



# Fish Passage Center

## Weekly Report #19-08

April 26, 2019

### This Week's Highlights

#### Water Supply

Precipitation throughout the Columbia Basin has varied between 90% and 202% of average at individual sub-basins over April. Precipitation above The Dalles has been 126% of average over April. Over the 2019 water year, precipitation has ranged between 69% and 96% of average.

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

Location	Water Year 2019		Water Year 2019	
	April 1-26, 2019		October 1, 2018 to April 26, 2019	
	Observed (inches)	% Average	Observed (inches)	% Average
Columbia Above Coulee	2.41	107	19.1	76
Snow River Above Ice Harbor	2.50	141	14.8	95
Columbia Above The Dalles	2.36	126	16.0	84
Kootenai	2.05	90	17.1	69
Clark Fork	3.23	164	16.6	96
Flathead	3.17	129	17.8	77
Pend Oreille River Basin above Waneta Dam	3.12	144	17.7	83
Salmon River Basin	3.16	139	18.8	96
Upper Snake Tributaries	2.77	134	15.9	90
Clearwater	5.14	174	25.5	89
Willamette River above Portland	9.16	202	46.3	85

Snowpack within the Columbia Basin has been variable. Average snowpack in the Columbia River for basins above the Snake River confluence is 86% of average, for Snake River Basins the average snowpack is 117% of average, and for lower Columbia Basins between McNary and Bonneville Dam average snowpack is 106% of average.

Table 2 displays the April 26<sup>th</sup> ESP runoff volume forecasts for multiple reservoirs along with the April COE forecasts at Libby and Dworshak. The April 26<sup>th</sup> ESP forecast at The Dalles between April and August is 84,126 Kaf (96% of average).

**Table 2. April 26 ESP Runoff Volume Forecasts for various reservoirs within the Columbia and Snake River Basins.**

Location	April 26, 2019 5-day QPF ESP	
	% Average (1981-2010)	Runoff Volume (Kaf)
The Dalles (Apr-Aug)	96	84,126
Grand Coulee (Apr-Aug)	88	44,809
Libby Res. Inflow, MT (Apr-Aug)	74 *81	4,360 *4,456
Hungry Horse Res. Inflow, MT (Apr-Aug)	94	1,815
Lower Granite Res. Inflow (Apr- July)	119	23,652
Brownlee Res. Inflow (Apr-July)	135	7,398
Dworshak Res. Inflow (Apr-July)	108 *81	2,619 *1,964

\*COE April Final Forecast

Grand Coulee Reservoir is at 1270.7 feet (4-25-19) and has refilled 2.3 feet over the last week. Outflows at Grand Coulee have ranged between 52.5 Kcfs and 116.8

Kcfs over the last week. The April 30<sup>th</sup> FC is 1278.9 ft. (based on April Forecast).

The Libby Reservoir is currently at elevation 2408.6 feet (4-25-19) and has refilled 1.4 feet over the past week. Daily average outflows at Libby Dam have been 4.0-8.0 Kcfs. The April 30<sup>th</sup> FC is 2453.0 ft. (based on April Forecast).

Hungry Horse is currently at an elevation of 3529.9 feet (4-25-19) and has refilled 5.3 feet last week. Outflows at Hungry Horse have been 1.0-2.3 Kcfs over the last week. The April 30<sup>th</sup> FC is 3553.6 ft. (based on April Forecast).

Dworshak is currently at an elevation of 1566.0 feet (4-25-19) and has refilled 8.2 feet over last week. Dworshak outflows have been increased from 9.9 Kcfs to 10.1 Kcfs last week. The April 30<sup>th</sup> FC is 1573.8 ft. (based on April Forecast).

The Brownlee Reservoir was at an elevation of 2061.0 feet on April 25<sup>th</sup>, 2019 and has refilled 6.4 feet in the last week. Outflows at Hells Canyon have ranged between 44.0 and 49.4 Kcfs over the last four days. The April 30<sup>th</sup> FC is 2068.7 ft. (based on April Forecast).

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 3<sup>rd</sup>, 2019), the flow objective this spring will be 95 Kcfs at Lower Granite. Flows at Lower Granite Dam have averaged 146.5 Kcfs over the last week and 123.4 Kcfs over the spring season.

Based on the April Final Water Supply Forecast, the Spring Biological Opinion Flow Objective is 220 Kcfs at McNary Dam and 135 Kcfs at Priest Rapids Dam. Flows at McNary averaged 234.0 Kcfs last week and 231.9 Kcfs over the spring season. At Priest Rapids flows averaged 97.1 Kcfs over the last week and 83.1 Kcfs over the spring season.

## Spill

Flows in the Snake River increased this week, when compared to the previous week. The average flow for this week at Lower Granite Dam was 146.5 Kcfs, whereas that for last week was 115.9 Kcfs. Flows in the Upper and Mid-Columbia rivers also increased this week, when compared to the previous week. This week's daily average flows at Rock Island and McNary dams were 94.8 Kcfs and 262.3 Kcfs, respectively. Last week's daily average flows were 75.5 Kcfs at Rock Island and 211.5 Kcfs at McNary.

In December of 2018, the Action Agencies (Bonneville Power Administration, the U.S. Army Corps of Engineers, and the U.S. Bureau of Reclamation) signed an agreement with the states of Oregon and Washington and the Nez Perce Tribe for 2019-2021 Spill Operations. The spill operations under this agreement are often referred to as "Flex Spill". In accordance with the 2019-2021 Spill Operations Agreement, the 2019 Fish Operations Plan (FOP) specifies that spring spill operations on the Snake and Mid-Columbia rivers will be to spill to the 120% spill caps at all eight FCRPS projects for sixteen hours per day and "performance standard" spill for eight hours per day. The eight hours of "performance standard" spill will occur in up to two blocks per calendar day, an am block and a pm block. The timing and duration of each "performance standard" block is flexible and may change between days. The spring spill operations specified by the 2019 FOP are summarized in Table 3.

**Table 3. 2019 Spring spill operations at Snake and Mid-Columbia projects under Flex Spill Agreement.**

Project	Dates	Gas Cap Spill (16 hours per day)	Performance Standard Spill (8 hours per day)
Lower Granite	Apr. 3-June 20	120% Gas Cap	20 Kcfs
Little Goose	Apr. 3-June 20	120% Gas Cap	30%
Lower Monumental	Apr. 3-June 20	120% Gas Cap	30 Kcfs (bulk pattern)
Ice Harbor	Apr. 3-June 20	120% Gas Cap	30%
McNary	Apr. 10-June 15	120% Gas Cap	48%
John Day	Apr. 10-June 15	120% Gas Cap	32%
The Dalles	Apr. 10-June 15	120% Gas Cap	40%
Bonneville	Apr. 10-June 15	120% Gas Cap	100 Kcfs

**Note:** For the Flex Spill Agreement, the State of Washington made two modifications to their TDG waiver. First, the requirement to not exceed 115% TDG in the downstream forebay has been eliminated. Therefore, TDG will only be managed to 120% in the tailrace. Second, the methodology of calculating the 12-hour average TDG has been changed to align with the State of Oregon’s methodology. This means that the 12-hour average TDG is based on the 12 highest hourly TDG measurements in a single calendar day (not necessarily consecutive). These modifications only apply to the spring spill season. When summer spill begins in June, the State of Washington’s 115% forebay TDG requirement will be reinstated and the Washington methodology of calculating the 12-hour average based on rolling average will be re-implemented.

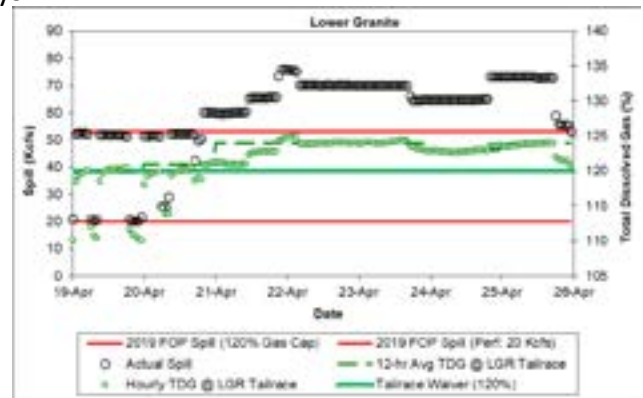
The COE will estimate 120% TDG spill caps (tailrace only) for each FCRPS project on a daily basis and projects will be operated to these estimated spill caps for the 16-hours of gas cap spill. The daily 120% TDG spill caps are published on the TMT website (<http://pweb.crohms.org/tmt/documents/ops/spill/caps/201904-120.html>). The 2019 spill for fish passage program at the lower Snake River and Mid-Columbia projects began just after midnight on April 3<sup>rd</sup> and April 10<sup>th</sup>, respectively. The range of the daily 120% spill caps at the FCRPS projects for the last week (April 19-25) are summarized in Table 4.

**Table 4. 120% TDG spill caps at Snake River projects. Estimated spill caps are for most recent week of spill operations.**

Project	120% Spill Caps (4/19-4/25)
Lower Granite	53 Kcfs
Little Goose	56 Kcfs
Lower Monumental	42-46 Kcfs
Ice Harbor	91-93 Kcfs
McNary	189-193 Kcfs
John Day	151-165 Kcfs
The Dalles	105-128 Kcfs and 44%
Bonneville	128-130 Kcfs

**Spill Summary**

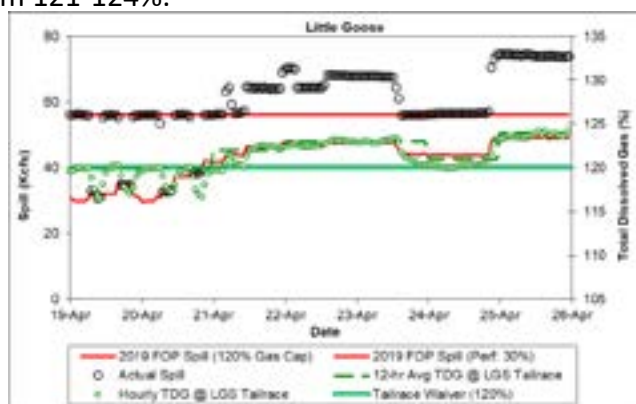
The 120% TDG spill cap at Lower Granite Dam (LGR) has been 53 Kcfs all of this week. On April 19<sup>th</sup> and most of April 20<sup>th</sup>, spill at LGR met the estimated 120% spill cap level for approximately 16 hours and met or exceeded the “performance standard” spill level (20 Kcfs) for 8 hours each day (Figure 1). The one exception to this was the evening of April 20<sup>th</sup> when flows were sufficiently high that spill was in excess of the Gas Cap spill levels. During these two days, hourly TDG levels during the 16 hours of gas cap spill were at or slightly above 120%. The 12-hour average TDG on April 19<sup>th</sup> was 120% but increased to 121% on April 20<sup>th</sup>. The exceedance on April 20<sup>th</sup> is at least partially due to the excess spill in the evening due to flows in excess of hydraulic capacity. Flows remained sufficiently high from the evening of April 21<sup>st</sup> through April 25<sup>th</sup> that spill exceeded both the estimated Spill Cap and the “performance standard” spill levels. The 12-hour average TDG during this period was in the 123-124% range. Flows in the Snake River are expected to decrease to manageable levels over the next several days.



**Figure 1.** Hourly spill and TDG at Lower Granite Dam (Apr. 19-25, 2019).

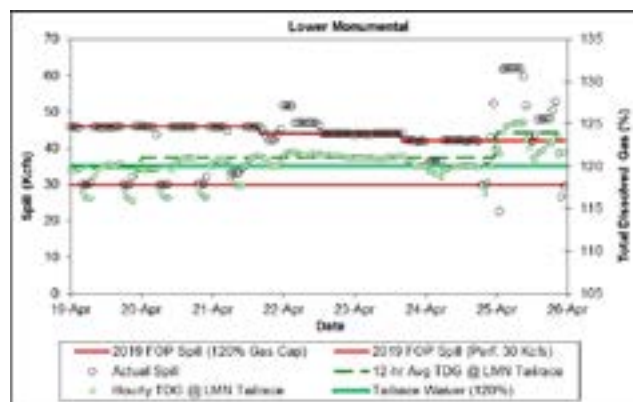
The 120% TDG spill cap at Little Goose Dam (LGS) was

56 Kcfs all of this week. On April 19<sup>th</sup> and most of April 20<sup>th</sup>, spill at LGS met the estimated 120% spill cap level for approximately 16 hours and the “performance standard” spill level (30% Kcfs) for 8 hours each day (Figure 2). During these two days, hourly TDG levels during the 16 hours of Gas Cap spill were as high as 120.3% and the 12-hour average TDG was 120% on both days. By April 21<sup>st</sup>, flows had increased to high enough levels to necessitate 24-hour spill at or above the 120% TDG spill cap for the period of April 21<sup>st</sup> through April 25<sup>th</sup>. Therefore, “performance standard” spill was not possible during this time. The 12-hour average TDG during for the April 21-25 period ranged from 121-124%.



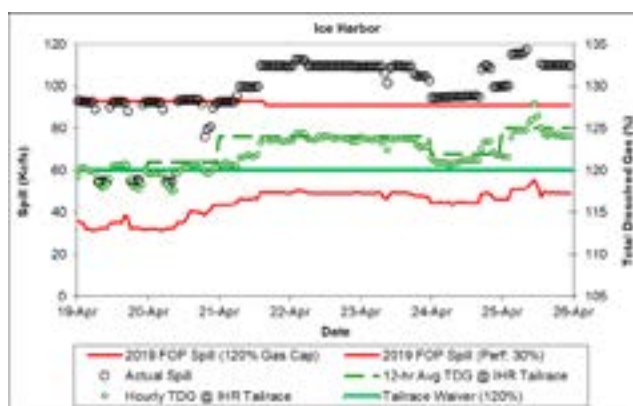
**Figure 2.** Hourly spill and TDG at Little Goose Dam (Apr. 19-25, 2019).

Lower Monumental Dam (LMN) started the week with a 120% TDG spill cap of 46 Kcfs. However, this spill cap was decreased to 44 Kcfs on April 21<sup>st</sup>, due to an exceedance in the LMN tailrace on April 20<sup>th</sup>. The 120% spill cap at LMN was reduced again to 42 Kcfs on April 23<sup>rd</sup>, presumably to due continued exceedances in the LMN tailrace. The 12-hour average TDG was 121% on both April 21<sup>st</sup> and April 22<sup>nd</sup>. From April 19<sup>th</sup> through April 21<sup>st</sup>, spill at LMN met the estimated 120% spill cap level for approximately 16 hours and met or exceeded the “performance standard” spill level (30 Kcfs) for 8 hours each day (Figure 3). By April 22<sup>nd</sup>, flows had increased to high enough levels to necessitate 24-hour spill at or above the 120% TDG spill cap for much of the period of April 22<sup>nd</sup> through April 25<sup>th</sup>. Therefore, “performance standard” spill was only possible for a limited number of hours during this time. The 12-hour average TDG during for the April 22-25 period ranged from 121-124%.



**Figure 3.** Hourly spill and TDG at Lower Monumental Dam (Apr. 19-25, 2019).

Ice Harbor Dam (IHR) started the week with a 120% TDG spill cap of 93 Kcfs. However, this spill cap was decreased to 91 Kcfs on April 21<sup>st</sup>, where it has remained since. This decrease in the spill cap was due to an exceedance of the 120% tailrace TDG standard on April 20<sup>th</sup>. The 12-hour average TDG for April 20<sup>th</sup> was 121%. For the period of April 19<sup>th</sup> through April 20<sup>th</sup>, spill at IHR met the estimated 120% spill cap level for approximately 16 hours and exceeded the “performance standard” spill level (30%) for 8 hours each day (Figure 4). By April 21<sup>st</sup>, flows had increased to high enough levels to warrant 24-hour spill at or above the 120% TDG spill cap for the period of April 21<sup>st</sup> through April 25<sup>th</sup>. Therefore, “performance standard” not possible during this period. The 12-hour average TDG during for the April 21-25 period ranged from 122-125%.



**Figure 4.** Hourly spill and TDG at Ice Harbor Dam (Apr. 19-25, 2019).

McNary Dam (MCN) started the week with a 120% spill cap of 189 Kcfs. This spill cap was increased to 191 Kcfs on April 23<sup>rd</sup> and again to 193 Kcfs on April 24<sup>th</sup>. Spill at MCN met the “performance standard” spill level (48%) for 8 hours every day this week (Figure 5). However,

spill during the Gas Cap periods did not meet the 120% spill cap (189 Kcfs) for the early portion of the week (April 19-21). This was due to low flows during this period. Instead, spill was all flows in excess of powerhouse minimum requirements. By the afternoon of April 21<sup>st</sup>, flows were sufficiently high that spill to the 120% spill cap was possible. Spill to the 120% spill cap was met for approximately 16 hours per day on each of April 22<sup>nd</sup> through April 25<sup>th</sup>. On these days, hourly TDG levels during the 16 hours of gas cap spill were as high as 120.4% and the 12-hour average TDG was in the 119-120% range.

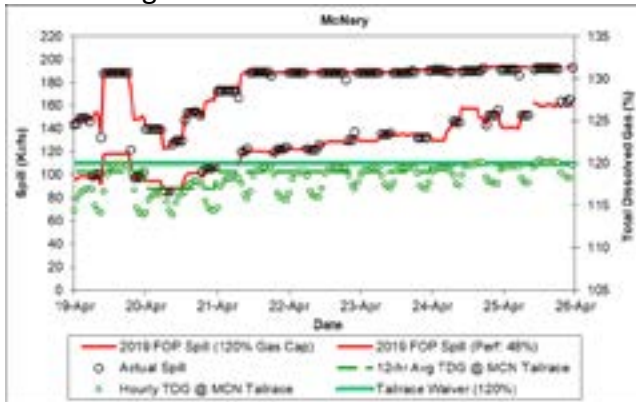


Figure 5. Hourly spill and TDG at McNary Dam (Apr. 19-25, 2019).

John Day Dam (JDA) started the week with a 120% TDG spill cap of 151 Kcfs. This spill cap was increased several times this week. These increases included: an increase to 157 Kcfs on April 22<sup>nd</sup>, an increase to 160 Kcfs on April 23<sup>rd</sup>, and an increase to 165 Kcfs on April 24<sup>th</sup>. Spill at JDA has met the estimated 120% spill cap level for approximately 16 hours and has met or exceeded the “performance standard” spill level (32%) for approximately 8 hours every day this week. Hourly TDG levels during the 16 hours of gas cap spill were as high as 119.5% and the 12-hour average TDG ranged from 118% to 119% this week. This indicates that there may still be room to increase the 120% spill cap at JDA.

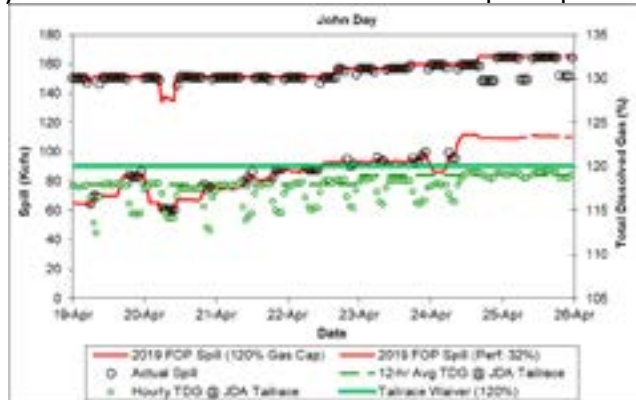


Figure 6. Hourly spill and TDG at John Day Dam (Apr. 19-25, 2019).

The Dalles Dam (TDA) started the week with a 120% spill cap of 112 Kcfs. This spill cap was reduced to 105 Kcfs on the afternoon of April 19<sup>th</sup>. This reduction was due to an exceedance of the 120% TDG standard on April 18<sup>th</sup>. After several days of no exceedances, the spill cap was then increased several times later in the week. These increases included: an increase to 116 Kcfs on April 22<sup>nd</sup>, an increase to 122 Kcfs on April 23<sup>rd</sup>, and an increase to 128 Kcfs on April 24<sup>th</sup>. Due to continued difficulties with keeping tailrace TDG under control at TDA, the Technical Management Team (TMT) discussed a proposal to change the 120% spill cap at TDA from a set volume to a spill proportion during their April 24 conference call. The theory is that managing Gas Cap spill to a spill proportion would be better for keeping TDG levels below the 120% standard in the tailrace, particularly at current flows. It was decided that this method would be implemented on April 25<sup>th</sup> and would run through the next week. TMT will re-evaluate the new method at their meeting next week (May 1). Therefore, the 120% TDG spill cap at TDA was adjusted from a spill volume of 128 Kcfs to 44% of river flows on the afternoon of April 25<sup>th</sup>.

Spill at TDA has met the estimated 120% spill cap level for approximately 16 hours every day this week (Figure 7). However, flow were sufficiently high this week that spilling down to the “performance standard” level (40%) was not always possible. During these times, spill to the 120% spill caps was provided. Hourly TDG levels during the period of April 20<sup>th</sup> through April 25<sup>th</sup> were as high as 120.2% and the 12-hour average TDG was in the 117%-120% range. It is too early to tell if the new method of managing Gas Cap spill to a spill proportion is working.

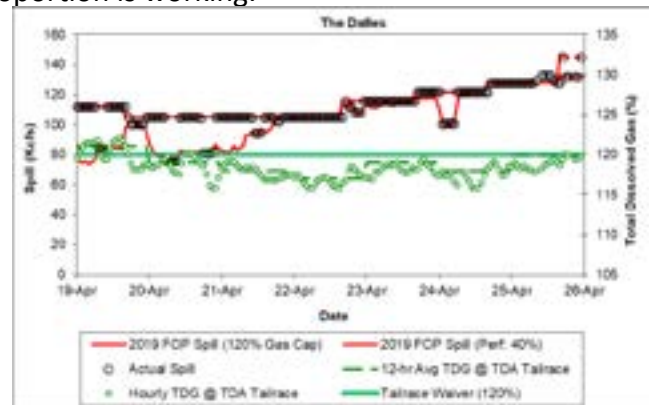
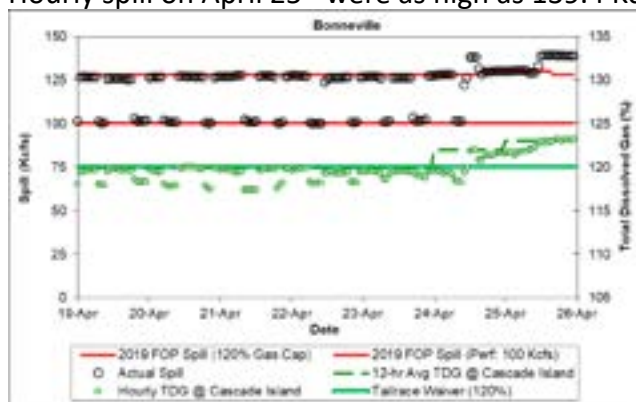


Figure 7. Hourly spill and TDG at The Dalles Dam (Apr. 19-25, 2019).

Bonneville Dam (BON) started the week with a 120% TDG spill cap of 128 Kcfs. This spill cap was

increased to 130 Kcfs on the afternoon of April 24<sup>th</sup> but decreased back to 128 Kcfs on the afternoon of April 25<sup>th</sup>. For the period of April 19<sup>th</sup> through April 23<sup>rd</sup>, spill at BON has met the estimated 120% spill cap level for approximately 16 hours and the “performance standard” spill level (100 Kcfs) for approximately 8 hours each day (Figure 8). The 12-hour average TDG during this period was 120%. By the afternoon of April 24<sup>th</sup>, flows had increased to high enough levels to necessitate 24-hour spill at or above the 120% TDG spill cap through April 25<sup>th</sup>. Therefore, “performance standard” spill was not possible during this time. The 12-hour average TDG on April 24<sup>th</sup> and 25<sup>th</sup> was 122% and 123%, respectively. The exceedance on April 24<sup>th</sup> is likely what prompted a reduction of the spill cap on the afternoon of April 25<sup>th</sup>. However, the exceedance on April 24<sup>th</sup> was mostly due to four hours of spill above the 120% spill cap that was due to flows in excess of hydraulic capacity (Figure 8). The exceedance on April 25<sup>th</sup> is also due to spill above the 120% spill cap, due to flows in excess of hydraulic capacity. Hourly spill on April 25<sup>th</sup> were as high as 139.4 Kcfs.



**Figure 8.** Hourly spill and TDG at Bonneville Dam (Apr.19-25, 2019).

### **Gas Bubble Trauma Monitoring**

Gas Bubble Trauma (GBT) monitoring in the Snake, Mid-Columbia, and Upper Columbia rivers continued this week. Each of the Snake River projects conducted one GBT sample this week. No fish were observed with signs of GBT in this week’s sample from Lower Granite Dam (Apr. 26). At Little Goose (Apr. 22), three fish were observed with signs of fin GBT, which equates to a 3% GBT rate for that sample. All three fish had Rank 1 signs of GBT (<5% of fin occluded by bubbles). Two fish were observed with signs of fin GBT in this week’s sample at Lower Monumental (Apr 25). This equates to a 2% GBT rate for that sample. Both fish that exhibited signs of fin GBT had Rank 1 signs. Two GBT samples were conducted at each of McNary (Apr.

21 and 25), Bonneville (Apr. 21 and 24), and Rock Island (Apr. 23 and 25) dams this week. No signs of GBT were observed in this week’s GBT samples at McNary. One of the samples at Bonneville (Apr. 21) had a GBT incidence rate of 2%. Both of the fish that had signs of GBT in the April 21 sample had Rank 1 signs. The other sample at Bonneville (Apr. 24) had zero signs of fin GBT. Both samples at Rock Island Dam had GBT incidence rates of 5%. Of the five fish that were observed with signs of GBT in April 23<sup>rd</sup> sample from Rock Island, four were Rank 1 while one was Rank 2 (6-25% of the fin was occluded with bubbles). All five fish that were observed with signs of GBT in the April 25<sup>th</sup> sample had Rank 1 signs of GBT. 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.

### **Temperature**

Forebay temperatures are now being reported for Lower Granite, Ice Harbor, McNary and Bonneville dams. The forebay temperatures at Ice Harbor, McNary, and Bonneville dams for April 25<sup>th</sup> were 52.9 °F, 51.9 °F, and 52.0 °F, respectively. These forebay temperatures are all 1.5-2.2 °F higher than their respective 10-year averages for April 25<sup>th</sup>. The April 25<sup>th</sup> temperature at Lower Granite Dam was 50.4 °F, which is only about 0.5 °F higher than the current 10-year average for this date.

### **Smolt Monitoring**

The Smolt Monitoring Program (SMP) is currently collecting and reporting data from all seven bypass facilities: Bonneville Dam, John Day Dam, McNary Dam, Rock Island Dam, Lower Granite Dam, Little Goose Dam, and Lower Monumental Dam. Due to high flows and debris levels, sampling at the four SMP traps has been intermittent this week.

Yearling Chinook dominated the samples at Bonneville Dam (BON) this week. This week’s daily average passage index for yearling Chinook at BON was nearly 36,000 per day. This is an increase over last week’s daily average passage index of about 29,000 per day. Passage of coho, sockeye, and steelhead also increased this week, when compared to the previous

week. This week's daily average passage indices for these three species were 6,100, 625, and 8,000 per day, respectively. Last week's daily average passage indices were 3,800 for coho, 325 for sockeye, and 2,300 for steelhead. Passage of subyearling Chinook decreased this week, when compared to the previous week. This week's daily average passage index for subyearling Chinook was about 3,300 per day, whereas that for last week was nearly 23,000 per day. Of the subyearling Chinook that were collected this week, approximately 13% were clipped and likely fall Chinook tules that were released from Spring Creek NFH earlier this month. Approximately 77% of the subyearling Chinook in this week's samples were fry. Pacific lamprey macrophthalmia were encountered in all seven samples this week while ammocoetes were encountered in four of this week's samples. This week's daily average collection for Pacific lamprey macrophthalmia was 7,000 per day, which is a large increase over last week's daily average collection of about 1,900 per day.

Sampling at John Day Dam (JDA) is every-other-day. Steelhead continued to dominate this week's samples at JDA. This week's daily average passage index for steelhead was 87,000 per day, which is a large increase over last week's daily average passage index of about 22,400 per day. Of the steelhead that were collected this week, approximately 55% were of known hatchery origin. Passage of yearling Chinook, subyearling Chinook, and coho also increased this week, when compared to the previous week. This week's daily average passage indices for these three species were 18,200, 1,300, and 850 per day, respectively. Last week's daily average passage indices were 7,400 for yearling Chinook, 30 for subyearling Chinook, and 80 for coho. All of the subyearling Chinook that were collected this week were collected in a single sample (April 23<sup>rd</sup>). Of those, approximately 67% were clipped. Pacific lamprey macrophthalmia were encountered in all four of this week's samples, with a daily average collection of about 21,000 per day. This is a large increase over last week's daily average collection of about 5,000 macrophthalmia per day and is largely due to two days of high collection counts (20,000 on April 21<sup>st</sup> and 46,000 on April 23<sup>rd</sup>). Pacific lamprey ammocoetes were also encountered in all four of this week's samples. This week's daily average collection for Pacific lamprey ammocoetes was about 520 per day, which is an increase over last week's daily average collection of about 300 per day.

Similar to John Day, sampling at McNary (MCN) occurs every-other-day. Steelhead continued to dominate this week's samples at MCN, with a daily average passage index of 30,500 per day. This is a decrease from last week's daily average passage index of 47,000 steelhead per day. Passage of yearling Chinook, subyearling Chinook, and coho all increased this week, when compared to the previous week. This week's daily average passage indices for these three species were 22,400, 1,200, and 2,500 per day, respectively. Last week's daily average passage indices were 14,300 for yearling Chinook, 470 for subyearling Chinook, and 540 for coho. As with previous weeks, all of the subyearling Chinook that were encountered in this week's samples were fry. No sockeye were encountered in this week's samples. Finally, Pacific lamprey macrophthalmia were encountered in all four of week's samples, with a daily average collection of about 23,200 per day. This is an increase over last week's daily average collection of 19,000 per day. Pacific lamprey ammocoetes were encountered in one of this week's samples (April 23<sup>rd</sup>).

Collections for transportation at Lower Granite Dam (LGR) began on April 23<sup>rd</sup>, with the first barge leaving on April 24<sup>th</sup>. Steelhead continued to dominate the samples at LGR this week. This week's daily average passage index was about 155,500 per day, which is an increase over last week's daily average passage index of about 111,300 per day. Of the steelhead collected this week, approximately 91% were of hatchery origin. Yearling Chinook passage also increased this week, when compared to the previous week. This week's daily average passage index for yearling Chinook at LGR was about 64,500 per day, whereas that for last week was 43,500 per day. Of the yearling Chinook sampled this week, approximately 84% were of hatchery origin. Subyearling Chinook and coho passage decreased this week, when compared to the previous week. This week's daily average passage indices for these two species were about 1,160 and 900 per day, respectively. As with previous weeks, all of the subyearling Chinook sampled at LGR this week were fry. Finally, both Pacific lamprey macrophthalmia were encountered in four of this week's sample while no ammocoetes were encountered this week.

Sampling at Little Goose Dam (LGS) occurred every-other-day until the start of transportation. Collections for transportation at LGS began on April 23<sup>rd</sup>, with the

first barge leaving on April 24<sup>th</sup>. To date, the FPC has not received the data for the sample on April 25<sup>th</sup>. Steelhead continued to dominate the samples at LGS this week. This week's daily average passage index for steelhead at LGS was about 270,200 per day, which is a large increase over last week's daily average passage index of about 146,300 per day. Of the steelhead collected at LGS this week, approximately 88% were of hatchery origin. Yearling Chinook and coho passage also increased this week, when compared to the previous week. This week's daily average passage indices for these two species were 80,000 and 2,000 per day, respectively. Last week's daily average passage indices were about 44,000 per day for yearling Chinook and only 400 for coho. Of the yearling Chinook collected at LGS this week, approximately 84% were of hatchery origin. Subyearling Chinook and sockeye were also encountered in this week's samples but in very low numbers. Pacific lamprey macrophthalmia were encountered in all three of this week's samples, with a daily average collection of about 300 per day. This is a large decrease from last week's daily average collection of 3,000 per day. No Pacific lamprey ammocoetes were encountered in this week's samples.

Similar to LGS, sampling at Lower Monumental Dam (LMN) occurred every-other-day until the start of transportation. Collections for transportation at LMN began on April 23<sup>rd</sup>, with the first barge leaving on April 24<sup>th</sup>. Steelhead continued to dominate the samples at LMN this week. This week's daily average passage index for steelhead was about 140,500 per day, which is an increase over last week's daily average passage index of about 107,000 per day. Of the steelhead that were collected this week, nearly 90% were of hatchery origin. Yearling Chinook and coho passage also increased this week, when compared to the previous week. This week's daily average passage indices for these two species were 65,400 and 1,025 per day, respectively. Last week's daily average passage indices were 22,300 for yearling Chinook and 425 for coho. Subyearling Chinook were also encountered in this week's samples but in relatively low numbers. All of the subyearling Chinook that were encountered this week were fry. Finally, Pacific lamprey macrophthalmia were encountered in three of this week's five samples, with a daily average collection of 2,400 per day. No Pacific lamprey ammocoetes were encountered at LMN this week.

Yearling Chinook dominated the samples at Rock Island Dam (RIS) this week. This week's daily average passage index for yearling Chinook was 430 per day, which is a large increase over last week's daily average of only nine per day. Of the yearling Chinook in this week's samples, approximately 93% were of hatchery origin. Passage of sockeye and steelhead also increased this week, when compared to the previous week. This week's daily average passage indices for these two species were 280 and 110 per day, respectively. Last week's daily average passage indices were 30 for sockeye and only five for steelhead. Subyearling Chinook and coho were also encountered in this week's samples at RIS but in relatively low numbers. Finally, Pacific lamprey macrophthalmia were encountered in three of this week's samples while ammocoetes were only encountered in one (April 22<sup>nd</sup>).

The Snake River Trap at Lewiston, ID (LEW) is located at river kilometer 225 of the Snake River and is operated by Idaho Department of Fish and Game. Due to high flows and debris in the Snake River, sampling at LEW was suspended from April 10<sup>th</sup> through April 18<sup>th</sup>. However, sampling at the trap was resumed on the afternoon of April 18<sup>th</sup>, for an April 19<sup>th</sup> sampling. Sampling continued for three total days until flows and debris increased to unsafe levels. Sampling has been suspended since the sample on April 21<sup>st</sup>. Yearling Chinook dominated the collections in the three samples that were conducted this week (April 19-21), with a total collection of about 2,170. Steelhead were the only other salmonids that were collected in these three samples. The total collection for steelhead over these three samples was about 525. Sampling at LEW will resume when flows and debris levels decrease to safe levels.

The Grande Ronde Trap (GRN) is located at river kilometer 002 of the Grande Ronde River and is operated by the Oregon Department of Fish and Wildlife. Due to high flows and debris in the Grande Ronde River, sampling at GRN was suspended from April 7<sup>th</sup> through April 15<sup>th</sup> and again from April 20<sup>th</sup> through April 22<sup>nd</sup>. Sampling resumed on the afternoon of April 22<sup>nd</sup>. Therefore, only four samples were collected at GRN this week (April 19, 23, 24, and 25). These four samples were dominated by steelhead, with a total collection of nearly 1,700. Of the steelhead collected in these four samples, approximately 79% were of hatchery origin. The total collection for



yearling Chinook over these four samples was just over 1,200. Of the yearling Chinook collected in this week's samples, approximately 75% were of known hatchery origin. Coho were also encountered in this week's samples, with a total collection of nearly 230. Finally, two Pacific lamprey ammocoetes were collected in the sample from April 23<sup>rd</sup>.

The Salmon River Trap at Whitebird (WTB) is located at river kilometer 103 of the Salmon River and is operated by Idaho Department of Fish and Game. Due to high flows and debris in the Salmon River, sampling at WTB was suspended from April 10<sup>th</sup> through April 18<sup>th</sup>. However, sampling at the trap was resumed on the afternoon of April 18<sup>th</sup>, for an April 19<sup>th</sup> sampling. Sampling continued for four total days (April 19-22) until flows and debris increased to unsafe levels. Sampling has been suspended since the sample on April 22<sup>nd</sup>. Yearling Chinook dominated the collections in the four samples that were conducted this week, with a total collection of about 1,550. Steelhead were the only other salmonids that were collected in these four samples. The total collection for steelhead over these four samples was about 390. Sampling at WTB will resume when flows and debris levels decrease to levels that are deemed safe for trap operations.

The Imnaha River Trap (IMN) is located at river kilometer 007 of the Imnaha River and is operated by the Nez Perce Tribe. Sampling at the Imnaha River Trap is year round. For 2019, the FPC currently has data from IMN for the period of February 15<sup>th</sup> through April 22<sup>nd</sup>. Due to high flows, sampling at IMN was suspended from April 9<sup>th</sup> through April 13<sup>th</sup> and again after the sample on April 20<sup>th</sup>. Yearling Chinook and steelhead were the only salmonids that were collected over the last seven days where sampling at IMN was possible (April 14-20). The daily average collections for these two species were 2,230 and 675 per day, respectively. Of the yearling Chinook and steelhead that were collected from April 14<sup>th</sup> through April 20<sup>th</sup>, approximately 98% and 94% were of known hatchery origin, respectively. Finally, no Pacific lamprey were collected in these samples.

#### **Hatchery Releases**

FPC has not received preliminary data from some hatcheries as of 04/19/19, 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 were almost 200,000 spring Chinook released into this zone all into the Yankee Fork of the Salmon River. The release of 2.5 million spring Chinook from Rapid River Hatchery also wrapped up this week on the 24<sup>th</sup>. Additionally, over the past week there were two releases of 416,000 summer steelhead in this zone, in the Little Salmon (256,000), and Wallowa Rivers (160,000).

Over the next two weeks there is one scheduled release of 230,000 fall Chinook into the Middle fork of the Clearwater River. Additionally, there are approximately 899,000 sockeye planned for release at Redfish Lake on April 30<sup>th</sup>, and one release of summer steelhead into the Salmon River (32,000) on May 1<sup>st</sup>.

#### **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 release of 143,000 spring Chinook in this zone into the Methow River.

Over the next two weeks there is one planned release of 235 fall Chinook parr into the Wanapum pool.

#### **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 three releases of spring Chinook totaling 25,000 in this zone, all three into the Deschutes Rivers and its tributaries. There were also approximately 75,000 summer steelhead released into the Deschutes (25,000) and Umatilla Rivers (50,000). Finally, there was also one release of 50,000 winter steelhead released into the Hood River.

Over the next two weeks just over 8.6 million fall Chinook are planned for release into this zone. Of these, 53% are scheduled for release into the Bonneville pool on May 3<sup>rd</sup> (2.54 million) and May 9<sup>th</sup> (2.08 million). The remaining will be released from Spring Creek Hatchery (4.0 million) on May 6<sup>th</sup>, and 4100 parr in the Bonneville pool on the first. Additionally, there will be approximately 900,000 coho

released into the Klickitat River on May 1<sup>st</sup>, and 25,000 summer steelhead released into the Deschutes on the 6<sup>th</sup>.

### **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 no scheduled releases into this zone.

Over the next two weeks there are 9.2 million fall Chinook scheduled for release into this zone. A majority of these are planned for volitional releases into the Kalama River (77%) beginning on May 1<sup>st</sup> and running through the end of June. The remainder are planned for a release of 1.8 million from Big Creek Hatchery, and 250,000 from Tanner Creek. In addition, there are approximately 4.8 million coho planned for release into this zone. Of these, 38% are planned for releases into the Klaskanine River, 27% directly into the Columbia at Tongue Point and Blind Slough. The remainder are split between the Washougal (150,000), Deep River (700,000), Cowlitz (109,000), Youngs River (4,100), and Big Creek Hatchery (735,000). Finally, there are nearly 240,000 winter steelhead planned for release into this zone. Most of these will be released into the Clackamas River (195,000), with the remainder released into the Lewis River (45,000).

### **Adult Passage**

At Bonneville Dam, 1,606 adult Chinook and 1,654 adult steelhead were counted. Of the steelhead counted 892 were unclipped steelhead. In 2018 for the same time frame, 996 adult Chinook and 2,445 adult steelhead were counted. Of the steelhead counted 2018, 1,041 were unclipped steelhead.

The direct counts at Bonneville Dam showed 88 to 235 adult spring Chinook passing over the project this past week, with a cumulative total of 1,606 for both direct and video counts (through April 25). There were 610 more fish in this year's count when compared to the 2018 count (161%), while this year's count was about 5.8% of the ten-year average. Adult steelhead direct counts ranged from 3 to 22 this week, with a cumulative total of 1,654 for both direct and video counts through April 25th. This is 67.6% of the 2018 count and 48.5% of the ten-year average.

The Willamette Falls cumulative steelhead count from January 1st through April 23rd was 3,159.

The 2019 Willamette Falls steelhead count was about 2.2 times greater than the 2018 count, while this year's count was about 60.4% of the 10-year average count of 5,227. This year's Lower Granite steelhead count of 2,738 had 1,502 fewer fish than the 2018 count of 4,240 and 5,063 fewer fish than the 10-year average count of 7,801.

## Hatchery Releases Last Two Weeks

### Hatchery Release Summary

From: 4/13/2019 to 04/26/19

Agency	Hatchery	Species	Race	MigYr	NumRel	RelStart	RelEnd	RelSite	RelRiver	Zone
Colville Tribe	Chief Joseph Hatchery	CH1	SP	2019	202,000	04-15-19	04-22-19	Riverside Pond	Okanogan River	UCOL
Colville Tribe	Chief Joseph Hatchery	CH1	SP	2019	556,000	04-15-19	04-22-19	Chief Joseph Hatchery	Wells Pool	UCOL
Colville Tribe	Chief Joseph Hatchery	CH1	SU	2019	303,000	04-15-19	04-22-19	Omak Pond	Okanogan River	UCOL
Colville Tribe	Chief Joseph Hatchery	CH1	SU	2019	380,000	04-15-19	04-22-19	Similkameen Acclim Pd	Okanogan River	UCOL
Colville Tribe	Chief Joseph Hatchery	CH1	SU	2019	464,000	04-15-19	04-22-19	Chief Joseph Hatchery	Wells Pool	UCOL
<b>Colville Tribe Total</b>					<b>1,905,000</b>					
Douglas County PUD	Methow Hatchery	CH1	SP	2019	29,358	04-15-19	04-15-19	Twisp River	Methow River	UCOL
Douglas County PUD	Methow Hatchery	CH1	SP	2019	124,866	04-15-19	04-15-19	Methow Hatchery	Methow River	UCOL
Douglas County PUD	Methow Hatchery	CH1	SP	2019	143,793	04-23-19	04-23-19	Carlton Acclim Pond	Methow River	UCOL
Douglas County PUD	Wells Hatchery	CH1	SU	2019	290,700	04-15-19	04-19-19	Wells Hatchery	Rocky Reach Pool	UCOL
Douglas County PUD	Wells Hatchery	ST	SU	2019	28,900	04-15-19	04-26-19	Twisp River	Methow River	UCOL
Douglas County PUD	Wells Hatchery	ST	SU	2019	180,000	04-15-19	04-26-19	Wells Hatchery	Rocky Reach Pool	UCOL
<b>Douglas County PUD Total</b>					<b>797,617</b>					
Idaho Dept. of Fish and Game	Magic Valley Hatchery	ST	SU	2019	106,000	04-12-19	04-15-19	Pahsimeroi River	Pahsimeroi River	SNAK
Idaho Dept. of Fish and Game	Magic Valley Hatchery	ST	SU	2019	217,000	04-17-19	04-19-19	Little Salmon River	Salmon River (ID)	SNAK
Idaho Dept. of Fish and Game	Magic Valley Hatchery	ST	SU	2019	282,900	04-09-19	04-22-19	Sawtooth Hatchery	Salmon River (ID)	SNAK
Idaho Dept. of Fish and Game	Niagara Springs	ST	SU	2019	177,000	04-16-19	04-22-19	Little Salmon River	Salmon River (ID)	SNAK
Idaho Dept. of Fish and Game	Niagara Springs	ST	SU	2019	256,000	04-23-19	05-01-19	Little Salmon River	Salmon River (ID)	SNAK
Idaho Dept. of Fish and Game	Niagara Springs	ST	SU	2019	802,000	04-01-19	04-15-19	Pahsimeroi River	Pahsimeroi River	SNAK
Idaho Dept. of Fish and Game	Pahsimeroi Hatchery	CH1	SU	2019	60,000	04-15-19	04-24-19	Pahsimeroi River	Pahsimeroi River	SNAK
Idaho Dept. of Fish and Game	Pahsimeroi Hatchery	CH1	SU	2019	780,000	04-15-19	04-24-19	Pahsimeroi River	Pahsimeroi River	SNAK
Idaho Dept. of Fish and Game	Rapid River Hatchery	CH1	SP	2019	2,500,000	03-11-19	04-26-19	Rapid River	Little Salmon River	SNAK
Idaho Dept. of Fish and Game	Sawtooth Hatchery	CH1	SP	2019	94,802	04-23-19	04-26-19	Yankee Fk (Salmon R)	Salmon River (ID)	SNAK
Idaho Dept. of Fish and Game	Springfield Hatchery	CH1	SP	2019	103,528	04-23-19	04-26-19	Yankee Fk (Salmon R)	Salmon River (ID)	SNAK
<b>Idaho Dept. of Fish and Game Total</b>					<b>5,379,230</b>					
Nez Perce Tribe	Lookingglass Hatchery	CH1	SP	2019	250,000	04-19-19	04-19-19	Lostine Accim Pond	Wallowa River	SNAK
<b>Nez Perce Tribe Total</b>					<b>250,000</b>					
Oregon Dept. of Fish and Wildlife	Bonneville Hatchery	CH0	FA	2019	1,600,000	04-18-19	04-18-19	Tanner Creek	Tanner Creek	LCOL
Oregon Dept. of Fish and Wildlife	Bonneville Hatchery	ST	SU	2019	75,000	04-18-19	04-18-19	Cedar Creek (Sandy R)	Sandy River	LCOL
Oregon Dept. of Fish and Wildlife	Irrigon Hatchery Complex	ST	SU	2019	160,000	04-25-19	04-25-19	Wallowa Acclim Pond	Wallowa River	SNAK
Oregon Dept. of Fish and Wildlife	Irrigon Hatchery Complex	ST	SU	2019	320,000	04-16-19	04-16-19	Deer Creek	Wallowa River	SNAK
Oregon Dept. of Fish and Wildlife	Lookingglass Hatchery	ST	SU	2019	50,000	04-19-19	04-19-19	Minthorn Acclimation Pond	Umatilla River	MCOL
Oregon Dept. of Fish and Wildlife	Lookingglass Hatchery	ST	SU	2019	50,000	04-19-19	04-19-19	Pendelton Acclim Pond	Umatilla River	MCOL
Oregon Dept. of Fish and Wildlife	Lookingglass Hatchery	ST	SU	2019	50,000	04-19-19	04-19-19	Umatilla River	Umatilla River	MCOL
Oregon Dept. of Fish and Wildlife	Sandy Hatchery	ST	SU	2019	75,000	04-18-19	04-18-19	Cedar Creek (Sandy R)	Sandy River	LCOL
Oregon Dept. of Fish and Wildlife	Wizard Falls Hatchery	CH1	SP	2019	7,500	04-26-19	04-26-19	Metolius River	Deschutes River	MCOL
Oregon Dept. of Fish and Wildlife	Wizard Falls Hatchery	CH1	SP	2019	7,500	04-26-19	04-26-19	Wychus Creek	Deschutes River	MCOL
Oregon Dept. of Fish and Wildlife	Wizard Falls Hatchery	CH1	SP	2019	10,000	04-26-19	04-26-19	Crooked River (OR)	Deschutes River	MCOL
Oregon Dept. of Fish and Wildlife	Wizard Falls Hatchery	ST	SU	2019	10,000	04-25-19	04-25-19	Wychus Creek	Deschutes River	MCOL
Oregon Dept. of Fish and Wildlife	Wizard Falls Hatchery	ST	SU	2019	15,000	04-25-19	04-25-19	Crooked River (OR)	Deschutes River	MCOL
<b>Oregon Dept. of Fish and Wildlife Total</b>					<b>2,430,000</b>					
U.S. Fish and Wildlife Service	Entiat Hatchery	CH1	SU	2019	451,000	04-16-19	04-16-19	Entiat Hatchery	Entiat River	UCOL
U.S. Fish and Wildlife Service	Leavenworth NFH	CH1	SP	2019	1,257,831	04-17-19	04-19-19	Leavenworth Hatchery	Wenatchee River	UCOL
U.S. Fish and Wildlife Service	Winthrop NFH	CH1	SP	2019	423,000	04-15-19	04-15-19	Methow River	Methow River	UCOL

U.S. Fish and Wildlife Service	Winthrop NFH	ST	SU	2019	215,000	04-15-19	05-03-19	Winthrop Hatchery	Methow River	UCOL
<b>U.S. Fish and Wildlife Service Total</b>					<b>2,346,831</b>					
Umatilla Tribe	Lookingglass Hatchery	CH1	SP	2019	150,000	04-19-19	04-19-19	Catherine Cr Acclim Pond	Grande Ronde River	SNAK
Umatilla Tribe	Lookingglass Hatchery	CH1	SP	2019	250,000	04-16-19	04-16-19	Grande Ronde Acclim Pond	Grande Ronde River	SNAK
Umatilla Tribe	Umatilla Hatchery	CH1	SP	2019	226,000	04-15-19	04-15-19	Imeques Acclim Pond	Umatilla River	MCOL
Umatilla Tribe	Umatilla Hatchery	ST	SU	2019	50,000	04-24-19	04-24-19	Thornhollow Acclim Pond	Umatilla River	MCOL
Umatilla Tribe	Umatilla Hatchery	ST	SU	2019	100,000	04-19-19	04-19-19	Pendelton Acclim Pond	Umatilla River	MCOL
<b>Umatilla Tribe Total</b>					<b>776,000</b>					
Warm Springs Tribe	Oak Springs Hatchery	ST	WI	2019	50,000	04-26-19	04-26-19	E Fk Hood River	Hood River	MCOL
<b>Warm Springs Tribe Total</b>					<b>50,000</b>					
Yakama Tribe	Cascade Hatchery	CO	UN	2019	42,475	04-15-19	05-03-19	Mid-Valley Pond	Methow River	UCOL
Yakama Tribe	Cascade Hatchery	CO	UN	2019	65,175	04-15-19	05-03-19	Wenatchee River	Wenatchee River	UCOL
Yakama Tribe	Cascade Hatchery	CO	UN	2019	70,074	04-15-19	05-03-19	Coulter Creek	Wenatchee River	UCOL
Yakama Tribe	Cascade Hatchery	CO	UN	2019	73,997	04-15-19	05-03-19	Beaver Creek Acclim Pond	Wenatchee River	UCOL
Yakama Tribe	Eagle Creek NFH	CO	UN	2019	69,553	04-15-19	05-03-19	Wenatchee River	Wenatchee River	UCOL
Yakama Tribe	Eagle Creek NFH	CO	UN	2019	108,130	04-15-19	05-03-19	Rolfings Acclim Pond	Wenatchee River	UCOL
Yakama Tribe	Eagle Creek NFH	CO	UN	2019	159,869	04-15-19	04-15-19	Holmes Pond	Yakima River	MCOL
Yakama Tribe	Eagle Creek NFH	CO	UN	2019	160,403	04-15-19	04-15-19	Stiles Pond	Yakima River	MCOL
Yakama Tribe	Eagle Creek NFH	CO	UN	2019	213,681	04-15-19	04-15-19	Easton Pond	Yakima River	MCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	34,458	04-15-19	05-03-19	Beaver Creek Acclim Pond	Wenatchee River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	44,988	04-15-19	05-03-19	Wenatchee River	Wenatchee River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	78,671	04-15-19	05-03-19	Chewuch Acclim Pond	Methow River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	98,713	04-15-19	05-03-19	Twisp Acclim Pond	Methow River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	104,329	04-15-19	05-03-19	Butcher Creek	Wenatchee River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	105,427	04-15-19	05-03-19	Acclim. Pond	Methow River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	110,952	04-15-19	05-03-19	Goat Wall Methow River	Methow River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	182,926	04-15-19	05-03-19	Methow River	Methow River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	191,563	04-15-19	05-03-19	Mid-Valley Pond	Methow River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	221,621	04-15-19	05-03-19	Wenatchee River	Wenatchee River	UCOL
Yakama Tribe	Winthrop NFH	CO	UN	2019	246,000	04-15-19	05-03-19	Winthrop Hatchery	Methow River	UCOL
Yakama Tribe	Winthrop NFH	CO	UN	2019	247,223	04-15-19	05-03-19	Winthrop Hatchery	Methow River	UCOL
<b>Yakama Tribe Total</b>					<b>2,630,228</b>					
<b>Grand Total</b>					<b>16,564,906</b>					

## Hatchery Releases Next Two Weeks

### Hatchery Release Summary

From: 4/27/2019 to 5/10/2019

Agency	Hatchery	Species	Race	MigYr	NumRel	RelStart	RelEnd	RelSite	RelRiver	Zone
Idaho Dept. of Fish and Game	Hagerman NFH	ST	SU	2019	32,052	05-01-19	05-01-19	East Fk Salmon River	Salmon River (ID)	STNAK
Idaho Dept. of Fish and Game	Hagerman NFH	ST	SU	2019	1,581,507	04-02-19	04-30-19	Salmon River (ID)	Salmon River (ID)	STNAK
Idaho Dept. of Fish and Game	Niagara Springs	ST	SU	2019	256,000	04-23-19	05-01-19	Little Salmon River	Salmon River (ID)	STNAK
Idaho Dept. of Fish and Game	Sawtooth Hatchery	SO	UN	2019	333,600	04-30-19	05-11-19	Redfish Lake Creek	Salmon River (ID)	STNAK
Idaho Dept. of Fish and Game	Springfield Hatchery	SO	UN	2019	565,671	04-30-19	05-11-19	Redfish Lake Creek	Salmon River (ID)	STNAK
<b>Idaho Dept. of Fish and Game Total</b>					<b>2,768,830</b>					
Nez Perce Tribe	Lyons Ferry Hatchery	CH0	FA	2019	230,000	05-09-19	05-09-19	North Lapwai Valley Hatchery	Clearwater River M F	STNAK
<b>Nez Perce Tribe Total</b>					<b>230,000</b>					
Oregon Dept. of Fish and Wildlife	Big Creek Hatchery	CH0	FA	2019	1,825,000	05-10-19	05-10-19	Big Creek Hatchery	Big Creek	LCOL
Oregon Dept. of Fish and Wildlife	Big Creek Hatchery	CO	UN	2019	735,000	05-02-19	05-02-19	Big Creek Hatchery	Big Creek	LCOL
Oregon Dept. of Fish and Wildlife	Bonneville Hatchery	CH0	FA	2019	250,000	05-02-19	05-02-19	Tanner Creek	Tanner Creek	LCOL
Oregon Dept. of Fish and Wildlife	Bonneville Hatchery	ST	WI	2019	25,000	05-01-19	05-01-19	Clackamas River	Clackamas River	LCOL
Oregon Dept. of Fish and Wildlife	Clackamas Hatchery	CO	UN	2019	540,000	05-02-19	05-02-19	Tongue Pt Dam	Col R Bel. Bon Dam	LCOL
Oregon Dept. of Fish and Wildlife	Clackamas Hatchery	ST	WI	2019	110,000	05-02-19	05-02-19	Clackamas River	Clackamas River	LCOL
Oregon Dept. of Fish and Wildlife	Enhancement Program	CO	UN	2019	4,000	05-10-19	05-10-19	Youngs Bay	Youngs River	LCOL
Oregon Dept. of Fish and Wildlife	Klaskanine Hatchery	CO	UN	2019	600,000	05-01-19	05-01-19	N Fk Klaskanine River	Klaskanine River	LCOL
Oregon Dept. of Fish and Wildlife	Klaskanine Hatchery	CO	UN	2019	838,000	05-01-19	05-01-19	N Fk Klaskanine River	Klaskanine River	LCOL
Oregon Dept. of Fish and Wildlife	Oak Springs Hatchery	ST	WI	2019	60,000	05-02-19	05-02-19	Clackamas Hatchery	Clackamas River	LCOL
Oregon Dept. of Fish and Wildlife	Oxbow-Oregon	CO	UN	2019	400,000	05-01-19	05-01-19	N Fk Klaskanine River	Klaskanine River	LCOL
Oregon Dept. of Fish and Wildlife	Oxbow-Oregon	CO	UN	2019	540,000	05-02-19	05-02-19	Tongue Pt Dam	Col R Bel. Bon Dam	LCOL
Oregon Dept. of Fish and Wildlife	Sandy Hatchery	CO	UN	2019	200,000	05-02-19	05-02-19	Blind Slough	Col R Bel. Bon Dam	LCOL
Oregon Dept. of Fish and Wildlife	Wizard Falls Hatchery	ST	SU	2019	10,000	05-06-19	05-06-19	Wychus Creek	Deschutes River	MCOL
Oregon Dept. of Fish and Wildlife	Wizard Falls Hatchery	ST	SU	2019	15,000	05-06-19	05-06-19	Crooked River (OR)	Deschutes River	MCOL
<b>Oregon Dept. of Fish and Wildlife Total</b>					<b>6,152,000</b>					
U.S. Fish and Wildlife Service	Spring Creek NFH	CH0	FA	2019	4,000,000	05-06-19	05-06-19	Spring Creek Hatchery	Bonneville Pool	MCOL
U.S. Fish and Wildlife Service	Winthrop NFH	ST	SU	2019	215,000	04-15-19	05-03-19	Winthrop Hatchery	Methow River	UCOL
<b>U.S. Fish and Wildlife Service Total</b>					<b>4,215,000</b>					
Washington Dept. of Fish and Wildlife	Beaver Creek Hatchery	ST	SU	2019	30,000	04-01-19	05-01-19	Beaver Creek	Elochoman River	LCOL
Washington Dept. of Fish and Wildlife	Beaver Creek Hatchery	ST	WI	2019	126,000	04-01-19	05-01-19	Beaver Creek	Elochoman River	LCOL
Washington Dept. of Fish and Wildlife	Bonneville Hatchery	CH0	FA	2019	2,080,000	05-09-19	05-09-19	Columbia R Above Bonn	Bonneville Pool	MCOL
Washington Dept. of Fish and Wildlife	Bonneville Hatchery	CH0	FA	2019	2,540,000	05-03-19	05-03-19	Columbia R Above Bonn	Bonneville Pool	MCOL
Washington Dept. of Fish and Wildlife	COOP	CH0	FA	2019	235	05-01-19	05-01-19		Wanapum Pool	UCOL
Washington Dept. of Fish and Wildlife	COOP	CH0	FA	2019	4,100	05-01-19	05-01-19	Columbia R Above Bonn	Bonneville Pool	MCOL
Washington Dept. of Fish and Wildlife	COOP	ST	WI	2019	5,000	04-01-19	05-01-19	Grays River	Grays River	LCOL
Washington Dept. of Fish and Wildlife	Cowlitz Trout	ST	SU	2019	640,000	04-01-19	05-01-19	Cowlitz River	Cowlitz River	LCOL
Washington Dept. of Fish and Wildlife	Cowlitz Trout	ST	WI	2019	48,000	04-01-19	05-01-19	Cowlitz River	Cowlitz River	LCOL
Washington Dept. of Fish and Wildlife	Cowlitz Trout	ST	WI	2019	113,000	04-01-19	05-01-19	Cowlitz River	Cowlitz River	LCOL
Washington Dept. of Fish and Wildlife	Fallert Creek Hatchery	CH0	FA	2019	3,570,000	05-01-19	07-01-19	Kalama River	Kalama River	LCOL
Washington Dept. of Fish and Wildlife	Kalama Falls Hatchery	CH0	FA	2019	3,570,000	05-01-19	07-01-19	Kalama River	Kalama River	LCOL

Washington Dept. of Fish and Wildlife	Kalama Falls Hatchery	CO	NO	2019	306,000	04-01-19	05-01-19	Kalama River	Kalama River	LCOL
Washington Dept. of Fish and Wildlife	Kalama Falls Hatchery	ST	WI	2019	40,000	04-01-19	05-01-19	Salmon Creek (WA)	Col R Bel. Bon Dam	LCOL
Washington Dept. of Fish and Wildlife	Kalama Falls Hatchery	ST	WI	2019	52,000	04-01-19	05-01-19	Kalama River	Kalama River	LCOL
Washington Dept. of Fish and Wildlife	Lewis River Hatchery	CO	NO	2019	900,000	04-01-19	05-01-19	Lewis River	Lewis River	LCOL
Washington Dept. of Fish and Wildlife	Lewis River Hatchery	CO	SO	2019	1,100,000	04-01-19	05-01-19	Lewis River	Lewis River	LCOL
Washington Dept. of Fish and Wildlife	Merwin Hatchery	ST	SU	2019	59,000	04-01-19	05-01-19	Lewis River	Lewis River	LCOL
Washington Dept. of Fish and Wildlife	Merwin Hatchery	ST	WI	2019	44,700	05-01-19	06-01-19	Lewis River	Lewis River	LCOL
Washington Dept. of Fish and Wildlife	Merwin Hatchery	ST	WI	2019	175,000	04-01-19	05-01-19	Lewis River	Lewis River	LCOL
Washington Dept. of Fish and Wildlife	North Toutle Hatchery	CO	SO	2019	109,000	05-01-19	05-01-19	Green River	Cowlitz River	LCOL
Washington Dept. of Fish and Wildlife	Skamania Hatchery	ST	SU	2019	70,000	04-01-19	05-01-19	Washougal River	Washougal River	LCOL
Washington Dept. of Fish and Wildlife	Skamania Hatchery	ST	SU	2019	90,000	04-01-19	05-01-19	Klickitat River	Klickitat River	MCOL
Washington Dept. of Fish and Wildlife	Washougal Hatchery	CH1	SP	2019	250,000	04-01-19	05-01-19	Deep River Net Pens	Grays River	LCOL
Washington Dept. of Fish and Wildlife	Washougal Hatchery	CO	NO	2019	150,000	05-01-19	06-01-19	Washougal River	Washougal River	LCOL
Washington Dept. of Fish and Wildlife	Washougal Hatchery	CO	NO	2019	700,000	05-01-19	05-01-19	Deep River	Grays River	LCOL
<b>Washington Dept. of Fish and Wildlife Total</b>					<b>16,772,035</b>					
Yakama Tribe	Cascade Hatchery	CO	UN	2019	42,475	04-15-19	05-03-19	Mid-Valley Pond	Methow River	UCOL
Yakama Tribe	Cascade Hatchery	CO	UN	2019	65,175	04-15-19	05-03-19	Wenatchee River	Wenatchee River	UCOL
Yakama Tribe	Cascade Hatchery	CO	UN	2019	70,074	04-15-19	05-03-19	Coulter Creek	Wenatchee River	UCOL
Yakama Tribe	Cascade Hatchery	CO	UN	2019	73,997	04-15-19	05-03-19	Beaver Creek Acclim Pond	Wenatchee River	UCOL
Yakama Tribe	Eagle Creek NFH	CO	UN	2019	69,553	04-15-19	05-03-19	Wenatchee River	Wenatchee River	UCOL
Yakama Tribe	Eagle Creek NFH	CO	UN	2019	108,130	04-15-19	05-03-19	Rolfings Acclim Pond	Wenatchee River	UCOL
Yakama Tribe	Klickitat Hatchery	CO	NO	2019	900,000	05-01-19	05-01-19	Klickitat Hatchery	Klickitat River	MCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	34,458	04-15-19	05-03-19	Beaver Creek Acclim Pond	Wenatchee River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	44,988	04-15-19	05-03-19	Wenatchee River	Wenatchee River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	78,671	04-15-19	05-03-19	Chewuch Acclim Pond	Methow River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	98,713	04-15-19	05-03-19	Twisp Acclim Pond	Methow River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	104,329	04-15-19	05-03-19	Butcher Creek Acclim. Pond	Wenatchee River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	105,427	04-15-19	05-03-19	Twisp River	Methow River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	110,952	04-15-19	05-03-19		Methow River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	182,926	04-15-19	05-03-19	Methow River	Methow River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	191,563	04-15-19	05-03-19	Mid-Valley Pond	Methow River	UCOL
Yakama Tribe	Willard Hatchery	CO	UN	2019	221,621	04-15-19	05-03-19	Wenatchee River	Wenatchee River	UCOL
Yakama Tribe	Winthrop NFH	CO	UN	2019	246,000	04-15-19	05-03-19	Winthrop Hatchery	Methow River	UCOL
Yakama Tribe	Winthrop NFH	CO	UN	2019	247,223	04-15-19	05-03-19	Winthrop Hatchery	Methow River	UCOL
<b>Yakama Tribe Total</b>					<b>2,996,275</b>					
<b>Grand Total</b>					<b>33,134,140</b>					

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

### Daily Average Flow and Spill (in Kcfs)

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#### Upper 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
04/12/2019	53.9	0.0	52.1	0.0	59.2	4.9	56.3	0.5	60.0	0.0	61.5	4.5	67.8	0.0
04/13/2019	57.3	0.0	57.5	0.0	56.9	5.1	57.7	0.0	62.9	0.0	74.3	0.0	67.8	0.0
04/14/2019	46.6	0.0	43.0	0.0	54.1	4.9	52.8	0.0	56.1	0.0	66.2	15.7	67.7	0.0
04/15/2019	61.6	0.0	63.8	0.0	72.8	7.7	71.9	0.0	77.1	0.0	78.0	12.9	68.9	0.0
04/16/2019	87.1	0.0	85.0	0.0	87.9	7.1	82.9	0.0	89.4	0.0	80.5	0.0	84.4	0.0
04/17/2019	86.9	0.0	86.3	0.0	89.8	7.0	82.8	0.0	86.8	9.3	73.5	12.9	73.0	0.0
04/18/2019	89.8	0.0	88.0	0.0	90.8	7.1	88.0	0.0	96.3	9.1	99.7	0.0	84.4	0.0
04/19/2019	65.4	0.0	73.7	0.0	71.8	5.9	68.0	1.3	72.3	7.2	68.2	12.9	75.5	0.0
04/20/2019	52.5	0.0	48.6	0.0	63.4	5.3	63.7	0.0	70.6	7.2	76.7	26.0	70.4	0.0
04/21/2019	52.9	0.0	57.3	0.0	52.1	5.6	51.4	0.0	57.8	7.2	62.9	9.6	72.6	0.0
04/22/2019	83.3	0.0	84.2	0.0	92.0	8.1	92.8	2.4	104.6	7.2	104.0	38.0	88.7	0.0
04/23/2019	91.3	0.0	86.4	0.0	100.4	8.5	101.2	0.0	111.3	7.2	116.8	36.1	109.0	30.8
04/24/2019	111.3	0.0	112.0	0.0	110.2	14.8	102.8	0.0	112.8	9.7	135.6	19.6	137.2	44.3
04/25/2019	116.8	0.0	116.2	0.0	125.0	15.2	121.9	0.0	133.7	11.6	129.1	19.9	122.2	35.2

- Data not available or incorrect

These data were obtained from the Corps of Engineers...

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### Daily Average Flow and Spill (in Kcfs)

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#### Snake Basin Projects

Date	Dworshak		Brownlee		Hells Canyon		Lower Granite		Little Goose		Lower Monumental		Ice Harbor	
	Flow	Spill	Inflow	Inflow	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill
04/12/2019	1.6	0.0			135.0	45.8	132.8	48.0	136.4	41.7	147.1			94.2
04/13/2019	1.6	0.0			123.0	41.7	121.3	47.1	124.0	41.3	129.7			84.8
04/14/2019	1.6	0.0			114.5	42.4	110.3	47.1	109.7	40.6	114.6			80.2
04/15/2019	9.8	0.0			113.5	42.1	110.8	48.4	113.9	40.6	120.8			83.1
04/16/2019	10.1	0.0			110.3	42.4	107.5	48.4	107.1	41.5	113.9			79.8
04/17/2019	10.1	0.0			105.7	42.3	103.6	47.7	102.8	40.8	110.2			80.9
04/18/2019	10.1	0.0			102.2	41.8	100.8	47.2	101.7	40.8	108.9			80.4
04/19/2019	10.1	0.0			108.0	41.6	106.5	48.5	107.6	40.7	111.4			79.8
04/20/2019	10.1	0.0			125.7	50.0	119.3	49.3	117.1	40.6	122.4			84.9
04/21/2019	9.3	0.3			154.2	65.0	150.7	62.3	149.3	42.7	156.8			102.9
04/22/2019	10.0	0.0			160.6	70.9	157.0	66.9	156.3	46.0	164.3			110.4
04/23/2019	9.9	0.0			157.8	68.4	153.7	62.7	152.2	43.3	161.3			107.4
04/24/2019	9.9	0.0			156.1	66.7	149.0	59.4	146.8	39.9	151.9			98.3
04/25/2019	9.9	0.0			162.9	68.1	163.1	73.7	156.0	49.6	167.0			113.2

- Data not available or incorrect

These data were obtained from the Corps of Engineers...



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### Daily Average Flow and Spill (in Kcfs)

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#### Mid - Columbia Projects

Date	McNary		John Day		The Dalles		Bonneville		PH1	PH2
	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill		
04/12/2019	248.7	164.6	294.2	124.5	290.8	138.7	331.0	114.9	103.1	100.6
04/13/2019	216.4	143.2	242.3	120.7	235.8	134.2	277.8	113.6	55.2	96.7
04/14/2019	205.4	130.7	228.0	120.6	227.6	131.0	256.5	113.1	34.2	96.8
04/15/2019	204.1	130.6	234.9	121.5	225.0	122.2	255.2	113.0	45.8	84.0
04/16/2019	207.9	133.1	208.7	122.6	200.3	117.1	219.2	113.2	9.3	84.4
04/17/2019	199.7	127.3	216.9	123.2	202.4	108.3	231.2	114.0	20.3	84.5
04/18/2019	198.0	126.0	214.4	122.8	208.6	107.6	231.9	115.3	15.3	89.0
04/19/2019	220.6	147.1	229.7	126.3	217.9	105.2	243.1	118.0	24.3	88.4
04/20/2019	201.3	128.9	210.8	122.7	202.3	96.2	233.7	118.4	7.6	95.3
04/21/2019	245.0	161.6	251.5	128.7	236.2	103.5	247.8	118.7	23.7	92.9
04/22/2019	263.9	167.9	281.6	131.5	271.1	107.3	288.8	118.1	69.5	88.9
04/23/2019	277.8	170.8	293.1	136.6	286.4	118.0	305.1	118.6	76.3	97.8
04/24/2019	305.8	176.9	323.6	150.1	306.1	119.6	324.6	126.6	88.2	97.3
04/25/2019	321.9	180.9	343.2	160.1	331.1	131.6	357.3	135.1	107.7	102.1

- Data not available or incorrect

These data were obtained from the Corps of Engineers...

## Gas Bubble Monitoring Program Two Week GBT Monitoring Report

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### LOWER GRANITE DAM

Date	Species Examined	Total Fish Examined	Total Fish w/ GBT	Total Fish w/ Fin GBT	Percent Fish w/ Fin GBT	Percent Fish w/ Severe Fin GBT	Number of Fish with Fin GBT - By Rank			
							Rank 1	Rank 2	Rank 3	Rank 4
04/12/2019	CH1+ST	100	0	0	0.00 %	0.00 %	0	0	0	0
04/19/2019	CH1+ST	100	0	0	0.00 %	0.00 %	0	0	0	0
04/26/2019	CH1+ST	100	0	0	0.00 %	0.00 %	0	0	0	0

### LITTLE GOOSE DAM

Date	Species Examined	Total Fish Examined	Total Fish w/ GBT	Total Fish w/ Fin GBT	Percent Fish w/ Fin GBT	Percent Fish w/ Severe Fin GBT	Number of Fish with Fin GBT - By Rank			
							Rank 1	Rank 2	Rank 3	Rank 4
04/16/2019	CH1+ST	100	1	1	1.00 %	0.00 %	1	0	0	0
04/22/2019	CH1+ST	100	3	3	3.00 %	0.00 %	3	0	0	0

 Samples highlighted in yellow indicate that the sample size criteria of 100 fish was not met. The inability to collect an adequate sample precludes the accurate estimation of the percentage of fish with GBT and, therefore, no estimate is provided.

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

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## Gas Bubble Monitoring Program Two Week GBT Monitoring Report

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### LOWER MONUMENTAL DAM

Date	Species Examined	Total Fish Examined	Total Fish w/ GBT	Total Fish w/ Fin GBT	Percent Fish w/ Fin GBT	Percent Fish w/ Severe Fin GBT	Number of Fish with Fin GBT - By Rank			
							Rank 1	Rank 2	Rank 3	Rank 4
04/19/2019	CH1+ST	100	0	0	0.00 %	0.00 %	0	0	0	0
04/25/2019	CH1+ST	100	2	2	2.00 %	0.00 %	2	0	0	0

### McNARY DAM

Date	Species Examined	Total Fish Examined	Total Fish w/ GBT	Total Fish w/ Fin GBT	Percent Fish w/ Fin GBT	Percent Fish w/ Severe Fin GBT	Number of Fish with Fin GBT - By Rank			
							Rank 1	Rank 2	Rank 3	Rank 4
04/13/2019	CH1+ST	100	0	0	0.00 %	0.00 %	0	0	0	0
04/17/2019	CH1+ST	100	0	0	0.00 %	0.00 %	0	0	0	0
04/21/2019	CH1+ST	100	0	0	0.00 %	0.00 %	0	0	0	0
04/25/2019	CH1+ST	100	0	0	0.00 %	0.00 %	0	0	0	0

Samples highlighted in yellow indicate that the sample size criteria of 100 fish was not met. The inability to collect an adequate sample precludes the accurate estimation of the percentage of fish with GBT and, therefore, no estimate is provided.

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

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## Gas Bubble Monitoring Program Two Week GBT Monitoring Report

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### BONNEVILLE DAM

Date	Species Examined	Total Fish Examined	Total Fish w/ GBT	Total Fish w/ Fin GBT	Percent Fish w/ Fin GBT	Percent Fish w/ Severe Fin GBT	Number of Fish with Fin GBT - By Rank			
							Rank 1	Rank 2	Rank 3	Rank 4
04/14/2019	CH1+ST	100	0	0	0.00 %	0.00 %	0	0	0	0
04/17/2019	CH1+ST	100	2	2	2.00 %	0.00 %	2	0	0	0
04/21/2019	CH1+ST	100	2	2	2.00 %	0.00 %	2	0	0	0
04/24/2019	CH1+ST	100	0	0	0.00 %	0.00 %	0	0	0	0

### ROCK ISLAND DAM (ALL FISH)

Date	Species Examined	Total Fish Examined	Total Fish w/ GBT	Total Fish w/ Fin GBT	Percent Fish w/ Fin GBT	Percent Fish w/ Severe Fin GBT	Number of Fish with Fin GBT - By Rank			
							Rank 1	Rank 2	Rank 3	Rank 4
04/23/2019	CH1+ST	100	5	5	5.00 %	0.00 %	4	1	0	0
04/25/2019	CH1+ST	100	5	5	5.00 %	0.00 %	5	0	0	0

Samples highlighted in yellow indicate that the sample size criteria of 100 fish was not met. The inability to collect an adequate sample precludes the accurate estimation of the percentage of fish with GBT and, therefore, no estimate is provided.

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

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## Gas Bubble Monitoring Program Two Week GBT Monitoring Report

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### ROCK ISLAND DAM ("TRADITIONAL" EXAMS ONLY)

Date	Species Examined	Total Fish Examined	Total Fish w/ GBT	Total Fish w/ Fin GBT	Percent Fish w/ Fin GBT	Percent Fish w/ Severe Fin GBT	Number of Fish with Fin GBT - By Rank			
							Rank 1	Rank 2	Rank 3	Rank 4
04/23/2019	CH1+ST	95	5	5			4	1	0	0
04/25/2019	CH1+ST	93	5	5			5	0	0	0

### ROCK ISLAND DAM ("FRESH" EXAMS ONLY)

Date	Species Examined	Total Fish Examined	Total Fish w/ GBT	Total Fish w/ Fin GBT	Percent Fish w/ Fin GBT	Percent Fish w/ Severe Fin GBT	Number of Fish with Fin GBT - By Rank			
							Rank 1	Rank 2	Rank 3	Rank 4
04/23/2019	CH1	5	0	0			0	0	0	0
04/25/2019	CH1+ST	7	0	0			0	0	0	0

Samples highlighted in yellow indicate that the sample size criteria of 100 fish was not met. The inability to collect an adequate sample precludes the accurate estimation of the percentage of fish with GBT and, therefore, no estimate is provided.

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

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

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**Total Dissolved Gas Data at Upper Columbia Sites**

Hungry H. Dnst				Boundary				Grand Coulee				Grand C. Tlwr				Chief Joseph				Chief J. Dnst				Date	
Date	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	Date
04/12									104.3	104.5	104.7	24	104.5	105.2	105.7	24	106.0	106.3	106.6	24	105.6	106.0	106.4	24	04/12
04/13									104.7	105.0	105.1	24	105.5	105.7	106.3	24	106.0	106.1	106.5	24	105.3	105.6	105.7	24	04/13
04/14									105.0	105.1	105.3	24	106.1	107.1	107.5	24	105.6	105.8	106.0	24	105.3	105.7	105.9	24	04/14
04/15									105.2	105.5	105.7	24	105.4	105.9	106.3	24	105.8	106.2	106.4	24	105.6	106.0	106.5	24	04/15
04/16									104.8	105.0	105.1	24	104.6	104.8	104.9	24	105.7	105.9	106.1	24	105.2	105.4	105.6	24	04/16
04/17									104.3	104.5	104.7	24	104.2	104.5	105.0	24	105.1	105.3	105.6	24	104.8	105.2	105.7	24	04/17
04/18									105.0	105.9	106.3	24	104.2	104.7	104.9	24	105.6	106.1	106.2	24	105.0	105.4	105.6	24	04/18
04/19									106.3	106.6	106.8	24	105.7	106.2	106.3	24	106.2	106.4	106.6	24	105.6	105.8	105.9	24	04/19
04/20									106.2	106.4	106.5	24	106.3	106.9	107.5	24	105.9	106.2	106.6	24	105.5	106.0	106.7	24	04/20
04/21									105.3	105.4	105.6	24	106.1	106.5	106.9	24	105.5	106.0	106.9	24	105.1	105.7	106.4	24	04/21
04/22									106.4	107.0	107.3	24	105.1	105.5	105.9	24	105.2	105.6	105.8	24	105.0	105.6	106.1	24	04/22
04/23									107.2	107.7	108.1	24	105.9	106.6	107.2	24	106.2	106.6	106.8	24	106.1	106.7	107.1	24	04/23
04/24									106.2	106.5	107.0	24	105.2	105.5	105.8	24	106.7	107.1	107.5	24	106.7	107.2	107.5	24	04/24
04/25									106.2	106.5	106.9	20	105.2	105.6	106.0	20	106.3	106.6	106.8	23	106.0	106.3	106.5	23	04/25

**Total Dissolved Gas Data at Upper Columbia Sites**

Wells				Wells Dwnstrm				Rocky Reach				Rocky R. Tlwr				Rock Island				Rock I. Tlwr				Date	
Date	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	Date
04/12	105.2	105.6	105.8	24	106.9	107.4	107.8	24	106.2	106.6	106.9	23	106.7	107.4	108.4	23	105.3	105.4	105.8	24	105.1	105.3	105.5	23	04/12
04/13	105.9	106.3	106.5	24	107.6	108.0	108.3	24	107.7	108.1	108.3	23	108.1	108.4	108.8	20	106.2	106.7	106.9	22	106.0	106.5	106.7	20	04/13
04/14	105.6	105.7	105.9	24	107.2	107.4	107.6	24	107.9	108.0	108.2	23	108.3	108.5	108.8	18	106.8	107.0	107.4	20	106.5	106.7	107.2	18	04/14
04/15	105.4	105.7	105.9	24	107.1	107.7	108.0	24	107.8	108.1	108.3	22	108.3	108.6	108.9	21	106.9	107.3	107.4	21	106.7	107.1	107.3	20	04/15
04/16	105.1	105.4	105.6	24	106.7	107.3	107.6	24	107.2	107.4	107.9	24	107.7	108.0	108.5	21	106.6	106.8	107.4	21	106.5	106.6	107.1	20	04/16
04/17	104.8	105.0	105.2	24	106.7	107.1	107.5	24	106.7	107.0	107.1	23	107.2	107.6	108.1	21	106.1	106.3	106.5	22	109.0	110.0	112.5	21	04/17
04/18	105.5	106.3	106.5	24	106.1	106.2	106.4	24	106.9	107.3	107.7	23	107.3	107.7	108.8	19	106.4	106.7	107.2	22	108.9	109.6	110.8	18	04/18
04/19	106.7	106.9	107.1	23	106.6	106.8	106.9	24	108.3	108.7	109.0	22	109.4	110.1	112.7	21	107.3	107.4	107.5	24	109.1	109.8	111.7	21	04/19
04/20	106.8	107.2	107.6	24	107.9	109.2	110.2	24	108.5	108.7	109.1	24	109.1	109.6	110.7	22	107.9	108.2	108.5	23	108.8	109.2	109.9	22	04/20
04/21	106.0	106.5	107.0	24	107.9	108.2	108.4	24	108.3	108.6	109.9	22	108.4	108.7	109.4	19	107.1	107.3	107.9	21	108.6	108.9	109.6	19	04/21
04/22	106.1	106.6	106.9	24	108.5	108.8	109.0	24	108.5	108.7	108.9	24	109.7	110.6	116.0	24	107.6	108.3	109.0	24	108.2	108.7	109.1	23	04/22
04/23	106.2	106.4	106.6	24	108.9	109.1	109.3	24	109.0	109.2	109.4	22	109.4	109.6	110.0	19	107.2	108.1	108.7	18	108.7	108.8	109.2	13	04/23
04/24	105.9	106.4	106.7	24	109.0	110.0	115.7	24	108.4	108.7	109.0	21	109.0	109.2	110.1	18	107.2	107.9	108.3	21	110.5	111.1	113.4	16	04/24
04/25	106.8	107.6	107.8	23	109.6	110.7	114.3	23	107.8	108.2	109.3	22	108.2	108.6	109.6	21	106.9	107.5	107.9	22	108.9	109.8	110.9	20	04/25

FISH PASSAGE CENTER

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

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**Total Dissolved Gas Data at Upper and Mid-Columbia Sites**

Wanapum				Wanapum Tlwr				Priest Rapids				Priest R. Dnstr				Pasco				Date	
Date	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	Date
04/12	105.8	106.5	107.0	24	106.8	108.1	112.0	24	104.6	104.8	105.2	24	105.7	106.1	107.0	24					04/12
04/13	106.2	106.3	106.6	24	106.4	107.0	114.8	24	104.5	104.7	104.8	24	105.9	106.4	106.7	24					04/13
04/14	105.7	105.8	105.9	24	116.7	118.0	119.6	24	104.2	104.3	104.4	24	105.5	105.9	106.6	24					04/14
04/15	105.8	106.5	107.8	24	118.7	121.8	124.9	24	104.7	105.5	108.1	24	106.3	108.0	111.9	24					04/15
04/16	106.6	107.0	107.8	24	119.1	121.1	123.5	24	109.4	111.2	113.6	24	110.5	110.5	112.3	6					04/16
04/17	104.6	105.0	105.7	24	117.5	119.3	124.7	24	104.4	105.0	107.2	24				0					04/17
04/18	105.2	106.4	107.0	24	124.3	126.5	127.8	24	107.4	111.2	113.6	24				0					04/18
04/19	106.7	107.0	107.2	24	120.3	122.7	125.6	24	108.1	108.7	110.4	24				0					04/19
04/20	105.7	105.9	106.2	24	121.7	123.1	128.4	24	106.9	107.5	108.1	24				0					04/20
04/21	105.6	106.0	106.5	24	120.2	123.9	127.6	24	108.5	109.5	109.9	24				0					04/21
04/22	106.9	107.8	108.3	24	118.0	123.1	126.0	24	110.8	111.9	112.6	24				0					04/22
04/23	108.1	108.2	108.3	24	113.0	114.3	117.3	24	112.2	113.3	114.2	24				0					04/23
04/24	107.7	107.9	108.2	24	109.8	110.1	110.6	24	109.9	110.5	112.2	21				0					04/24
04/25	108.4	109.3	109.9	24	111.0	111.6	113.5	24				0				0					04/25

**Total Dissolved Gas Data at Snake and Clearwater Sites**

Dworshak				Clrwr Peck				Anatone				Clrwr-Lewiston				Lower Granite				Lower G. Tlwr				Date	
Date	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	Date
04/12	101.5	102.5	103.4	24	101.5	101.8	101.9	24	104.2	104.5	104.7	24					104.6	104.9	105.2	24	118.6	121.4	135.3	24	04/12
04/13	102.1	103.0	103.8	24	101.3	101.6	101.7	24	103.9	104.2	104.5	24					104.8	104.9	105.1	24	116.8	120.0	120.2	24	04/13
04/14	102.8	103.6	104.4	24	101.0	101.4	101.8	24	103.5	103.8	104.1	24					104.4	104.5	104.8	24	116.9	120.0	120.2	24	04/14
04/15	96.1	96.7	101.5	24	100.0	100.5	100.9	24	103.9	104.7	105.2	24					104.0	104.1	104.4	24	117.0	120.2	120.4	24	04/15
04/16	95.3	95.7	96.1	24	99.0	99.3	99.9	24	103.5	103.7	104.0	24					103.3	103.6	104.1	24	116.8	120.2	120.5	24	04/16
04/17	94.2	94.4	94.6	24	98.5	98.7	98.8	24	103.8	104.1	104.8	24					102.4	102.7	102.9	24	116.6	119.8	120.1	24	04/17
04/18	94.2	94.6	95.0	24	99.2	100.1	100.5	24	104.3	105.1	105.6	24					102.5	103.1	103.7	24	116.7	120.0	120.3	24	04/18
04/19	94.8	95.0	95.5	24	100.1	100.8	101.3	24	105.3	105.9	106.4	24					104.5	105.0	105.2	24	116.8	120.2	120.5	24	04/19
04/20	94.4	94.6	94.9	24	100.3	100.6	100.7	24	104.7	105.0	105.2	24					105.1	105.3	105.6	24	119.3	120.6	121.2	24	04/20
04/21	94.8	95.8	100.1	24	101.6	102.2	102.7	24	104.0	104.4	104.6	24					103.2	103.7	104.6	24	122.4	123.4	124.8	24	04/21
04/22	93.6	93.9	94.2	24	101.9	102.7	103.3	24	104.7	105.3	105.5	24					103.2	104.3	104.8	24	124.1	124.3	124.9	24	04/22
04/23	94.0	94.2	94.4	24	101.5	101.9	102.1	24	106.1	106.6	106.8	24					105.1	105.8	106.2	24	123.9	124.3	124.5	24	04/23
04/24	93.7	93.9	94.2	24	101.7	102.4	102.9	24	106.4	106.6	106.9	24					105.0	105.2	105.6	24	123.0	123.3	123.7	24	04/24
04/25	94.0	94.5	94.7	23	102.1	103.0	103.6	23	106.6	107.2	107.5	23					105.2	105.9	106.4	23	123.2	124.0	124.1	23	04/25

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

Little Goose				L. Goose Tlwr				Lower Mon.				Lwr. Mon. Tlwr				Ice Harbor				Tlwr Ice Harbor				Date	
Date	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	Date
04/12	116.5	116.9	117.3	24	118.6	119.6	120.7	24	123.9	124.6	125.4	24	120.1	121.8	122.0	24	122.4	122.9	123.3	24	121.2	122.4	125.1	24	04/12
04/13	115.4	115.7	116.0	24	118.1	119.1	119.2	24	120.0	120.9	122.6	24	119.5	121.2	121.6	24	120.2	120.7	121.4	24	119.3	119.7	120.1	24	04/13
04/14	113.8	114.3	114.7	24	118.0	119.3	119.5	24	118.0	118.5	118.8	24	118.6	119.8	120.1	24	116.9	117.5	118.8	24	118.8	119.1	119.5	24	04/14
04/15	112.3	112.6	112.8	24	118.4	119.6	120.0	24	118.1	119.0	120.4	24	118.9	120.2	120.5	24	115.7	116.2	116.6	24	119.3	119.9	120.1	24	04/15
04/16	112.0	112.1	112.3	24	118.3	119.6	119.7	24	119.1	119.7	120.4	24	118.7	120.1	121.0	24	116.2	116.4	116.6	24	118.9	119.4	119.5	24	04/16
04/17	112.4	112.5	112.6	24	118.2	119.5	119.7	24	117.8	118.1	118.5	24	118.2	119.4	119.9	24	115.5	115.8	115.9	24	118.9	119.2	119.8	24	04/17
04/18	112.7	113.2	113.7	24	118.3	119.6	120.1	24	118.7	119.5	120.8	24	118.4	119.5	119.8	24	116.4	117.1	117.8	24	119.0	119.7	120.0	24	04/18
04/19	114.4	115.0	115.3	24	118.9	119.9	120.3	24	121.5	122.2	123.0	24	118.7	120.0	120.5	24	118.5	119.0	119.3	24	119.4	120.4	120.8	24	04/19
04/20	115.5	115.8	116.0	24	119.0	119.9	120.1	24	120.9	121.3	121.8	24	119.1	120.6	121.0	24	118.4	118.5	118.7	24	119.7	120.5	120.8	24	04/20
04/21	114.8	115.0	115.5	24	121.5	122.4	122.6	24	119.7	120.1	120.6	24	120.2	121.0	121.3	24	117.1	117.3	117.6	24	122.3	123.5	123.9	24	04/21
04/22	114.9	115.7	116.3	24	122.8	123.0	123.2	24	121.9	122.6	123.3	24	121.3	121.5	121.8	24	117.6	118.0	118.5	24	123.9	124.1	124.4	24	04/22
04/23	117.2	117.8	118.1	24	122.1	123.1	123.4	24	123.4	123.6	123.9	24	120.8	121.1	121.3	24	118.9	119.2	119.5	24	123.4	123.8	123.9	24	04/23
04/24	117.5	117.7	117.8	24	120.7	121.2	123.3	24	122.1	122.7	123.1	24	119.7	120.4	122.5	24	118.7	118.9	119.1	24	121.5	122.1	123.5	24	04/24
04/25	118.1	118.7	119.3	23	123.7	123.9	124.2	23	122.8	123.8	125.8	23	123.1	124.3	125.2	23	119.4	119.8	120.6	23	124.5	125.3	128.0	23	04/25

**Total Dissolved Gas Data at Mid-Columbia Sites**

McNary-Wash.				Tlwr McNary				John Day				Tlwr John Day				The Dalles				Dnstr T. Dalles				Date	
Date	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	Date
04/12	118.2	118.5	119.0	24	118.4	119.7	120.1	24	104.1	104.3	104.5	24	117.5	118.3	118.5	24	110.2	111.1	111.8	24	116.7	118.0	119.2	24	04/12
04/13	116.1	117.2	118.1	24	117.2	118.5	119.5	24	105.3	106.0	106.9	24	116.6	117.9	118.1	24	110.4	111.3	112.5	24	119.9	122.6	124.8	24	04/13
04/14	112.1	113.0	114.2	24	115.8	117.0	117.3	24	107.2	107.7	108.1	24	116.2	117.8	118.1	24	111.6	112.8	113.8	24	120.9	123.2	124.6	24	04/14
04/15	109.6	110.1	111.0	24	116.2	117.3	117.6	24	109.6	110.7	111.1	24	116.4	118.0	118.7	24	113.3	114.5	115.6	24	121.3	123.6	125.1	24	04/15
04/16	107.7	107.9	108.7	24	115.8	117.0	117.5	24	110.8	111.0	111.2	24	117.0	118.3	118.5	24	114.2	115.2	116.0	24	121.3	124.5	126.0	24	04/16
04/17	108.5	108.9	109.2	24	115.7	116.6	117.4	24	109.5	109.8	110.3	24	116.6	118.1	118.4	24	113.4	114.4	115.1	24	120.7	122.9	124.6	24	04/17
04/18	108.9	109.3	110.2	24	115.8	116.8	117.3	24	108.5	108.8	109.2	22	116.5	118.1	118.4	24	115.4	116.8	118.1	24	120.2	121.8	123.0	24	04/18
04/19	111.3	112.6	113.1	24	117.1	118.9	120.0	24	109.4	109.7	109.9	23	116.7	118.0	118.1	24	116.7	117.9	119.0	24	120.2	121.4	122.1	24	04/19
04/20	113.4	113.8	114.3	24	116.1	117.1	117.9	24	109.7	109.9	110.1	24	116.5	117.7	118.1	24	114.8	116.0	116.7	24	118.5	119.4	120.2	24	04/20
04/21	111.2	111.6	111.8	24	117.8	118.9	119.6	24	109.4	109.7	110.0	24	116.8	118.0	118.1	24	113.3	114.3	115.2	24	117.8	118.5	119.1	24	04/21
04/22	112.9	113.1	113.4	24	118.3	119.3	119.7	24	111.2	112.0	112.8	24	117.3	118.4	118.6	24	113.3	114.2	115.2	24	116.9	117.5	118.5	24	04/22
04/23	114.0	114.3	114.4	24	118.6	119.4	119.6	24	112.9	113.1	113.4	24	117.7	118.5	118.8	24	114.9	115.4	116.3	24	118.2	118.7	119.4	24	04/23
04/24	112.9	113.6	114.3	24	119.0	119.7	120.1	24	112.0	112.4	112.7	24	118.5	119.2	119.5	24	114.3	115.5	116.3	24	117.5	118.3	119.1	24	04/24
04/25	114.9	115.4	116.2	21	119.5	120.1	120.4	21	113.0	113.6	114.2	21	119.2	119.4	119.5	21	115.8	116.4	117.1	21	118.9	119.4	120.1	21	04/25



FISH PASSAGE CENTER

**Total Dissolved Gas Saturation(%) - Average of  
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**Total Dissolved Gas Data at Mid-Columbia Sites**

Date	Bonneville				Warrendale				Camas\Washug.				Cascade Isl.				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	
04/12	115.7	116.2	116.7	24	116.4	116.7	117.0	24	115.5	116.3	116.8	24	120.1	120.4	120.8	24	04/12
04/13	116.1	116.3	116.8	24	117.0	117.5	117.9	24	115.1	115.3	115.5	24	119.3	119.6	120.0	24	04/13
04/14	115.5	116.8	119.0	24	116.9	117.6	118.0	24	114.6	114.9	115.5	24	119.2	119.5	119.8	24	04/14
04/15	119.5	120.7	121.8	24	119.0	119.7	120.6	24	115.8	116.6	117.2	24	119.5	119.9	120.3	24	04/15
04/16	119.6	120.2	120.9	24	119.0	119.4	119.6	24	116.9	117.2	117.7	24	118.7	119.0	119.3	24	04/16
04/17	118.0	119.2	119.9	24	118.4	118.8	119.1	24	116.9	117.7	118.6	24	118.6	119.1	119.4	24	04/17
04/18	118.7	119.6	120.9	24	119.1	119.6	119.9	24	117.8	119.0	120.1	24	118.8	119.3	119.6	24	04/18
04/19	121.5	122.5	123.5	24	120.0	120.6	120.7	24	118.3	118.7	119.1	24	119.2	119.7	119.9	24	04/19
04/20	117.2	118.1	119.9	24	118.5	119.2	119.6	24	117.2	117.9	118.3	24	119.2	119.9	120.1	24	04/20
04/21	113.6	113.9	115.1	24	117.0	117.7	118.1	24	115.2	115.8	116.5	24	119.0	119.8	119.9	24	04/21
04/22	114.3	115.0	115.4	24	116.2	116.9	117.3	24	114.6	115.3	116.0	24	119.1	119.6	119.9	24	04/22
04/23	115.6	115.8	116.2	24	116.7	117.2	117.5	24	115.5	115.9	116.4	24	119.4	119.6	119.6	24	04/23
04/24	115.2	115.5	116.0	24	116.8	117.2	117.4	24	115.0	116.2	116.9	24	120.5	121.6	122.0	24	04/24
04/25	117.3	118.2	119.5	23	118.2	118.9	119.4	23	116.5	117.1	117.3	23	122.5	123.1	123.3	23	04/25

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 4/26/2019 11:16:24 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)
04/12/2019					55,910	58,645		2			30,708
04/13/2019					33,151		29,721	4	14,457	7,557	40,472
04/14/2019		109			28,743	21,240		3			32,096
04/15/2019		284			28,899		20,674	1	9,204	6,364	26,091
04/16/2019		7,441	45		59,250	65,301		8			30,331
04/17/2019		3,685	82		58,329		16,525	12	19,249	8,319	25,357
04/18/2019		210	88		40,545	31,606		37			17,723
04/19/2019	91	2,842	120	71	29,954		39,715	152	23,301	5,448	26,426
04/20/2019	109	1,021		448	40,830	63,979		423			30,418
04/21/2019	589			1,650	43,407		58,570	870	20,211	8,290	24,978
04/22/2019	755				57,756	54,556		674			28,021
04/23/2019			169		76,862		66,988	296	16,243	26,203	35,097
04/24/2019			105		90,127	122,000	89,296	223			45,271
04/25/2019			822		112,259		72,374	353	29,767	32,894	61,652
04/26/2019											
<b>Total:</b>	1,544	15,592	1,431	2,169	756,022	417,327	393,863	3,058	132,432	95,075	454,641
<b># Days:</b>	4	7	7	3	14	7	8	14	7	7	14
<b>Average:</b>	386	2,227	204	723	54,002	59,618	49,233	218	18,919	13,582	32,474
<b>YTD:</b>	15,667	17,017	2,694	3,125	1,218,944	427,947	561,913	3,089	151,818	141,780	486,439

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)
04/12/2019					3,646	3,706		50			38,914
04/13/2019					21,181		589	33	0	0	42,515
04/14/2019		0			3,159	5,479		17			35,579
04/15/2019		0			4,130		0	77	0	99	10,894
04/16/2019		0	0		1,283	717		98			14,956
04/17/2019		0	0		314		0	31	1,412	0	9,328
04/18/2019		0	0		338	1,683		59			8,168
04/19/2019	0	0	0	0	0		0	25	874	0	6,733
04/20/2019	0	0		0	324	0		4			2,346
04/21/2019	0			0	331		879	10	959	0	3,113
04/22/2019	0				354	2		12			2,071
04/23/2019			0		3,217		0	4	1,710	5,347	2,329
04/24/2019			0		1,052	0	0	26			1,735
04/25/2019			0		2,842		284	31	1,167	0	4,569
04/26/2019											
Total:	0	0	0	0	42,171	11,587	1,752	477	6,122	5,446	183,250
# Days:	4	7	7	3	14	7	8	14	7	7	14
Average:	0	0	0	0	3,012	1,655	219	34	875	778	13,089
YTD:	1	2	4	67	62,526	11,611	1,752	1,274	6,122	5,631	1,458,265

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 COHO

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (Index)	LGS (Index)	LMN (Index)	RIS (Index)	MCN (Index)	JDA (Index)	BO2 (Index)
04/12/2019					12,143	1,011		1			4,822
04/13/2019					1,535		0	0	479	0	3,301
04/14/2019		0			948	2		0			4,005
04/15/2019		0			0		608	0	850	0	4,169
04/16/2019		0	12		0	717		0			4,473
04/17/2019		0	19		0		661	1	282	238	2,082
04/18/2019		0	23		0	0		2			3,996
04/19/2019	0	0	31	0	0		1,999	1	4,369	118	4,544
04/20/2019	0	0		0	0	735		5			2,738
04/21/2019	0			0	0		879	4	2,877	247	3,259
04/22/2019	0				1,063	1,037		5			5,245
04/23/2019			78		2,502		281	5	1,140	1,177	4,348
04/24/2019			44		1,753	4,133	832	6			9,490
04/25/2019			75		1,066		1,135	6	1,634	1,842	13,241
04/26/2019											
Total:	0	0	282	0	21,010	7,635	6,395	36	11,631	3,622	69,713
# Days:	4	7	7	3	14	7	8	14	7	7	14
Average:	0	0	40	0	1,501	1,091	799	3	1,662	517	4,980
YTD:	0	0	359	43	36,285	7,673	6,728	38	12,425	3,938	94,452

Number of hours sampled:

- No data available or no sample conducted

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

## Smolt Monitoring Program Two Week Passage Index Report

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### COMBINED STEELHEAD

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (Index)	LGS (Index)	LMN (Index)	RIS (Index)	MCN (Index)	JDA (Index)	BO2 (Index)	
04/12/2019					108,776	341,692		0			931	
04/13/2019					63,234		168,907	2	31,400	14,137	157	
04/14/2019		231			98,862	97,947		3			1,246	
04/15/2019		247			148,623		80,569	0	47,576	21,976	1,076	
04/16/2019		133	55		109,211	55,337		1			2,516	
04/17/2019		116	46		161,504		71,389	1	62,342	31,019	4,379	
04/18/2019		3,921	54		88,861	90,117		27			5,909	
04/19/2019	106	65	77	18	43,443		69,379	51	53,592	24,517	7,912	
04/20/2019	132	12			225	73,558	166,174	83			6,257	
04/21/2019	46				281	58,650		91,662	132	28,382	32,664	11,845
04/22/2019	107				211,180	91,354		228			13,528	
04/23/2019			906		278,490		148,612	109	18,238	133,502	4,659	
04/24/2019			219		245,832	552,965	194,398	88			6,499	
04/25/2019			497		177,624		198,393	85	21,807	157,623	5,480	
04/26/2019												
<b>Total:</b>	391	4,725	1,854	524	1,867,848	1,395,586	1,023,309	810	263,337	415,438	72,394	
<b># Days:</b>	4	7	7	3	14	7	8	14	7	7	14	
<b>Average:</b>	98	675	265	175	133,418	199,369	127,914	58	37,620	59,348	5,171	
<b>YTD:</b>	535	11,240	2,327	900	2,748,089	1,418,524	1,167,670	813	289,762	421,594	75,483	

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)
04/12/2019					0	0		16			423
04/13/2019					0		0	36	0	0	236
04/14/2019		0			0	0		19			402
04/15/2019		0			0		0	15	0	0	134
04/16/2019		0	0		0	0		14			140
04/17/2019		0	0		0		0	57	0	0	248
04/18/2019		0	0		0	0		70			696
04/19/2019	0	0	0	0	0		0	19	0	0	674
04/20/2019	0	0		0	0	0		242			521
04/21/2019	0			0	0		0	235	0	0	1,386
04/22/2019	0				0	0		657			552
04/23/2019			0		0		0	467	0	0	466
04/24/2019			0		0	2	0	190			320
04/25/2019			0		0		0	159	0	0	456
04/26/2019											
Total:	0	0	0	0	0	2	0	2,196	0	0	6,654
# Days:	0	0	0	0	0	0	0	157	0	0	475
Average:	0	0	0	0	0	0	0	157	0	0	475
YTD:	0	0	0	0	272	84	219	2,202	4	0	7,884

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)
04/12/2019					2	4,800		2			425
04/13/2019					11		800	2	9,250	6,350	1,025
04/14/2019		1			7	4,800		1			1,670
04/15/2019		0			23		20,800	1	27,450	4,850	3,150
04/16/2019		0	0		20	400		1			2,750
04/17/2019		0	0		2		9,000	2	20,400	4,900	1,587
04/18/2019		0	0		3	2,600		1			2,866
04/19/2019	0	0	0	0	1		10,800	0	44,800	6,550	2,867
04/20/2019	0	0		0	0	400		0			3,067
04/21/2019	0			0	1		0	0	32,300	21,500	3,000
04/22/2019	0				0	200		3			2,100
04/23/2019			2		3		0	2	9,700	47,857	2,300
04/24/2019			0		2	400	400	0			13,587
04/25/2019			0		1		1,000	2	6,200	9,857	22,933
04/26/2019											
<b>Total:</b>	0	1	2	0	76	13,600	42,800	17	150,100	101,864	63,327
<b># Days:</b>	4	7	7	3	15	8	8	15	8	14	23
<b>Average:</b>	0	0	0	0	5	1,700	5,350	1	18,763	7,276	2,753
<b>YTD:</b>	2	59	87		288	16,440	47,764	39	153,202	152,744	70,491

- 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  
 $\text{Passage Index} = \frac{\text{Collection Counts}}{(\text{Powerhouse Flow} / (\text{Powerhouse Flow} + \text{Spill}))}$   
 RIS, BO2 (Index) = Rock Island Dam Second Powerhouse Bypass Trap : Passage Index Counts  
 $\text{Passage Index} = \frac{\text{Collection Counts}}{(\text{Powerhouse 2 Flow} / (\text{Powerhouse 1 \& 2 Flow} + \text{Spill}))}$
- 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

### 4/12/2019 12:00:00 AM TO 4/26/2019 12:00:00 AM

Date 4/26/2019 11:19:05 AM

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#### Lower Granite Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	26,605	451,898	13,200	0	1,113,903	1,605,606
Sum of Number Barged	2,522	133,352	1,783	0	292,224	429,881
Sum of Number Bypassed	24,061	318,279	11,413	0	821,652	1,175,405
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	14	8	1	0	6	29
Sum of Facility Morts	8	259	3	0	21	291
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	22	267	4	0	27	320

#### Little Goose Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	6,701	237,905	4,404	1	803,749	1,052,760
Sum of Number Barged	0	60,179	1,985	0	258,706	320,870
Sum of Number Bypassed	6,692	177,389	2,414	0	545,005	731,500
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	8	1	0	0	3	12
Sum of Facility Morts	1	336	5	1	35	378
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	9	337	5	1	38	390

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## Two Week Transportation Summary Report

### 4/12/2019 12:00:00 AM TO 4/26/2019 12:00:00 AM

Date 4/26/2019 11:19:05 AM

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#### Lower Monumental Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	1,200	270,671	4,200	0	700,929	977,000
Sum of Number Barged	200	56,699	867	0	161,814	219,580
Sum of Number Bypassed	1,000	213,969	3,333	0	539,111	757,413
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	0	3	0	0	4	7
Sum of Facility Morts	0	0	0	0	0	0
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	0	3	0	0	4	7

#### Total

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	34,506	960,474	21,804	1	2,618,581	6,253,947
Sum of Number Barged	2,722	250,230	4,635	0	712,744	1,683,075
Sum of Number Bypassed	31,753	709,637	17,160	0	1,905,768	4,570,086
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	22	12	1	0	13	61
Sum of Facility Morts	9	595	8	1	56	725
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	31	607	9	1	69	786

FISH PASSAGE CENTER

## YTD Transportation Summary Report

Date 4/26/2019 11:17:52 AM

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### Lower Granite Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	40573	754584	22714	150	1667122	2485143
Sum of Number Barged	2999	152317	2157	0	323276	480749
Sum of Number Bypassed	37509	601917	20553	150	1343798	2003927
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	49	20	1	0	10	80
Sum of Facility Morts	16	329	3	0	38	386
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	65	349	4	0	48	466

### Little Goose Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	6711	243287	4424	41	814895	1069358
Sum of Number Barged	0	60179	1985	0	258706	320870
Sum of Number Bypassed	6702	182763	2434	40	556148	748087
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	8	3	0	0	4	15
Sum of Facility Morts	1	342	5	1	37	386
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	9	345	5	1	41	401

FISH PASSAGE CENTER

## YTD Transportation Summary Report

Date 4/26/2019 11:17:52 AM

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### Lower Monumental Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	1200	412239	4400	128	786017	1203984
Sum of Number Barged	200	56699	867	0	161814	219580
Sum of Number Bypassed	1000	355531	3533	128	624197	984389
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	0	9	0	0	6	15
Sum of Facility Morts	0	0	0	0	0	0
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	0	9	0	0	6	15

### Total

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	48484	1410110	31538	319	3268034	4758485
Sum of Number Barged	3199	269195	5009	0	743796	1021199
Sum of Number Bypassed	45211	1140211	26520	318	2524143	3736403
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	57	32	1	0	20	110
Sum of Facility Morts	17	671	8	1	75	772
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	74	703	9	1	95	882

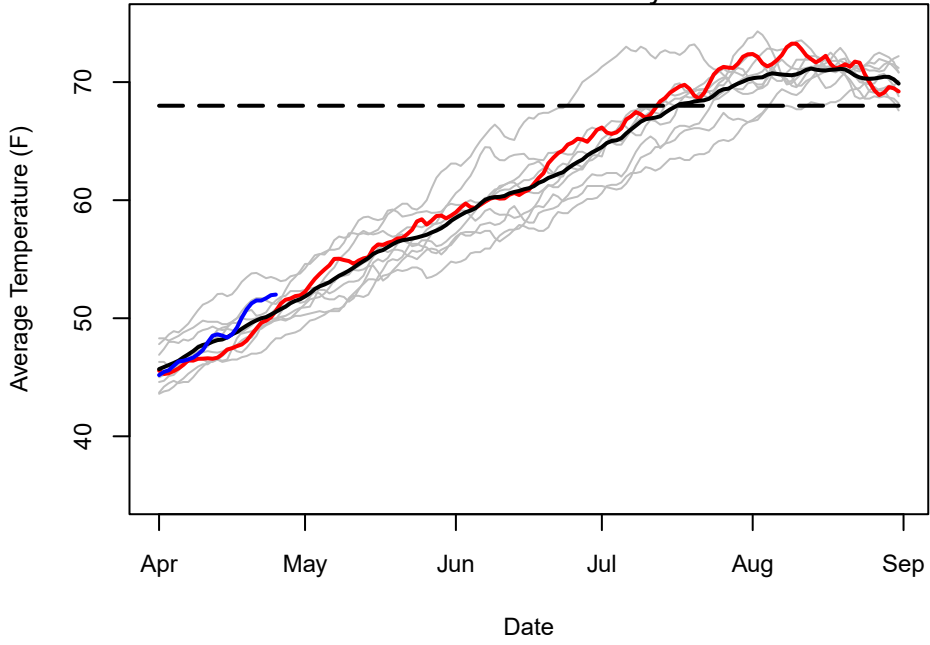
Cumulative Adult Passage at Mainstem Dams Through: 04/25

dam	enddate	Spring Chinook						Summer Chinook						Fall Chinook					
		2019		2018		10-Yr Avg.		2019		2018		10-Yr Avg.		2019		2018		10-Yr Avg.	
		Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack
BON	04/25	1606	8	996	19	27504	202	0	0	0	0	0	0	0	0	0	0	0	0
TDA	04/22	178	14	126	3	10571	65	0	0	0	0	0	0	0	0	0	0	0	0
JDA	04/23	107	3	136	6	8589	70	0	0	0	0	0	0	0	0	0	0	0	0
MCN	04/23	26	5	57	0	4239	31	0	0	0	0	0	0	0	0	0	0	0	0
IHR	04/22	0	0	28	1	1438	1	0	0	0	0	0	0	0	0	0	0	0	0
LMN	04/22	2	1	17	2	691	2	0	0	0	0	0	0	0	0	0	0	0	0
LGS	04/23	1	0	15	2	558	15	0	0	0	0	0	0	0	0	0	0	0	0
LGR	04/25	1	1	12	2	611	7	0	0	0	0	0	0	0	0	0	0	0	0
PRD	04/24	7	0	4	0	317	0	0	0	0	0	0	0	0	0	0	0	0	0
WAN	04/24	2	1	3	0	182	0	0	0	0	0	0	0	0	0	0	0	0	0
RIS	04/23	0	0	0	0	37	0	0	0	0	0	0	0	0	0	0	0	0	0
RRH	04/23	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
WEL		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WFA	04/23	251	2	199	8	3005	34	0	0	0	0	0	0	0	0	0	0	0	0

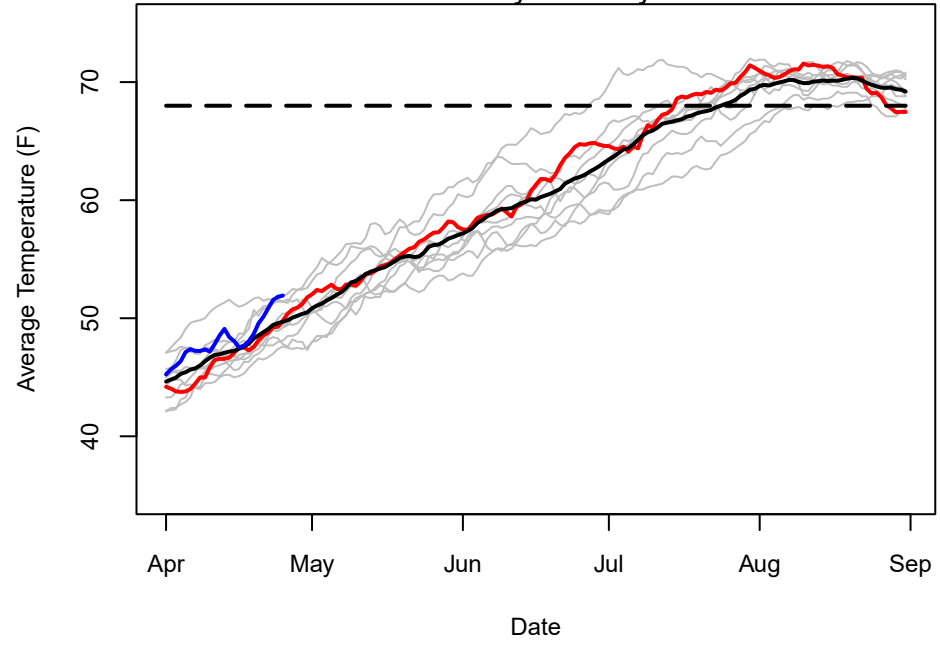
DAM	ENDDATE	Coho						Sockeye			Steelhead						Lamprey		
		2019		2018		10-Yr Avg.		2019	2018	10-Yr Avg.	10-Yr Unclipped		Unclipped		10-Yr Avg.	2019	2018	10-Yr Avg.	
		Adult	Jack	Adult	Jack	Adult	Jack				2019	2018	2019	2018					
BON	04/25	4	1	1	-1	0	0	0	0	0	1654	2445	3408	892	1041	1237	-39	0	0
TDA	04/22	0	0	4	0	2	0	0	0	0	190	131	1728	97	40	783	1	-2	0
JDA	04/23	18	-12	0	0	0	1	0	0	0	343	342	2747	185	152	1258	3	0	-1
MCN	04/23	0	0	-2	0	0	0	0	0	0	255	346	3639	61	162	1436	0	16	0
IHR	04/22	1	0	0	0	0	0	0	0	0	902	1130	3073	149	362	1112	0	2	1
LMN	04/22	0	0	0	0	0	0	0	0	0	857	983	7266	187	252	2301	0	0	0
LGS	04/23	0	0	0	0	0	0	0	0	0	646	965	4219	67	231	2086	0	0	0
LGR	04/25	0	0	0	0	0	0	0	0	0	2738	4240	7801	1078	1131	3154	1	0	0
PRD	04/24	0	0	0	0	0	0	0	0	0	7	11	22	0	0	0	0	0	0
WAN	04/24	0	0	0	0	0	0	0	0	0	16	22	41	0	0	0	0	0	0
RIS	04/23	0	0	0	0	0	0	0	0	0	32	26	45	17	7	23	0	0	0
RRH	04/23	0	0	0	0	0	0	0	0	0	46	45	130	19	15	90	0	0	0
WEL		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WFA	04/23	0	0	0	2	7	7	0	0	0	3159	1439	5227	2698	1267	127	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.

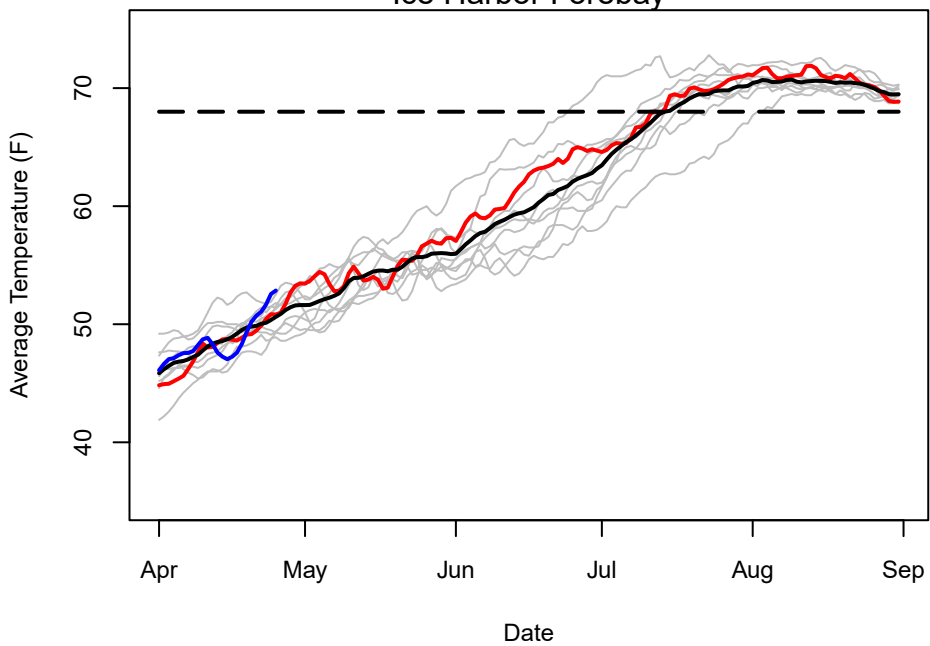
Bonneville Forebay



McNary Forebay



Ice Harbor Forebay



Lower Granite Forebay

