



# Fish Passage Center

## Weekly Report #18-13

June 01, 2018

### This Week's Highlights

#### Water Supply

Precipitation throughout the Columbia Basin has varied between 16% and 102% of average at individual sub-basins over May. Precipitation above The Dalles has been 78% of average over May. Over the 2018 water year, precipitation has ranged between 89% and 115% 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 1-31, 2018		Water Year 2018 October 1, 2017 to May 31, 2018	
	Observed (inches)	% Average	Observed (inches)	% Average
	Columbia Above Coulee	2.00	66	29.7
Snake River Above Ice Harbor	2.35	96	17.5	95
Columbia Above The Dalles	1.91	78	21.4	98
Kootenai	1.38	45	28.9	102
Clark Fork	3.10	102	23.2	112
Flathead	2.53	74	30.9	115
Pend Oreille River Basin above Waneta Dam	2.65	83	27.4	110
Salmon River Basin	2.93	100	22.7	99
Upper Snake Tributaries	2.63	90	20.7	99
Clearwater	3.51	90	37.8	114
Willamette River above Portland	0.67	16	52.6	89

Snowpack within the Columbia Basin has been variable. Average snowpack in the Columbia River for basins above the Snake River confluence is 104% of average, for Snake River Basins the average snowpack is 42% of average, and for lower Columbia Basins between McNary and Bonneville Dam average snowpack is 4% of average.

Table 2 displays the June 1<sup>st</sup> ESP runoff volume forecasts for multiple reservoirs along with the May COE forecasts at Libby and Dworshak. The June 1<sup>st</sup> ESP forecast at The Dalles between April and August is 109,316 Kaf (125% of average).

**Table 2. June 1 ESP Runoff Volume Forecasts for various reservoirs within the Columbia and Snake River Basins.**

Location	June 1, 2018 5-day QPF ESP	
	% Average (1981-2010)	Runoff Volume (Kaf)
The Dalles (Apr-Aug)	125	109,316
Grand Coulee (Apr-Aug)	127	72,367
Libby Res. Inflow, MT (Apr-Aug)	126 125**	7,397 7,556**
Hungry Horse Res. Inflow, MT (Apr-Aug)	157	3,040
Lower Granite Res. Inflow (Apr- July)	120	23,858
Brownlee Res. Inflow (Apr-July)	109	5,953
Dworshak Res. Inflow (Apr-July)	126 124**	3,052 3,032**

\* Denotes COE May Forecast

Grand Coulee Reservoir is at 1267.5 feet (5-31-18) and has refilled 13.9 feet over the last week. Outflows at Grand Coulee have ranged between 202.0 Kcfs and 228.8 Kcfs over the last week.

The Libby Reservoir is currently at elevation 2430.5 feet (5-31-18) and has refilled 10.4 feet over the past week. Daily average outflows at Libby Dam have been 20.0 Kcfs over the last week.

Hungry Horse is currently at an elevation of 3542.3 feet (5-31-18) and has refilled 12.6 feet last week. Outflows at Hungry Horse have been 1.9-6.0 Kcfs over the last week.

Dworshak is currently at an elevation of 1586.1 feet (5-31-18) and continues to refill, filling 12.0 feet over last week. Dworshak outflows have been 6.0 Kcfs.

The Brownlee Reservoir was at an elevation of 2070.0 feet on May 31<sup>st</sup>, 2018 and has refilled 4.3 feet. Outflows at Hells Canyon have ranged between 31.9 and 37.6 Kcfs over the last four days.

The Biological Opinion flow period began on April 3<sup>rd</sup> in the lower Snake River (Lower Granite). According to the April Final Water Supply Forecast (April 4<sup>th</sup>, 2018), the flow objective this spring is 100 Kcfs at Lower Granite. Flows at Lower Granite Dam have averaged 163.8 Kcfs last week; over the spring season have averaged 118.6 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 10<sup>th</sup>). Flows at McNary averaged 456.0 Kcfs last week at McNary and 379.2 Kcfs over the spring season. Flows averaged 292.8 Kcfs at Priest Rapids last week and 251.9 Kcfs over the spring season.

**Spill**

Flows in the Lower Snake River remained high this week and even increased slightly when compared to the previous week. Daily average flows at Lower Granite Dam ranged from 149.9 to 175.4 Kcfs this week. Flows in the Mid-Columbia and Upper Columbia rivers were also high this week but decreased slightly when compared to the previous week. Daily average flows at McNary and Rock Island dams ranged from 395.1 to 487.8 Kcfs and 222.4 to 281.8 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 3<sup>rd</sup> and April 10<sup>th</sup>, 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 (5/25-5/31)
Lower Granite	Gas Cap/Gas Cap	31 Kcfs
Little Goose	Gas Cap/Gas Cap	26 Kcfs
Lower Monumental	Gas Cap/Gas Cap	27 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 this week. Due to the high flows this week, spill volumes at LGR have exceeded the estimated 115%/120% spill caps. Total dissolved gas (TDG) exceeded the 120% waiver limit in the LGR tailrace nearly every day this week and has been as high as 126% (May 27<sup>th</sup>). Total dissolved gas exceeded the 115% waiver in the Little Goose (LGS) forebay all this week, with 12-hour average TDG as high as 120% (May 28-29). The estimated spill cap for LGS was 26 Kcfs all of this week. Spill volumes at LGS exceeded the estimated 115%/120% spill cap all of this week. In addition, a modified operation was implemented on May 30<sup>th</sup> in order to remedy adult passage issues at LGS. Under the modified operation, spill is reduced to 30% of instantaneous flows for the period of 0400-1200 while excess flows are stored into the forebay, inflows are passed for the period of 1200-1600, and spill is increased from 1600-0400 to a level necessary to pass all stored water from the 0400-1200 period (but not to exceed 130% TDG in the tailrace). This modified operation is planned to run through 0400 on June 2<sup>nd</sup>, with a TMT check-in planned for June 1<sup>st</sup> to determine if an extension is necessary. Total dissolved gas exceeded the 120% waiver limit in the LGS tailrace

every day this week, with TDG as high as 127% (May 27<sup>th</sup>). Total dissolved gas in the Lower Monumental (LMN) forebay exceeded the 115% waiver limit all week and has been as high as 129% (May 28<sup>th</sup>). The estimated spill cap for LMN was 27 Kcfs this week. Due to flows in excess of hydraulic capacity, spill volumes at LMN have exceeded the estimated spill cap this week. In addition, spill volumes at LMN fluctuated on May 30<sup>th</sup> and May 31<sup>st</sup>, due to the modified operation at LGS. Total dissolved gas in the LMN tailrace has exceeded the 120% waiver limit all of this week, with 12-hour averages as high as 122% for several days this week. Total dissolved gas in the Ice Harbor (IHR) forebay exceeded the 115% waiver limit all of this week, with 12-hour average TDG as high as 123% on May 28-29. The estimated spill cap for IHR was 80 Kcfs all of this week. Daily average spill volumes at IHR exceeded the estimated spill cap all of this week, due to flows in excess of hydraulic capacity. Similar to LMN, spill volumes at IHR fluctuated on May 30<sup>th</sup> and May 31<sup>st</sup>, due to the modified operation at LGS. Total dissolved gas exceeded the 120% TDG waiver limit in the IHR tailrace all of this week, with 12-hour TDG levels as high as 130% (May 30<sup>th</sup>). Total dissolved gas in the McNary (MCN) forebay exceeded the 115% waiver limit all of this week, with 12-hour TDG as high as 124% (May 25<sup>th</sup>). 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 month.

Due to flows in excess of hydraulic capacity, spill volumes at the Mid-Columbia projects (McNary, John Day, The Dalles, and Bonneville) have exceeded their respective 115%/120% spill caps since late April. In fact, over the last week, spill at these four projects has been 1.6-3.3 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 159.2 to 256.3 Kcfs this week, which is 1.8 to 2.8 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 233.1 to 327.93 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 129%-131% range. Total dissolved gas in the John Day (JDA) forebay also exceeded the 115% waiver limit all week, with 12-hour

averages in the 119%-127% range. The estimated spill cap for JDA was 90 Kcfs all this week. Due to the high flows, spill at JDA has ranged from 159.2 to 256.3 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 126%-132% range. Total dissolved gas in The Dalles (TDA) forebay exceeded the 115% standard all this week, with 12-hour averages in the 117%-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 213.6 to 300.8 Kcfs this week. Total dissolved gas in the tailrace at TDA exceeded the 120% waiver limit nearly all of this week, with 12-hour average TDG in the 120%-126% 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 119%-125% 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 212.8 to 269.6 Kcfs this week. The tailrace monitor at Cascade Island has been out of service since May 13<sup>th</sup>, likely as a result of the high flows and spill volumes. The 12-hour average TDG at the Warrendale gauge has been in the 125% to 129% range over the past week.

**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 eight of the nine GBT samples conducted this week (May 25-May 31). Bonneville observed signs of GBT in each of their samples on May 26<sup>th</sup> and May 30<sup>th</sup>. In the sample from May 26<sup>th</sup>, four fish (4.1%) had signs of fin GBT and in the sample from May 30<sup>th</sup>, five (5%) had signs of fin GBT. All signs of GBT observed at BON this week were rank 1 or rank 2. Rock Island observed high levels of GBT in their two samples this week. In the samples on May 29<sup>th</sup> and May 31<sup>st</sup>, 29% and 30% of the Chinook and steelhead examined had signs of fin GBT, respectively. Of the fish that had signs of fin GBT on May 29<sup>th</sup>, one was rank 3 while the rest (28) were rank 1 or 2. For the sample on May 31<sup>st</sup>, two fish had rank 3 signs of fin GBT while the rest (28) had rank 1 or 2 signs. Total dissolved gas in the tailraces of the projects above Rock Island have been at or above 125% for most of the last three weeks and TDG in the Rock Island forebay has been at or above 125% since mid-May. These high TDG levels are due to spill in excess of prescribed levels, as a result of flows in excess of hydraulic capacity. McNary observed zero fish with signs of fin GBT in their sample on May 27<sup>th</sup> but two fish (2%) with rank 1 or 2 signs of fin GBT in their sample on May 29<sup>th</sup>. Lower Granite observed one fish (1%) with rank 1 signs of fin GBT in their sample on May 31<sup>st</sup>. Little Goose observed nine fish (9%) with rank 1 or 2 signs of GBT in their sample on May 28<sup>th</sup>. Lower Monumental also observed nine fish (9%) with signs of fin GBT in their sample on May 30<sup>th</sup>. Of the fish that were observed to have signs of fin GBT, one had rank 3 signs and the remaining eight had rank 1 or 2 signs. 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 Rock Island on May 29<sup>th</sup> and May 31<sup>st</sup> but, due to the high flows in excess of hydraulic capacity, very little can be done to curtail spill above the project.

## 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 above their respective 10-year averages for this time of year.

## Smolt Monitoring

Smolt Monitoring Program (SMP) activities continued at all bypass facilities this week. Sampling also continued at the Imnaha River trap this week. Sampling at the Grande Ronde River trap was terminated after the sample on May 26<sup>th</sup>.

This week's samples at Bonneville Dam (BON) continued to be dominated by yearling Chinook and sockeye. This week's daily average passage indices for these two species were 6,900 and 6,250 per day, respectively. These are both decreases from last week's daily average passage indices, which were 16,400 for yearling Chinook and 16,000 for sockeye. 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 2,700 and 2,800 per day, respectively. Last week's daily average passage indices were about 3,550 for steelhead and 6,750 for coho. Subyearling Chinook passage this week was similar to last week. This week's daily average passage index for subyearling Chinook at BON was nearly 6,000 per day. Pacific lamprey macrophthalmia were encountered every day this week while ammocoetes were only encountered in four of this week's samples. This week's daily average collection for Pacific lamprey macrophthalmia was about 500 per day, which is a decrease from last week's daily average collection of nearly 1,300 per day. While still lower than what was observed two weeks ago, sockeye smolts experienced elevated mortality rates in a few of this week's samples. Daily mortality rates for sockeye ranged from 0.0% to 5.7% this week. In addition, descaling rates were elevated for most of the samples this week. Daily descaling rates for this week's sockeye samples ranged from 6.7% to 13.5%. However, it is worth noting that sample counts for sockeye continue to decrease, particularly in recent days.

Similar to the last two years, sampling at John Day Dam (JDA) is every-other-day. However, the Action Agencies and Salmon Managers implemented a coordinated operation at JDA, beginning Friday,

May 25<sup>th</sup>. As part of this coordinated operation, daily sampling was implemented at JDA, beginning May 26<sup>th</sup>. Daily sampling is expected to continue through June 5<sup>th</sup>, after which sampling will go back to every-other-day. Yearling Chinook and steelhead dominated this week's samples at JDA. This week's daily average passage index for both species was about 8,100 per day. This is a decrease from last week's daily average passage indices, which were 32,200 for yearling Chinook and 10,600 for steelhead. Sockeye, coho, and subyearling Chinook passage also decreased this week, when compared to the previous week. This week's daily average passage indices for these three species were 5,300, 4,000, and 5,300 per day, respectively. Last week's daily average passage indices were 18,200 for sockeye, 8,550 for coho, and 10,000 for subyearling Chinook. Unlike previous weeks, the majority (68%) of the subyearling Chinook in this week's sample were smolts and not fry. Pacific lamprey macrophthalmia were encountered in all of this week's samples while ammocoetes were encountered in only three of this week's samples. This week's daily average collection for Pacific lamprey macrophthalmia at JDA was 7,150 per day, which is a decrease from last week's daily average collection of about 24,000.

Similar to John Day, sampling at McNary (MCN) is every-other-day. However, the Action Agencies and Salmon Managers implemented a coordinated operation at MCN, beginning Wednesday, May 16<sup>th</sup>. This coordinated operation was renewed on Wednesday, May 23<sup>rd</sup>, at which time the salmon managers requested the implementation of daily sampling at MCN, beginning May 25<sup>th</sup>. Daily sampling is expected to continue through June 6<sup>th</sup>, after which sampling will go back to every-other-day. Subyearling Chinook dominated the samples at MCN this week. This week's daily average passage index for subyearling Chinook was 40,500 per day, which is a large increase over last week's daily average passage index of 23,000 per day. This week continued the trend of an increasing proportion of subyearling Chinook smolts in the sample at MCN. Of the subyearling Chinook in this week's samples, approximately 84% were smolts. Passage of all spring migrants decreased this week, when compared to last week. This week's daily average passage indices for spring migrants were 9,200 for yearling Chinook, 3,200 for coho, 13,300 for sockeye, and 1,700 for steelhead. Last week's daily average passage indices for these four species were 30,000, 7,300, 22,600, and 3,050 per day,

respectively. Finally, Pacific lamprey macrophthalmia were encountered in all of this week's samples while ammocoetes were encountered in three of this week's seven samples. This week's daily average collection for Pacific lamprey macrophthalmia was about 7,600 per day, which is a decrease from last week's daily average collection of about 21,100 macrophthalmia per day. Sockeye experienced elevated levels of descaling in a few of this week's samples. Specifically, descaling rates were 10.3% on May 25<sup>th</sup>, 7.4% on May 27<sup>th</sup>, 10.0% on May 28<sup>th</sup>, and 14.3% on May 29<sup>th</sup>. However, it is worth noting that sample counts for sockeye continue to decrease, particularly in recent days.

Subyearling Chinook dominated the samples at Lower Granite Dam (LGR) this week. This week's daily average passage index for subyearling Chinook was 45,000 per day, which is a substantial increase over last week's daily average passage index of 9,700 per day. Passage of spring migrants all decreased this week. This week's daily average passage indices for spring migrants were 4,450 for yearling Chinook, 3,550 for coho, 600 for sockeye, and 22,100 for steelhead. Last week's daily average passage indices for these four species were 9,700, 7,200, 10,000, and 42,300 per day, respectively. Pacific lamprey macrophthalmia were encountered in five of this week's samples and ammocoetes were encountered in three 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 23<sup>rd</sup>), at which time sampling changed to every day. Subyearling Chinook dominated this week's samples at LGS. This week's daily average passage index for subyearling Chinook was about 58,000 per day, which is a substantial increase over last week's daily average passage index of about 3,700 per day. Yearling Chinook, coho, sockeye, and steelhead all decreased this week, when compared to the previous week. This week's daily average passage indices for these four species were 5,700, 4,150, 1,900, and 18,300 per day, respectively. Last week's daily average passage indices were 25,600 for yearling Chinook, 5,300 for coho, 10,300 for sockeye, and 22,500 for steelhead. Finally, Pacific lamprey macrophthalmia were encountered in all of this week's samples while ammocoetes were encountered in only four of this week's samples. This week's daily average collection for Pacific lamprey macrophthalmia was 380 per day.

Sampling at Lower Monumental Dam (LMN) was every-third-day through April 14<sup>th</sup>, transitioned to every-other-day through April 23<sup>rd</sup>, 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 26,000 per day, which is a large increase from last week's daily average passage index of about 1,900 per day. Yearling Chinook, sockeye, and steelhead passage all decreased this week when compared to last week. This week's daily average passage indices for these three species were 2,800, 1,700, and 7,350 per day, respectively. Last week's daily average passage indices were 17,200 for yearling Chinook, 4,500 for sockeye, and 12,500 for steelhead. With a daily average passage index of about 860 per day, passage of coho this week was similar to last week. Finally, Pacific lamprey macrophthalmia were encountered in all of this week's samples and ammocoetes were encountered in only two of this week's samples (May 27<sup>th</sup> and May 31<sup>st</sup>). This week's daily average collection for Pacific lamprey macrophthalmia was about 960 per day, which is a decrease from last week's daily average collection of about 1,250 per day.

Subyearling Chinook and coho dominated this week's samples at Rock Island Dam (RIS). This week's daily average passage indices for these two species were 590 and 620 per day, respectively. For coho, this was a decrease in passage, when compared to last week's daily average passage index of nearly 1,000 per day. For subyearling Chinook, this was an increase in passage, as last week's daily average passage index was about 240 per day. Passage of yearling Chinook and sockeye decreased this week, when compared to the previous week. This week's daily average passage indices for these two species were 80 and 150 per day, respectively. Last week's daily average passage indices were 300 for yearling Chinook and 600 for sockeye. This week's daily average passage index for steelhead was about 300, which is an increase over last week's daily average passage index of 150 per day. Finally, Pacific lamprey macrophthalmia were collected in only three of this week's samples and ammocoetes were encountered in two of this week's samples. Sockeye mortality rates were 0.0% all of this week. However, descaling rates were elevated in two of this week's samples. The samples on May 26<sup>th</sup> and May 31<sup>st</sup> had descaling rates of 9.0% and 10.5%, respectively. The

number of fish examined for descaling on these two days were 67 (May 26<sup>th</sup>) and 57 (May 31<sup>st</sup>).

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 high flows and upcoming releases of listed subyearling fall Chinook above the trap, sampling at LEW was terminated after the sample on May 11<sup>th</sup>.

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. Sampling at GRN was terminated for the season after the sample on May 26<sup>th</sup>.

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 4<sup>th</sup>.

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 26<sup>th</sup>. Steelhead dominated the collections over the last week of available data (May 20-26). The daily average collection for steelhead during this period was about 120 per day, which is a decrease over the previous week's daily average collection of 530 per day. Collections of yearling Chinook have decreased significantly over the last week of available data. In fact, no yearling Chinook were collected in the last two samples of available data (May 25<sup>th</sup> and May 26<sup>th</sup>). The daily average yearling Chinook collection for the May 20-26 period was about 5 fish per day.

### **Hatchery Releases**

FPC has not received preliminary data from some hatcheries as of 06/01/18, 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 two releases of fall Chinook

subyearlings into this zone. Of these, 475,000 were scheduled for release at the Nez Perce Tribal Hatchery, and the remaining 200,000 were released into the Grande Ronde River. In addition, there was also one release of 60,000 summer Chinook juveniles at the Lyons Ferry Hatchery on the Snake River.

In the next two weeks there are nearly 1.3 million fall Chinook subyearlings scheduled for release into this zone. Approximately 660,000 are planned for release at the Nez Perce Tribal Hatchery, and two additional releases of 300,000 subyearlings each are scheduled for Lukes Gulch and Cedar Flats on the Clearwater River.

### **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). Over the past week there were more than 6.5 million fall Chinook subyearlings that were scheduled for release into this zone. Of these, approximately 61% were planned to be released at the Klickitat Hatchery on the Klickitat River. Another 1.0 million were scheduled for release from Ringold Springs Hatchery, and nearly 1.6 million were released at Priest Rapids Hatchery. There were also three smaller releases into the Yakima River totaling approximately 5,000 fish. Finally, a volitional release of 1.6 million fall Chinook subyearlings concluded this week, it began on May 15<sup>th</sup> at Priest Rapids Hatchery.

Over the next two weeks just over 2 million subyearling fall Chinook are scheduled for release into this zone. Almost all of these will be released from Priest Rapids Hatchery, with another three releases into the Yakima River, again, totaling approximately 5,000 fish.

### **Lower Columbia Zone:**

The Lower Columbia Zone is defined as the Columbia River and its tributaries below Bonneville Dam. Over the past week there were almost 2.8 million

subyearling fall Chinook scheduled for release into this zone. A majority of these are a release at the Washougal Hatchery of 1.9 million juveniles that is scheduled for today. Another 830,000 will be a volitional release on the Green River (Cowlitz) beginning today and running through the end of this month. There are also two smaller releases today at Youngs Bay (25,000), and in the Skipanon River (16,500). Additionally, two volitional releases that totaling nearly 2.6 million fall Chinook juveniles were scheduled to conclude today in the Cowlitz River. This week also saw two small releases of coho into the Skipanon River (5000), and Campbell Creek (1000), as well as the end of a volitional release of 150,000 in the Washougal River that began early last month. Finally, the release of winter steelhead in the Lewis River that began in early May was also scheduled to conclude today.

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

### **Adult Passage**

Adult Passage Adult counts at Bonneville Dam have been updated through 5/30/18. The 2018 adult spring Chinook count at Bonneville Dam of 86,804, is about 1.1 times greater than the 2017 count of 82,313, while being 58% of the 10-year average count of 150,337. The 2018 spring Chinook jack count of 6,377 is about 36% of the 2017 count of 17,789 and is 25% of the 10-year average count of 25,305. At Willamette Falls, 14,365 adult spring Chinook have been counted so far this year. The Willamette Falls adult spring Chinook is 83% of the 2017 count, while being 66% of the 10 year average count. As of May 30<sup>th</sup>, a total of 53,261 adult spring Chinook have been counted at The Dalles Dam and 35,802 have been counted at McNary Dam. The Dalles Dam 2018 adult spring Chinook count is about 1.0 times greater than the 2017 count, while being 47% of the 10-year average count. The 2018 McNary Dam adult spring Chinook count is 1.1 times greater than the 2017 count, while being 43% of the 10-year average count. A total of 13,854 spring chinook have been counted at Lower Granite Dam as of May 31<sup>st</sup>. Over the last several days, a special operation has been implemented at Little Goose Dam to help facilitate the passage of Chinook salmon. This operation consists of using storage in the reservoir to store enough water to reduce total outflows to level where a 30% spill level can be maintained from 0400 to 1200 (8 hours per day), from 1200 to 1600 inflows are passed, and beyond 1600 outflows include releasing the storage needed to achieve

the 30% spill level during the morning operation. Adult counts at Little Goose have responded to the operation, increasing 6-7 times the daily counts several days prior to the operation.

The 2018 Bonneville Dam adult steelhead count of 3,642 has 439 more fish than the 2017 count of 3,203 and is about 70% of the 10-year average count of 5,181. The 2018 Bonneville Dam adult unclipped steelhead count of 1,443 is about 1.4 times the 2017 count of 1,037 and 90% of the 10-year average count of 1,603. At upriver sites, adult steelhead continue to move through the hydrosystem to reach their tributaries and spawning sites. The majority of these fish overwintered 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 1 adults per day last week. This year's Lower Granite steelhead count of 4,530 is about 62% of the 2017 count of 7,298 and 52% of the 10-year average count of 8,706. The 2018 Lower Granite Dam adult unclipped steelhead count of 1,259 is 41% of the 2017 count of 3,042 and 34% of the 10-year average count of 3,659. At Willamette Falls, the 2018 count for steelhead was 4,573 as of May 30<sup>th</sup>. This year's steelhead count is about 3.2 times greater than the 2017 count of 1,418, while being 40% of the 10-year average count of 11,582.



## Hatchery Releases Last Two Weeks

### Hatchery Release Summary

From: 5/19/2018 to 06/01/18

Agency	Hatchery	Species	Race	MigYr	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
<b>Idaho Dept. of Fish and Game Total</b>					<b>156,500</b>					
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	500,000	05-21-18	05-21-18	Cpt John Acclim Pond	Snake River	SNAK
Nez Perce Tribe	Lyons Ferry Hatchery	CH0	FA	2018	500,000	05-24-18	05-25-18	Big Canyon (Clearwater	Clearwater River M F	SNAK
<b>Nez Perce Tribe Total</b>					<b>1,875,000</b>					
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
<b>Oregon Dept. of Fish and Wildlife Total</b>					<b>246,500</b>					
Umatilla Tribe	Umatilla Hatchery	CH0	FA	2018	600,000	05-24-18	05-24-18	Reith Bridge	Umatilla River	MCOL
<b>Umatilla Tribe Total</b>					<b>600,000</b>					
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	CH0	FA	2018	200,000	05-21-18	05-21-18	Lyons Ferry Hatchery	Snake River	SNAK
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 Touth 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	1,567,495	05-25-18	06-01-18	Priest Rapids Hatchery	McNary Pool	MCOL
Washington Dept. of Fish and Wildlife	Priest Rapids Hatchery	CH0	FA	2018	1,629,346	05-15-18	06-01-18	Priest Rapids Hatchery	McNary Pool	MCOL
Washington Dept. of Fish and Wildlife	Ringold Springs Hatchery	CH0	FA	2018	1,000,000	05-25-18	05-29-18	Ringold Springs Hatchery	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
<b>Washington Dept. of Fish and Wildlife Total</b>					<b>11,116,341</b>					
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
<b>Yakama Tribe Total</b>					<b>5,737,000</b>					
<b>Grand Total</b>					<b>19,731,341</b>					

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

## Hatchery Releases Next Two Weeks

Hatchery Release Summary

	From:	6/2/2018		to	6/15/2018					
Agency	Hatchery	Species	Race	MigYr	NumRel	RelStart	RelEnd	RelSite	RelRiver	Zone
Nez Perce Tribe	Lyons Ferry Hatchery	CH0	FA	2018	300,000	06-07-18	06-07-18	Lukes Gulch Acclim.	S Fk Clearwater River	SNAK
Nez Perce Tribe	Lyons Ferry Hatchery	CH0	FA	2018	660,000	06-07-18	06-08-18	Nez Perce Tribal Hatchery	Clearwater River M F	SNAK
<b>Nez Perce Tribe Total</b>					<b>960,000</b>					
Washington Dept. of Fish and Wildlife	Priest Rapids Hatchery	CH0	FA	2018	1,000,000	06-11-18	06-11-18	Priest Rapids Hatchery	McNary Pool	MCOL
Washington Dept. of Fish and Wildlife	Priest Rapids Hatchery	CH0	FA	2018	1,000,000	06-15-18	06-15-18	Priest Rapids Hatchery	McNary Pool	MCOL
<b>Washington Dept. of Fish and Wildlife Total</b>					<b>2,000,000</b>					
Yakama Tribe	Prosser Acclim. Pond	CH0	FA	2018	1,000	06-05-18	06-05-18	Yakama River	Yakima River	MCOL
Yakama Tribe	Prosser Acclim. Pond	CH0	FA	2018	2,000	06-05-18	06-05-18	Prosser Acclim Pond	Yakima River	MCOL
Yakama Tribe	Prosser Acclim. Pond	CH0	FA	2018	2,000	06-05-18	06-05-18	Yakama River	Yakima River	MCOL
<b>Yakama Tribe Total</b>					<b>5,000</b>					
<b>Grand Total</b>					<b>2,965,000</b>					

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
05/18/2018	249.5	41.0	252.0	126.1	301.2	158.9	315.5	176.6	308.5	203.1	355.9	239.1	361.1	213.1
05/19/2018	246.2	36.0	252.1	112.8	297.2	152.2	304.5	154.5	295.8	161.2	334.1	201.6	337.4	197.9
05/20/2018	250.0	38.4	258.8	114.4	301.2	158.1	312.3	172.9	302.9	169.4	346.6	214.4	352.5	210.5
05/21/2018	258.6	48.7	267.9	133.0	303.2	154.8	306.4	157.8	299.1	165.8	337.2	208.6	342.4	201.4
05/22/2018	264.6	61.0	271.4	151.0	316.9	167.7	321.4	179.7	313.1	180.4	350.0	219.2	353.1	204.7
05/23/2018	263.3	46.3	268.0	152.3	311.0	162.8	315.0	159.9	305.6	175.7	344.1	221.7	351.1	208.4
05/24/2018	251.4	31.8	255.4	138.0	295.3	148.5	304.2	149.9	299.8	167.8	337.9	231.0	345.8	213.7
05/25/2018	229.1	10.7	240.7	119.8	277.7	130.6	284.6	143.2	281.8	147.2	313.7	190.4	316.7	200.3
05/26/2018	226.1	6.2	234.0	116.3	272.0	124.9	277.0	156.8	277.8	139.2	305.7	174.9	314.2	201.8
05/27/2018	228.8	9.7	226.0	89.2	259.8	114.6	266.7	142.5	270.2	129.7	294.7	163.1	301.2	184.7
05/28/2018	232.2	10.0	231.7	106.0	259.1	112.6	261.7	135.1	263.5	122.7	289.0	172.7	294.3	182.2
05/29/2018	225.9	5.3	246.6	124.2	269.3	121.7	276.7	143.0	275.8	145.3	299.8	170.5	308.2	202.1
05/30/2018	205.1	0.0	205.4	67.8	234.9	88.4	242.0	107.2	249.2	111.0	267.4	146.4	273.9	153.9
05/31/2018	202.0	0.0	194.2	64.4	217.2	75.1	219.2	83.0	222.4	79.4	236.5	135.3	240.8	123.6

## 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
05/18/2018	2.3	0.2	---	---	153.2	44.3	146.1	55.7	143.4	54.6	150.6	95.2
05/19/2018	2.3	0.0	---	---	152.9	43.3	148.2	72.6	147.3	59.1	154.2	99.6
05/20/2018	2.3	0.0	---	---	150.0	42.2	142.9	52.9	142.0	53.6	149.7	94.8
05/21/2018	3.5	1.2	---	---	148.2	41.8	143.2	53.1	140.9	52.2	147.3	92.1
05/22/2018	4.9	2.6	---	---	147.6	38.9	142.0	51.7	141.2	52.5	148.4	94.0
05/23/2018	4.7	1.3	---	---	154.8	46.3	151.0	60.8	148.3	59.7	156.2	101.6
05/24/2018	4.5	0.0	---	---	157.6	49.4	149.1	58.9	148.0	60.3	154.2	99.5
05/25/2018	4.4	0.0	---	---	163.3	57.4	158.1	68.0	160.8	73.5	163.9	109.3
05/26/2018	6.0	1.5	---	---	174.9	73.4	169.8	79.3	167.5	79.8	170.0	115.2
05/27/2018	6.0	1.6	---	---	175.4	66.6	171.6	81.0	172.4	84.5	178.0	122.9
05/28/2018	6.1	1.7	---	---	164.6	56.5	158.5	68.9	157.9	69.8	163.1	108.4
05/29/2018	6.0	1.6	---	---	160.5	51.7	155.9	77.5	152.4	64.2	158.4	103.8
05/30/2018	6.1	1.7	---	---	158.2	49.6	151.0	61.6	149.8	61.5	156.2	101.5
05/31/2018	6.1	1.7	---	---	149.9	42.1	144.4	54.6	143.8	55.1	151.7	97.8

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

Date	McNary		John Day		The Dalles		Bonneville			
	Flow	Spill	Flow	Spill	Flow	Spill	PH1	PH2		
05/18/2018	497.5	335.2	500.6	285.5	483.0	270.0	493.4	298.1	63.7	119.2
05/19/2018	497.0	334.8	500.1	285.6	480.0	270.0	489.9	295.0	63.5	119.1
05/20/2018	492.4	335.1	500.2	285.5	480.0	270.0	483.8	285.6	63.6	122.2
05/21/2018	489.9	334.9	500.4	284.3	482.0	270.0	489.7	290.2	64.8	122.4
05/22/2018	488.0	335.0	493.5	280.5	479.0	264.1	486.5	293.0	58.1	122.9
05/23/2018	494.4	335.3	497.6	270.1	472.8	290.9	474.5	282.8	53.7	125.6
05/24/2018	501.1	342.3	497.5	270.2	479.4	310.0	489.8	290.4	58.6	128.3
05/25/2018	487.8	327.9	486.1	256.3	474.7	300.8	484.5	269.6	63.5	138.8
05/26/2018	479.9	320.7	480.5	228.1	464.3	292.7	474.7	255.8	64.8	141.7
05/27/2018	482.2	323.6	485.9	221.5	464.4	284.8	474.7	257.6	65.6	139.1
05/28/2018	454.0	295.4	464.3	199.6	448.1	277.6	469.1	257.5	65.3	133.9
05/29/2018	449.6	297.7	453.3	210.9	433.1	261.8	444.6	247.9	52.9	131.5
05/30/2018	443.5	294.5	451.6	217.8	434.8	243.5	445.0	241.6	55.5	135.5
05/31/2018	395.1	233.1	404.7	159.2	391.2	213.6	415.8	212.8	56.5	134.1

## 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
<b>Lower Granite Dam</b>										
	05/24/18 Chinook + Steelhead	101	0	0	0.00%	0.00%	0	0	0	0
	05/31/18 Chinook + Steelhead	100	2	1	1.00%	0.00%	1	0	0	0
<b>Little Goose Dam</b>										
	05/21/18 Chinook + Steelhead	100	1	1	1.00%	0.00%	1	0	0	0
	05/28/18 Chinook + Steelhead	100	9	9	9.00%	0.00%	7	2	0	0
<b>Lower Monumental Dam</b>										
	05/23/18 Chinook + Steelhead	100	6	6	6.00%	0.00%	6	0	0	0
	05/30/18 Chinook + Steelhead	100	9	9	9.00%	1.00%	6	2	1	0
<b>McNary Dam</b>										
	05/20/18 Chinook + Steelhead	100	3	3	3.00%	0.00%	1	2	0	0
	05/22/18 Chinook + Steelhead	100	2	2	2.00%	0.00%	1	1	0	0
	05/27/18 Chinook + Steelhead	100	0	0	0.00%	0.00%	0	0	0	0
	05/29/18 Chinook + Steelhead	100	2	2	2.00%	0.00%	1	1	0	0
<b>Bonneville Dam</b>										
	05/19/18 Chinook + Steelhead	29*	0	0			0	0	0	0
	05/22/18 Chinook + Steelhead	100	11	11	11.00%	0.00%	9	2	0	0
	05/26/18 Chinook + Steelhead	97*	4	4			3	1	0	0
	05/30/18 Chinook + Steelhead	100	5	5	5.00%	0.00%	5	0	0	0
<b>Rock Island Dam</b>										
	05/22/18 Chinook + Steelhead	95*	42	41			35	6	0	0
	05/24/18 Chinook + Steelhead	88*	28	28			23	4	1	0
	05/29/18 Chinook + Steelhead	100	30	29	29.00%	1.00%	23	5	1	0
	05/31/18 Chinook + Steelhead	100	31	30	30.00%	2.00%	27	1	2	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)**

[INTERNAL PURPOSES ONLY]

Date 6/1/2018 7:15:10 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	
05/18									117.5	117.8	117.9	24	133.9	134.5	134.6	24	131.9	133.2	132.3	24	126.1	128.4	128.2	24	05/18
05/19									118.6	119.1	119.6	24	133.5	134.0	134.3	24	132.6	133.1	133.5	24	125.4	125.8	126.2	24	05/19
05/20									120.2	120.7	120.9	24	135.0	135.9	136.5	24	132.8	133.3	133.7	24	125.7	126.1	126.4	24	05/20
05/21									120.7	120.9	121.0	24	137.5	138.5	138.9	24	133.4	134.1	134.5	24	127.1	127.8	128.5	24	05/21
05/22									121.0	121.3	121.6	24	138.1	138.7	139.6	24	135.7	136.6	137.3	24	128.2	128.6	129.4	24	05/22
05/23									122.0	122.3	122.6	24	136.7	138.7	138.5	24	137.3	137.7	138.3	24	128.2	128.7	130.1	24	05/23
05/24									121.6	122.2	121.9	24	132.6	135.7	136.7	24	135.2	137.5	136.5	24	126.7	128.3	128.8	24	05/24
05/25									122.0	122.3	122.5	24	125.5	129.2	126.3	24	133.3	134.4	135.2	24	125.4	125.7	126.5	24	05/25
05/26									121.8	122.3	122.2	24	124.9	125.7	125.8	24	125.2	133.7	130.6	24	124.2	125.6	126.9	24	05/26
05/27									121.6	121.9	122.1	24	128.1	128.9	129.1	24	122.9	124.1	123.8	24	122.1	123.2	123.3	24	05/27
05/28									122.7	123.1	123.4	24	129.6	130.1	130.3	24	126.0	127.9	128.4	24	123.7	124.1	124.9	24	05/28
05/29									123.7	124.0	124.2	24	126.8	130.1	130.3	24	128.0	128.3	128.6	24	125.4	126.1	127.0	24	05/29
05/30									124.2	124.5	124.7	24	122.3	123.1	122.9	24	128.1	128.6	129.1	24	120.4	124.4	121.9	24	05/30
05/31									124.5	124.6	124.7	23	122.6	122.8	123.1	23	122.3	128.0	125.3	23	119.0	120.7	121.2	23	05/31

**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	
05/18	122.2	123.2	122.7	24	134.8	136.1	136.4	24	133.8	135.1	135.3	23	132.8	133.8	134.6	20	129.5	129.8	131.1	21	135.9	135.9	136.2	20	05/18
05/19	122.7	123.5	123.8	24	134.4	134.7	135.3	24	134.1	134.4	135.0	24	132.9	133.2	133.8	21	129.2	129.7	130.0	23	135.4	135.7	136.1	21	05/19
05/20	123.9	124.6	125.1	24	135.5	136.0	136.7	24	134.3	135.2	135.9	24	133.4	134.2	134.6	24	130.0	130.5	131.1	24	135.9	136.3	136.9	24	05/20
05/21	124.1	125.1	125.5	24	135.4	135.8	136.6	24	134.5	135.4	135.6	24	133.5	134.2	135.1	23	129.8	130.6	131.1	24	135.7	136.5	136.4	23	05/21
05/22	125.4	126.3	126.6	24	136.4	136.9	137.4	24	134.7	135.6	136.5	24	134.5	134.9	136.2	24	130.3	131.4	132.5	24	135.8	136.3	136.7	23	05/22
05/23	126.3	126.9	127.6	24	136.6	137.0	137.8	24	135.3	135.8	136.0	24	134.5	135.6	135.6	22	130.8	131.4	131.6	23	136.1	136.4	136.4	22	05/23
05/24	125.5	126.6	126.4	24	135.6	136.9	137.0	24	134.2	135.5	135.1	24	133.7	134.6	135.9	24	130.0	130.7	131.7	24	135.1	136.0	136.4	24	05/24
05/25	124.0	125.7	125.1	24	134.1	135.0	135.6	24	133.5	134.6	134.8	22	131.5	133.2	132.7	21	128.6	130.4	129.8	21	132.0	134.6	132.5	21	05/25
05/26	121.6	124.8	124.3	24	132.3	134.3	133.6	24	130.7	133.1	132.3	24	129.2	130.9	130.9	24	126.7	128.5	127.4	24	130.7	131.8	131.2	23	05/26
05/27	119.1	120.6	120.6	24	130.6	131.6	132.0	24	156.1	157.3	157.5	24	129.0	130.2	130.4	22	126.5	127.0	127.5	23	130.0	130.4	130.4	17	05/27
05/28	120.0	120.8	121.4	24	130.8	131.0	132.8	24	141.5	157.3	157.4	24	129.0	129.8	130.5	22	126.3	127.1	128.2	23	129.7	130.0	130.5	20	05/28
05/29	121.5	122.2	122.4	24	131.7	132.5	133.5	24	129.1	130.0	130.9	24	130.0	130.7	132.0	22	125.8	126.8	127.7	24	129.4	130.1	130.4	20	05/29
05/30	121.5	122.2	122.4	24	129.3	132.5	131.8	24	129.7	131.0	132.2	23	128.7	129.9	130.6	21	126.4	126.6	127.2	21	129.7	129.8	130.1	18	05/30
05/31	120.0	122.2	122.3	23	127.0	129.3	129.3	23	127.9	131.0	129.8	23	127.2	129.1	128.2	21	125.3	127.0	127.4	21	128.0	130.0	130.3	19	05/31

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 6/1/2018 7:15:10 AM

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**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	
05/18	130.2	131.4	131.3	24	139.3	140.8	141.9	24	136.4	137.9	138.0	24	130.6	131.3	131.3	24					05/18
05/19	131.8	132.6	133.0	24	136.8	138.3	138.8	24	134.7	136.4	136.9	24	129.3	130.5	130.0	24					05/19
05/20	132.0	132.7	133.4	24	138.8	138.9	139.3	24	136.0	136.5	136.9	24	130.2	130.5	130.8	24					05/20
05/21	131.6	133.0	133.7	24	138.3	139.0	139.2	24	134.9	136.1	136.7	24	129.6	130.5	130.8	24					05/21
05/22	133.6	134.5	134.9	24	139.5	140.0	141.1	24	137.2	138.0	139.0	24	131.0	131.7	131.9	24					05/22
05/23	134.2	135.0	136.5	24	140.0	141.0	141.3	24	137.8	138.7	139.4	24	131.7	132.2	132.7	24					05/23
05/24	132.2	133.8	133.3	24	139.5	140.2	141.0	24	135.9	137.3	138.1	24	130.1	131.4	131.3	24					05/24
05/25	130.8	132.4	133.8	24	137.1	138.9	139.8	24	133.9	136.9	135.8	24	128.4	130.6	129.1	24					05/25
05/26	124.8	129.4	126.6	24	133.7	135.5	134.7	24	128.0	133.0	129.6	24	126.1	128.3	126.6	24					05/26
05/27	126.3	127.5	128.3	24	132.8	134.2	134.9	24	129.7	130.7	131.8	24	126.1	126.8	127.0	24					05/27
05/28	125.3	127.1	126.7	24	134.0	135.2	136.9	24	128.2	130.2	131.3	24	125.7	126.8	126.8	24					05/28
05/29	124.1	125.0	126.0	24	132.7	134.5	135.3	24	127.4	129.0	130.7	24	125.6	126.5	127.1	24					05/29
05/30	125.0	126.9	127.4	24	130.3	131.9	134.2	24	128.2	129.5	131.3	24	125.1	126.0	126.3	24					05/30
05/31	125.8	126.9	127.8	24	130.4	130.5	131.2	24	127.0	129.0	130.7	24	124.6	125.7	141.4	24					05/31

**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	
05/18	100.8	101.3	104.9	24	103.4	104.2	103.8	24	106.3	106.9	107.5	24	102.4	102.8	103.1	24	104.3	104.5	104.7	24	117.7	118.0	118.1	24	05/18
05/19	102.3	102.9	106.5	24	104.1	105.1	105.6	24	107.1	107.9	108.5	24	103.0	103.8	104.4	24	104.8	105.3	105.9	24	117.7	118.1	118.3	24	05/19
05/20	101.2	101.9	102.8	24	103.7	105.0	104.7	24	107.0	107.8	107.7	24	102.8	103.8	103.7	24	105.8	106.2	106.6	24	117.8	118.4	120.6	24	05/20
05/21	104.4	108.1	109.7	24	103.8	104.8	105.3	24	107.0	107.6	108.2	24	102.8	103.5	104.0	24	105.9	106.4	106.4	24	117.7	118.4	120.1	24	05/21
05/22	110.2	111.0	111.9	24	104.8	105.9	106.7	24	107.8	108.7	109.5	24	103.6	104.4	105.0	24	106.0	106.4	106.8	24	117.0	118.1	118.2	24	05/22
05/23	106.9	111.0	112.1	24	104.7	105.9	105.6	24	107.5	108.6	108.3	24	103.4	104.4	104.3	24	106.8	107.1	107.5	24	118.8	119.9	121.9	24	05/23
05/24	101.0	102.1	102.1	24	104.0	105.0	105.6	24	107.2	107.7	108.5	24	102.8	103.7	103.6	24	105.9	107.1	106.9	24	119.1	119.7	119.4	24	05/24
05/25	101.4	102.2	102.8	24	104.6	105.7	106.4	24	108.0	108.6	109.4	24	103.5	104.2	104.7	24	105.9	106.4	106.9	24	121.5	123.8	127.6	24	05/25
05/26	104.7	105.1	105.7	24	103.9	105.5	104.9	24	106.9	108.5	107.5	23	102.6	104.2	103.4	24	105.9	106.5	106.4	24	125.5	126.2	127.9	24	05/26
05/27	104.9	105.4	105.9	24	104.2	105.2	105.9	24	107.2	107.8	108.4	24	103.1	103.9	104.5	24	105.1	105.9	105.6	24	123.7	125.6	125.6	24	05/27
05/28	105.5	106.3	106.8	24	104.2	105.2	105.7	24	107.4	108.0	108.5	24	103.3	104.0	104.5	24	106.4	107.1	107.5	24	121.3	122.6	122.1	24	05/28
05/29	105.7	106.3	106.8	24	104.1	105.1	105.7	24	107.4	108.1	108.8	24	103.2	103.9	104.3	24	106.6	107.2	107.1	24	120.0	121.8	121.8	24	05/29
05/30	106.2	106.9	107.4	24	103.5	105.0	104.2	24	107.2	108.0	107.8	24	102.6	103.7	103.5	24	106.3	106.9	106.8	24	119.2	121.1	121.3	24	05/30
05/31	106.3	106.5	106.9	23	102.9	104.0	103.6	23	106.8	107.5	107.1	23	101.9	102.9	102.2	23	105.9	106.6	106.5	23	117.6	119.0	119.2	23	05/31

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 6/1/2018 7:15:10 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	
05/18	110.6	111.2	111.7	24	119.9	120.0	120.3	24	119.6	120.7	120.9	24	120.8	120.9	121.3	24	117.2	117.5	117.8	24	121.4	121.6	122.0	24	05/18
05/19	112.1	112.6	113.1	24	123.2	125.8	126.9	24	121.1	121.6	122.2	24	120.8	120.9	121.6	24	118.7	119.5	120.2	24	122.4	123.2	123.3	24	05/19
05/20	113.7	114.3	114.7	24	120.0	122.8	120.5	24	125.1	126.9	127.8	24	121.0	121.4	122.6	24	120.3	120.4	120.6	24	121.5	121.9	122.2	24	05/20
05/21	113.6	114.3	114.1	24	120.0	120.5	121.2	24	121.1	125.3	122.1	24	121.0	121.4	124.0	24	120.7	121.2	121.5	24	121.2	122.0	122.2	24	05/21
05/22	114.0	114.2	114.5	24	120.1	120.6	120.8	24	121.4	121.9	122.8	24	121.2	121.5	122.3	24	120.3	121.2	120.8	24	121.5	122.2	122.5	24	05/22
05/23	114.6	114.9	115.2	24	121.8	123.3	124.0	24	121.7	122.6	123.1	24	126.1	128.0	129.1	24	120.5	120.8	120.9	24	122.8	123.8	124.4	24	05/23
05/24	113.3	114.4	114.2	24	121.3	123.3	121.8	24	122.2	123.1	123.8	24	124.8	130.4	131.6	24	119.5	120.3	120.0	24	122.5	124.1	124.2	24	05/24
05/25	115.0	115.9	116.6	24	123.2	124.4	124.5	24	122.9	123.4	123.7	24	121.9	122.2	122.4	24	120.1	120.4	120.6	24	123.9	124.9	125.7	24	05/25
05/26	114.2	115.9	115.5	24	124.9	125.8	127.8	24	123.6	123.9	124.1	24	121.4	122.2	121.9	24	119.9	120.4	120.6	24	125.0	125.9	130.1	24	05/26
05/27	116.2	117.6	118.1	24	125.4	127.4	127.8	24	125.5	127.2	129.0	24	120.7	121.2	121.0	24	120.7	121.9	123.0	24	126.7	129.8	130.3	24	05/27
05/28	119.1	119.7	120.1	24	123.7	124.0	124.6	24	127.6	129.1	129.8	24	121.1	121.4	121.7	24	123.1	123.2	123.6	24	124.0	124.6	125.2	24	05/28
05/29	117.5	119.7	119.0	24	124.7	125.7	127.0	24	124.6	126.3	125.8	24	121.5	121.8	121.9	24	122.3	123.1	123.0	24	123.2	124.0	125.5	24	05/29
05/30	115.9	117.0	116.3	24	122.3	125.4	126.2	24	125.4	126.4	126.8	24	121.9	122.2	122.4	24	121.0	122.0	121.5	24	123.1	124.4	125.8	24	05/30
05/31	115.3	116.1	115.7	23	120.5	125.4	125.7	23	123.2	126.5	126.4	23	120.6	122.3	122.3	23	121.1	121.4	121.6	23	122.3	125.6	125.9	23	05/31

**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	
05/18	122.3	122.6	122.7	24	129.9	130.2	130.5	24	121.1	122.6	121.9	24	133.1	133.4	133.7	24	126.4	128.1	128.6	24	124.2	125.1	125.6	24	05/18
05/19	122.8	123.6	124.0	24	130.0	130.0	130.6	24	123.2	124.7	125.3	24	132.8	133.0	133.6	24	128.2	128.9	129.5	24	125.4	125.7	126.2	24	05/19
05/20	123.1	123.7	123.8	24	130.0	130.2	130.5	24	126.0	126.5	126.9	24	133.3	133.4	133.9	24	127.1	128.9	128.2	24	124.8	125.8	125.4	24	05/20
05/21	122.3	123.0	123.4	24	130.2	130.4	130.7	24	126.0	126.5	126.8	24	133.3	133.4	134.0	24	127.5	129.2	129.9	24	124.9	125.3	125.6	24	05/21
05/22	122.8	123.4	123.7	24	130.4	130.5	131.0	24	126.6	127.3	127.7	24	132.3	133.3	133.4	24	129.5	130.6	131.5	24	125.2	125.9	126.9	24	05/22
05/23	124.0	124.6	125.0	24	132.5	133.0	133.2	24	128.3	129.0	129.4	24	131.6	132.2	132.9	24	128.8	130.7	129.9	24	126.6	126.7	127.4	24	05/23
05/24	123.8	124.6	124.5	24	131.2	132.3	133.2	23	126.7	128.9	128.0	24	131.8	132.3	133.3	24	126.6	128.8	128.2	24	125.4	126.6	126.1	24	05/24
05/25	123.0	123.9	123.6	24	130.2	131.2	131.2	22	124.8	126.6	126.1	24	129.8	132.1	131.1	24	125.4	127.5	126.8	24	124.8	125.7	126.1	24	05/25
05/26	120.2	123.0	122.3	24	131.1	131.3	131.6	24	119.3	123.7	121.8	24	127.9	129.0	129.7	24	118.9	123.9	120.1	24	120.8	123.7	122.0	24	05/26
05/27	118.6	119.2	119.8	24	131.1	131.4	132.9	24	118.4	118.8	119.2	24	127.8	128.7	129.3	24	119.9	121.9	123.1	24	121.5	122.3	122.8	24	05/27
05/28	119.9	120.7	121.0	24	129.6	132.0	132.8	24	117.7	118.7	118.2	24	125.0	127.3	125.4	24	117.8	121.9	120.7	24	120.5	122.4	122.3	24	05/28
05/29	119.7	120.6	120.7	24	127.9	128.6	129.0	24	118.4	118.6	119.0	24	125.8	126.7	127.8	24	116.8	117.0	117.3	24	119.2	119.6	120.3	24	05/29
05/30	118.8	119.7	119.9	24	127.5	128.8	129.3	24	118.8	119.3	119.5	24	126.9	127.8	128.2	24	121.1	122.9	124.0	24	121.9	123.0	123.8	24	05/30
05/31	118.6	119.6	119.3	23	126.5	129.3	131.7	19	117.5	119.3	118.7	23	122.1	125.9	125.5	23	117.0	122.9	120.9	23	119.9	123.0	122.5	23	05/31

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 6/1/2018 7:15:10 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	
05/18	121.4	122.8	123.4	24	128.8	129.4	129.7	24	126.3	126.9	127.3	24					05/18
05/19	125.8	126.5	126.9	24	130.6	130.9	131.3	24	128.3	129.2	129.7	24					05/19
05/20	124.4	126.5	126.1	24	129.4	130.7	129.8	24	127.8	129.2	128.6	24					05/20
05/21	123.0	123.7	123.6	24	129.1	129.4	129.6	24	127.2	127.8	128.4	24					05/21
05/22	126.5	128.1	128.7	24	131.2	131.8	132.4	24	128.9	130.5	131.3	24					05/22
05/23	127.4	128.7	128.8	24	131.1	131.6	131.6	24	129.5	130.5	130.6	24					05/23
05/24	123.9	126.2	124.5	24	129.5	130.8	130.1	24	127.5	129.5	128.8	24					05/24
05/25	123.8	124.5	124.7	24	128.1	129.4	129.2	24	126.1	128.2	127.2	24					05/25
05/26	119.0	122.9	121.5	24	124.9	127.1	125.9	24	122.8	125.9	124.1	24					05/26
05/27	119.0	119.6	120.4	24	125.1	125.5	126.2	24	122.5	123.3	123.9	24					05/27
05/28	119.4	120.3	120.8	24	125.4	126.1	126.5	24	122.9	123.6	124.0	24					05/28
05/29	117.4	118.7	118.7	24	124.9	125.2	125.9	24	121.6	123.4	122.5	24					05/29
05/30	118.9	120.1	121.0	24	125.3	126.0	126.4	24	121.7	122.5	122.9	24					05/30
05/31	120.2	121.1	121.4	23	124.5	126.3	126.4	23	122.1	122.7	123.4	23					05/31

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 6/1/2018 7:17:33 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)
05/18/2018		26	106		49,313	48,167	33,497	683		64,453	17,239
05/19/2018		10	48		39,884	32,881	36,450	393	26,274		7,297
05/20/2018		7	28		23,440	34,421	19,900	322		27,400	14,470
05/21/2018		11	30		14,445	22,581	10,793	224	39,225		18,701
05/22/2018		8	42		22,484	14,537	6,895	175		23,251	26,277
05/23/2018		1	20		7,912	14,642	7,775	113	24,279		15,477
05/24/2018		8	53		8,995	12,201	5,039	136		13,846	15,051
05/25/2018		0	73		8,067	10,154	8,307	99	22,546		16,083
05/26/2018		0	38		7,001	3,272	1,884	127	9,515	12,235	9,159
05/27/2018					8,443	7,808	3,046	96	9,840	9,526	3,974
05/28/2018					2,814	5,513	1,181	51	9,868	8,385	4,967
05/29/2018					2,117	5,918	2,079	74	2,620	7,759	7,304
05/30/2018					1,184	5,511	1,658	65	3,828	7,006	3,777
05/31/2018					1,508	1,697	1,355	57	5,293	3,660	3,000
06/01/2018											
Total:	0	71	438	0	197,607	219,303	139,859	2,615	153,288	177,521	162,776
# Days:	0	9	9	0	14	14	14	14	10	10	14
Average:	0	8	49	0	14,115	15,665	9,990	187	15,329	17,752	11,627
YTD:	23,452	40,901	21,824	12,792	4,627,462	2,830,979	2,035,998	49,602	1,472,573	1,244,586	1,875,265

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 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)
05/18/2018		1	4		11,403	1,617	0	126		6,679	5,040
05/19/2018		0	1		6,506	163	0	260	31,275		4,090
05/20/2018		0	11		3,309	1,930	485	299		18,046	10,310
05/21/2018		0	3		6,112	4,519	483	190	21,600		5,233
05/22/2018		0	5		12,366	2,395	1,443	238		9,998	6,797
05/23/2018		0	6		15,279	4,558	6,172	293	15,916		6,825
05/24/2018		0	5		13,058	10,678	4,865	248		5,275	4,032
05/25/2018		0	6		45,951	10,994	9,014	260	16,430		6,542
05/26/2018		0	8		57,841	5,813	4,521	600	14,114	3,670	5,427
05/27/2018					77,340	21,984	4,874	675	24,907	3,549	6,250
05/28/2018					51,284	101,285	14,996	783	58,451	4,329	4,218
05/29/2018					62,304	111,359	44,527	707	32,899	4,453	3,208
05/30/2018					7,102	84,975	68,258	701	46,988	5,527	7,554
05/31/2018					12,641	69,459	36,251	405	89,977	10,084	8,597
06/01/2018											
Total:	0	1	49	0	382,496	431,729	195,889	5,785	352,557	71,610	84,123
# Days:	0	9	9	0	14	14	14	14	10	10	14
Average:	0	0	5	0	27,321	30,838	13,992	413	35,256	7,161	6,009
YTD:	0	1	89	192	440,030	434,911	196,776	9,163	627,885	85,836	1,383,092

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 COHO

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (Index)	LGS (Index)	LMN (Index)	RIS (Index)	MCN (Index)	JDA (Index)	BO2 (Index)
05/18/2018		0	68		5,563	4,960	161	802		13,358	7,955
05/19/2018		0	21		7,072	5,913	999	1,476	6,881		4,021
05/20/2018		0	22		8,825	4,838	647	844		9,691	5,076
05/21/2018		0	12		5,834	7,094	644	899	9,057		5,492
05/22/2018		0	57		10,961	5,733	481	998		6,975	11,244
05/23/2018		0	17		9,004	4,726	882	911	6,094		7,882
05/24/2018		0	50		3,192	4,064	1,911	794		4,176	5,544
05/25/2018		0	58		2,737	6,653	1,944	765	4,509		7,087
05/26/2018		0	82		2,334	4,166	188	764	3,068	4,486	3,731
05/27/2018					5,741	4,196	1,219	650	5,227	4,483	1,022
05/28/2018					4,691	3,943	273	540	4,272	3,874	1,973
05/29/2018					5,444	4,142	693	421	1,456	3,218	2,526
05/30/2018					2,071	3,931	331	656	2,790	4,048	1,107
05/31/2018					1,796	2,022	1,355	515	1,176	4,034	2,048
06/01/2018											
Total:	0	0	387	0	75,265	66,381	11,728	11,035	44,530	58,343	66,708
# Days:	0	9	9	0	14	14	14	14	10	10	14
Average:	0	0	43	0	5,376	4,742	838	788	4,453	5,834	4,765
YTD:	0	0	1,224	1,365	252,787	204,551	36,288	41,094	216,455	104,238	451,404

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 STEELHEAD

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (Index)	LGS (Index)	LMN (Index)	RIS (Index)	MCN (Index)	JDA (Index)	BO2 (Index)
05/18/2018		703	58		49,009	15,570	15,138	137		15,027	6,098
05/19/2018		358	23		47,805	20,126	15,479	228	3,753		1,980
05/20/2018		274	34		55,981	32,048	14,237	172		12,030	2,906
05/21/2018		183	19		51,948	25,143	13,048	184	2,085		3,138
05/22/2018		123	30		31,759	28,583	7,376	119		9,533	5,491
05/23/2018		30	22		30,285	18,854	14,108	119	3,306		2,807
05/24/2018		151	75		29,597	17,230	7,992	127		5,824	2,520
05/25/2018		42	27		27,514	27,572	11,488	110	1,610		4,271
05/26/2018		32	13		33,005	15,568	5,086	162	1,534	5,811	2,968
05/27/2018					37,826	26,502	5,687	249	1,691	6,351	1,435
05/28/2018					22,828	13,621	7,180	280	1,861	7,428	2,517
05/29/2018					16,635	29,334	7,623	222	1,747	8,773	2,526
05/30/2018					9,913	11,389	9,350	457	948	10,432	3,126
05/31/2018					7,254	4,374	5,082	499	2,352	10,009	2,309
06/01/2018											
Total:	0	1,896	301	0	451,359	285,914	138,874	3,065	20,887	91,218	44,092
# Days:	0	9	9	0	14	14	14	14	10	10	14
Average:	0	211	33	0	32,240	20,422	9,920	219	2,089	9,122	3,149
YTD:	723	26,634	3,888	5,328	3,885,938	2,972,990	1,928,160	20,841	236,385	660,338	344,624

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 SOCKEYE

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (Index)	LGS (Index)	LMN (Index)	RIS (Index)	MCN (Index)	JDA (Index)	BO2 (Index)
05/18/2018		0	1		15,575	7,192	7,569	596		40,075	41,101
05/19/2018		0	2		14,143	11,837	6,325	442	23,144		12,610
05/20/2018		0	0		15,995	18,368	5,501	695		13,700	11,863
05/21/2018		0	0		10,556	8,406	3,222	313	19,776		9,545
05/22/2018		0	0		8,431	10,865	2,726	1,075		10,928	15,362
05/23/2018		0	0		4,365	5,236	3,687	727	24,833		9,228
05/24/2018		0	0		871	10,182	2,432	390		8,132	11,714
05/25/2018		0	0		1,008	3,351	3,358	302	31,242		12,721
05/26/2018		0	1		500	3,276	3,768	180	19,637	9,584	7,802
05/27/2018					0	2,544	1,828	138	14,760	6,818	6,002
05/28/2018					938	1,791	1,091	107	12,205	4,466	8,777
05/29/2018					907	1,427	1,386	98	4,076	4,938	3,413
05/30/2018					592	801	662	57	5,579	3,970	2,931
05/31/2018					287	348	0	117	5,881	1,942	2,126
06/01/2018											
Total:	0	0	4	0	74,168	85,624	43,555	5,237	161,133	104,553	155,195
# Days:	0	0	0	0	5,298	6,116	3,111	374	16,113	10,455	11,085
Average:	0	0	0	0	5,298	6,116	3,111	374	16,113	10,455	11,085
YTD:	0	0	4	115	259,497	119,065	57,204	75,998	1,519,435	374,612	730,350

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 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)
05/18/2018		0	0		1	800	7,100	0		76,000	867
05/19/2018		0	0		6	400	700	4	40,400		900
05/20/2018		0	0		4	400	0	1		11,000	1,745
05/21/2018		0	0		5	0	0	2	19,660		2,533
05/22/2018		0	0		5	100	400	1		6,400	1,950
05/23/2018		0	0		1	200	200	1	3,300		805
05/24/2018		0	0		2	600	600	1		2,700	233
05/25/2018		0	0		5	500	700	2	5,700		925
05/26/2018		0	0		0	800	400	0	8,900	4,200	425
05/27/2018					4	150	900	2	13,600	4,100	335
05/28/2018					6	250	150	1	13,600	4,025	500
05/29/2018					3	1,050	500	0	6,100	7,875	280
05/30/2018					1	200	2,600	0	3,400	13,680	580
05/31/2018					3	400	1,800	1	2,200	9,560	648
06/01/2018											
Total:	0	0	0	0	46	5,850	16,050	16	116,860	139,540	12,726
# Days:	0	9	9	0	19	22	17	16	13	13	20
Average:	0	0	0	0	2	266	944	1	8,989	10,734	636
YTD:		1	3		236	32,684	49,250	325	202,712	202,083	20,137

- 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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## 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 5/18/2018 12:00:00 AM TO 6/1/2018 12:00:00 AM

Date 6/1/2018 7:18:08 AM

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### Lower Granite Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	248,600	138,911	52,150	53,000	310,893	1,114,447
Sum of Number Barged	239,429	135,239	50,880	52,751	298,692	1,075,683
Sum of Number Bypassed	31	2,438	0	0	7,758	17,985
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	5	3	0	2	2	14
Sum of Facility Morts	341	141	20	47	25	599
Sum of Reseach Morts	0	40	0	0	32	104
Sum of Total Project Mort	346	184	20	49	59	717

### Little Goose Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	239,999	129,571	38,792	50,161	165,649	789,821
Sum of Number Barged	196,905	127,192	37,420	49,571	162,925	736,938
Sum of Number Bypassed	7	0	0	0	0	7
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	24	7	2	4	3	43
Sum of Facility Morts	2,292	1,374	171	393	129	4,488
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	2,316	1,381	173	397	132	4,531



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## Two Week Transportation Summary Report

### 5/18/2018 12:00:00 AM TO 6/1/2018 12:00:00 AM

Date 6/1/2018 7:18:08 AM

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#### Lower Monumental Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	114,648	84,602	6,800	25,900	82,600	397,150
Sum of Number Barged	93,195	83,671	5,999	25,863	79,559	367,846
Sum of Number Bypassed	0	0	0	0	0	0
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	3	1	0	1	0	5
Sum of Facility Morts	56	141	1	36	42	318
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	59	142	1	37	42	323

#### Total

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	603,247	353,084	97,742	129,061	559,142	2,301,418
Sum of Number Barged	529,529	346,102	94,299	128,185	541,176	2,180,467
Sum of Number Bypassed	38	2,438	0	0	7,758	17,992
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	32	11	2	7	5	62
Sum of Facility Morts	2,689	1,656	192	476	196	5,405
Sum of Reseach Morts	0	40	0	0	32	104
Sum of Total Project Mort	2,721	1,707	194	483	233	5,571

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## YTD Transportation Summary Report

Date 6/1/2018 7:17:46 AM

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### Lower Granite Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	286800	3033133	176250	187921	2496247	8676598
Sum of Number Barged	265925	2420120	171410	183091	1782902	6606350
Sum of Number Bypassed	11685	610813	3539	4464	708719	2047939
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	16	58	0	8	43	168
Sum of Facility Morts	380	1050	51	158	164	1967
Sum of Reseach Morts	0	42	0	0	35	112
Sum of Total Project Mort	396	1150	51	166	242	2247

### Little Goose Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	242203	1852056	129910	73437	1948193	6193992
Sum of Number Barged	198303	1540198	128008	64752	1333568	4598397
Sum of Number Bypassed	809	306206	407	7716	611659	1538456
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	24	40	3	11	13	104
Sum of Facility Morts	2296	4614	293	765	361	8690
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	2320	4654	296	776	374	8794

FISH PASSAGE CENTER

## YTD Transportation Summary Report

Date 6/1/2018 7:17:46 AM

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### Lower Monumental Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	115148	1212135	21000	34400	1169267	3721217
Sum of Number Barged	93695	1011458	20098	32756	913968	2985943
Sum of Number Bypassed	0	199433	100	1598	252167	705465
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	3	7	0	3	6	25
Sum of Facility Morts	56	448	2	43	127	803
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	59	455	2	46	133	828

### Total

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	644151	6097324	327160	295758	5613707	18591807
Sum of Number Barged	557923	4971776	319516	280599	4030438	14190690
Sum of Number Bypassed	12494	1116452	4046	13778	1572545	4291860
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	43	105	3	22	62	297
Sum of Facility Morts	2732	6112	346	966	652	11460
Sum of Reseach Morts	0	42	0	0	35	112
Sum of Total Project Mort	2775	6259	349	988	749	11869

Cumulative Adult Passage at Mainstem Dams Through: 05/31

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	05/30	86804	6377	82313	17789	150337	25305	0	0	0	0	0	0	0	0	0	0	0	0
TDA	05/30	53261	4513	52366	11436	113182	20334	0	0	0	0	0	0	0	0	0	0	0	0
JDA	05/30	44618	4622	39480	10630	96076	18475	0	0	0	0	0	0	0	0	0	0	0	0
MCN	05/30	35802	2866	32543	4646	83723	13690	0	0	0	0	0	0	0	0	0	0	0	0
IHR	05/30	24133	1613	19902	4332	58831	8612	0	0	0	0	0	0	0	0	0	0	0	0
LMN	05/30	22878	1837	17664	3580	56761	7591	0	0	0	0	0	0	0	0	0	0	0	0
LGS	05/30	15803	1143	11096	2749	50468	7792	0	0	0	0	0	0	0	0	0	0	0	0
LGR	05/30	13854	1187	8091	1473	47582	7717	0	0	0	0	0	0	0	0	0	0	0	0
PRD	05/30	4111	569	3335	154	13938	1245	0	0	0	0	0	0	0	0	0	0	0	0
WAN	05/30	4398	470	2561	99	13822	1339	0	0	0	0	0	0	0	0	0	0	0	0
RIS	05/30	3619	466	2160	37	12856	1446	0	0	0	0	0	0	0	0	0	0	0	0
RRH	05/30	2445	280	1225	24	5121	579	0	0	0	0	0	0	0	0	0	0	0	0
WEL	05/30	1492	170	748	31	3572	586	0	0	0	0	0	0	0	0	0	0	0	0
WFA	05/30	14365	1170	17224	953	21795	817	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		10-Yr Unclipped	10-Yr Unclipped	2018	2017	10-Yr Avg.	2018	2017	10-Yr Avg.
		Adult	Jack	Adult	Jack	Adult	Jack				2018	2017								
BON	05/30	1	-1	0	0	0	0	30	44	72	3642	3203	5181	1443	1037	1603	2736	3761	1364	
TDA	05/30	4	0	0	0	0	0	2	8	15	177	1486	2187	64	517	928	9	0	4	
JDA	05/30	0	0	0	0	0	1	3	12	7	380	529	4070	180	338	1790	146	232	73	
MCN	05/30	-4	0	0	0	1	0	2	-1	1	360	2528	4183	163	755	1669	43	3	5	
IHR	05/30	-1	0	0	0	0	0	0	0	0	1302	1068	4186	436	502	1502	5	3	0	
LMN	05/30	0	0	0	0	0	0	0	0	0	1202	1438	8150	314	695	2796	7	2	0	
LGS	05/30	0	0	0	0	0	0	0	0	0	1220	1487	4982	318	657	2534	1	0	0	
LGR	05/30	0	0	0	0	0	0	0	0	0	4530	7298	8706	1259	3042	3659	0	0	0	
PRD	05/30	0	0	0	0	0	0	0	0	0	30	31	47	0	0	0	188	44	12	
WAN	05/30	0	0	0	0	0	0	0	0	0	55	31	105	0	0	0	108	7	2	
RIS	05/30	0	0	0	0	0	0	0	0	0	63	56	110	24	17	57	0	0	0	
RRH	05/30	0	0	0	0	0	0	0	0	0	85	123	314	29	29	210	0	0	0	
WEL	05/30	0	0	0	0	0	0	0	0	0	115	35	71	40	23	48	48	0	0	
WFA	05/30	0	2	117	117	0	0	0	0	0	4573	1418	11582	1670	690	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.

