103.7	103.4	24	115.3	115.6	116.4	24	07/28
07/29	108.8	109.1	109.3	24	107.5	108.5	109.2	24	102.0	103.5	104.8	24	105.9	108.2	110.0	24	102.4	103.1	102.7	24	115.4	115.6	116.0	24	07/29
07/30	108.6	109.2	110.2	24	106.8	108.1	109.3	24	102.2	103.8	105.3	24	106.0	108.5	110.3	24	102.5	102.7	102.9	24	115.7	116.0	116.6	24	07/30
07/31	108.9	109.1	109.3	24	107.1	107.8	108.3	24	101.9	103.4	103.6	24	105.2	108.1	108.6	24	102.6	102.7	102.9	24	115.7	116.0	117.5	24	07/31
08/01	109.0	109.3	109.6	24	106.8	107.8	108.5	24	102.0	103.4	104.7	24	106.0	108.3	110.1	24	102.5	102.8	102.9	24	115.6	116.0	117.0	24	08/01
08/02	108.9	109.2	109.5	24	106.6	107.6	108.5	24	101.9	103.3	104.6	24	105.7	108.0	109.8	24	102.9	103.1	103.4	24	115.6	115.9	116.4	24	08/02
08/03	108.6	109.1	109.1	24	105.3	107.3	106.5	24	101.4	102.7	104.1	24	105.5	107.8	109.6	24	102.8	103.1	103.1	24	115.6	116.0	117.2	24	08/03
08/04	102.1	108.2	103.0	24	98.9	105.5	103.9	24	101.6	103.1	104.4	24	104.9	107.4	108.3	24	102.4	102.7	102.7	24	116.0	116.4	117.1	24	08/04
08/05	102.0	102.3	102.6	24	96.3	98.2	98.1	24	101.7	103.1	104.4	24	103.7	106.1	107.8	24	102.0	102.5	102.2	24	115.3	116.1	116.0	24	08/05
08/06	105.1	108.2	108.6	24	100.8	104.3	105.7	24	101.8	103.3	104.8	24	103.8	106.2	108.0	24	101.2	101.9	101.4	24	114.7	115.4	115.4	24	08/06
08/07	108.1	108.4	108.7	24	105.2	106.2	106.9	24	102.1	103.6	105.1	24	105.2	107.3	109.0	24	101.6	102.3	102.5	24	115.2	115.4	115.8	24	08/07
08/08	108.5	108.9	109.2	24	106.2	108.5	109.3	24	102.3	103.7	105.1	24	105.5	107.7	109.4	24	102.3	102.4	102.6	24	113.9	115.5	116.4	24	08/08
08/09	109.2	110.1	116.9	23	107.9	109.2	112.5	23	102.5	104.0	105.3	23	105.8	108.4	110.0	23	102.5	102.5	102.8	23	110.9	112.1	111.4	23	08/09

FISH PASSAGE CENTER

**Total Dissolved Gas Saturation(%) - Average of
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Total Dissolved Gas Data at Lower Snake Sites

Date	Little Goose				L. Goose Tlwr				Lower Mon.				Lwr. Mon. Tlwr				Ice Harbor				Tlwr Ice Harbor				Date
	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	
07/27	110.9	111.3	112.4	24	112.5	113.9	114.2	24	112.4	112.6	113.0	24	115.9	117.9	117.4	24	115.1	115.2	115.7	24	113.1	113.7	114.6	24	07/27
07/28	111.9	112.1	112.4	24	111.5	113.9	114.3	24	112.3	112.5	112.8	24	116.1	116.7	117.0	24	114.7	115.2	115.1	24	113.3	113.9	114.3	24	07/28
07/29	111.3	112.1	111.6	24	110.1	110.6	110.8	24	111.9	112.4	112.3	24	115.9	116.6	116.5	24	114.0	114.5	114.2	24	112.9	113.5	114.1	24	07/29
07/30	111.3	111.5	112.0	24	110.0	110.5	110.8	24	111.7	111.9	112.1	24	116.1	116.6	117.0	24	114.5	114.9	115.2	24	113.3	114.0	114.5	24	07/30
07/31	111.6	111.9	112.5	24	111.2	112.4	113.9	24	111.5	111.9	111.8	24	115.9	116.6	116.8	24	114.8	115.0	115.2	24	113.4	114.0	114.6	24	07/31
08/01	111.8	111.9	112.5	24	112.1	113.6	113.8	24	110.6	111.7	111.4	24	116.1	116.6	117.1	24	114.4	115.0	115.0	24	113.5	114.1	114.6	24	08/01
08/02	111.7	112.2	112.7	24	114.1	114.5	115.0	24	109.6	110.5	110.2	24	116.0	116.5	116.9	24	114.0	114.6	114.6	24	112.9	113.8	114.3	24	08/02
08/03	110.3	111.6	111.0	24	112.9	114.4	114.7	24	108.6	109.3	109.1	24	116.1	116.2	116.6	24	112.2	113.7	113.2	24	112.6	113.2	113.8	24	08/03
08/04	109.3	110.3	110.2	24	109.6	112.0	110.7	24	108.2	108.6	108.5	24	116.0	116.3	116.7	24	110.9	111.8	111.3	24	112.3	112.9	113.6	24	08/04
08/05	109.0	109.6	110.0	24	109.3	109.8	110.2	24	108.0	108.3	108.5	24	116.2	116.5	116.8	24	110.0	110.7	110.3	24	112.5	113.2	113.7	24	08/05
08/06	107.6	109.0	108.8	24	112.2	114.6	115.3	24	108.1	108.2	108.6	24	114.9	116.2	116.1	24	109.8	109.9	110.0	24	111.8	112.8	113.5	24	08/06
08/07	107.6	107.8	108.1	24	112.7	115.2	116.1	24	108.7	109.4	109.7	24	116.1	116.4	116.6	24	110.7	111.2	111.5	24	113.1	113.7	114.7	24	08/07
08/08	108.3	108.7	109.2	24	112.4	114.4	115.2	24	108.6	109.4	108.9	24	115.3	116.3	116.4	24	112.2	112.7	113.0	24	112.5	113.4	113.9	24	08/08
08/09	108.8	109.2	109.9	23	112.9	114.9	115.6	23	108.5	108.7	108.9	23	115.1	115.4	115.9	23	113.3	113.8	114.2	23	113.3	114.2	114.7	23	08/09

Total Dissolved Gas Data at Mid-Columbia Sites

Date	McNary-Wash.				Tlwr McNary				John Day				Tlwr John Day				The Dalles				Dnstr T. Dalles				Date
	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	
07/27	111.5	111.9	112.5	24	115.9	117.2	118.0	24	107.3	108.1	108.5	24	113.9	114.3	115.4	24	108.0	108.2	108.4	24	113.7	114.2	115.1	24	07/27
07/28	111.1	112.0	112.0	24	115.3	116.9	116.9	24	107.8	108.6	109.1	24	114.2	114.7	115.3	24	108.0	108.2	108.3	24	113.3	114.2	114.1	24	07/28
07/29	110.5	110.9	113.0	24	115.2	116.3	117.0	24	108.1	108.9	109.3	24	114.2	114.6	115.1	24	109.1	109.9	110.5	24	113.8	114.7	115.2	24	07/29
07/30	109.8	110.8	111.9	24	116.0	116.8	117.7	24	109.4	109.9	111.3	24	114.4	114.8	115.4	24	111.0	111.2	111.6	24	115.2	115.8	116.1	24	07/30
07/31	109.7	110.8	110.8	24	115.6	116.5	116.9	24	109.5	110.2	110.4	24	114.0	114.4	114.7	24	109.3	111.1	111.0	24	114.1	115.7	115.0	24	07/31
08/01	110.1	110.2	110.5	24	114.3	116.2	115.1	24	108.2	109.3	109.5	24	113.7	114.3	114.8	24	107.2	108.1	107.6	24	112.4	113.5	113.2	24	08/01
08/02	108.7	110.1	109.8	24	114.2	114.9	115.0	24	107.3	108.7	108.0	24	113.4	113.9	113.8	24	106.0	107.0	106.5	24	111.4	112.4	112.2	24	08/02
08/03	105.9	108.2	107.7	24	113.6	114.3	114.7	24	105.7	107.0	106.5	24	112.4	113.4	112.8	24	104.8	105.9	105.4	24	110.2	111.3	110.9	24	08/03
08/04	105.5	105.9	106.4	24	113.7	114.3	114.3	24	105.0	105.5	105.7	24	112.9	113.3	113.8	24	104.8	105.8	106.5	24	111.0	111.5	111.9	24	08/04
08/05	105.9	106.1	107.5	24	113.8	114.2	114.8	24	104.8	105.5	105.3	24	112.6	113.3	113.4	24	108.0	108.8	109.2	24	112.3	112.9	113.3	24	08/05
08/06	106.0	106.6	107.2	24	114.3	114.7	115.3	24	104.5	104.8	104.9	24	112.8	113.3	113.7	24	108.6	109.3	109.9	24	113.5	114.5	115.2	24	08/06
08/07	107.3	107.9	110.5	24	114.2	114.8	115.3	24	105.8	106.2	108.0	24	112.5	113.1	113.7	24	108.7	109.1	109.2	24	113.6	114.5	114.5	24	08/07
08/08	109.0	109.8	111.8	24	114.4	115.3	116.4	24	106.2	106.8	107.6	24	112.6	113.1	114.2	24	108.6	109.0	109.6	24	113.8	114.7	115.6	24	08/08
08/09	109.1	110.2	110.7	23	115.1	115.5	116.0	23	106.0	106.6	107.1	23	113.8	114.7	115.1	23	108.3	108.9	108.6	23	113.2	114.6	114.2	23	08/09

FISH PASSAGE CENTER

**Total Dissolved Gas Saturation(%) - Average of
12 Highest Hours, 24 Hours Average and 24 Hours High
(Washington Calculation)**

[INTERNAL PURPOSES ONLY]

Date 8/10/2018 7:15:11 AM

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Total Dissolved Gas Data at Mid-Columbia Sites

Date	Bonneville				Warrendale				Camas\Washug.				Cascade Islid.				Date
	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	
07/27	109.7	110.9	110.3	24	115.6	116.5	116.8	24	114.4	117.4	115.9	24	116.4	116.5	117.0	24	07/27
07/28	108.6	109.9	109.2	24	115.4	116.3	116.2	24	113.9	115.2	115.8	24	115.3	116.8	117.2	24	07/28
07/29	109.2	110.3	111.0	24	116.4	117.4	118.6	24	114.9	117.3	119.5	24	115.4	116.0	117.7	24	07/29
07/30	111.4	111.9	112.3	24	116.8	117.2	118.1	24	114.2	117.5	117.6	24	116.7	117.0	117.8	24	07/30
07/31	109.7	111.7	110.9	24	116.0	116.8	117.4	24	113.8	116.2	115.4	24	116.7	116.9	117.3	24	07/31
08/01	107.5	109.1	108.3	24	115.3	116.7	116.6	24	112.9	114.5	114.7	24	115.1	117.0	117.2	24	08/01
08/02	105.4	107.5	107.0	24	115.1	115.8	115.9	24	111.4	114.0	113.0	24	114.4	115.2	116.5	24	08/02
08/03	103.9	105.0	104.9	24	115.9	116.2	116.6	24	112.7	114.0	115.1	24	114.6	116.4	116.8	24	08/03
08/04	104.5	105.0	105.4	24	116.2	116.3	116.9	24	114.8	116.1	116.8	24	114.7	115.7	116.9	24	08/04
08/05	106.1	107.3	107.8	24	116.1	116.5	117.1	24	115.0	116.2	117.1	24	115.3	116.9	117.2	24	08/05
08/06	108.6	109.6	109.9	24	114.8	116.6	118.2	24	114.2	116.1	117.6	24	115.5	116.2	117.0	24	08/06
08/07	110.1	110.9	111.1	24	115.1	115.4	116.2	24	114.8	116.9	118.4	24	116.9	117.1	117.2	24	08/07
08/08	111.3	112.0	112.2	24	115.4	115.8	116.2	24	116.2	117.3	118.2	24	117.1	117.1	117.3	24	08/08
08/09	111.3	112.0	112.0	23	115.9	116.2	117.0	23	116.0	117.4	117.7	23	115.1	117.1	117.3	23	08/09

Hours used in calculating values:

24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
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FISH PASSAGE CENTER

Smolt Monitoring Program Two Week Passage Index Report

Date 8/10/2018 7:17:05 AM

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COMBINED YEARLING CHINOOK

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (Index)	LGS (Index)	LMN (Index)	RIS (Index)	MCN (Index)	JDA (Index)	BO2 (Index)
07/27/2018					0	0	0	0		0	0
07/28/2018					0	0	0	0	0		
07/29/2018					0	0	0	0			0
07/30/2018					0	0	0	0	0		
07/31/2018					0	0	0	0		0	0
08/01/2018					0	0	0	0	0		
08/02/2018					0	0	0	0			0
08/03/2018					0	0	0	0	0	0	
08/04/2018					0	0	0	0			0
08/05/2018					0	0	0	0	0		
08/06/2018					0	0	0	0			0
08/07/2018					0	0	0	0	0	0	
08/08/2018				0	0	0	0	0			
08/09/2018				0	0	0	0	0	0		
08/10/2018											
Total:	0	0	0	0	0	0	0	0	0	0	0
# Days:	0	0	0	0	14	14	14	14	7	4	6
Average:	0	0	0	0	0	0	0	0	0	0	0
YTD:	23,452	41,213	21,824	12,792	4,639,013	2,838,048	2,045,317	49,702	1,494,206	1,257,455	1,890,717

Number of hours sampled:

- No data available or no sample conducted

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
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FISH PASSAGE CENTER

Smolt Monitoring Program Two Week Passage Index Report

Date 8/10/2018 7:17:05 AM

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COMBINED SUBYEARLING CHINOOK

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (Index)	LGS (Index)	LMN (Index)	RIS (Index)	MCN (Index)	JDA (Index)	BO2 (Index)
07/27/2018					2,150	1,902	1,571	246		3,149	29,067
07/28/2018					1,367	1,567	573	198	13,960		
07/29/2018					1,774	530	340	264			15,375
07/30/2018					1,541	689	288	277	7,192		
07/31/2018					1,974	450	235	136		2,079	7,206
08/01/2018					3,180	630	126	87	6,165		
08/02/2018					1,867	504	56	94			4,952
08/03/2018					1,177	842	33	87	2,368	1,024	
08/04/2018					916	984	75	135			1,133
08/05/2018					537	1,012	184	112	1,225		
08/06/2018					687	448	134	115			1,866
08/07/2018					677	510	228	83	1,702	559	
08/08/2018					771	395	164	81			
08/09/2018					547	478	122	67	572		
08/10/2018											
Total:	0	0	0	0	19,165	10,941	4,129	1,982	33,184	6,811	59,599
# Days:	0	0	0	0	14	14	14	14	7	4	6
Average:	0	0	0	0	1,369	782	295	142	4,741	1,703	9,933
YTD:	0	6	89	192	858,701	933,210	506,852	35,848	2,284,820	1,067,650	2,873,673

Number of hours sampled:

- No data available or no sample conducted

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
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FISH PASSAGE CENTER

Smolt Monitoring Program Two Week Passage Index Report

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COMBINED COHO

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (Index)	LGS (Index)	LMN (Index)	RIS (Index)	MCN (Index)	JDA (Index)	BO2 (Index)
07/27/2018					0	0	0	2		7	0
07/28/2018					0	0	0	1	0		
07/29/2018					0	7	0	0			0
07/30/2018					0	0	0	0	0		
07/31/2018					0	0	0	0		0	0
08/01/2018					0	6	0	0	0		
08/02/2018					0	0	0	2			0
08/03/2018					0	0	0	1	0	0	
08/04/2018					0	0	0	1			0
08/05/2018					0	0	0	0	0		
08/06/2018					0	7	0	2			0
08/07/2018					0	0	0	0	0	0	
08/08/2018					0	5	9	0			
08/09/2018					0	0	0	0	0		
08/10/2018											
Total:	0	0	0	0	0	25	9	9	0	7	0
# Days:	0	0	0	0	14	14	14	14	7	4	6
Average:	0	0	0	0	0	2	1	1	0	2	0
YTD:	0	0	1,224	1,365	262,500	215,272	42,479	44,208	226,511	120,100	477,464

Number of hours sampled:

- No data available or no sample conducted

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
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FISH PASSAGE CENTER

Smolt Monitoring Program Two Week Passage Index Report

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COMBINED STEELHEAD

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (Index)	LGS (Index)	LMN (Index)	RIS (Index)	MCN (Index)	JDA (Index)	BO2 (Index)
07/27/2018					0	0	0	0		0	0
07/28/2018					0	0	8	0	0		
07/29/2018					0	0	0	0			0
07/30/2018					0	14	0	0	0		
07/31/2018					0	0	0	0		0	0
08/01/2018					0	6	0	0	0		
08/02/2018					0	0	0	0			0
08/03/2018					9	3	0	0	0	0	
08/04/2018					0	3	0	0			0
08/05/2018					0	9	0	0	0		
08/06/2018					0	0	0	0			0
08/07/2018					4	5	0	0	0	0	
08/08/2018					0	5	0	0			
08/09/2018					4	5	0	0	0		
08/10/2018											
Total:	0	0	0	0	17	50	8	0	0	0	0
# Days:	0	0	0	0	14	14	14	14	7	4	6
Average:	0	0	0	0	1	4	1	0	0	0	0
YTD:	723	27,448	3,888	5,328	3,924,748	3,004,324	1,942,805	24,913	240,968	681,267	356,557

Number of hours sampled:

- No data available or no sample conducted

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
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FISH PASSAGE CENTER

Smolt Monitoring Program Two Week Passage Index Report

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COMBINED SOCKEYE

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (Index)	LGS (Index)	LMN (Index)	RIS (Index)	MCN (Index)	JDA (Index)	BO2 (Index)
07/27/2018					0	0	0	2		0	0
07/28/2018					0	0	0	0	0		
07/29/2018					0	0	0	0			0
07/30/2018					0	0	0	2	0		
07/31/2018					0	0	0	0		0	0
08/01/2018					0	0	0	0	0		
08/02/2018					0	0	0	2			0
08/03/2018					0	0	0	0	0	7	
08/04/2018					0	0	0	0			0
08/05/2018					0	0	0	0	0		
08/06/2018					0	0	0	0			0
08/07/2018					0	0	0	0	0	7	
08/08/2018					0	0	0	0			
08/09/2018					0	0	0	0	0		
08/10/2018											
Total:	0	0	0	0	0	0	0	6	0	14	0
# Days:	0	0	0	0	0	0	0	0	0	4	0
Average:	0	0	0	0	0	0	0	0	0	4	0
YTD:	0	0	4	115	260,629	120,859	58,625	76,235	1,527,701	383,716	741,292

Number of hours sampled:

- No data available or no sample conducted

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
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FISH PASSAGE CENTER

Smolt Monitoring Program Two Week Passage Index Report

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COMBINED LAMPREY JUVENILES

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR* (Sample)	LGS (Coll)	LMN (Coll)	RIS (Coll)	MCN (Coll)	JDA (Coll)	BO2 (Coll)
07/27/2018					0	5	0	0		0	33
07/28/2018					1	0	4	0	0		
07/29/2018					7	20	0	0			0
07/30/2018					3	0	0	0	0		
07/31/2018					1	0	0	0		0	0
08/01/2018					5	4	0	0	20		
08/02/2018					1	10	0	0			10
08/03/2018					1	6	0	1	0	0	
08/04/2018					0	10	0	0			0
08/05/2018					4	8	8	1	0		
08/06/2018					3	4	4	0			2
08/07/2018					0	8	0	0	4	0	
08/08/2018					3	2	0	0			
08/09/2018					4	6	0	0	4		
08/10/2018											
Total:	0	0	0	0	33	83	16	2	28	0	45
# Days:	0	0	0	0	17	18	15	14	7	4	6
Average:	0	0	0	0	2	5	1	0	4	0	8
YTD:		1	3		483	35,833	56,800	370	219,190	227,728	27,305

- No data available or no sample conducted

- Juvenile lamprey can escape the sample tank at LGR which would lead to unreliable estimates of collection. Therefore, only sample counts are provided in this report.

Number of hours sampled:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
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FISH PASSAGE CENTER

Smolt Monitoring Program Two Week Passage Index Report

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Smolt Monitoring Program Sites and Agency Collaborations:

- WTB (Collection) - Salmon River Trap at Whitebird : Collection Counts
- IMN (Collection) - Imnaha River Trap : Collection Counts
- GRN (Collection) - Grande Ronde River Trap : Collection Counts
- LEW (Collection) = Snake River Trap at Lewiston : Collection Counts
- LGR (Index) - Lower Granite Dam Bypass Collection System : Passage Index Counts
- LGS (Index) - Little Goose Bypass Collection System : Passage Index Counts
- LMN (Index) - Lower Monumental Dam Bypass Collection System : Passage Index Counts
- RIS (Index) - Rock Island Dam Second Powerhouse Bypass Trap : Passage Index Counts
- MCN (Index) - McNary Dam Bypass Collection System : Passage Index Counts
- JDA (Index) - John Day Dam Bypass Collection System : Passage Index Counts
- BO2 (Index) - Bonneville Dam Second Powerhouse Bypass Collection System : Passage Index Counts

- No data available or no sample conducted

Number of hours sampled:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
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Important Information About this Report:

- For clip information see: <http://www.fpc.org/currentdaily/smpcomments.htm>
- Three classes of fish counts are shown in these tables:
 Sample counts (Samp) are provided for juvenile lamprey at LGR. See note below for details.
 Collection counts (Coll), which account for sample rates but are not adjusted for flow;
 Passage indices (INDEX), which are collection counts divided by the proportion of water passing through the sampled powerhouse.
 Passage indices are not population estimates, but are used to adjust collection counts for daily fluctuations in the site's or project's operations. Equations for passage index are provided below for each site.
 LGR, LGS, LMN, MCN, JDA (Index) = Lower Granite Dam Bypass Collection System : Passage Index Counts $\text{Passage Index} = \text{Collection Counts} / (\text{Powerhouse Flow} / (\text{Powerhouse Flow} + \text{Spill}))$
 RIS, BO2 (Index) = Rock Island Dam Second Powerhouse Bypass Trap : Passage Index Counts $\text{Passage Index} = \text{Collection Counts} / (\text{Powerhouse 2 Flow} / (\text{Powerhouse 1 \& 2 Flow} + \text{Spill}))$
- Combined lamprey juvenile collection counts are provided for all sites. Combined lamprey juveniles is a combination of pacific lamprey ammocoetes, brook lamprey ammocoetes, unknown lamprey ammocoetes, pacific lamprey macrophthalmia, and unidentified lamprey species.
- Most samples occur over a 24-hr period that spans two calendar days. In this report, the date shown corresponds with the sample end date.

FISH PASSAGE CENTER

Two Week Transportation Summary Report

7/27/2018 12:00:00 AM TO 8/10/2018 12:00:00 AM

Date 8/10/2018 7:17:40 AM

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Lower Granite Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	8,884	0	0	0	8	8,900
Sum of Number Barged	9,319	0	0	0	5	9,329
Sum of Number Bypassed	0	0	0	0	0	0
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	48	0	0	0	0	48
Sum of Facility Morts	39	0	0	0	1	41
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	87	0	0	0	1	89

Little Goose Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	7,074	0	15	0	30	7,149
Sum of Number Barged	8,326	0	13	0	33	8,405
Sum of Number Bypassed	0	0	0	0	0	0
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	17	0	1	0	0	18
Sum of Facility Morts	58	0	1	0	0	59
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	75	0	2	0	0	77

FISH PASSAGE CENTER

Two Week Transportation Summary Report

7/27/2018 12:00:00 AM TO 8/10/2018 12:00:00 AM

Date 8/10/2018 7:17:40 AM

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Lower Monumental Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	2,084	0	4	0	4	2,096
Sum of Number Barged	3,033	4	3	0	8	3,056
Sum of Number Bypassed	0	0	0	0	0	0
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	1	0	0	0	0	1
Sum of Facility Morts	10	0	1	0	0	11
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	11	0	1	0	0	12

Total

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	18,042	0	19	0	42	18,145
Sum of Number Barged	20,678	4	16	0	46	20,790
Sum of Number Bypassed	0	0	0	0	0	0
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	66	0	1	0	0	67
Sum of Facility Morts	107	0	2	0	1	111
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	173	0	3	0	1	178

FISH PASSAGE CENTER

YTD Transportation Summary Report

Date 8/10/2018 7:17:17 AM

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Lower Granite Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	523141	3041143	182812	188701	2522936	8981669
Sum of Number Barged	507104	2429167	179209	184065	1811312	6922169
Sum of Number Bypassed	14636	610813	3539	4465	711353	2056159
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	202	58	0	9	44	357
Sum of Facility Morts	929	1063	64	162	190	2598
Sum of Reseach Morts	25	42	0	0	35	137
Sum of Total Project Mort	1156	1163	64	171	269	3092

Little Goose Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	562993	1857031	137100	74669	1969525	6570843
Sum of Number Barged	557831	1546147	136377	66134	1357460	5021409
Sum of Number Bypassed	854	306206	407	7716	611659	1538501
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	135	40	4	13	14	220
Sum of Facility Morts	4003	4638	312	806	390	10539
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	4138	4678	316	819	404	10759

FISH PASSAGE CENTER

YTD Transportation Summary Report

Date 8/10/2018 7:17:17 AM

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Lower Monumental Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	304554	1218103	24944	35305	1178560	3940026
Sum of Number Barged	304269	1018208	24840	33659	926245	3233466
Sum of Number Bypassed	0	199433	100	1598	252167	705465
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	13	7	0	3	7	37
Sum of Facility Morts	217	455	4	45	141	1003
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	230	462	4	48	148	1040

Total

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	1390688	6116277	344856	298675	5671021	19492538
Sum of Number Barged	1369204	4993522	340426	283858	4095017	15177044
Sum of Number Bypassed	15490	1116452	4046	13779	1575179	4300125
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	350	105	4	25	65	614
Sum of Facility Morts	5149	6156	380	1013	721	14140
Sum of Reseach Morts	25	42	0	0	35	137
Sum of Total Project Mort	5524	6303	384	1038	821	14891

Cumulative Adult Passage at Mainstem Dams Through: 08/09

dam	enddate	Spring Chinook						Summer Chinook						Fall Chinook					
		2018		2017		10-Yr Avg.		2018		2017		10-Yr Avg.		2018		2017		10-Yr Avg.	
		Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack
BON	08/09	87894	6456	83624	18110	152393	25835	61057	4349	88044	10648	101791	21805	1991	368	2455	355	4948	981
TDA	08/09	57935	4793	58310	12497	119227	21697	49296	3787	69246	9277	84539	17568	841	163	723	162	2586	581
JDA	08/09	50572	5053	46675	12475	103731	20380	42835	4293	60416	7363	75555	16777	346	76	302	78	1255	335
MCN	08/09	44427	3472	44292	7020	94405	16297	42649	2513	57279	4705	71705	12468	53	3	104	18	312	58
IHR	08/09	32600	2197	28306	6949	68113	11204	6016	515	9254	2084	18967	4811	0	0	0	0	0	0
LMN	08/08	35398	3020	28545	8270	68100	11017	6011	698	8137	3364	19380	5948	0	0	0	0	1	0
LGS	08/09	31834	2486	26598	8335	63992	12109	7347	580	8994	3729	19065	6379	0	0	0	0	0	0
LGR	08/09	31161	2948	27357	8256	62850	13009	7135	811	8843	3602	16997	6786	0	0	0	0	0	0
PRD	08/08	7067	949	7268	783	18018	1858	39667	2175	52504	1693	58619	2680	0	0	0	0	0	0
WAN	08/08	8071	964	6612	484	17542	2163	37341	1370	48827	1301	55297	2135	0	0	0	0	0	0
RIS	08/08	7894	997	8080	564	18255	2598	38025	1432	54886	1095	56669	4241	0	0	0	0	0	0
RRH	08/08	5919	807	5864	406	8195	1153	32042	928	41054	836	44231	2822	0	0	0	0	0	0
WEL	08/08	7500	976	6589	820	8670	1609	19996	870	27908	878	32769	2641	0	0	0	0	0	0
WFA	08/07	24513	1996	34117	2429	35660	1664	0	0	0	0	0	0	0	0	0	0	0	0

DAM	ENDDATE	Coho						Sockeye			Steelhead						Lamprey		
		2018		2017		10-Yr Avg.		10-Yr			10-Yr			Unclipped		Unclipped	10-Yr		
		Adult	Jack	Adult	Jack	Adult	Jack	2018	2017	Avg.	2018	2017	Avg.	2018	2017	Avg.	2018	2017	Avg.
BON	08/09	6	4	0	0	20	4	193731	87600	321816	46239	33994	136387	19960	15887	59456	39109	76531	26317
TDA	08/09	4	0	0	0	0	0	151910	63885	273475	13409	8465	68737	6442	4455	32676	9059	25841	7279
JDA	08/09	1	0	0	0	3	1	168323	65852	264461	7661	4455	48011	4422	2931	22162	7283	18381	5320
MCN	08/09	-4	0	0	0	1	0	155361	57943	230140	6575	5300	35035	3465	2439	15078	1232	1711	757
IHR	08/09	-2	0	0	0	0	0	656	391	958	3660	2252	19485	1510	1165	6497	794	902	282
LMN	08/08	0	0	0	0	0	0	388	345	1116	3802	2549	20527	1696	1388	7478	307	246	67
LGS	08/09	0	0	0	0	0	0	260	285	1043	2681	1979	11839	1106	985	5360	112	384	63
LGR	08/09	0	0	1	0	0	0	269	226	1064	5916	7695	13636	2019	3309	5803	156	247	27
PRD	08/08	0	0	0	0	0	0	189724	66617	270704	1142	680	3974	0	0	0	8181	15175	3001
WAN	08/08	0	0	0	0	0	0	195979	76044	241209	1058	547	3883	0	0	0	4313	10934	1887
RIS	08/08	0	0	0	0	0	0	171556	73011	263134	984	519	2711	563	307	1411	2232	5344	745
RRH	08/08	0	0	0	0	0	0	162218	46544	219913	653	326	1937	342	135	945	2290	4916	665
WEL	08/08	0	0	0	0	0	0	152723	42082	208131	511	216	910	256	129	445	149	21	0
WFA	08/07	0	2	117	117	0	0	0	0	0	10449	2678	20396	2113	741	0	0	0	0

PRD does not post wild steelhead numbers.
 These numbers were collected from USACE, Grant PUD, Douglas PUD, Chelan PUD, ODFW and DART.
 Wild steelhead numbers are included in the total. Wild Steelhead are defined as unclipped fish.
 Historic counts (pre-1996) were obtained from CRITFC and compiled by the FPC.
 Historic counts 1997 to present were obtained from the Corps of Engineers.

