



Fish Passage Center

Weekly Report #18-11

May 18, 2018

This Week's Highlights

Water Supply

Precipitation throughout the Columbia Basin has varied between 14% and 94% of average at individual sub-basins over May. Precipitation above The Dalles has been 70% of average over May. Over the 2018 water year, precipitation has ranged between 77% and 117% of average.

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

Location	Water Year 2018 May 1-17, 2018		Water Year 2018 October 1, 2017 to May 17, 2018	
	Observed (inches)	% Average	Observed (inches)	% Average
	Columbia Above Coulee	1.23	74	28.9
Snake River Above Ice Harbor	0.93	69	16.1	93
Columbia Above The Dalles	0.94	70	20.4	99
Kootenai	0.85	51	28.4	106
Clark Fork	1.45	87	21.5	111
Flathead	1.45	77	29.8	117
Pend Oreille River Basin above Waneta Dam	1.44	83	26.2	111
Salmon River Basin	0.99	62	20.8	97
Upper Snake Tributaries	1.08	67	19.2	98
Clearwater	1.60	75	35.9	114
Willamette River above Portland	0.46	20	52.3	91

Snowpack within the Columbia Basin has been variable. Average snowpack for Snake River Basins the average snowpack is 103% of average, and for lower Columbia

Basins between McNary and Bonneville Dam average snowpack is 99% of average.

Table 2 displays the May 17th ESP runoff volume forecasts for multiple reservoirs along with the May COE forecasts at Libby and Dworshak. The May 17th ESP forecast at The Dalles between April and August is 111,377 Kaf (127% of average).

Table 2. May 17 ESP Runoff Volume Forecasts for various reservoirs within the Columbia and Snake River Basins.

Location	May 10, 2018 5-day QPF ESP	
	% Average (1981-2010)	Runoff Volume (Kaf)
The Dalles (Apr-Aug)	127	111,524
Grand Coulee (Apr-Aug)	131	74,189
Libby Res. Inflow, MT (Apr-Aug)	127 125**	7,503 7,356**
Hungry Horse Res. Inflow, MT (Apr-Aug)	160	3,092
Lower Granite Res. Inflow (Apr- July)	117	23,231
Brownlee Res. Inflow (Apr-July)	106	5,817
Dworshak Res. Inflow (Apr-July)	130 125**	3,141 3,032**

* Denotes COE May Forecast

Grand Coulee Reservoir is at 1237.7 feet (5-17-18) and has refilled 7.3 feet over the last week. Outflows at Grand Coulee have ranged between 238.9 Kcfs and 283.2 Kcfs over the last week.

The Libby Reservoir is currently at elevation 2404.0 feet (5-17-18) and has refilled 16.5 feet over the past week. Daily average outflows at Libby Dam have been 9.8 – 13.0 Kcfs over the last week.

Hungry Horse is currently at an elevation of 3514.8 feet (5-17-18) and has refilled 11.3 feet last week. Outflows at Hungry Horse have been 2.17 – 6.3 Kcfs over the last week.

Dworshak is currently at an elevation of 1545.4 feet (5-17-18) and continues to refill, filling 16.7 feet over last week. Dworshak outflows have been 2.4 Kcfs.

The Brownlee Reservoir was at an elevation of 2054.0 feet on May 17th, 2018 and has refilled 12.0 feet. Outflows at Hells Canyon have ranged between 13.5 and 28.0 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 is 100 Kcfs at Lower Granite. Flows at Lower Granite Dam have averaged 135.0 Kcfs last week; over the spring season have averaged 108.4 Kcfs.

Based on the April Final Water Supply Forecast, the Spring Biological Opinion Flow Objectives is 260 Kcfs at McNary Dam and 135 Kcfs at Priest Rapids Dam (both began April 10th). Flows at McNary averaged 474.9 Kcfs last week at McNary and 343.8 Kcfs over the spring season. Flows averaged 346.1 Kcfs at Priest Rapids last week and 225.5 Kcfs over the spring season.

Spill

Flows in the Lower Snake River remained high this week. Daily average flows at Lower Granite Dam ranged from 118.8 to 155.4 Kcfs this week. Flows in the Mid-Columbia and Upper Columbia rivers were also high this week. Daily average flows at McNary and Rock Island dams ranged from 451.1 to 497.6 Kcfs and 280.9 to 325.9 Kcfs this week, respectively.

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. In response to the order from the U.S. District Court of the District of Oregon, the 2018 Fish Operations Plan (FOP) specifies that spring spill operations on the Snake and Mid-Columbia rivers will be to spill to the 115%/120% total dissolved gas (TDG) caps at all eight projects. The COE estimates spill caps for each project on a daily basis and projects will be operated to these estimated spill caps. These daily

spill caps are implemented at 1600 each day and are published on the TMT website (<http://pweb.crohms.org/tmt/documents/ops/spill/caps/>). The daily spill caps at the Snake and Mid-Columbia river projects for the past week are summarized in Table 3.

Table 3. Spring spill operations and estimated 115%/120% TDG spill caps at Snake and Mid-Columbia river projects. Estimated spill caps for Snake River projects are for most recent week of spill operations.

Project	Spring Spill Level (Day/Night)	Estimated Spill Caps (5/11-5/17)
Lower Granite	Gas Cap/Gas Cap	31-33 Kcfs
Little Goose	Gas Cap/Gas Cap	26 Kcfs
Lower Monumental	Gas Cap/Gas Cap	27-29 Kcfs
Ice Harbor	Gas Cap/Gas Cap	80 Kcfs
McNary	Gas Cap/Gas Cap	145 Kcfs
John Day	Gas Cap/Gas Cap	90 Kcfs
The Dalles	Gas Cap/Gas Cap	90 Kcfs
Bonneville	Gas Cap/Gas Cap	121 Kcfs

The estimated 115%/120% spill cap for Lower Granite Dam (LGR) was 31 Kcfs for most of the past week, with one day (May 13th) with a spill cap of 33 Kcfs. Spill volumes at LGR have met or exceeded the estimated 115%/120% spill caps this week. Spill in excess of the estimated spill caps was necessitated by increasing flows that, at times, exceeded powerhouse capacity. Total dissolved gas (TDG) exceeded the 120% waiver limit in the LGR tailrace on May 11th but has been below 120% since. Total dissolved gas exceeded the 115% waiver limit in the Little Goose (LGS) forebay on May 12th through May 14th but has been below 115% since. The estimated spill cap for LGS was 26 Kcfs all of this week. Spill volumes at LGS have mostly exceeded the estimated 115%/120% spill cap this week. This excess spill is due to flows that were in excess of hydraulic capacity. Total dissolved gas exceeded the 120% waiver limit in the LGS tailrace on May 11th and 12th but has been below 120% since. Total dissolved gas in the Lower Monumental (LMN) forebay has exceeded the 115% waiver limit all week. The estimated spill cap for LMN started at 29 Kcfs on the afternoon of May 10th but was reduced to 27 Kcfs on May 14th where it has remained since. Due to flows in excess of hydraulic capacity, spill volumes at LMN have mostly exceeded the estimated spill cap this week. Total dissolved gas in the LMN tailrace exceeded the 120% waiver limit on May 11th and 12th

and again on May 17th. Total dissolved gas in the Ice Harbor (IHR) forebay exceeded the 115% waiver limit all of this week. The estimated spill cap for IHR was 80 Kcfs all of this week. Spill volumes this week met or exceeded the estimated spill cap. Spill in excess of the 115%/120% spill was necessary at times due to flows in excess of hydraulic capacity. Total dissolved gas exceeded the 120% TDG waiver limit in the IHR tailrace on May 11th, May 12th, May 16th, and May 17th. Total dissolved gas in the McNary (MCN) forebay exceeded the 115% waiver limit all of this week. However, it is important to note that TDG from spill at IHR is only a portion of what is measured at the MCN forebay, as TDG coming in from the Upper Columbia has been high for most the last two weeks. Finally, early in the week, the 12-hour average TDG levels in the LMN and IHR forebays was greater than what was observed in their respective tailraces. For example, on May 12th, May 13th, and May 14th the 12-hour average TDG in the LMN forebay was 124%, 124%, and 122%, whereas that in the LMN tailrace was only 121%, 118%, and 119%, respectively.

Due to flows in excess of hydraulic capacity, spill volumes at the Mid-Columbia projects (McNary, John Day, The Dalles, and Bonneville) has exceeded their respective 115%/120% spill caps since late April. In fact, over the last week, spill at these projects has been two to three times their respective estimated spill caps. For example, the estimated 115%/120% spill cap at John Day Dam (JDA) has been 90 Kcfs all this week. Spill volumes at JDA have ranged from 246.9 to 285.1 Kcfs this week, which is 2.7 to 3.2 times the estimated cap. The estimated spill cap for McNary Dam (MCN) was 145 Kcfs all of this week. Due to the high flows, spill at MCN has ranged from 309.8 to 369.8 Kcfs this week. The 12-hour average TDG exceeded the 120% waiver limit in the MCN tailrace all this week, with 12-hour average TDG in the 127%-134% range. Total dissolved gas in the John Day (JDA) forebay also exceeded the 115% waiver limit all week, with 12-hour averages in the 117%-131% range. The estimated spill cap for JDA was 90 Kcfs all this week. Due to the high flows, spill at JDA has ranged from 246.9 to 285.1 Kcfs this week. Total dissolved gas exceeded the 120% waiver limit in the JDA tailrace all this week, with 12-hour average TDG in the 128%-132% range. The TDG monitor in the JDA tailrace malfunctioned from late evening on May 16th to the afternoon of May 17th so TDG estimates on

these days are questionable. Total dissolved gas in The Dalles (TDA) forebay exceeded the 115% standard all this week, with 12-hour averages in the 122%-127% range. The estimated spill cap for The Dalles Dam was 90 Kcfs all this week. Due to the high flows, spill at TDA ranged from 254.7 to 302.3 Kcfs this week. Total dissolved gas in the tailrace at TDA exceeded the 120% waiver limit all of this week, with 12-hour average TDG in the 122%-127% range. Total dissolved gas in the Bonneville (BON) forebay exceeded the 115% waiver limit all of this week, with 12-hour average TDG in the 121%-128% range. Finally, the estimated spill cap for BON has 121 Kcfs all week. Due to the flows in excess of hydraulic capacity, spill at BON has ranged from 228.8 to 310.6 Kcfs this week. The 120% TDG waiver limit at the Cascade Island monitor was exceeded on May 11th through May 13th. The monitor has been malfunctioning since May 13th, likely as a result of the high flows and spill volumes.

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 over the past week at Lower Granite, Little Goose, Lower Monumental, Rock Island, McNary, and Bonneville dams this week. Signs of GBT were observed in seven of the nine GBT samples conducted this week (May 11-May 17). No signs of GBT were observed at McNary Dam this week. Bonneville observed three fish with signs of GBT (3%) in their

sample on May 12th. In the May 15th sample at Bonneville, 17% of examined Chinook and steelhead had signs of fin GBT. All signs of GBT observed were rank 1 or rank 2. Total dissolved gas in the tailraces of the Mid-Columbia projects (McNary, John Day, and The Dalles) had been near or above 130% for several days prior to May 15th and TDG in the Bonneville forebay had been 128% from May 13th to May 15th. These high TDG levels were due to increased spill, as a result of flows in excess of hydraulic capacity. Similarly, Rock Island observed high levels of GBT in their two samples this week. In the samples on May 15th and May 17th, 35% and 38% of Chinook and steelhead examined had signs of GBT, respectively. Total dissolved gas in the tailraces of the projects above Rock Island have been near or above 130% over the last several days and TDG in the Rock Island forebay has been at or above 128% since May 12th. These high TDG levels are due to spill in excess of prescribed levels, as a result of flows in excess of hydraulic capacity. Lower Granite observed one fish (0.97%) with rank 1 signs of GBT in their sample on May 17th. Little Goose observed one fish (1.0%) with rank 1 signs of GBT in their sample on May 14th. Lower Monumental observed two fish (2.0%) with rank 1 signs on GBT in their sample on May 16th. 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. The 15% action criterion was met at Bonneville on May 15th and Rock Island on May 15th and May 17th but, due to the high flows in excess of hydraulic capacity, very little can be done to curtail spill above these projects.

Temperature

Forebay temperatures are now being reported for Lower Granite, Ice Harbor, McNary and Bonneville dams. Temperatures at these four projects are currently at or slightly below their respective 10-year averages.

Smolt Monitoring

Smolt Monitoring Program (SMP) activities continued at all bypass facilities this week. Sampling also continued at two SMP traps this week, the Grand Ronde and Imnaha river traps. Sampling at the Salmon River trap was terminated after May 4th due to high flows and sampling at the Snake River Trap was terminated after May 11th due to high flows and anticipated releases of subyearling fall Chinook above the trap.

Sockeye dominated the samples at Bonneville Dam (BON) this week. This week's daily average passage index for sockeye was about 54,000 per day, which is an increase over last week's daily average passage index of about 26,000 per day. Yearling Chinook, coho, and steelhead passage all decreased this week, when compared to last week. This week's daily average passage indices for these three species were 46,500, 8,600, and 6,350 per day, respectively. Last week's daily average passage indices were nearly 69,000 for yearling Chinook, 19,000 for coho, and 11,300 for steelhead. Subyearling Chinook passage decreased substantially this week. The large decrease in subyearling Chinook passage is explained by the fact that the large release of subyearling fall Chinook tules from Spring Creek NFH had mostly passed the project by May 12th. The daily average passage index since this time has been about 3,200 per day. Pacific lamprey macrophthalmia were encountered in nearly every sample this week while ammocoetes were only encountered in one of this week's samples (May 11th). This week's daily average collection for Pacific lamprey macrophthalmia was 100 per day. Sockeye smolts experienced elevated mortality rates in several of this week's samples. The highest mortality rates occurred on May 14th and 15th, where mortality rates were 28.1% and 21.1%, respectively. Mortality rates for sockeye smolts decreased to 4.7% on May 16th and 4.0% on May 17th. SMP personnel at the project noted that many sockeye smolts were arriving into the sample tank dead or were dying shortly thereafter. The fish were found to be in otherwise good condition, with normal levels of descaling and injury. Fish passing through the bypass system at BON pass in shallow water and are held in shallow holding tanks for up to 24-hours. Current spill levels in the Mid-Columbia River are above those outlined in the Fish Operations Plan, due to flows in excess of hydraulic capacity. Total dissolved gas (TDG)

in the tailrace monitors at Mid-Columbia projects (McNary, John Day, and The Dalles) have been near or above 130% over the last several days and TDG at the Bonneville forebay monitor was 128% from May 13th through May 15th. As part of the Gas Bubble Trauma monitoring program, SMP personnel conducted a GBT exam on May 15th. Approximately 17% of Chinook and steelhead in the GBT sample had signs of GBT in their fins, all of which were Rank 1 or Rank 2. It is likely that the elevated mortality rates observed this week were a combination of the high TDG in the Upper and Mid-Columbia rivers, due to flows in excess of hydraulic capacity, and holding times in shallow water.

Similar to the last two years, sampling at John Day Dam (JDA) is every-other-day. Yearling Chinook dominated the samples at JDA this week. This week's daily average passage index for yearling Chinook was 82,000, which is a slight decrease over last week's daily average passage index of 85,300 per day. Steelhead passage also decreased this week, when compared to the previous week. This week's daily average passage index was 26,000 per day, whereas that for last week was about 42,300. Coho and sockeye passage increased this week. This week's daily average passage indices for these two species were 8,700 and 43,200 per day, respectively. Last week's daily average passage indices were about 2,500 for coho and 29,500 for sockeye. The sample on May 16th had an elevated mortality rate for sockeye, at 6.25%. Similar to what was observed at BON, the elevated mortality at JDA is likely a function of elevated TDG levels in the Upper and Mid-Columbia rivers and prolonged (i.e., up to 24-hours) holding in shallow sample tanks. Passage of subyearling Chinook increased this week, when compared to the previous week. This week's daily average passage index was about 3,900 per day, whereas that for last week was about 500. Unlike past weeks, a portion of the subyearling Chinook encountered in each of this week's samples were smolts and not fry. Pacific lamprey macrophthalmia were encountered in all three of this week's samples while no ammocoetes were encountered. This week's daily average collection for Pacific lamprey macrophthalmia at JDA was 8,000 per day.

Similar to John Day, sampling at McNary (MCN) is every-other-day. Sockeye dominated the samples at MCN this week. This week's daily average passage index for sockeye was about 191,500 per day. This

is an increase over last week's daily average passage index of about 165,000 per day. Yearling Chinook were the second most abundant species in this week's samples. This week's daily average passage index for yearling Chinook at MCN about 113,500 per day, which is a decrease from last week's daily average passage index of about 143,000 per day. Steelhead passage also decreased this week, when compared to last week. This week's daily average passage index for steelhead was 6,100, whereas that for last week was about 13,500 per day. Subyearling Chinook and coho passage increased this week, when compared to the previous week. This week's daily average passage indices for these two species were 59,000 and 20,500 per day, respectively. Last week's daily average passage indices were 10,000 for subyearling Chinook and 16,850 for coho. Unlike previous weeks, many of the subyearling Chinook that were encountered this week were smolts. Prior to May 9th, all subyearling Chinook encountered at MCN were fry. Finally, Pacific lamprey macrophthalmia were encountered in all four of this week's samples while no ammocoetes were encountered. This week's daily average collection for Pacific lamprey macrophthalmia was about 18,600 per day, which is a large increase over last week's daily average collection of about 1,200 macrophthalmia per day.

Yearling Chinook dominated the samples at Lower Granite Dam (LGR) this week. This week's daily average passage index for yearling Chinook was about 93,100 per day, which is a substantial decrease from last week's daily average passage index of nearly 188,000 per day. Of the yearling Chinook collected this week, approximately 87% were of hatchery origin (i.e., clipped or CWT). Steelhead and coho passage also decreased this week, when compared to last week. This week's daily average passage indices for these two species were 75,000 and 8,100 per day, respectively. Last week's daily average passage indices were about 100,000 for steelhead and 11,400 for coho. Approximately 79% of the steelhead collected at LGR this week were of hatchery origin. Sockeye passage increased substantially this week, when compared to the previous week. This week's daily average passage index was nearly 24,000 per day, whereas that for last week was only about 800. The increase in sockeye passage is largely due to the arrival of hatchery sockeye smolts that were released into Redfish Lake in April and early May. The first detection of a PIT-tagged hatchery sockeye at LGR was May 5th. The juvenile sampling

facility encountered their first clipped sockeye smolt on May 8th and, over the last few days, sample counts of clipped sockeye have increased. Subyearling Chinook passage also increased this week, when compared to last week. This week's daily average passage index was about 4,000 per day, whereas that for last week was about 900. Unlike previous weeks, at least a portion of the subyearling Chinook encountered this week were smolts. Prior to this week, nearly all subyearling Chinook encountered at LGR were fry. Pacific lamprey macrophthalmia were encountered in all of this week's samples and ammocoetes were encountered in six of this week's samples.

Similar to recent years, sampling at Little Goose Dam (LGS) was every-other-day until the start of transportation (April 23rd), at which time sampling changed to every day. Yearling Chinook dominated this week's samples at LGS. This week's daily average passage index was nearly 93,000 per day, which is a decrease from last week's daily average passage index of about 114,500 per day. Steelhead passage also decreased this week, when compared to the previous week. This week's daily average passage index was about 52,500 per day, whereas that for last week was nearly 76,000 per day. Passage of coho and sockeye increased this week, when compared to the previous week. This week's daily average passage indices were about 9,400 and 2,300 per day, respectively. Last week's daily average passage indices were 7,600 for coho and 360 for sockeye. Similar to Lower Granite, samples of clipped sockeye have increased over the last several days, indicating that hatchery sockeye released into Redfish Lake in April and early May are currently passing the Snake River projects. Subyearling Chinook passage also increased this week. This week's daily average passage index was 200 per day. Unlike previous weeks, all subyearling Chinook encountered in this week's samples were smolts. Finally, Pacific lamprey macrophthalmia were encountered every day this week. This week's daily average collection for Pacific lamprey macrophthalmia was nearly 2,200 per day. Pacific lamprey ammocoetes were only encountered in one of this week's samples (May 16th).

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

yearling Chinook. This week's daily average passage index for yearling Chinook was nearly 41,000 per day, which is a decrease from last week's daily average passage index of about 89,000 per day. Steelhead and coho passage also decreased this week when compared to last week. This week's daily average passage indices for these two species were about 28,300 and 900 per day, respectively. Last week's daily average passage indices were about 52,200 per day for steelhead and 1,800 for coho. Sockeye passage increased this week. This week's daily average passage index for sockeye was just over 800 per day, whereas that for last week was only 106 per day. Subyearling Chinook were only encountered in one of this week's samples (May 17th). Finally, Pacific lamprey macrophthalmia were encountered in six of this week's samples and no ammocoetes were encountered this week. This week's daily average collection for Pacific lamprey macrophthalmia was about 4,300 per day.

Sockeye and coho dominated this week's samples at Rock Island Dam (RIS). This week's daily average passage indices were 2,560 and 2,450 per day, respectively. For coho, this is an increase in passage when compared to last week. Last week's daily average passage index for coho was 1,500 per day. For sockeye, this is a decrease in passage. Last week's daily average passage index for sockeye was about 4,560 per day. Passage of yearling Chinook and steelhead decreased this week, when compared to last week. This week's daily average passage indices for these two species were 1,550 and 600 per day, respectively. Last week's daily average passage indices were 3,050 for yearling Chinook and 1,300 for steelhead. Subyearling Chinook passage increased this week, when compared to last week. This week's daily average passage index was 250 per day, whereas that for last week was about 70. Similar to previous weeks, nearly all of the subyearling Chinook that were collected this week were fry. Finally, Pacific lamprey macrophthalmia were collected nearly every day this week and ammocoetes were encountered in four of this week's samples. The daily average collection for Pacific lamprey macrophthalmia for this week was 12 per day. Elevated mortalities for sockeye were observed at RIS this week. The samples on May 14th, 15th, and 16th had mortality rates of 5.1%, 14.3%, and 3.2%, respectively. The mortality rate for the May 17 sample was much lower, at 1.7%. Fish passing into the smolt trap at RIS spend an unknown amount of time in the collection channel and then up to

24-hours in the smolt trap, both of which are relatively shallow. Current spill levels in the Upper Columbia are significantly above prescribed levels, due to flows in excess of hydraulic capacity. Total dissolved gas (TDG) in the tailrace monitors at the project above RIS have been near or above 130% over the last several days and TDG at the RIS forebay monitor has been at or above 128% since May 12th. As part of the Gas Bubble Trauma monitoring program, SMP personnel conducted GBT exams on May 15th and May 17th. In these two GBT samples, approximately 35% and 38% of Chinook and steelhead had signs of GBT in their fins, all of which were Rank 1 or Rank 2. It is likely that the elevated mortality rates observed this week were a combination of the high TDG in the Upper Columbia due to flows in excess of hydraulic capacity, and holding times in shallow water.

The Snake River Trap at Lewiston, ID (LEW) is located at river kilometer 225 of the Snake River and is operated by the Idaho Department of Fish and Game. Due to increased collections of yearling Chinook, LEW has operated under a modified protocol since May 1st. This modified protocol involved reducing the sampling period to 6-8 hours per day. The intent of these modifications is to reduce the number of listed hatchery yearling Chinook being handled at the trap. Due to increased flows and the anticipated release of listed subyearling fall Chinook above the trap when flows are expected to decline to a level when trapping could be resumed, sampling at LEW was terminated after the sample on May 11th.

The Grande Ronde Trap (GRN) is located at river kilometer 2 of the Grande Ronde River and is operated by the Oregon Department of Fish and Wildlife. Yearling Chinook continued to dominate the collections at GRN this week. This week's daily average collection for yearling Chinook at GRN was about 120 per day, which is a decrease from last week's daily average collection of 230 per day. Of the yearling Chinook that were collected this week, approximately 55% were of known hatchery origin. Steelhead collections decreased this week compared to the previous week. This week's daily average collection for steelhead was about 60 per day, whereas that for last week was about 170 per day. Of the steelhead that were collected this week, approximately 53% were clipped. Finally, 36 subyearling Chinook and 350 total coho smolts were encountered in this week's samples.

The Salmon River Trap at Whitebird (WTB) is located at river kilometer 103 of the Salmon River and is operated by the Idaho Department of Fish and Game. Due to high flows, sampling for the 2018 season was terminated after the sample on May 4th.

The Imnaha River Trap (IMN) is located at river kilometer 7 of the Imnaha River and is operated by the Nez Perce Tribe. Sampling at the Imnaha River Trap is year round. For 2018, the FPC currently has data from IMN for the period of February 15 through May 16th. Due to high flows and debris loads, sampling was suspended on two occasions over the last two weeks (May 7th and May 10th). Over the last week of available data (May 10-16), a total of 235 yearling Chinook and nearly 4,400 steelhead were collected at the trap. Of the yearling Chinook that were collected over this period, only 6% were clipped. Of the steelhead collected over this period, approximately 66% were clipped.

Hatchery Releases

FPC has not received preliminary data from some hatcheries as of 05/18/18, 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. Over the past week there was one release scheduled in this zone of approximately a million fall Chinook subyearlings into the Salmon River. There was also one release of 50,000 summer Chinook into the Tucannon River that was scheduled to conclude on the 15th.

Over the next two weeks there are more than 2.3 million fall Chinook subyearlings scheduled for release into this zone. Approximately 43% are planned for release into the Clearwater River at the Nez Perce Tribal Hatchery and at Big Canyon. Another 48% of the planned releases are scheduled for the Snake River at three sites: Pittsburg landing (400,000), Captain John Acclimation Pond (534,000), and at Lyons Ferry Hatchery (200,000). Finally, another 200,000 fall Chinook juveniles will be released into the Grande Ronde on June 1st.

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. Over the past week there was one scheduled release of 200,000 summer Chinook into the Methow River on May 15th. There were also two previous releases that were scheduled to conclude this week in the Methow River. One of approximately 200 summer Chinook, and the other a release of nearly 73,000 summer Steelhead that began on April 15th.

Over the next two weeks there are no scheduled hatchery releases into this zone.

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). Over the past week there were over 8.5 million fall Chinook planned for release into this zone. A majority of these (92%) were planned for release at Priests Rapid Hatchery beginning on the 15th and running through the beginning of June. The rest were released into the Umatilla River (7%), and the Yakima River (1%). There were also three releases into the Yakima River that were scheduled to finish up this week, all of spring Chinook from Cle Elum Hatchery. Finally, a release of nearly 20,000 winter steelhead into Rock Creek was also scheduled to conclude this week on the 15th.

In the next two weeks over 17.72 million fall Chinook are scheduled for release into the Middle Columbia Zone. Of these, approximately 64% are planned for release into the McNary pool at Priest Rapids Hatchery (7.88 million), and Ringold Springs Hatchery (3.5 million) on May 15th and June 1st, respectively. Another 22.5% are planned for release into the Klickitat River on June 1st, and the rest are split between the Yakima River (1.73 million) at the end of the month, and Umatilla River (600,000) on the twenty fourth.

Lower Columbia Zone:

The Lower Columbia Zone is defined as the Columbia River and its tributaries below Bonneville Dam. Over the past week there just over one million juvenile coho released into this zone. Of these a majority (80%) were released into the Klaskanine River, with the remaining made up of 200,000 released into Tanner Creek, and another release of 4,000 fish released

into Youngs Bay near the mouth of the Columbia River. Additionally, four volitional releases of summer steelhead concluded this week in the Cowlitz, Lewis, Toutle, and Washougal Rivers. And another six volitional releases of winter steelhead also came to a close on the Cowlitz, Elochoman, Kalama, and Lewis Rivers.

Over the next two weeks there are nearly 2.8 million fall Chinook planned for release into this zone. Of these, approximately 69% will be released into the Washougal River, with the rest split between three other releases into the Skipanon (16,500), Youngs (25,000), and Cowlitz Rivers(830,000). There are also two small releases of coho smolts in this zone on June 1st. One, of 1,000 juveniles into Campbell Creek on the Cowlitz River, and another of 6,000 juveniles into the Skipanon River.

Adult Passage

Adult Passage Adult counts at Bonneville Dam have been updated through 5/17/18. The 2018 adult spring Chinook count at Bonneville Dam of 58,354 is about 1.5 times greater than the 2017 count of 37,899, while being 45.7% of the 10-year average count of 127,598. The 2018 spring Chinook jack count of 3,673 has 565 more fish than the 2017 count of 3,108 and is 21.3% of the 10-year average count of 17,261. At Willamette Falls, 10,358 adult spring Chinook have been counted so far this year. The Willamette Falls adult spring Chinook is 2.5 times greater than the 2017 count, while being 70.1% of the 10 year average count. As of May 17th, a total of 29,352 adult spring Chinook have been counted at The Dalles Dam and 15,115 have been counted at McNary Dam. The Dalles Dam 2018 adult spring Chinook count is about 1.5 times greater than the 2017 count, while being 31.7% of the 10-year average count. The 2018 McNary Dam adult spring Chinook count is 1.8 times greater than the 2017 count, while being 23.8% of the 10-year average count. A total of 4,056 spring chinook have been counted at Lower Granite Dam as of May 10th.

The 2018 Bonneville Dam adult steelhead count of 3,204 has 405 more fish than the 2017 count of 2,799 and is about 73.4% of the 10-year average count of 4,366. The 2018 Bonneville Dam adult unclipped steelhead count of 1,282 is about 1.4 times the 2017 count of 944 and 89.6% of the 10-year average count of 1,431. At upriver sites, adult steelhead continue to move

through the hydrosystem to reach their tributaries and spawning sites. The majority of these fish over-wintered in pools and will complete their trip to their spawning grounds in March through early May. Daily adult steelhead counts at Lower Granite Dam ranged from 0 to 5 adults per day last week. This year's Lower Granite steelhead count of 4,514 is about 62.2% of the 2017 count of 7,263 and 52.2% of the 10-year average count of 8,652. The 2018 Lower Granite Dam adult unclipped steelhead count of 1,247 is 41.3% of the 2017 count of 3,022 and 34.4% of the 10-year average count of 3,620. At Willamette Falls, the 2018 count for steelhead was 3,185 as of May 15th. This year's steelhead count is about 3.7 times greater than the 2017 count of 871, while being 37% of the 10-year average count of 8,622.

Hatchery Releases Last Two Weeks

Hatchery Release Summary
From: 5/5/2018 to 05/18/18

Agency	Hatchery	Species	Race	MigYr	NumRel	RelStart	RelEnd	RelSite	RelRiver	Zone
Colville Tribe	Chief Joseph Hatchery	CH1	SU	2018	204,000	05-15-18	05-15-18	Chief Joseph Hatchery	Wells Pool	UCOL
Colville Tribe Total					204,000					
Idaho Dept. of Fish and Game	McCall Hatchery	CH1	SU	2018	969,500	04-02-18	05-05-18	S Fk Salmon River	Salmon River (ID)	SNAK
Idaho Dept. of Fish and Game	Springfield Hatchery	SO	UN	2018	662,621	04-30-18	05-11-18	Redfish Lake Creek	Salmon River (ID)	SNAK
Idaho Dept. of Fish and Game Total					1,632,121					
Oregon Dept. of Fish and Wildlife	Big Creek Hatchery	CH0	FA	2018	3,100,000	05-11-18	05-11-18	Big Creek Hatchery	Big Creek	LCOL
Oregon Dept. of Fish and Wildlife	Bonneville Hatchery	CO	UN	2018	200,000	05-16-18	05-16-18	Tanner Creek	Tanner Creek	LCOL
Oregon Dept. of Fish and Wildlife	Enhancement Program	CO	UN	2018	4,000	05-12-18	05-12-18	Youngs Bay	Youngs River	LCOL
Oregon Dept. of Fish and Wildlife	Irrigon Hatchery Complex	CH0	FA	2018	1,000,000	05-15-18	05-17-18	Salmon River (ID)	Salmon River (ID)	SNAK
Oregon Dept. of Fish and Wildlife	Klaskanine Hatchery	CO	UN	2018	800,000	05-16-18	05-16-18	Klaskanine River	Klaskanine River	LCOL
Oregon Dept. of Fish and Wildlife	Wizard Falls Hatchery	ST	SU	2018	10,000	05-05-18	05-05-18	Wychus Creek	Deschutes River	MCOL
Oregon Dept. of Fish and Wildlife	Wizard Falls Hatchery	ST	SU	2018	15,000	05-05-18	05-05-18	Crooked River (OR)	Deschutes River	MCOL
Oregon Dept. of Fish and Wildlife Total					5,129,000					
U.S. Fish and Wildlife Service	Spring Creek NFH	CH0	FA	2018	4,500,000	05-07-18	05-07-18	Spring Creek Hatchery	Bonneville Pool	MCOL
U.S. Fish and Wildlife Service Total					4,500,000					
Umatilla Tribe	Umatilla Hatchery	CH0	FA	2018	600,000	05-16-18	05-16-18	Reith Bridge	Umatilla River	MCOL
Umatilla Tribe Total					600,000					
Warm Springs Tribe	Oak Springs Hatchery	ST	WI	2018	54,981	05-07-18	05-08-18	E Fk Irrig Dist Sand Tra	Hood River	MCOL
Warm Springs Tribe Total					54,981					
Washington Dept. of Fish and Wildlife	Beaver Creek Hatchery	ST	WI	2018	120,000	04-01-18	05-18-18	Beaver Creek	Elochoman River	LCOL
Washington Dept. of Fish and Wildlife	COOP	CT	UN	2018	10,000	04-15-18	05-15-18	Cowlitz River	Cowlitz River	LCOL
Washington Dept. of Fish and Wildlife	Cowlitz Trout	CT	UN	2018	95,000	04-15-18	05-15-18	Blue Creek	Cowlitz River	LCOL
Washington Dept. of Fish and Wildlife	Cowlitz Trout	ST	SU	2018	620,000	04-15-18	05-15-18	Blue Creek	Cowlitz River	LCOL
Washington Dept. of Fish and Wildlife	Cowlitz Trout	ST	WI	2018	53,000	04-15-18	05-15-18	Cowlitz River	Cowlitz River	LCOL
Washington Dept. of Fish and Wildlife	Cowlitz Trout	ST	WI	2018	103,000	04-15-18	05-15-18	Blue Creek	Cowlitz River	LCOL
Washington Dept. of Fish and Wildlife	Cowlitz Trout	ST	WI	2018	470,000	04-15-18	05-15-18	Blue Creek	Cowlitz River	LCOL
Washington Dept. of Fish and Wildlife	Kalama Falls Hatchery	ST	WI	2018	84,000	04-15-18	05-15-18	Kalama Falls Hatchery	Kalama River	LCOL
Washington Dept. of Fish and Wildlife	Merwin Hatchery	ST	SU	2018	10,000	04-15-18	05-15-18	N Fk Lewis River	Lewis River	LCOL
Washington Dept. of Fish and Wildlife	Merwin Hatchery	ST	WI	2018	247,000	04-15-18	05-15-18	N Fk Lewis River	Lewis River	LCOL
Washington Dept. of Fish and Wildlife	Priest Rapids Hatchery	CH0	FA	2018	7,883,506	05-15-18	06-01-18	Priest Rapids Hatchery	McNary Pool	MCOL
Washington Dept. of Fish and Wildlife	Skamania Hatchery	ST	SU	2018	13,200	04-15-18	05-15-18	Washougal River	Washougal River	LCOL
Washington Dept. of Fish and Wildlife	Skamania Hatchery	ST	SU	2018	20,000	04-15-18	05-15-18	S Fk Toutle River	Toutle River	LCOL
Washington Dept. of Fish and Wildlife	Skamania Hatchery	ST	WI	2018	20,000	04-15-18	05-15-18	Rock Cr (Stevenson)	Bonneville Pool	MCOL
Washington Dept. of Fish and Wildlife	Tucannon Hatchery	ST	SU	2018	50,000	04-30-18	05-15-18	Curl Lake Acclim Pond	Tucannon River	SNAK
Washington Dept. of Fish and Wildlife Total					9,798,706					
Yakama Tribe	Cle Elem Hatchery	CH1	SP	2018	218,712	03-15-18	05-15-18	Easton Pond	Yakima River	MCOL
Yakama Tribe	Cle Elem Hatchery	CH1	SP	2018	220,160	03-15-18	05-15-18	Jack Creek Acclim Pond	Yakima River	MCOL
Yakama Tribe	Cle Elem Hatchery	CH1	SP	2018	230,627	03-15-18	05-15-18	Clark Flat Acclim Pond	Yakima River	MCOL
Yakama Tribe	Prosser Acclim. Pond	CH0	FA	2018	37,276	05-17-18	05-17-18	Wapatox Sampling	Yakima River	MCOL
Yakama Tribe	Prosser Acclim. Pond	CH0	FA	2018	500,000	05-05-18	05-05-18	Prosser Acclim Pond	Yakima River	MCOL
Yakama Tribe Total					1,206,775					
Grand Total					23,125,583					

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

Hatchery Releases Next Two Weeks

Hatchery Release Summary
From: **5/19/2018** to **6/1/2018**

Agency	Hatchery	Species	Race	MiqYr	NumRel	RelStart	RelEnd	RelSite	RelRiver	Zone
Idaho Dept. of Fish and Game	McCall Hatchery	CH1	SU	2018	156,500	04-02-18	05-20-18	S Fk Salmon River	Salmon River (ID)	SNAK
Idaho Dept. of Fish and Game Total					156,500					
Nez Perce Tribe	Lyons Ferry Hatchery	CH0	FA	2018	400,000	05-22-18	05-22-18	Pittsburg Landing Acclim	Snake River	SNAK
Nez Perce Tribe	Lyons Ferry Hatchery	CH0	FA	2018	475,000	05-30-18	05-31-18	Nez Perce Tribal Hatche	Clearwater River M F	SNAK
Nez Perce Tribe	Lyons Ferry Hatchery	CH0	FA	2018	534,000	05-23-18	05-23-18	Cpt John Acclim Pond	Snake River	SNAK
Nez Perce Tribe	Lyons Ferry Hatchery	CH0	FA	2018	534,000	05-24-18	05-24-18	Big Canyon (Clearwater	Clearwater River M F	SNAK
Nez Perce Tribe Total					1,943,000					
Oregon Dept. of Fish and Wildlife	Enhancement Program	CH0	FA	2018	16,500	06-01-18	06-01-18	Skipanon River	Col R Bel. Bon Dam	LCOL
Oregon Dept. of Fish and Wildlife	Enhancement Program	CH0	FA	2018	25,000	06-01-18	06-01-18	Youngs Bay	Youngs River	LCOL
Oregon Dept. of Fish and Wildlife	Enhancement Program	CO	UN	2018	5,000	06-01-18	06-01-18	Skipanon River	Col R Bel. Bon Dam	LCOL
Oregon Dept. of Fish and Wildlife	Irrigon Hatchery Complex	CH0	FA	2018	200,000	05-31-18	05-31-18	Grande Ronde River	Grande Ronde River	SNAK
Oregon Dept. of Fish and Wildlife Total					246,500					
Umatilla Tribe	Umatilla Hatchery	CH0	FA	2018	600,000	05-24-18	05-24-18	Reith Bridge	Umatilla River	MCOL
Umatilla Tribe Total					600,000					
Washington Dept. of Fish and Wildlife	COOP	CO	NO	2018	1,000	06-01-18	06-01-18	Campbell Creek	Cowlitz River	LCOL
Washington Dept. of Fish and Wildlife	Cowlitz Salmon	CH0	FA	2018	1,581,000	05-01-18	06-01-18	Cowlitz Hatchery	Cowlitz River	LCOL
Washington Dept. of Fish and Wildlife	Cowlitz Salmon	CH0	FA	2018	2,093,500	05-01-18	06-01-18	Cowlitz Hatchery	Cowlitz River	LCOL
Washington Dept. of Fish and Wildlife	Lyons Ferry Hatchery	ST	SU	2018	60,000	06-01-18	06-01-18	Lyons Ferry Hatchery	Snake River	SNAK
Washington Dept. of Fish and Wildlife	Merwin Hatchery	ST	WI	2018	104,000	05-01-18	06-01-18	N Fk Lewis River	Lewis River	LCOL
Washington Dept. of Fish and Wildlife	North Toutle Hatchery	CH0	FA	2018	830,000	06-01-18	07-01-18	Green River	Cowlitz River	LCOL
Washington Dept. of Fish and Wildlife	Priest Rapids Hatchery	CH0	FA	2018	7,883,506	05-15-18	06-01-18	Priest Rapids Hatchery	McNary Pool	MCOL
Washington Dept. of Fish and Wildlife	Ringold Springs Hatchery	CH0	FA	2018	3,500,000	06-01-18	06-01-18	Ringold Springs Hatche	McNary Pool	MCOL
Washington Dept. of Fish and Wildlife	Washougal Hatchery	CH0	FA	2018	1,900,000	06-01-18	06-01-18	Washougal Hatchery	Washougal River	LCOL
Washington Dept. of Fish and Wildlife	Washougal Hatchery	CO	NO	2018	150,000	05-01-18	06-01-18	Washougal River	Washougal River	LCOL
Washington Dept. of Fish and Wildlife Total					18,103,006					
Yakama Tribe	Klickitat Hatchery	CH0	FA	2018	4,000,000	06-01-18	06-01-18	Klickitat Hatchery	Klickitat River	MCOL
Yakama Tribe	Prosser Acclim. Pond	CH0	FA	2018	1,000	05-30-18	05-30-18	Yakama River	Yakima River	MCOL
Yakama Tribe	Prosser Acclim. Pond	CH0	FA	2018	2,000	05-25-18	05-25-18	Yakama River	Yakima River	MCOL
Yakama Tribe	Prosser Acclim. Pond	CH0	FA	2018	2,000	05-30-18	05-30-18	Prosser Acclim Pond	Yakima River	MCOL
Yakama Tribe	Prosser Acclim. Pond	CH0	FA	2018	2,000	05-30-18	05-30-18	Yakama River	Yakima River	MCOL
Yakama Tribe	Prosser Acclim. Pond	CH0	FA	2018	30,000	05-25-18	05-25-18	Roza Acclim Pond	Yakima River	MCOL
Yakama Tribe	Prosser Acclim. Pond	CH0	FA	2018	1,700,000	05-20-18	05-20-18	Prosser Acclim Pond	Yakima River	MCOL
Yakama Tribe Total					5,737,000					
Grand Total					26,786,006					

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

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
05/04/2018	179.8	0.0	185.6	52.3	202.9	39.5	212.7	50.5	216.9	67.9	229.3	94.8	226.0	117.8
05/05/2018	194.3	4.2	208.5	57.6	240.0	66.4	246.4	83.1	241.7	95.2	265.7	123.4	267.2	144.6
05/06/2018	194.4	4.6	178.4	46.0	211.2	52.7	215.2	52.4	216.9	69.1	239.3	98.6	240.0	127.7
05/07/2018	199.5	5.0	202.8	72.3	234.5	72.1	247.8	85.6	245.6	100.8	274.8	137.5	281.0	156.9
05/08/2018	190.3	4.7	199.8	82.8	243.0	78.2	246.8	87.0	247.1	108.5	268.2	127.9	269.4	145.1
05/09/2018	189.6	4.7	192.9	70.7	234.3	77.5	244.6	84.2	249.1	114.9	277.1	156.2	281.6	145.7
05/10/2018	190.5	4.6	190.1	70.2	241.3	81.8	246.9	87.0	249.7	119.1	274.8	139.4	281.3	170.9
05/11/2018	238.9	37.3	239.7	111.2	277.6	115.8	283.3	125.6	280.9	143.5	309.7	175.8	308.6	186.1
05/12/2018	260.8	61.0	268.5	142.1	295.5	137.3	316.9	155.9	302.9	171.9	340.4	216.9	345.6	207.5
05/13/2018	283.2	81.9	295.4	148.5	313.1	159.4	335.2	178.3	317.7	193.8	363.0	245.2	371.2	231.6
05/14/2018	282.5	82.2	292.3	140.1	323.9	185.2	337.0	204.8	325.9	206.8	375.2	249.7	387.6	241.7
05/15/2018	270.2	72.6	278.3	140.5	319.2	173.5	329.3	193.3	318.2	198.2	363.4	241.7	374.7	231.0
05/16/2018	248.8	49.1	253.9	140.2	303.8	160.4	312.1	167.2	307.8	180.9	351.2	227.9	361.9	237.7
05/17/2018	245.0	45.9	255.1	147.7	300.3	158.4	306.6	159.0	306.5	182.4	333.4	229.1	338.1	205.2

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

Date	Dworshak		Brownlee Inflow	Hells Canyon		Lower Granite		Little Goose		Lower Monumental		Ice Harbor	
	Flow	Spill		Outflow	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	
05/04/2018	4.8	0.0	---	---	90.1	34.7	86.3	30.2	84.8	30.3	91.5	80.7	
05/05/2018	4.8	0.0	---	---	98.9	34.6	95.6	30.3	96.0	30.0	102.7	85.2	
05/06/2018	4.8	0.0	---	---	111.9	34.7	106.7	29.0	108.2	42.1	115.2	85.0	
05/07/2018	4.8	0.0	---	---	138.5	36.7	134.7	43.6	133.8	66.4	137.8	91.0	
05/08/2018	2.7	0.0	---	---	139.6	33.5	133.0	42.2	134.5	64.6	140.3	86.0	
05/09/2018	2.6	0.0	---	---	141.5	35.1	135.1	44.8	135.2	65.6	138.9	84.9	
05/10/2018	2.5	0.0	---	---	158.1	49.1	152.4	61.7	151.6	80.3	159.2	104.8	
05/11/2018	2.4	0.0	---	---	155.4	51.3	150.8	64.9	151.4	72.0	155.8	101.5	
05/12/2018	2.4	0.1	---	---	139.4	44.4	134.4	52.3	134.9	46.2	144.7	90.8	
05/13/2018	2.4	0.1	---	---	126.1	33.6	120.2	40.5	117.3	30.4	124.2	80.4	
05/14/2018	2.4	0.0	---	---	118.8	32.4	113.7	29.0	112.8	37.6	119.9	79.8	
05/15/2018	2.4	0.0	---	---	124.4	31.1	120.0	33.5	119.0	42.3	124.6	81.6	
05/16/2018	2.4	0.0	---	---	133.8	31.1	126.6	36.7	124.2	42.8	134.1	84.8	
05/17/2018	2.3	0.0	---	---	147.4	39.3	142.1	52.2	141.9	52.8	147.9	92.3	

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
05/04/2018	323.4	149.8	323.8	112.5	301.1	116.2	328.0	130.0	68.1	117.5
05/05/2018	359.1	197.1	352.8	155.0	331.5	130.0	356.1	149.3	68.6	125.8
05/06/2018	365.4	205.4	366.9	160.2	341.4	146.3	368.0	161.6	68.1	125.9
05/07/2018	394.5	242.5	388.7	181.5	371.2	198.0	382.0	191.2	67.4	111.0
05/08/2018	419.4	259.0	424.6	210.9	401.4	225.9	409.8	202.7	67.3	127.4
05/09/2018	417.8	257.7	420.9	219.8	404.7	215.2	418.7	202.9	66.8	136.6
05/10/2018	427.7	268.8	429.4	220.2	413.1	231.0	429.5	214.0	65.4	137.7
05/11/2018	451.1	309.8	456.7	246.9	434.0	254.7	448.4	228.8	66.5	140.6
05/12/2018	488.4	344.5	489.3	270.2	469.5	297.4	474.0	257.3	65.3	138.9
05/13/2018	477.2	339.5	486.0	262.5	470.8	302.3	486.0	271.0	64.7	137.8
05/14/2018	474.1	362.9	481.0	257.8	460.7	292.1	468.3	269.5	64.7	121.8
05/15/2018	490.2	369.8	487.1	265.7	467.8	293.7	465.7	285.6	63.6	104.1
05/16/2018	497.6	361.5	494.8	275.5	480.8	295.7	495.6	310.6	64.4	108.2
05/17/2018	493.7	335.2	498.6	285.1	479.4	281.2	489.3	294.6	61.6	120.7

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										
	05/10/18 Chinook + Steelhead	102	0	0	0.00%	0.00%	0	0	0	0
	05/17/18 Chinook + Steelhead	103	1	1	0.97%	0.00%	1	0	0	0
Little Goose Dam										
	05/07/18 Chinook + Steelhead	100	1	1	1.00%	0.00%	1	0	0	0
	05/14/18 Chinook + Steelhead	100	1	1	1.00%	0.00%	1	0	0	0
Lower Monumental Dam										
	05/09/18 Chinook + Steelhead	100	0	0	0.00%	0.00%	0	0	0	0
	05/16/18 Chinook + Steelhead	100	2	2	2.00%	0.00%	2	0	0	0
McNary Dam										
	05/08/18 Chinook + Steelhead	100	0	0	0.00%	0.00%	0	0	0	0
	05/10/18 Chinook + Steelhead	100	1	1	1.00%	0.00%	1	0	0	0
	05/12/18 Chinook + Steelhead	100	0	0	0.00%	0.00%	0	0	0	0
	05/14/18 Chinook + Steelhead	100	0	0	0.00%	0.00%	0	0	0	0
Bonneville Dam										
	05/05/18 Chinook + Steelhead	100	0	0	0.00%	0.00%	0	0	0	0
	05/12/18 Chinook + Steelhead	100	3	3	3.00%	0.00%	3	0	0	0
	05/15/18 Chinook + Steelhead	100	17	17	17.00%	0.00%	16	1	0	0

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 5/18/2018 7:15:24 AM

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Total Dissolved Gas Data at Upper Columbia Sites

Date	Hungry H. Dnst				Boundary				Grand Coulee				Grand C. Tlwr				Chief Joseph				Chief J. Dnst				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	
05/04									109.0	109.4	109.9	24	106.9	107.2	107.5	24	106.7	106.8	107.1	24	115.5	116.6	117.0	24	05/04
05/05									109.0	109.8	110.7	24	112.4	114.0	114.3	24	106.9	107.1	107.3	24	116.3	116.8	116.9	24	05/05
05/06									110.4	110.6	111.2	24	114.8	115.3	115.6	24	108.8	110.3	112.7	24	114.9	117.3	117.5	24	05/06
05/07									110.4	110.6	111.5	24	115.2	115.8	121.4	24	113.6	114.2	114.7	24	119.1	120.2	121.9	24	05/07
05/08									111.6	112.0	112.3	24	116.0	116.6	117.0	24	114.6	115.2	115.7	24	120.7	121.8	122.2	24	05/08
05/09									111.9	112.4	113.1	24	116.6	116.8	117.2	24	116.0	116.3	116.4	24	119.3	121.8	121.6	24	05/09
05/10									111.9	112.3	112.4	24	116.7	117.1	117.5	24	115.8	116.2	116.1	24	119.1	119.3	119.4	24	05/10
05/11									112.0	112.5	113.3	24	124.0	126.3	129.4	24	115.2	115.8	115.6	24	123.7	124.9	125.4	24	05/11
05/12									112.7	113.3	114.5	24	131.6	133.4	137.0	24	120.3	123.3	125.8	24	126.8	128.0	128.7	24	05/12
05/13									113.6	113.7	114.1	24	136.7	137.1	137.5	24	129.3	131.0	132.8	24	128.3	128.8	129.3	24	05/13
05/14									114.4	114.7	115.1	24	137.5	138.2	138.4	24	135.1	135.9	136.0	24	128.4	128.8	129.3	24	05/14
05/15									115.8	116.1	116.3	24	138.0	138.2	139.5	24	136.5	137.3	137.6	24	128.3	128.6	128.6	24	05/15
05/16									117.3	117.7	119.1	24	135.0	137.8	137.4	24	137.1	137.6	138.2	24	127.3	128.2	128.6	24	05/16
05/17									117.7	117.9	118.2	23	134.5	134.7	135.0	23	134.8	137.0	136.1	23	127.5	128.2	129.0	23	05/17

Total Dissolved Gas Data at Upper Columbia Sites

Date	Wells				Wells Dwnstrm				Rocky Reach				Rocky R. Tlwr				Rock Island				Rock I. Tlwr				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	
05/04	108.2	108.7	109.0	22	114.3	115.2	117.1	22	114.6	115.3	115.5	24	121.7	122.7	124.1	21	115.6	116.5	116.7	23	120.0	121.2	122.0	21	05/04
05/05	109.2	109.6	109.9	24	117.4	118.2	119.0	24	114.0	114.9	116.2	24	124.7	125.3	126.3	22	116.6	117.1	118.1	24	122.7	123.2	124.2	21	05/05
05/06	109.3	109.7	109.7	24	116.1	118.3	120.3	24	117.1	117.4	117.7	24	122.7	125.5	125.6	22	117.6	118.4	119.2	23	122.9	124.4	125.2	22	05/06
05/07	111.9	113.4	114.5	23	120.2	121.1	123.2	23	115.9	117.3	118.0	24	125.5	125.9	126.9	22	118.5	118.7	120.1	23	124.4	124.6	125.7	21	05/07
05/08	114.5	115.1	115.9	24	122.4	123.3	124.4	24	120.0	120.7	121.0	24	126.5	127.4	128.1	22	120.2	121.9	123.1	24	124.5	125.6	126.3	20	05/08
05/09	114.8	115.5	115.7	23	122.6	123.6	124.6	23	121.7	121.8	122.2	24	127.0	127.6	128.3	21	121.2	121.9	122.3	23	125.2	125.5	125.6	21	05/09
05/10	113.7	114.4	114.3	24	122.3	122.8	123.8	24	120.7	121.7	121.2	24	127.7	127.9	128.7	22	120.7	121.1	121.3	24	125.8	126.2	127.4	19	05/10
05/11	114.6	115.8	116.2	24	127.0	128.5	129.3	24	121.2	122.1	124.6	24	133.4	134.8	136.5	22	122.7	124.5	124.6	22	129.2	131.3	131.6	21	05/11
05/12	117.9	119.6	120.6	24	130.1	131.3	131.5	24	126.6	128.1	128.7	24	136.5	137.7	138.8	22	127.7	128.8	129.3	23	133.3	133.9	134.3	22	05/12
05/13	122.4	124.0	124.6	24	134.1	135.8	136.6	24	129.3	130.2	131.8	24	135.1	136.3	137.8	23	128.6	129.5	130.1	24	133.7	134.4	135.6	23	05/13
05/14	125.4	126.8	127.5	22	137.4	138.5	139.9	22	133.7	134.8	135.8	24	135.8	136.9	137.7	20	131.0	131.3	132.7	22	136.4	136.7	137.3	18	05/14
05/15	126.3	126.9	127.4	24	136.8	138.3	137.5	24	136.1	136.4	136.7	24	134.7	136.1	135.6	22	131.7	132.2	132.5	23	136.6	136.9	137.2	22	05/15
05/16	125.6	126.9	126.2	24	136.5	137.2	137.5	24	135.4	136.4	136.3	24	133.7	134.0	135.1	22	130.4	131.8	131.4	24	136.0	136.8	136.5	21	05/16
05/17	123.7	125.8	124.7	23	136.1	136.3	137.3	23	134.6	135.7	135.5	23	133.8	134.4	135.8	23	129.1	130.3	131.1	23	134.4	135.9	135.8	23	05/17

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

Date 5/18/2018 7:15:24 AM

Total Dissolved Gas Data at Upper and Mid-Columbia Sites

Date	Wanapum				Wanapum Tlwr				Priest Rapids				Priest R. Dnstr				Pasco				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	
05/04	118.5	119.0	119.6	24	120.6	122.2	125.8	24	119.3	122.2	121.9	24	120.5	121.6	121.3	24					05/04
05/05	118.5	118.9	119.2	24	123.4	123.8	124.1	24	121.2	122.6	122.7	24	122.0	122.9	123.1	24					05/05
05/06	119.7	120.3	120.8	24	121.2	124.0	124.8	24	121.9	123.1	123.3	24	122.1	123.1	123.1	24					05/06
05/07	120.0	120.5	121.7	24	125.3	126.2	128.8	24	122.3	124.8	126.1	24	122.5	123.9	124.4	24					05/07
05/08	122.1	122.9	123.5	24	124.8	126.4	127.4	24	124.2	125.4	127.2	24	123.7	124.1	124.4	24					05/08
05/09	121.7	122.9	122.2	24	129.5	130.8	135.1	24	126.8	128.8	130.9	24	124.6	125.1	125.9	24					05/09
05/10	119.7	121.3	120.8	24	125.9	129.0	127.5	24	124.5	127.9	130.1	24	123.8	125.0	124.6	24					05/10
05/11	121.1	122.3	123.3	24	129.6	130.9	133.7	24	123.9	126.8	127.5	24	123.5	125.1	125.8	24					05/11
05/12	125.4	127.2	128.2	24	136.6	137.5	140.4	24	131.8	133.8	134.3	24	128.1	129.4	129.7	24					05/12
05/13	130.3	131.3	132.1	24	140.9	141.1	141.5	24	136.8	138.2	138.6	24	130.4	131.3	131.8	24					05/13
05/14	132.0	133.2	134.2	24	141.0	141.4	142.7	24	137.9	138.3	139.0	24	131.6	131.7	131.8	4					05/14
05/15	134.3	134.8	135.8	24	142.3	142.4	142.5	24	139.5	140.0	140.4	24				0					05/15
05/16	133.6	134.8	134.5	24	141.9	142.2	142.3	24	138.0	139.7	139.0	24	132.0	132.1	132.4	15					05/16
05/17	131.8	133.2	133.5	24	140.5	141.8	142.0	24	137.1	138.4	139.2	24	130.4	132.1	131.9	24					05/17

Total Dissolved Gas Data at Snake and Clearwater Sites

Date	Dworshak				Clrwr Peck				Anatone				Clrwr-Lewiston				Lower Granite				Lower G. Tlwr				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	
05/04	99.6	100.0	100.7	24	101.6	102.4	103.1	24	104.3	105.1	105.9	24	102.1	103.1	104.0	24	104.4	104.6	104.9	24	115.9	116.0	116.3	24	05/04
05/05	99.8	100.3	100.8	24	101.8	102.5	102.8	24	104.2	104.9	105.4	24	101.9	102.8	102.9	24	104.8	105.2	105.5	24	116.0	116.1	116.3	24	05/05
05/06	100.0	100.6	101.4	24	102.6	103.1	103.5	24	104.6	105.1	105.6	24	102.4	103.0	103.8	24	104.9	105.2	105.5	24	115.8	116.1	116.2	24	05/06
05/07	99.3	100.0	100.2	24	102.7	103.4	104.0	24	104.7	105.4	105.6	24	102.1	102.8	103.1	24	103.6	104.6	104.0	24	116.0	116.5	117.3	24	05/07
05/08	100.0	101.1	101.9	24	103.6	104.3	104.8	24	106.3	107.4	107.9	24	103.6	104.4	104.9	24	104.3	104.8	105.3	24	115.1	116.4	115.9	24	05/08
05/09	100.4	100.9	101.6	24	102.9	104.3	103.7	24	106.0	107.2	106.6	24	102.8	104.3	103.5	24	105.5	105.8	106.2	24	115.4	116.6	117.3	24	05/09
05/10	100.0	100.7	101.4	24	103.4	104.0	104.5	24	106.5	107.1	107.5	24	103.0	103.5	103.9	24	105.3	106.0	106.0	24	119.1	120.7	121.5	24	05/10
05/11	99.8	100.4	100.9	24	102.1	104.0	103.2	24	106.7	107.0	107.2	24	102.7	103.6	103.4	24	104.7	105.0	105.1	24	119.8	121.0	120.8	24	05/11
05/12	101.0	102.4	104.8	24	100.5	101.9	101.2	24	106.9	107.6	108.4	24	103.3	104.2	105.0	24	105.7	106.2	106.4	24	118.1	119.3	120.2	24	05/12
05/13	101.8	103.4	106.6	24	98.6	100.6	100.0	24	106.0	107.4	107.4	24	102.8	104.1	104.0	24	106.3	106.5	106.8	24	115.5	117.6	119.8	24	05/13
05/14	101.0	102.3	102.8	24	97.6	98.7	98.3	24	105.8	106.6	107.4	24	102.9	103.8	104.4	24	106.2	106.7	106.8	24	115.1	115.4	115.7	24	05/14
05/15	101.3	102.4	103.2	24	100.4	103.7	105.6	24	105.8	106.6	107.2	24	103.1	103.8	104.4	24	105.9	106.1	106.3	24	114.6	115.1	115.0	24	05/15
05/16	100.7	101.9	101.5	23	103.5	104.8	104.8	24	105.6	106.5	106.7	24	102.2	103.8	102.9	24	105.6	106.1	106.2	24	114.5	114.8	114.7	24	05/16
05/17	100.7	101.1	101.6	23	103.7	104.3	104.5	23	105.7	106.0	106.4	23	102.5	102.7	103.2	23	104.5	105.4	105.5	23	116.4	117.3	118.0	23	05/17

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 5/18/2018 7:15:24 AM

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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	
05/04	113.2	114.3	114.7	24	115.4	115.7	115.8	24	114.6	114.7	115.1	24	114.6	116.0	115.8	24	116.3	116.6	117.1	24	116.6	117.6	117.8	24	05/04
05/05	114.8	115.2	115.7	24	115.5	115.7	115.8	24	115.6	116.2	116.6	24	115.3	115.3	116.4	24	116.2	116.8	116.9	24	117.7	117.9	118.3	24	05/05
05/06	115.8	116.0	116.4	24	115.4	115.7	115.7	24	116.8	117.0	117.2	24	117.5	119.2	119.8	24	116.1	116.3	116.4	24	118.2	118.4	118.7	24	05/06
05/07	114.5	115.6	115.1	24	118.1	120.7	122.2	24	116.0	116.8	116.4	24	121.5	123.6	125.5	24	115.7	116.3	117.2	23	119.9	121.5	122.9	23	05/07
05/08	113.3	114.2	113.8	24	117.7	120.4	119.5	24	118.6	120.9	122.1	24	121.0	123.5	124.6	24	119.2	120.5	120.9	24	120.3	121.4	121.5	24	05/08
05/09	112.0	113.3	112.9	24	117.8	120.6	122.7	24	118.6	121.1	120.4	24	121.7	123.6	127.2	24	119.5	120.6	120.5	24	120.0	120.6	121.6	24	05/09
05/10	109.6	111.5	110.7	24	121.2	123.5	124.3	24	116.7	118.6	120.0	24	123.9	126.2	127.7	24	118.0	119.0	119.0	24	123.0	124.2	125.9	24	05/10
05/11	110.6	111.1	111.9	24	122.3	123.5	122.9	24	120.4	122.3	123.2	24	123.4	126.8	127.1	24	119.0	119.9	120.8	24	122.5	124.6	124.0	24	05/11
05/12	114.6	115.8	116.7	24	119.7	122.6	121.4	24	123.6	124.4	124.6	24	119.3	120.8	121.2	24	121.5	121.7	122.1	24	121.2	122.1	122.4	24	05/12
05/13	115.5	116.1	116.2	24	117.1	118.6	119.4	24	123.1	124.5	124.3	24	115.6	117.9	118.7	24	121.3	121.7	121.8	24	119.2	120.1	119.7	24	05/13
05/14	115.1	115.5	116.2	24	115.4	116.8	116.7	24	119.5	122.3	121.4	24	117.0	119.1	120.1	24	120.4	121.3	120.9	24	119.0	119.1	119.4	24	05/14
05/15	113.8	114.8	114.2	24	116.0	117.5	119.6	24	118.0	119.5	119.4	24	118.6	119.2	120.5	24	119.6	120.6	120.4	24	119.4	119.8	121.0	24	05/15
05/16	113.2	113.8	113.8	24	116.2	117.7	118.2	24	115.9	117.6	117.5	24	118.5	119.8	121.0	24	118.1	119.5	119.3	24	120.2	120.5	121.0	24	05/16
05/17	111.5	112.8	112.6	23	118.8	119.3	120.1	23	116.3	116.9	117.7	23	120.6	121.0	121.8	23	116.2	117.5	116.9	23	121.2	121.5	121.8	23	05/17

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	
05/04	115.7	116.2	116.8	24	118.7	119.2	119.4	24	113.6	114.2	114.4	24	118.0	118.5	118.4	24	113.2	115.1	114.6	24	116.4	118.3	118.6	24	05/04
05/05	116.0	116.5	117.1	24	118.8	119.5	120.4	24	115.8	116.7	117.1	24	120.3	120.8	120.9	24	115.4	117.3	118.4	24	118.6	119.5	120.3	24	05/05
05/06	116.4	116.7	116.9	24	120.5	120.7	121.2	24	116.3	116.8	116.7	24	121.1	121.3	121.7	24	117.3	118.0	118.0	24	121.4	122.5	123.1	24	05/06
05/07	116.7	117.3	118.1	24	121.2	121.6	123.1	24	115.4	116.0	117.1	24	122.5	123.2	124.1	24	116.9	118.4	120.4	24	122.6	123.1	124.3	24	05/07
05/08	117.0	117.7	118.2	24	123.7	123.8	124.3	24	118.3	119.0	119.6	24	125.4	126.5	127.9	24	119.6	121.0	122.1	24	123.0	123.4	123.8	24	05/08
05/09	117.3	117.7	117.8	24	123.6	124.2	124.8	24	118.8	119.1	119.5	24	125.9	126.6	126.6	24	120.5	121.6	122.5	24	122.8	123.5	124.1	24	05/09
05/10	115.6	117.2	116.3	24	123.7	123.7	124.1	24	117.8	119.1	119.2	24	125.8	126.0	126.3	24	119.5	119.9	120.2	24	121.7	122.4	123.0	24	05/10
05/11	116.1	117.3	117.9	24	125.4	126.6	127.0	24	114.8	116.9	115.7	24	127.5	128.2	128.6	24	119.4	121.2	122.3	24	121.4	122.4	122.9	24	05/11
05/12	117.9	118.7	119.1	24	128.2	129.3	131.8	24	116.4	117.6	118.4	24	131.2	132.4	132.9	24	124.0	126.1	127.4	24	124.6	125.7	126.1	24	05/12
05/13	120.5	121.8	122.2	24	130.3	131.3	131.8	24	122.3	124.7	125.4	24	131.3	132.5	132.8	24	126.5	127.7	128.3	24	126.1	126.5	127.1	24	05/13
05/14	122.5	123.6	124.0	23	131.0	132.0	133.5	24	127.1	128.7	129.3	24	130.4	132.5	133.4	24	126.6	128.2	130.1	24	125.7	126.5	127.2	24	05/14
05/15	125.0	125.9	126.5	24	133.5	133.6	133.9	24	129.7	130.6	131.2	24	131.4	132.2	132.2	24	129.1	129.6	130.7	24	126.7	127.0	127.3	24	05/15
05/16	123.9	125.9	125.2	24	133.2	133.6	133.9	24	128.3	130.5	129.4	24	132.2	133.0	133.5	21	125.0	129.2	126.0	24	124.3	126.7	125.6	24	05/16
05/17	122.0	123.3	122.3	23	130.3	132.8	132.3	23	124.2	128.0	126.6	23	133.3	133.4	133.7	11	124.4	125.3	126.7	23	123.1	124.0	123.7	23	05/17

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

Date 5/18/2018 7:15:24 AM

Total Dissolved Gas Data at Mid-Columbia Sites

Date	Bonneville				Warrendale				Camas\Washug.				Cascade Isld.				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	
05/04	118.0	121.4	120.4	24	119.3	121.7	120.7	24	119.6	120.7	121.0	24	121.1	123.8	123.7	24	05/04
05/05	116.7	118.5	120.0	24	119.0	120.2	121.3	24	117.6	119.9	119.1	24	123.0	123.4	123.8	24	05/05
05/06	119.3	119.7	120.2	24	121.2	121.3	121.6	24	119.3	120.2	120.8	24	122.9	123.4	123.5	24	05/06
05/07	119.1	120.3	121.1	24	122.2	123.2	123.8	24	120.2	121.7	122.4	24	123.0	123.1	123.6	24	05/07
05/08	123.3	123.8	124.0	24	124.9	125.5	125.8	24	123.2	124.6	125.2	24	123.9	124.0	124.2	24	05/08
05/09	122.4	123.7	123.3	24	124.4	124.9	124.7	24	122.7	124.5	123.4	24	123.8	123.8	124.1	24	05/09
05/10	121.1	121.8	121.9	24	124.2	124.3	124.7	24	122.0	122.9	123.1	24	124.3	124.3	124.5	24	05/10
05/11	118.6	120.9	120.0	24	123.7	124.2	125.0	24	121.0	122.0	122.2	24	125.1	125.8	126.6	24	05/11
05/12	121.9	123.3	124.5	24	126.7	127.7	128.1	24	123.7	125.3	125.8	24	127.2	127.9	128.2	24	05/12
05/13	127.2	128.1	128.6	24	129.7	130.2	130.3	24	127.5	129.1	129.9	24	128.1	128.2	128.3	6	05/13
05/14	128.1	128.4	128.7	24	130.4	130.8	131.3	24	129.0	130.1	130.8	24				0	05/14
05/15	125.3	128.2	127.2	24	130.2	130.9	130.7	24	128.4	130.0	129.2	24				0	05/15
05/16	121.1	123.9	122.2	24	129.2	130.1	130.1	24	127.9	128.5	128.6	24				0	05/16
05/17	119.4	120.7	120.2	23	127.7	128.6	128.3	23	126.1	128.3	127.5	23				0	05/17

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

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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)
05/04/2018	35	43	63	18	80,231	73,889	51,551	2,696		60,169	53,619
05/05/2018		66	120	23	93,179	69,812	43,873	3,272	147,304		55,078
05/06/2018		61	212	50	118,983	99,133	79,427	4,074		88,293	63,218
05/07/2018			318	93	168,366	126,497	96,849	2,124	105,072		85,129
05/08/2018		37	227	101	251,390	134,113	109,570	2,762		97,508	80,852
05/09/2018			214	510	300,039	141,182	127,160	3,162	177,684		74,211
05/10/2018			464	473	301,682	156,900	114,799	3,216		95,175	69,733
05/11/2018		30	361	96	230,995	147,847	46,464	1,841	138,469		63,914
05/12/2018		48	170		180,308	110,343	40,040	1,735		93,151	62,014
05/13/2018		22	65		52,053	135,605	60,253	1,702	120,627		37,526
05/14/2018		52	33		41,052	98,820	55,498	1,844		82,877	24,029
05/15/2018			48		32,851	60,644	37,902	1,683	111,541		59,120
05/16/2018		31	66		45,921	55,268	25,414	1,345		69,865	61,159
05/17/2018			106		68,328	41,247	21,219	729	83,294		18,159
05/18/2018										64,453	17,239
Total:	35	442	2,467	1,364	1,965,378	1,451,300	910,019	32,185	883,991	651,491	825,000
# Days:	1	10	14	8	14	14	14	14	7	8	15
Average:	35	44	176	171	140,384	103,664	65,001	2,299	126,284	81,436	55,000
YTD:	23,452	40,757	21,386	12,792	4,429,855	2,611,676	1,896,139	46,987	1,319,285	1,131,518	1,729,728

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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Smolt Monitoring Program Two Week Passage Index Report

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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)
05/04/2018	0	0	0	3	646	0	0	15		232	483
05/05/2018		0	0	0	638	2	0	35	1,267		1,620
05/06/2018		0	1	4	1,217	293	305	25		0	1,850
05/07/2018			0	5	0	0	0	27	9,939		300
05/08/2018		0	0	24	0	0	0	86		539	274,905
05/09/2018			0	37	2,877	289	0	62	19,071		77,704
05/10/2018			0	27	1,075	0	425	209		1,198	28,068
05/11/2018		0	0	11	2,698	0	0	192	17,934		16,198
05/12/2018		0	0		5,321	0	0	303		1,243	7,991
05/13/2018		0	4		2,588	0	0	374	16,440		2,525
05/14/2018		0	0		2,219	592	0	147		4,788	3,887
05/15/2018			21		1,916	1	0	151	143,861		5,375
05/16/2018		0	9		5,278	555	0	177		5,641	1,690
05/17/2018			2		7,534	294	157	381	58,473		2,594
05/18/2018										6,679	5,040
Total:	0	0	37	111	34,007	2,026	887	2,184	266,985	20,320	430,230
# Days:	1	10	14	8	14	14	14	14	7	8	15
Average:	0	0	3	14	2,429	145	63	156	38,141	2,540	28,682
YTD:	0	0	40	192	57,534	3,182	887	3,354	275,328	20,905	1,304,009

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)
05/04/2018	0	0	9	7	969	2,735	0	219		2,083	20,446
05/05/2018		0	9	13	3,510	5,736	601	422	22,909		22,409
05/06/2018		0	9	6	4,565	6,155	611	706		3,348	27,558
05/07/2018			55	11	7,936	6,963	3,003	701	17,039		25,778
05/08/2018		0	74	46	18,053	9,515	1,623	1,969		3,234	13,243
05/09/2018			93	31	19,357	7,720	2,578	2,682	10,595		14,405
05/10/2018			121	33	25,252	14,830	4,252	3,804		1,498	9,210
05/11/2018		0	92	5	16,790	13,251	430	1,881	25,454		8,758
05/12/2018		0	51		16,848	8,493	1,281	2,386		7,762	11,508
05/13/2018		0	41		4,889	16,395	2,488	2,569	25,010		11,644
05/14/2018		0	36		3,883	7,693	828	3,384		9,575	6,007
05/15/2018			37		2,190	10,090	648	3,847	14,121		12,031
05/16/2018		0	38		5,542	4,756	305	2,226		8,772	5,210
05/17/2018			54		6,755	5,003	472	1,637	17,344		5,188
05/18/2018										13,358	7,955
Total:	0	0	719	152	136,539	119,335	19,120	28,433	132,472	49,630	201,350
# Days:	1	10	14	8	14	14	14	14	7	8	15
Average:	0	0	51	19	9,753	8,524	1,366	2,031	18,925	6,204	13,423
YTD:	0	0	837	1,365	177,522	138,170	24,560	31,181	171,925	59,253	392,651

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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Smolt Monitoring Program Two Week Passage Index Report

Date 5/18/2018 12:17:30 PM

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)
05/04/2018	14	361	78	10	38,760	85,008	48,115	841		51,376	10,222
05/05/2018		522	126	329	69,565	92,376	41,168	1,183	21,739		15,390
05/06/2018		1,161	134	46	63,904	65,937	47,351	1,497		44,532	6,812
05/07/2018			173	134	86,450	68,282	57,809	1,253	10,886		13,489
05/08/2018		962	178	55	102,119	44,557	40,581	1,508		45,522	15,628
05/09/2018			108	132	152,243	79,448	56,444	1,513	7,988		7,419
05/10/2018			363	97	185,898	95,649	73,981	1,264		27,835	10,085
05/11/2018		751	260	36	122,941	90,516	38,720	880	5,872		4,817
05/12/2018		455	66		164,643	53,678	32,672	774		36,641	7,672
05/13/2018		452	25		72,184	64,296	44,222	599	7,744		7,400
05/14/2018		1,052	14		48,816	72,760	31,476	490		17,054	3,887
05/15/2018			10		37,505	38,288	20,409	466	6,284		9,471
05/16/2018		634	21		40,906	30,513	17,477	568		24,124	6,149
05/17/2018			54		34,294	17,908	13,046	324	4,465		5,046
05/18/2018										15,027	6,098
Total:	14	7,402	1,610	839	1,220,228	899,216	563,471	13,160	64,978	262,111	129,585
# Days:	1	10	14	8	14	14	14	14	7	8	15
Average:	14	740	115	105	87,159	64,230	40,248	940	9,283	32,764	8,639
YTD:	723	23,169	3,587	5,328	3,434,579	2,687,076	1,789,286	17,776	215,498	584,147	306,630

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)
05/04/2018	0	0	0	1	0	1,234	0	2,217		12,264	15,238
05/05/2018		0	0	0	319	17	0	2,103	125,366		10,260
05/06/2018		0	0	0	609	10	0	6,398		15,188	11,270
05/07/2018			0	7	567	9	375	4,605	203,518		24,280
05/08/2018		0	0	15	1,347	18	0	8,847		34,479	22,678
05/09/2018			0	27	1,570	586	368	3,985	166,337		41,906
05/10/2018			0	13	1,343	642	0	3,754		55,966	55,258
05/11/2018		0	0	52	1,199	23	430	3,998	356,362		58,662
05/12/2018		0	0		7,094	727	320	3,527		55,890	58,817
05/13/2018		0	0		16,392	1,270	276	2,754	199,727		51,976
05/14/2018		0	0		19,694	2,965	552	4,060		38,597	45,231
05/15/2018			0		21,080	4,257	972	1,297	148,274		87,271
05/16/2018		0	0		45,129	4,466	611	851		35,089	53,461
05/17/2018			0		55,078	2,425	2,672	705	61,650		22,915
05/18/2018										40,075	41,101
Total:	0	0	0	115	171,421	18,649	6,576	49,101	1,261,234	287,548	600,324
# Days:	0	0	0	14	12,244	1,332	470	3,507	180,176	35,944	40,022
Average:	0	0	0	14	12,244	1,332	470	3,507	180,176	35,944	40,022
YTD:	0	0	0	115	185,329	33,441	13,649	71,349	1,358,302	310,134	616,256

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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Smolt Monitoring Program Two Week Passage Index Report

Date 5/18/2018 12:17:30 PM

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)
05/04/2018	0	0	0	0	6	0	0	11		571	0
05/05/2018		0	0	0	2	1,000	0	2	500		0
05/06/2018		0	0	0	6	4,000	800	12		0	0
05/07/2018			0	0	1	400	800	20	400		100
05/08/2018		0	0	0	1	800	400	32		143	0
05/09/2018			0	0	5	200	200	35	2,600		0
05/10/2018			0	0	15	0	200	44		1,429	0
05/11/2018		0	0	0	26	1,600	0	26	5,600		143
05/12/2018		0	0		48	4,800	600	41		2,143	100
05/13/2018		0	0		13	4,000	1,400	14	6,600		210
05/14/2018		0	0		11	2,000	1,400	6		5,714	100
05/15/2018			0		24	1,600	2,800	4	36,600		67
05/16/2018		0	0		15	1,000	11,000	2		16,143	120
05/17/2018			0		3	400	12,800	0	25,650		100
05/18/2018										76,000	867
Total:	0	0	0	0	176	21,800	32,400	249	77,950	102,143	1,807
# Days:	1	10	14	8	22	16	14	22	7	8	15
Average:	0	0	0	0	8	1,363	2,314	11	11,136	12,768	120
YTD:		1	3		190	26,834	33,200	309	85,852	138,543	8,278

☐ - 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.

Two Week Transportation Summary Report

5/4/2018 12:00:00 AM TO 5/18/2018 12:00:00 AM

Date 5/18/2018 7:18:36 AM

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Lower Granite Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	24,600	1,398,985	98,200	127,401	864,819	3,378,824
Sum of Number Barged	24,506	1,394,995	98,173	127,320	852,350	3,349,694
Sum of Number Bypassed	50	3,393	0	0	12,368	28,179
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	5	17	0	6	15	58
Sum of Facility Morts	39	579	27	75	86	892
Sum of Reseach Morts	0	1	0	0	0	1
Sum of Total Project Mort	44	597	27	81	101	951

Little Goose Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	1,404	959,025	78,697	12,993	595,344	2,242,807
Sum of Number Barged	1,398	957,329	78,591	12,795	595,285	2,240,683
Sum of Number Bypassed	2	0	0	0	0	2
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	0	15	1	1	3	23
Sum of Facility Morts	4	1,681	105	197	56	2,099
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	4	1,696	106	198	59	2,122

FISH PASSAGE CENTER

Two Week Transportation Summary Report

5/4/2018 12:00:00 AM TO 5/18/2018 12:00:00 AM

Date 5/18/2018 7:18:36 AM

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Lower Monumental Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	500	526,800	10,900	4,100	331,000	1,204,300
Sum of Number Barged	500	526,632	10,899	4,097	330,969	1,204,066
Sum of Number Bypassed	0	0	0	0	0	0
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	0	2	0	0	3	8
Sum of Facility Morts	0	166	1	3	28	226
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	0	168	1	3	31	234

Total

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	26,504	2,884,810	187,797	144,494	1,791,163	6,825,931
Sum of Number Barged	26,404	2,878,956	187,663	144,212	1,778,604	6,794,443
Sum of Number Bypassed	52	3,393	0	0	12,368	28,181
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	5	34	1	7	21	89
Sum of Facility Morts	43	2,426	133	275	170	3,217
Sum of Reseach Morts	0	1	0	0	0	1
Sum of Total Project Mort	48	2,461	134	282	191	3,307

Cumulative Adult Passage at Mainstem Dams Through: 05/17

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	05/17	58354	3673	37899	3108	127598	17261	0	0	0	0	0	0	0	0	0	0	0	0
TDA	05/17	29352	1888	18989	1623	92683	12903	0	0	0	0	0	0	0	0	0	0	0	0
JDA	05/17	21949	1664	12611	1112	77467	10716	0	0	0	0	0	0	0	0	0	0	0	0
MCN	05/17	15115	720	8542	564	63605	6742	0	0	0	0	0	0	0	0	0	0	0	0
IHR	05/17	10104	365	4432	257	44733	4059	0	0	0	0	0	0	0	0	0	0	0	0
LMN	05/17	8282	382	2749	159	40544	3166	0	0	0	0	0	0	0	0	0	0	0	0
LGS	05/17	4996	241	716	61	31594	2661	0	0	0	0	0	0	0	0	0	0	0	0
LGR	05/17	4056	149	368	24	27928	1938	0	0	0	0	0	0	0	0	0	0	0	0
PRD	05/16	512	15	255	0	8560	235	0	0	0	0	0	0	0	0	0	0	0	0
WAN	05/16	308	6	159	0	7619	192	0	0	0	0	0	0	0	0	0	0	0	0
RIS	05/16	154	3	81	0	6351	128	0	0	0	0	0	0	0	0	0	0	0	0
RRH	05/16	70	2	28	0	2126	43	0	0	0	0	0	0	0	0	0	0	0	0
WEL	05/16	20	0	12	0	1297	35	0	0	0	0	0	0	0	0	0	0	0	0
WFA	05/15	10358	787	4142	208	14766	376	0	0	0	0	0	0	0	0	0	0	0	0

DAM	ENDDATE	Coho						Sockeye			Steelhead						Lamprey		
		2018		2017		10-Yr Avg.		2018	2017	10-Yr Avg.	10-Yr Unclipped		Unclipped		10-Yr Avg.	2018	2017	10-Yr Avg.	
		Adult	Jack	Adult	Jack	Adult	Jack	2018	2017	Avg.	2018	2017	Avg.	2018	2017	Avg.	2018	2017	Avg.
BON	05/17	1	-1	0	0	0	0	0	1	0	3204	2799	4366	1282	944	1431	646	116	165
TDA	05/17	4	0	0	0	0	0	0	0	0	166	1453	2055	57	498	909	-1	0	0
JDA	05/17	0	0	0	0	0	1	0	0	0	364	515	3934	171	333	1764	43	5	32
MCN	05/17	-2	0	0	0	1	0	1	0	0	362	2533	4108	168	760	1661	17	0	2
IHR	05/17	-1	0	0	0	0	0	0	0	0	1280	1058	4150	433	499	1498	5	-2	0
LMN	05/17	0	0	0	0	0	0	0	0	0	1189	1403	8087	307	677	2780	2	0	0
LGS	05/17	0	0	0	0	0	0	0	0	0	1212	1438	4934	315	643	2514	0	0	0
LGR	05/17	0	0	0	0	0	0	0	0	0	4514	7263	8652	1247	3022	3620	0	0	0
PRD	05/16	0	0	0	0	0	0	0	0	0	27	26	43	0	0	0	24	0	3
WAN	05/16	0	0	0	0	0	0	0	0	0	47	24	89	0	0	0	7	1	1
RIS	05/16	0	0	0	0	0	0	0	0	0	56	45	99	19	14	55	0	0	0
RRH	05/16	0	0	0	0	0	0	0	0	0	77	112	286	24	25	194	0	0	0
WEL	05/16	0	0	0	0	0	0	0	0	0	108	25	54	35	17	36	0	0	0
WFA	05/15	0	2	117	117	0	0	0	0	0	3185	871	8622	1580	641	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.

