



Fish Passage Center

Weekly Report #19-06

April 12, 2019

This Week's Highlights

Water Supply

Precipitation throughout the Columbia Basin has varied between 157% and 408% of average at individual sub-basins over early April. Precipitation above The Dalles has been 200% of average over early April. Over the 2019 water year, precipitation has ranged between 69% and 97% 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 1-11, 2019		October 1, 2018 to April 11, 2019	
	Observed (inches)	% Average	Observed (inches)	% Average
Columbia Above Coulee	1.59	160	18.3	76
Snake River Above Ice Harbor	1.64	210	14.0	95
Columbia Above The Dalles	1.64	200	15.2	85
Kootenai	1.29	129	16.3	69
Clark Fork	2.36	273	15.7	97
Flathead	2.34	216	16.9	78
Pend Oreille River Basin above Waneta Dam	2.32	244	16.9	84
Salmon River Basin	2.22	223	17.8	98
Upper Snake Tributaries	1.43	157	14.6	88
Clearwater	3.86	297	24.3	90
Willamette River above Portland	8.14	408	45.3	88

Snowpack within the Columbia Basin has been variable. Average snowpack in the Columbia River for basins above the Snake River confluence is 91% of average, for Snake River Basins the average snowpack is 129% of average, and for lower Columbia Basins between McNary and Bonneville Dam average snowpack is

128% of average.

Table 2 displays the April 11th ESP runoff volume forecasts for multiple reservoirs along with the April COE forecasts at Libby and Dworshak. The April 11th ESP forecast at The Dalles between April and August is 83,078 Kaf (95% of average).

Table 2. April 11 ESP Runoff Volume Forecasts for various reservoirs within the Columbia and Snake River Basins.

Location	April 11, 2019 5-day QPF ESP	
	% Average (1981-2010)	Runoff Volume (Kaf)
The Dalles (Apr-Aug)	95	83,078
Grand Coulee (Apr-Aug)	87	49,310
Libby Res. Inflow, MT (Apr-Aug)	75 *81	4,413 *4,456
Hungry Horse Res. Inflow, MT (Apr-Aug)	87	1,690
Lower Granite Res. Inflow (Apr- July)	117	23,124
Brownlee Res. Inflow (Apr-July)	131	7,160
Dworshak Res. Inflow (Apr-July)	102 *81	2,470 *1,964

**COE April Final Forecast

Grand Coulee Reservoir is at 1263.7 feet (4-11-19) and has refilled 3.4 feet over the last week. Outflows at Grand Coulee have ranged between 47.2 Kcfs and 63.2

Kcfs over the last week. The April 10th Flood Control Elevation at Grand Coulee is 1283.3 feet (based on March Final Forecast, the April 30th FC is 1278.9 ft. (based on April Forecast).

The Libby Reservoir is currently at elevation 2406.4 feet (4-11-19) and has refilled 0.5 feet over the past week. Daily average outflows at Libby Dam have been 4.0 Kcfs. The April 10th Flood Control Elevation at Libby is 2441.3 feet (based on March Final Forecast), the April 30th FC is 2453.0 ft. (based on April Forecast).

Hungry Horse is currently at an elevation of 3522.6 feet (4-11-19) and has refilled 1.7 feet last week. Outflows at Hungry Horse have been 1.0-2.0 Kcfs over the last week. The April 10th Flood Control Elevation at Hungry Horse is 3544.6 feet (based on March Final Forecast), the April 30th FC is 3553.6 ft. (based on April Forecast).

Dworshak is currently at an elevation of 1551.3 feet (4-11-19) and has refilled 17.4 feet over last week. Dworshak outflows have been decreased from 5.0 Kcfs to 1.6 Kcfs last week. Inflows have ranged between 10.5 and 28.3 Kcfs. The April 10th System Flood Control Elevation at Dworshak is 1559.5 feet, the April 10th Local FC Elevation is 1570.5 feet (based on March Final Forecast), the April 30th FC is 1573.8 ft. (based on April Forecast).

The Brownlee Reservoir was at an elevation of 2057.0 feet on April 11th, 2019 and has refilled 12.0 feet in the last week. Outflows at Hells Canyon have ranged between 26.1 and 52.1 Kcfs over the last four days. The April 10th Flood Control Elevation at Brownlee is 2053.5 feet (based on March Final Forecast), the April 30th FC is 2068.7 ft. (based on April Forecast).

The Biological Opinion flow period began on April 3rd in the lower Snake River (Lower Granite). According to the April Final Water Supply Forecast (April 3rd, 2019), the flow objective this spring will be 95 Kcfs at Lower Granite. Flows at Lower Granite Dam have averaged 125.6 Kcfs over the last week.

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 ranged between 285.8 Kcfs last week

and 305.7 Kcfs over the last two days. At Priest Rapids flows ranged between 68.6 Kcfs and 73.5 Kcfs over the last two days.

Spill

Flows in the Snake and Mid-Columbia increased substantially this week, when compared to the previous week. This week's daily average flows at Lower Granite and McNary dams ranged from 73.3-195.6 Kcfs and 149.3-305.6 Kcfs, respectively. Flows in the Upper Columbia this week were similar to last week. This week's daily average flows at Rock Island Dam ranged from 55.7-73.6 Kcfs.

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. Daily spill caps are published on the TMT website (<http://pweb.crohms.org/tmt/documents/ops/spill/caps/>). The 2019 spill for fish passage program at the lower Snake River projects began just after midnight on April 3rd. Spill for fish passage at the Mid-Columbia River projects began just after midnight on April 10th. The range of the daily 120% spill caps at the FCRPS projects for the last week (April 5-11) 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 (4/5-4/11)
Lower Granite	53 Kcfs
Little Goose	52 Kcfs
Lower Monumental	48-51 Kcfs
Ice Harbor	88-93 Kcfs
McNary	189 Kcfs
John Day	140-150 Kcfs
The Dalles	140-150 Kcfs
Bonneville	120 Kcfs

Spill Summary

The 120% spill cap at Lower Granite Dam (LGR) has been 53 Kcfs all of this week. Spill at LGR met the estimated 120% spill cap level for approximately 16 hours and the “performance standard” spill levels (20 Kcfs) for 8 hours on each of April 5th through April 7th (Figure 1). During this time, hourly TDG levels during the 16 hours of gas cap spill were as high as 119.9% and the 12-hour average TDG was 119%. By the afternoon of April 8th, flows had increased to a level where “performance standard” spill of 20 Kcfs was not possible. Therefore, LGR spilled ~35 Kcfs for the pm block of “performance standard” spill. Likewise, the am block of “performance standard” spill at LGR on April 9th was ~34 Kcfs for five hours (0100-0559). By the afternoon of April 9th, flows were sufficiently high that neither the 120% Gas Cap nor the “performance standard” spill levels could be met and LGR spilled all flows in excess of hydraulic capacity. The 12-hour average TDG in the LGR tailrace peaked at 128% on April 10th. Flows have decreased over the last two days and, by the afternoon of May 11th, were sufficiently low to manage spill to the 120% spill cap. Flows at LGR are expected to continue to decrease to manageable levels over the next 24 hours.

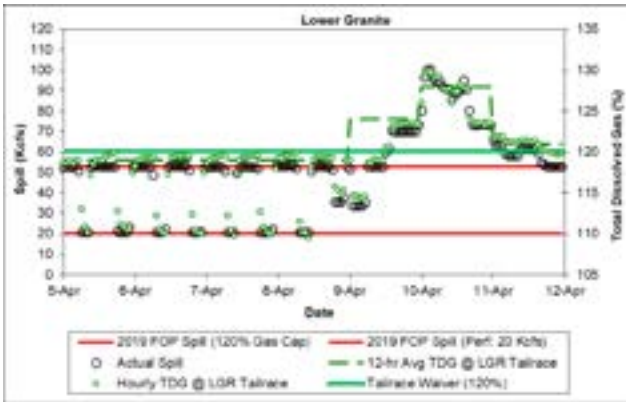


Figure 1. Hourly spill and TDG at Lower Granite Dam (Apr. 5-11, 2019).

The 120% spill cap at Little Goose Dam (LGS) has been 52 Kcfs all of this week. Spill at LGS met the estimated 120% spill cap level for approximately 16 hours and the “performance standard” spill levels (30%) for 8 hours on each of April 3rd through April 8th (Figure 2). During this time, hourly TDG levels during the 16 hours of gas cap spill were as high as 120.1% and the 12-hour average TDG was 119% on all four days. By the morning of April 9th, flows had increased to a level where “performance standard” spill of 30% was not possible. Therefore, LGS spilled ~35% for the am block of “performance standard” spill. By the afternoon of April 9th, flows were sufficiently high that neither the 120% Gas Cap nor the “performance standard” spill levels could be met and LGS spilled all flows in excess of hydraulic capacity. The 12-hour average TDG in the LGS tailrace peaked at 128% on April 10th. Although flows have decreased over the last two days, they were still sufficiently high that spill at LGS through April 11th remained all flows in excess of hydraulic capacity. Flows at LGS are expected to continue to decrease to manageable levels over the next 24 hours.

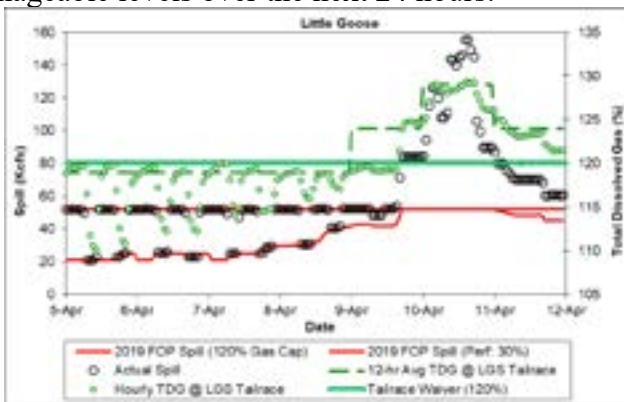


Figure 2. Hourly spill and TDG at Little Goose Dam (Apr. 5-11, 2019).

The 120% spill cap at Lower Monumental Dam (LMN)

began at 51 Kcfs but was reduced to 48 Kcfs on the afternoon of April 9th. On the afternoon of April 5th, the COE sent notification to the Technical Management Team (TMT) that the “performance standard” spill level of 30 Kcfs, using a bulk spill pattern, was resulting in high tailrace TDG levels. Therefore, if the 12-hour average TDG exceeded the 120% criteria from the “performance standard” spill operation, they would switch to a uniform spill pattern during the “performance standard” spill periods. The 12-hour average TDG exceeded 120% on April 6th and, by the afternoon of April 7th, the COE began using a uniform spill pattern for the “performance standard” spill periods.

Spill at LMN met the estimated 120% spill cap level for approximately 16 hours and the “performance standard” spill levels (30 Kcfs) for 8 hours on each of April 3rd through April 8th (Figure 3). During this time, hourly TDG levels during the 16 hours of gas cap spill were as high as 121.1% and the 12-hour average TDG was ranged from 120% to 121%. As mentioned above, the 120% spill cap at LMN was reduced to 48 Kcfs on the afternoon of April 9th, likely due to the project exceeding the waiver criteria on April 8th. By the morning of April 9th, flows had increased to a level where “performance standard” spill of 30 Kcfs was not possible. Therefore, LMN spilled ~32 Kcfs for the am block of “performance standard” spill. By the afternoon of April 9th, flows were sufficiently high that neither the 120% gas cap nor the “performance standard” spill levels could be met and LMN spilled all flows in excess of hydraulic capacity. The 12-hour average TDG in the LMN tailrace peaked at 128% on April 10th. Flows have decreased over the last two days and, by the afternoon of May 11th, were sufficiently low to manage spill close to the 120% spill cap. Flows at LMN are expected to continue to decrease to manageable levels over the next 24 hours.

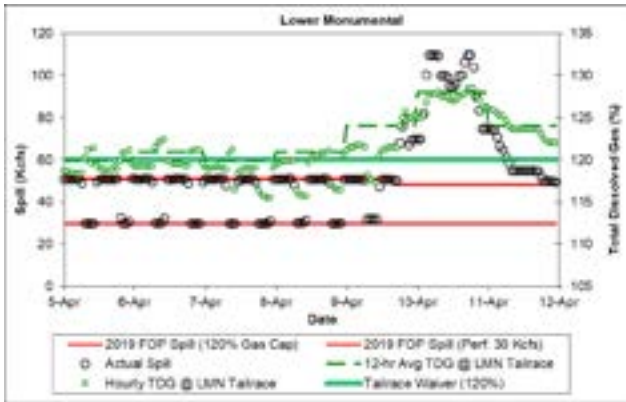


Figure 3. Hourly spill and TDG at Lower Monumental Dam (Apr. 5-11, 2019).

The 120% spill cap at Ice Harbor Dam (IHR) began at 93 Kcfs but was reduced to 88 Kcfs on the afternoon of April 9th. Spill at IHR did not meet the estimated 120% spill cap of 93 Kcfs on April 5-7 but generally met or exceeded the “performance standard” spill level of 30% for eight hours on each of these days (Figure 4). The reason spill did not meet the estimated spill cap of 93 Kcfs during the gas cap spill operation was because hourly flows were sufficiently low to not allow for it. Instead, spill at IHR during the gas cap hours was everything in excess of powerhouse minimum requirements. Furthermore, powerhouse capacity at IHR is extremely limited. This is why “performance standard” spill levels were exceeded on April 6th and April 7th. By the afternoon of April 8th, flows at IHR were sufficiently high that spill to the 120% spill cap was possible. However, the 12-hour average TDG for April 8th exceeded the 120% standard (121%). It is worth noting that the 12-hour average TDG for April 8th was rounded up to 121% and the hourly TDG measurements for April 8th peaked at 120.9%. As mentioned above, the 120% spill cap at IHR was reduced to 88 Kcfs on the afternoon of April 9th, likely due to this 12-hour average TDG of 121% on April 8th. By the afternoon of April 9th, flows were sufficiently high that neither the 120% gas cap nor the “performance standard” spill levels could be met and IHR spilled all flows in excess of hydraulic capacity. The 12-hour average TDG in the IHR tailrace peaked at 133% on April 10th. Flows have decreased over the last two days but, because of the extremely limited powerhouse capacity at IHR, have not decreased to a point where the 120% spill cap can be managed. Flows at IHR are expected to continue to decrease over the next few days, perhaps even to manageable levels.

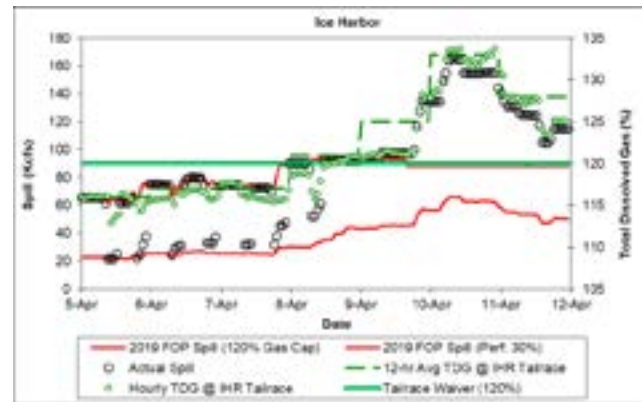


Figure 4. Hourly spill and TDG at Ice Harbor Dam (Apr. 5-11, 2019).

The 120% spill cap at McNary Dam (MCN) has been 189 Kcfs since voluntary spill for fish began on April 10th. Spill at MCN met the estimated 120% spill cap level for approximately 16 hours and the “performance standard” spill levels (48%) for 8 hours on each of April 10th and April 11th (Figure 5). During this time, hourly TDG levels during the 16 hours of gas cap spill were as high as 120.2% and the 12-hour average TDG was 120%.

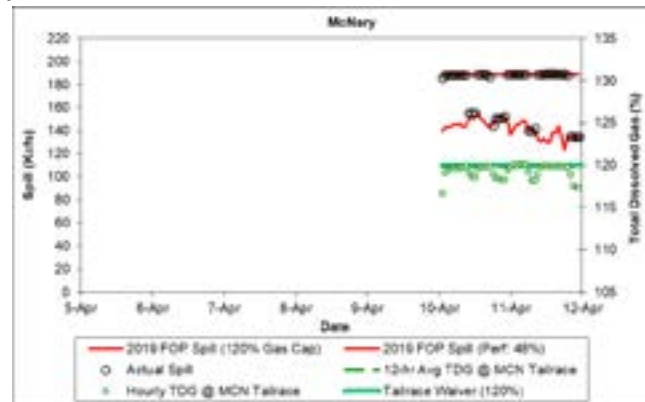


Figure 5. Hourly spill and TDG at McNary Dam (Apr. 5-11, 2019).

The 120% spill cap at John Day (JDA) started at 150 Kcfs on the morning of April 10th but was reduced to 140 Kcfs on the afternoon of April 10th where it has remained since. Spill at JDA has met or exceeded the estimated 120% spill cap level for approximately 16 hours on each of April 10th and April 11th (Figure 6). During this time, hourly TDG levels during the 16 hours of gas cap spill were as high as 121.9% and the 12-hour average TDG was as high as 121%. On April 10th, there was no am block of “performance standard” spill but there was a pm block (1800-2259). However, spill during this pm block was higher than the 32% specified by the FOP. This is likely due to the current limited hydraulic capacity at JDA. “Performance standard”

spill during the pm block on April 10th was ~36%. Similarly, “performance standard” spill during the am block on April 11th was ~36-37%, whereas that for the pm block was in the 31-33% range.

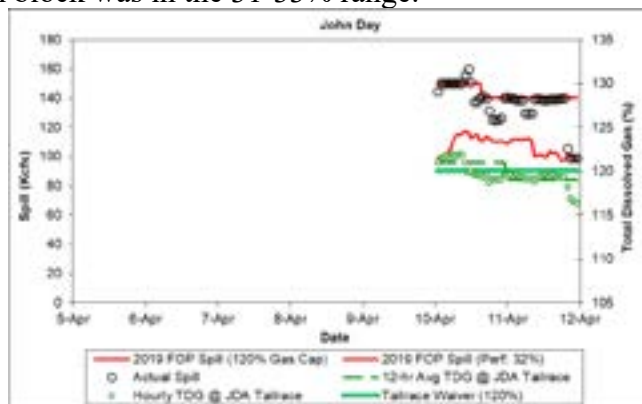


Figure 6. Hourly spill and TDG at John Day Dam (Apr. 5-11, 2019).

The 120% spill cap at The Dalles (TDA) started at 100 Kcfs on the morning of April 10th but was increased to 150 Kcfs on the afternoon of April 10th where it has remained since. Spill at TDA has met the estimated 120% spill cap level for approximately 16 hours on each of April 10th and April 11th (Figure 7). However, during this time, hourly TDG levels during the 16 hours of gas cap spill peaked at 118.1% and the 12-hour average TDG was 116% on each day. This indicates that there is room to increase the spill cap at TDA above the current 150 Kcfs cap. On April 10th, there was no am block of “performance standard” but there was a pm block (1800-2259). However, flows at this point were sufficiently high that “performance standard” spill of 40% was only slightly lower (~5-7 Kcfs) than the 120% spill cap of 140 Kcfs. It appears that there were only seven total hours of “performance spill” on April 11th (1200-1459 and 2000-2359).

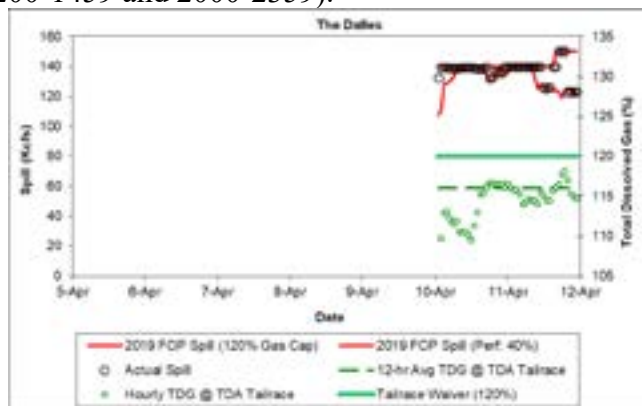


Figure 7. Hourly spill and TDG at The Dalles Dam (Apr. 5-11, 2019).

The 120% spill cap at Bonneville (BON) was 120 Kcfs

for both April 10th and 11th. With exception to a few hours on the morning of April 10th, flows at BON have been sufficiently high that spill exceeded both the 120% spill cap and the “performance standard” spill levels on both April 10th and April 11th (Figure 8). Instead, spill over much of the last two days has been all flows in excess of hydraulic capacity. The 12-hour average TDG at the Cascade Island gauge peaked at 122% on April 10th but decreased to 121% on April 11th. Flows are expected to decrease to manageable levels over the next few days.

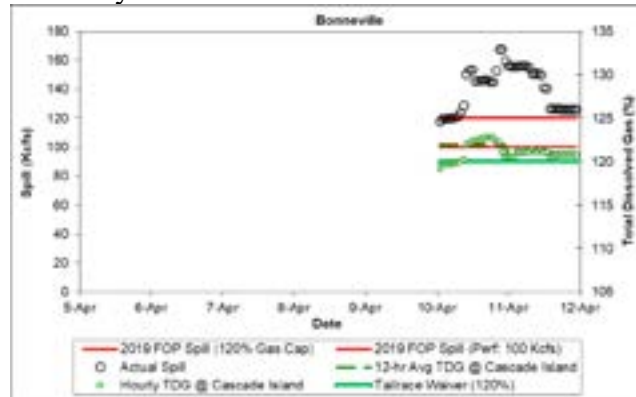


Figure 8. Hourly spill and TDG at Bonneville Dam (Apr. 5-11, 2019).

Gas Bubble Trauma Monitoring

Gas Bubble Trauma (GBT) monitoring in the Snake River continued this week. GBT sampling at Mid-Columbia and Upper Columbia projects is expected to begin soon, pending sample size requirements can be met. Each of the Snake River projects conducted one GBT sample this week. No fish were observed with signs of GBT in this week’s samples from Lower Granite Dam (Apr. 12) or Little Goose Dam (Apr. 8). At Lower Monumental Dam, one fish was observed with signs of fin GBT, which equates to a 1% GBT rate for the entire sample. This single fish had Rank 1 signs of GBT (<5% of fin occluded by bubbles). 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.

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. In addition, the SMP is currently receiving data from all four of our mainstem traps: the Salmon River Trap, the Snake River Trap, the Grande Ronde River Trap, and the Imnaha River Trap.

Subyearling Chinook continued to dominate the samples at Bonneville Dam (BON) this week. The daily average passage index for subyearling Chinook this week was approximately 177,000 per day, which is a substantial increase over last week's daily average passage index of about 2,600. This large increase in subyearling Chinook passage was due to the fact that Spring Creek NFH released approximately 7.0 million subyearling fall Chinook tules into Bonneville pool on Monday, April 8th. These fall Chinook tules were observed at BON by later that evening. Passage of these tules has remained high through the sample on April 11th but is expected to decrease in the next couple of days. Passage of other salmonids also increased this week, when compared to previous weeks. This week's daily average passage indices for yearling Chinook and coho were 4,230 and 3,100 per day, respectively. Last week's daily average passage indices were only 260 per day for yearling Chinook and 430 per day for coho. Passage of sockeye and steelhead also increased this week, but was much lower in magnitude than yearling Chinook and coho. This week's daily average passage indices were about 160 per day for sockeye and about 425 per day for steelhead. Last week's daily average passage indices for these two species were both less than 20 per day. Pacific lamprey macrophthalmia were encountered in all seven samples this week while no ammocoetes were encountered this week. This week's daily average collection for Pacific lamprey macrophthalmia was about 430 per day, which is an increase over last week's daily average collection of 200 per day.

Similar to the last few years, sampling at John Day Dam (JDA) is every-other-day. Yearling Chinook continued to dominate the salmonid samples at JDA this week. This week's daily average passage index for yearling Chinook was about 10,400 per day, which is

a large increase over last week's daily average passage index of 1,300 per day. Of the yearling Chinook collected this week, only 2.6% were yearling fall Chinook holdovers. The only other salmonids that were encountered in this week's samples were coho and steelhead. Steelhead passage increased this week, when compared to the previous week. This week's daily average passage index for steelhead was nearly 1,500 per day, whereas that for last week was less than 100 per day. Coho passage was relatively low this week, with daily passage indices ranging from 10 to 166. Pacific lamprey macrophthalmia were encountered in all four of this week's samples, with a daily average collection of about 1,500 per day. This is a slight increase over last week's daily average collection of about 1,100 macrophthalmia per day. 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 650 per day, which is a large increase over last week's daily average collection of nearly 100 per day.

Sampling at McNary Dam (MCN) began on April 4th, with the first sample being tallied and reported on April 5th. Like JDA, sampling at MCN will occur every-other-day. Yearling Chinook and steelhead dominated this week's samples at MCN, with daily average passage indices of nearly 4,900 and 6,600 per day, respectively. Coho and sockeye were also encountered in this week's samples but in relatively small numbers. Finally, Pacific lamprey macrophthalmia were encountered in all four of week's samples, with a daily average collection of about 1,500 per day. No ammocoetes were encountered at MCN this week.

Steelhead dominated the samples at Lower Granite Dam (LGR) this week. This week's daily average passage index was just over 109,000 per day, which is a large increase over last week's daily average passage index of nearly 15,000 per day. Of the steelhead collected this week, approximately 96% were of hatchery origin. Yearling Chinook passage also increased substantially this week, when compared to the previous week. This week's daily average passage index for yearling Chinook at LGR was nearly 49,000 per day, whereas that for last week was only 16,000 per day. Of the yearling Chinook sampled this week, approximately 87% were of hatchery origin. Subyearling Chinook, coho, and sockeye were also encountered in this week's samples

at LGR. This week's daily average passage indices for these three species were about 1,900, 1,650, and 32 per day, respectively. As with previous weeks, all of the subyearling Chinook sampled at LGR this week were fry. Finally, both Pacific lamprey macrophthalmia and ammocoetes were encountered this week. Macrophthalmia were encountered in four of this week's samples while ammocoetes were encountered in two samples.

Sampling at Little Goose Dam (LGS) will occur every-other-day until the start of transportation, at which time daily sampling will begin. Steelhead continued to dominate the samples at LGS, followed by yearling Chinook. This week's daily average passage indices for these two species were 39,300 and 8,000 per day, respectively. Of the steelhead collected at LGS this week, approximately 97% were of hatchery origin. Of the yearling Chinook collected at LGS this week, approximately 86% were of hatchery origin. Coho and sockeye were also encountered in this week's samples but in relatively small numbers. Pacific lamprey macrophthalmia were encountered in all three of this week's samples, with a daily average collection of 875 per day. Pacific lamprey ammocoetes were encountered in only one of this week's samples (April 6th).

Similar to LGS, sampling at Lower Monumental Dam (LMN) will also occur every-other-day until the start of transportation, at which time daily sampling will begin. Steelhead dominated this week's samples at LMN. This week's daily average passage index for steelhead was nearly 33,000 per day, which is a large increase over last week's daily average passage index of 2,200 per day. Of the steelhead that were collected this week, approximately 94% 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 was about 13,600 per day, whereas that for last week was 6,600 per day. Of the yearling Chinook in this week's sample, approximately 46% were yearling fall Chinook that were reared at Lyons Ferry Hatchery and either released directly from the hatchery or from acclimation ponds above Lower Granite Dam. Coho and sockeye were also encountered in this week's samples but in relatively low numbers. Finally, both Pacific lamprey macrophthalmia and ammocoetes were encountered in this week's samples. Macrophthalmia were encountered in three of this week's four samples, with a daily

average collection of about 450 per day. Ammocoetes were encountered in only one of this week's samples (April 7th).

Subyearling Chinook dominated the samples at Rock Island Dam (RIS) this week. This week's daily average passage index for subyearling Chinook was about 80 per day. As with last week, all of the subyearling Chinook that were collected this week were fry. Yearling Chinook, coho, sockeye, and steelhead were all encountered in this week's samples at RIS but in very low numbers. Finally, Pacific lamprey macrophthalmia were encountered in five of this week's samples and ammocoetes were encountered in only one (April 7th) of this week's samples. Daily collections of Pacific lamprey macrophthalmia and ammocoetes were both very low this week.

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. In order to reduce handling of hatchery yearling fall Chinook that were released upstream of the trap, sampling at LEW was suspended from April 5th through April 7th. Sampling resumed for a sample on April 8th but was suspended again at 0400 on April 9th due to high flows and debris. The samples on April 8th and April 9th were dominated by yearling Chinook, with 856 total collected. These two samples also collected a total of 104 steelhead, 15 coho, and 6 subyearling Chinook. Sampling at LEW will resume when conditions are deemed safe for trap operations.

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 after the April 6 sample. Therefore, only two samples were collected at GRN this week (April 5th and 6th). These two samples were dominated by yearling Chinook, with 908 total collected. Of the yearling Chinook collected in these two samples, approximately 97% were of known hatchery origin. Coho and steelhead were also encountered in these two samples, with total collections of 46 and 97, respectively. One Pacific lamprey ammocoete and two Pacific lamprey macrophthalmia were collected in the sample from April 6th. Sampling at GRN will resume when conditions are deemed safe for trap operations.

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. Similar to recent years, sampling at WTB in 2019 will only occur on weekdays. Due to high flows and debris in the Salmon River, sampling at WTB was suspended after the sample on April 9th. Therefore, only three samples were collected at WTB this week (April 5th, April 8th, and April 9th). These three samples were dominated by yearling Chinook, with 3,390 total collected. Of the yearling Chinook that were collected this week, approximately 92% were of known hatchery origin. The only other salmonids that were encountered in this week's three samples at WTB were steelhead, with a total collection of 143.

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 15th through April 7th. Salmonid collections over the last week of available data (April 1-7) consisted of yearling Chinook (346 total), steelhead (7,393 total), and subyearling Chinook (1 total). Of the yearling Chinook that were collected over this last week, approximately 26% were of known hatchery origin. Steelhead collections have increased substantially over the last week (Apr. 1-7), compared to the previous week (Mar. 25-31). The total collection for steelhead in the previous week was only 141. This increase is likely due to recent hatchery releases in the Imnaha River, as approximately 96% of the steelhead in this week's collections were of known hatchery origin. Finally, both Pacific lamprey ammocoetes (30 total) and macrophthalmia (9 total) were collected at IMN over this last week.

Hatchery Releases

FPC has not received preliminary data from some hatcheries as of 04/12/19, 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, nearly 1.75 million summer steelhead were released into this zone. Approximately 51% of these were in the Yankee Fork of the Salmon River, and at

Sawtooth Hatchery. Another 34% were released in the Clearwater River, with the remaining steelhead released into the Pahsimeroi River.

In the next two weeks, approximately 4.2 million spring and summer Chinook are planned for release into this zone. Of these, approximately 59% are an ongoing release at Rapid River Hatchery that began in mid-March and is scheduled to run through the end of the month. In addition to this release, another 200,000 fish will be released into the Yankee Fork of the Salmon River beginning on April 23rd. Another 15% are scheduled for release into the Grande Ronde River or one of its tributaries, and 20% are scheduled for release into the Pahsimeroi River. There are also a little over 2.3 million summer steelhead planned for release into this zone over the next two weeks. 40% of these are scheduled for release into the Salmon River or one of its tributaries, another 39% are scheduled for the Pahsimeroi River, and the remainder will be released into the Wallowa River.

Upper Columbia Zone:

The Upper Columbia Zone encompasses the area of the Columbia River and its tributaries from Priest Rapids Dam to Chief Joseph Dam. In the past week there were no planned releases in this zone.

Over the next two weeks approximately 4.62 million spring and summer Chinook are scheduled to be released into this zone. 22% of these are planned to be direct releases from Chief Joseph Hatchery, while another 20% will be released into the Okanogan River at Omak pond (303,000), Similkameen pond (380,000), and Riverside pond (202,000). Leavenworth Hatchery will be releasing 1.26 million into the Wenatchee River beginning on the 17th, and another 450,000 will be released from Entiat Hatchery on the 16th. Finally, there is a scheduled release at Wells Hatchery of 290,000, and the remaining fish are scheduled for release in the Methow River (721,000) starting on April 15th. In addition, over 2.1 million coho are planned for release into this zone as well. 62% are planned for release into the Methow River, with the remaining released into the Wenatchee. All of these releases are scheduled to begin on April 15th and run through early May. Finally, there are three planned releases of 424,000 summer steelhead into the Methow River (244,000) and at Wells Hatchery (180,000) beginning on April 15th.

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 scheduled to be seven million fall Chinook released from Spring Creek Hatchery. Additionally, there were also two releases of spring Chinook scheduled into the Little White Salmon (1.04 million), the Wind River (1.2 million), Deschutes River (380,000), and the west fork of the Hood River (75,000). In addition, there were also 181,000 summer steelhead that were planned for release into the Deschutes River (1,000) and from Ringold Springs Hatchery (180,000). Finally, there was one scheduled release of approximately 506,000 coho planned for release at the Pendelton Acclimation Pond on the Umatilla River last week.

Over the next two weeks, spring Chinook releases in this zone should total around 251,000 juveniles. Of these, a majority are planned for release into the Umatilla River (226,000), with a few smaller releases in the Deschutes River and its tributaries (25,000). There will also be approximately 550,000 juvenile coho released into this zone, all of which are planned for the Yakima River at Holmes pond (159,000), Stiles pond (160,000), and Easton pond (213,000). Summer steelhead releases total approximately 325,000 over the next two weeks, most of which will go to the Umatilla (300,000), and 25,000 to the Deschutes River. There will also be a release of 50,000 winter steelhead into east fork of the Hood River on the 26th.

Lower Columbia Zone:

The Lower Columbia Zone is defined as the Columbia River and its tributaries below Bonneville Dam. Over the past week there have been approximately 395,000 winter steelhead released into the Clackamas (75,000) and Sandy Rivers (320,000). Additionally, there were approximately 734,000 spring Chinook scheduled for release over the past week, both into the Willamette (234,000) and at Tongue Point (200,000) and Youngs Bay (300,000). Finally, there were over 2.5 million coho released into this zone in the past week. 770,000 of these were released into the Klaskanine River, 200,000 into the Sandy, 350,000 at Eagle Creek Hatchery, and the rest at Blind Slough (450,000), and Youngs Bay (766,000).

Over the next two weeks, there is one scheduled release of 1.6 million fall Chinook from Tanner Creek

on April 18th. There will also be approximately 150,000 summer steelhead released into the Sandy River beginning on the 18th.

Adults

At Bonneville Dam, 189 adult Chinook and 1,477 adult steelhead were counted. Of the steelhead counted 806 were unclipped steelhead. In 2018 for the same time frame, 125 adult Chinook and 2,158 adult steelhead were counted. Of the steelhead counted in 2018, 906 were unclipped steelhead.

The direct counts at Bonneville Dam showed 0 to 27 adult spring Chinook passing over the project this past week, with a cumulative total of 189 for both direct and video counts (through April 11). There were 64 more fish in this year's count when compared to the 2018 count, while this year's count was about 8% of the ten-year average count of 2,392. Adult steelhead direct counts ranged from 6 to 36 this week, with a cumulative total of 1,477 for both direct and video counts through April 11th. This is 68.4% of the 2018 count and 51.1% of the ten-year average.

The Willamette Falls cumulative steelhead count from January 1st through April 9th was 2,738. The 2019 Willamette Falls steelhead count was about 2.3 times greater than the 2018 count, while this year's count was about 68% of the 10-year average count of 4,029. This year's Lower Granite steelhead count of 2,322 had 1,142 (67%) fewer fish than the 2018 count of 3,464 and 4,297 (35%) fewer fish than the 10-year average count of 6,619.

Hatchery Releases Last Two Weeks

Hatchery Release Summary

From: 3/30/2019 to 04/12/19

Agency	Hatchery	Species	Race	MigYr	NumRel	RelStart	RelEnd	RelSite	RelRiver	Zone
Colville Tribe	Wells Hatchery	ST	SU	2019	83,700	04-01-19	04-01-19	Okanogan River	Okanogan River	UCOL
Colville Tribe Total					83,700					
Idaho Dept. of Fish and Game	Clearwater Hatchery	CH1	SP	2019	691,278	03-18-19	04-03-19	Kooskia Hatchery	Clearwater River M F	SNAK
Idaho Dept. of Fish and Game	Clearwater Hatchery	ST	SU	2019	123,956	04-10-19	04-12-19	Newsome Creek	S Fk Clearwater River	SNAK
Idaho Dept. of Fish and Game	Clearwater Hatchery	ST	SU	2019	189,915	04-03-19	04-03-19	S Fk Clearwater River	Clearwater River M F	SNAK
Idaho Dept. of Fish and Game	Clearwater Hatchery	ST	SU	2019	473,417	04-03-19	04-09-19	S Fk Clearwater River	Clearwater River M F	SNAK
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)	SNAK
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	143,800	04-11-19	04-12-19	Pahsimeroi River	Pahsimeroi River	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	Magic Valley Hatchery	ST	SU	2019	616,000	04-01-19	04-09-19	Yankee Fk (Salmon R)	Salmon River (ID)	SNAK
Idaho Dept. of Fish and Game	McCall Hatchery	CH1	SU	2019	127,763	03-29-19	04-01-19	Johnson Cr Idaho	South Fork Salmon River	SNAK
Idaho Dept. of Fish and Game	McCall Hatchery	CH1	SU	2019	160,956	04-01-19	04-05-19	S Fk 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 Total					5,299,492					
Nez Perce Tribe	Lyons Ferry Hatchery	CH1	FA	2019	160,000	04-04-19	04-02-19	Cpt John Acclim Pond	Snake River	SNAK
Nez Perce Tribe Total					160,000					
Oregon Dept. of Fish and Wildlife	Big Creek Hatchery	ST	WI	2019	40,000	04-05-19	04-05-19	Gnat Creek	Col R Bel. Bon Dam	LCOL
Oregon Dept. of Fish and Wildlife	Big Creek Hatchery	ST	WI	2019	40,000	04-05-19	04-05-19	Klaskanine Hatchery	Klaskanine River	LCOL
Oregon Dept. of Fish and Wildlife	Big Creek Hatchery	ST	WI	2019	60,000	04-05-19	04-05-19	Big Creek Hatchery	Big Creek	LCOL
Oregon Dept. of Fish and Wildlife	Bonneville Hatchery	ST	SU	2019	150,000	04-05-19	04-05-19	Clackamas River	Clackamas River	LCOL
Oregon Dept. of Fish and Wildlife	Bonneville Hatchery	ST	WI	2019	25,000	04-11-19	04-11-19	Clackamas River	Clackamas River	LCOL
Oregon Dept. of Fish and Wildlife	Bonneville Hatchery	ST	WI	2019	50,000	04-11-19	04-11-19	Clackamas Hatchery	Clackamas River	LCOL
Oregon Dept. of Fish and Wildlife	Clackamas Hatchery	ST	WI	2019	100,000	03-31-19	03-31-19	Eagle Creek Hatchery	Eagle Creek	LCOL
Oregon Dept. of Fish and Wildlife	Clatsop County Fisheries	CO	UN	2019	385,000	04-12-19	04-12-19	S Fk Klaskanine River	Klaskanine River	LCOL
Oregon Dept. of Fish and Wildlife	Irrigon Hatchery Complex	ST	SU	2019	215,000	04-02-19	04-02-19	Little Sheep Creek	Imnaha River	SNAK
Oregon Dept. of Fish and Wildlife	Irrigon Hatchery Complex	ST	SU	2019	320,000	04-02-19	04-02-19	Wallowa Acclim Pond	Wallowa River	SNAK
Oregon Dept. of Fish and Wildlife	Leaburg Hatchery	ST	SU	2019	108,000	04-05-19	04-05-19	McKenzie River	Willamette River	LCOL
Oregon Dept. of Fish and Wildlife	Lookingglass Hatchery	CH1	SP	2019	250,000	04-02-19	04-02-19	Lookingglass Creek	Grande Ronde River	SNAK
Oregon Dept. of Fish and Wildlife	Lookingglass Hatchery	CH1	SP	2019	280,000	04-02-19	04-02-19	Imnaha Acclim Pond	Imnaha River	SNAK
Oregon Dept. of Fish and Wildlife	Marion Forks Hatchery	CH1	SP	2019	200,000	04-08-19	04-08-19	Tongue Pt	Col R Bel. Bon Dam	LCOL
Oregon Dept. of Fish and Wildlife	Marion Forks Hatchery	CH1	SP	2019	300,000	04-08-19	04-08-19	Youngs Bay	Youngs River	LCOL
Oregon Dept. of Fish and Wildlife	Oak Springs Hatchery	ST	WI	2019	160,000	04-12-19	04-12-19	Cedar Creek (Sandy R)	Sandy River	LCOL
Oregon Dept. of Fish and Wildlife	Opal Springs Hatchery	ST	SU	2019	1,000	04-12-19	04-12-19	Crooked River (OR)	Deschutes River	MCOL
Oregon Dept. of Fish and Wildlife	Oxbow-Oregon	CO	UN	2019	385,000	04-12-19	04-12-19	S Fk Klaskanine River	Klaskanine River	LCOL
Oregon Dept. of Fish and Wildlife	Oxbow-Oregon	CO	UN	2019	450,000	04-12-19	04-12-19	Blind Slough	Col R Bel. Bon Dam	LCOL
Oregon Dept. of Fish and Wildlife	Oxbow-Oregon	CO	UN	2019	766,193	04-12-19	04-12-19	Youngs Bay	Youngs River	LCOL
Oregon Dept. of Fish and Wildlife	Roaring River Hatchery	ST	SU	2019	96,000	04-02-19	04-02-19	Willamette River	Willamette River	LCOL
Oregon Dept. of Fish and Wildlife	Round Butte Hatchery	CH1	SP	2019	80,000	04-12-19	04-12-19	Deschutes River	Deschutes River	MCOL
Oregon Dept. of Fish and Wildlife	Round Butte Hatchery	CH1	SP	2019	300,000	04-12-19	04-12-19	Deschutes River	Deschutes River	MCOL
Oregon Dept. of Fish and Wildlife	Round Butte Hatchery	ST	SU	2019	162,000	04-05-19	04-05-19	Deschutes River	Deschutes River	MCOL
Oregon Dept. of Fish and Wildlife	Sandy Hatchery	CH1	SP	2019	66,000	04-05-19	04-05-19	Bull Run Acclimation	Sandy River	LCOL
Oregon Dept. of Fish and Wildlife	Sandy Hatchery	CO	UN	2019	200,000	04-12-19	04-12-19	Cedar Creek (Sandy R)	Sandy River	LCOL
Oregon Dept. of Fish and Wildlife	Sandy Hatchery	ST	WI	2019	160,000	04-12-19	04-12-19	Cedar Creek (Sandy R)	Sandy River	LCOL
Oregon Dept. of Fish and Wildlife	South Santiam Hatchery	ST	SU	2019	161,500	04-03-19	04-03-19	Santiam River	Willamette River	LCOL
Oregon Dept. of Fish and Wildlife	Willamette Hatchery	CH1	SP	2019	234,000	04-12-19	04-12-19	M Fk Willamette River	Willamette River	LCOL
Oregon Dept. of Fish and Wildlife	Willamette Hatchery	ST	SU	2019	61,000	04-05-19	04-05-19	M Fk Willamette River	Willamette River	LCOL
Oregon Dept. of Fish and Wildlife Total					5,805,693					
U.S. Fish and Wildlife Service	Carson NFH	CH1	SP	2019	1,200,000	04-10-19	04-10-19	Wind River	Wind River	MCOL
U.S. Fish and Wildlife Service	Dworshak NFH	ST	SU	2019	247,263	04-02-19	04-05-19	Lolo Creek	Clearwater River M F	SNAK
U.S. Fish and Wildlife Service	Dworshak NFH	ST	SU	2019	392,045	04-02-19	04-05-19	S Fk Clearwater River	Clearwater River M F	SNAK
U.S. Fish and Wildlife Service	Dworshak NFH	ST	SU	2019	421,976	04-02-19	04-05-19	Clear Creek	Clearwater River M F	SNAK
U.S. Fish and Wildlife Service	Dworshak NFH	ST	SU	2019	1,338,720	04-02-19	04-05-19	Dworshak Hatchery	Clearwater River M F	SNAK
U.S. Fish and Wildlife Service	Eagle Creek NFH	CO	UN	2019	350,000	04-10-19	04-10-19	Eagle Creek Hatchery	Eagle Creek	LCOL
U.S. Fish and Wildlife Service	Little White Salmon NFH	CH1	SP	2019	1,040,000	04-11-19	04-11-19	Little White Salmon Hatchery	Little White Salmon River	MCOL
U.S. Fish and Wildlife Service	Spring Creek NFH	CH0	FA	2019	7,000,000	04-08-19	04-08-19	Spring Creek Hatchery	Bonneville Pool	MCOL
U.S. Fish and Wildlife Service Total					11,990,004					
Umatilla Tribe	Leaburg Hatchery	CO	UN	2019	506,000	04-10-19	04-10-19	Pendelton Acclim Pond	Umatilla River	MCOL
Umatilla Tribe	Lookingglass Hatchery	CH1	SP	2019	150,000	04-02-19	04-02-19	Umatilla River	Umatilla River	MCOL
Umatilla Tribe	Lookingglass Hatchery	CH1	SP	2019	220,000	04-02-19	04-02-19	Thornhollow Acclim Pond	Umatilla River	MCOL

Umatilla Tribe	Lookingglass Hatchery	CH1	SP	2019	440,000	04-02-19	04-02-19	Imeques Acclim Pond	Umatilla River	MCOL
Umatilla Tribe	Umatilla Hatchery	CH1	SP	2019	230,000	04-04-19	04-04-19	Thornhollow Acclim Pond	Umatilla River	MCOL
Umatilla Tribe	Umatilla Hatchery	CH1	SP	2019	231,000	04-05-19	04-05-19	Imeques Acclim Pond	Umatilla River	MCOL
Umatilla Tribe Total					1,777,000					
Warm Springs Tribe	Round Butte Hatchery	CH1	SP	2019	75,000	04-12-19	04-12-19	W Fk Hood River	Hood River	MCOL
Warm Springs Tribe Total					75,000					
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	Chelan Hatchery	CH1	SU	2019	530,000	04-01-19	04-01-19	Chelan Falls	Rocky Reach Pool	UCOL
Washington Dept. of Fish and Wildlife	Chewuch Acclim. Pond	CH1	SP	2019	60,000	04-01-19	04-01-19	Chewuch River	Methow River	UCOL
Washington Dept. of Fish and Wildlife	Chiwawa Hatchery	CH1	SP	2019	148,000	04-01-19	04-01-19	Chiwawa River	Wenatchee River	UCOL
Washington Dept. of Fish and Wildlife	Chiwawa Hatchery	CH1	SP	2019	230,000	04-01-19	04-01-19	Nason Creek	Wenatchee River	UCOL
Washington Dept. of Fish and Wildlife	Chiwawa Hatchery	ST	SU	2019	125,000	04-01-19	04-01-19	Chiwawa River	Wenatchee River	UCOL
Washington Dept. of Fish and Wildlife	Chiwawa Hatchery	ST	SU	2019	142,000	04-01-19	04-01-19	Chiwawa River	Wenatchee River	UCOL
Washington Dept. of Fish and Wildlife	COOP	CH1	SP	2019	55,000	03-01-19	04-01-19	Cowlitz River	Cowlitz River	LCOL
Washington Dept. of Fish and Wildlife	COOP	CO	NO	2019	225	04-01-19	04-01-19	Cowlitz River	Cowlitz River	LCOL
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 Salmon	CH1	SP	2019	99,000	03-01-19	04-01-19	Cowlitz River	Cowlitz River	LCOL
Washington Dept. of Fish and Wildlife	Cowlitz Salmon	CO	NO	2019	2,348,000	04-01-19	06-01-19	Cowlitz River	Cowlitz 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	Eastbank Hatchery	CH1	SU	2019	486,000	04-01-19	04-01-19	Wenatchee River	Wenatchee River	UCOL
Washington Dept. of Fish and Wildlife	Fallert Creek Hatchery	ST	SU	2019	91,800	04-01-19	04-01-19	Kalama River	Kalama River	LCOL
Washington Dept. of Fish and Wildlife	Fallert Creek Hatchery	ST	WI	2019	45,900	04-01-19	04-01-19	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	Lyons Ferry Hatchery	CH0	FA	2019	449,000	04-01-19	04-01-19	Lyons Ferry Hatchery	Snake River	SNAK
Washington Dept. of Fish and Wildlife	Lyons Ferry Hatchery	ST	SU	2019	39,400	04-01-19	04-01-19	Dayton Acclim Pond	Touchet River	MCOL
Washington Dept. of Fish and Wildlife	Lyons Ferry Hatchery	ST	SU	2019	102,700	04-01-19	04-01-19	Dayton Acclim Pond	Touchet River	MCOL
Washington Dept. of Fish and Wildlife	Lyons Ferry Hatchery	ST	SU	2019	104,400	04-01-19	04-01-19	Tucannon River	Tucannon River	SNAK
Washington Dept. of Fish and Wildlife	Lyons Ferry Hatchery	ST	SU	2019	227,200	04-01-19	04-01-19	Grande Ronde River	Grande Ronde River	SNAK
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	175,000	04-01-19	05-01-19	Lewis River	Lewis River	LCOL
Washington Dept. of Fish and Wildlife	Ringold Springs Hatchery	ST	SU	2019	180,000	03-29-19	04-12-19	Ringold Springs Hatchery	McNary Pool	MCOL
Washington Dept. of Fish and Wildlife	Similkameen Hatchery	CH1	SU	2019	240,000	04-01-19	04-01-19	Similkameen River	Okanogan River	UCOL
Washington Dept. of Fish and Wildlife	Skamania Hatchery	ST	SU	2019	20,000	04-01-19	04-01-19	Toutle River	Toutle 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	Skamania Hatchery	ST	WI	2019	105,000	04-01-19	04-01-19	Washougal River	Washougal River	LCOL
Washington Dept. of Fish and Wildlife	Tucannon Hatchery	CH1	SP	2019	150,500	04-01-19	04-01-19	Tucannon River	Tucannon River	SNAK
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	2,500,000	04-01-19	04-01-19	Klickitat River	Klickitat River	MCOL

Washington Dept. of Fish and Wildlife Total 12,483,125
Grand Total 37,674,014

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

Hatchery Releases Next Two Weeks

Hatchery Release Summary

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

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		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		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
Colville Tribe Total					1,905,000					
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
Douglas County PUD Total					797,617					
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
Idaho Dept. of Fish and Game Total					5,379,230					
Nez Perce Tribe	Lookingglass Hatchery	CH1	SP	2019	250,000	04-19-19	04-19-19	Lostine Accim Pond	Wallowa River	SNAK
Nez Perce Tribe Total					250,000					
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
Oregon Dept. of Fish and Wildlife Total					2,430,000					
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
U.S. Fish and Wildlife Service Total					2,346,831					
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
Umatilla Tribe Total					776,000					
Warm Springs Tribe	Oak Springs Hatchery	ST	WI	2019	50,000	04-26-19	04-26-19	E Fk Hood River	Hood River	MCOL
Warm Springs Tribe Total					50,000					
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 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
Yakama Tribe Total					2,630,228					
Grand Total					16,564,906					

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
03/29/2019	60.1	0.0	58.8	0.0	60.0	0.0	59.1	3.4	62.8	0.0	68.2	11.7	69.7	0.0
03/30/2019	56.3	0.0	57.1	0.0	62.4	0.0	64.6	0.5	69.2	0.0	82.5	11.5	69.8	0.0
03/31/2019	52.3	0.0	54.9	0.0	56.0	0.0	54.3	0.0	57.5	0.0	62.6	4.2	69.7	0.0
04/01/2019	64.0	0.0	59.1	0.0	65.1	0.4	61.8	0.0	64.9	0.0	74.3	1.0	69.7	0.0
04/02/2019	59.4	0.0	58.4	0.0	62.0	0.0	60.4	0.1	65.6	0.0	67.1	0.0	69.8	0.0
04/03/2019	52.4	0.0	56.1	0.0	51.5	0.0	52.9	0.0	55.9	0.0	65.0	9.7	69.9	0.0
04/04/2019	54.8	0.0	53.6	0.0	66.4	0.0	66.6	0.0	72.4	0.0	75.5	16.1	69.0	0.0
04/05/2019	56.8	0.0	56.7	0.0	57.8	0.0	55.0	5.4	57.6	2.3	65.2	7.8	68.2	0.0
04/06/2019	50.4	0.0	56.5	0.0	57.1	0.0	52.9	0.0	58.1	0.1	76.8	3.3	67.6	0.0
04/07/2019	47.5	0.0	45.7	0.0	54.0	0.0	52.9	4.2	55.7	0.3	63.0	20.2	67.3	0.0
04/08/2019	64.0	0.0	62.5	0.0	72.1	0.0	71.8	1.0	73.6	0.0	67.2	3.7	67.5	0.0
04/09/2019	58.2	0.0	57.3	0.0	61.9	6.7	58.6	6.8	62.7	0.1	69.0	7.5	67.8	0.0
04/10/2019	62.7	0.0	58.4	0.0	60.9	6.0	60.8	0.0	65.8	0.0	74.9	4.6	67.9	0.0
04/11/2019	51.5	0.0	58.8	0.0	63.2	5.2	60.7	0.1	66.5	0.0				

- Data not available or incorrect

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

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
03/29/2019	5.5	0.0			76.4	0.0	76.9	0.0	82.4	0.0	83.3	28.3		
03/30/2019	5.5	0.0			78.3	0.0	76.9	0.0	78.1	0.0	79.4	24.9		
03/31/2019	5.5	0.0			76.6	0.0	79.6	0.0	82.0	0.0	79.7	25.2		
04/01/2019	5.5	0.0			68.9	0.0	64.3	0.0	71.8	0.0	75.9	22.3		
04/02/2019	5.0	0.0			60.2	0.0	62.4	0.0	65.1	0.0	68.8	16.2		
04/03/2019	5.1	0.0			62.6	39.2	59.3	33.7	59.9	41.8	61.9	40.3		
04/04/2019	5.0	0.0			66.3	40.2	67.9	40.9	66.9	44.0	70.2	47.5		
04/05/2019	5.0	0.0			73.3	42.2	73.3	42.4	72.7	44.0	76.3	52.0		
04/06/2019	1.8	0.0			80.3	42.0	79.0	42.8	80.2	43.9	85.9	61.8		
04/07/2019	1.6	0.0			84.8	41.9	83.0	43.4	83.0	43.8	87.2	62.3		
04/08/2019	1.7	0.0			118.2	44.7	113.5	46.9	114.7	43.8	119.4	85.9		
04/09/2019	1.6	0.0			159.3	58.0	152.5	63.4	153.5	53.5	158.6	105.0		
04/10/2019	1.6	0.0			195.0	85.6	197.4	120.3	204.5	96.0	207.6	153.3		
04/11/2019	1.6	0.0			165.5	58.1	159.5	69.0	166.5	57.5	173.3	120.3		

- Data not available or incorrect

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

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		
03/29/2019	164.1	0.0	179.8	0.0	178.0	0.0	195.8	1.2	91.0	93.6
03/30/2019	162.5	0.0	175.0	0.0	175.6	0.0	196.9	1.2	91.5	94.3
03/31/2019	168.6	0.0	187.2	0.0	185.1	6.4	188.4	1.2	78.0	99.2
04/01/2019	141.1	0.0	168.7	0.0	167.1	7.5	188.9	1.2	79.1	98.7
04/02/2019	136.3	0.0	147.3	0.0	147.7	7.4	165.0	1.2	57.5	96.3
04/03/2019	128.2	0.0	129.4	0.0	126.1	0.0	148.8	1.4	41.0	96.5
04/04/2019	141.3	0.0	153.4	0.0	152.4	0.0	158.7	1.4	51.6	97.2
04/05/2019	149.3	0.0	161.1	0.0	161.9	0.0	175.3	1.4	67.2	98.0
04/06/2019	163.5	0.0	188.1	0.0	189.6	0.0	209.6	1.4	97.2	101.6
04/07/2019	173.8	0.0	200.6	0.0	201.6	0.0	218.2	1.5	102.9	103.7
04/08/2019	176.6	8.7	188.9	0.0	194.5	0.0	227.7	1.4	106.4	111.4
04/09/2019	230.8	66.5	226.2	19.7	234.1	16.0	261.9	12.3	110.8	127.7
04/10/2019	305.7	176.1	344.6	142.5	337.4	138.0	357.3	140.7	100.8	103.5
04/11/2019	286.0	173.1	325.7	131.3	324.8	136.5	367.1	140.8	111.2	102.8

- Data not available or incorrect

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FISH PASSAGE CENTER

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
04/05/2019	CH1+ST	100	0	0	0.00 %	0.00 %	0	0	0	0
04/12/2019	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
04/08/2019	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)

FISH PASSAGE CENTER

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
04/11/2019	CH1+ST	100	1	1	1.00 %	1.00 %	1	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

 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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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

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

 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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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

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

 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)

FISH PASSAGE CENTER

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

Date 4/12/2019 7:15:08 AM

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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
03/29									101.0	101.2	101.4	24	101.2	101.7	102.3	24	102.7	102.8	103.2	21	102.6	103.0	103.2	24	03/29
03/30									100.9	101.3	101.4	24	101.6	102.5	103.6	24	102.9	103.3	105.2	15	101.9	102.5	103.5	24	03/30
03/31									101.6	102.0	102.2	24	102.3	103.2	103.7	24	103.4	104.0	105.0	19	102.6	103.3	103.9	24	03/31
04/01									102.4	102.7	102.9	24	102.7	103.4	104.5	24	103.7	103.9	104.1	16	103.1	103.6	103.8	24	04/01
04/02									103.2	103.7	104.0	24	103.7	104.6	105.8	24	104.6	105.3	106.1	24	104.2	104.7	105.1	24	04/02
04/03									103.6	103.8	103.9	24	104.6	105.2	106.0	24	105.0	105.3	105.7	19	104.6	105.0	105.5	24	04/03
04/04									103.4	103.7	103.9	24	104.1	104.9	105.3	24	104.9	105.2	105.6	19	104.8	105.4	105.9	24	04/04
04/05									104.2	104.4	104.6	24	104.8	105.3	106.7	24				0	105.3	105.6	106.1	24	04/05
04/06									103.9	104.0	104.0	24	105.1	105.6	106.6	24	105.1	105.1	105.1	2	104.9	105.3	105.7	24	04/06
04/07									103.9	103.9	104.0	24	104.9	105.6	106.4	24	105.9	105.9	107.0	9	104.7	105.2	105.8	24	04/07
04/08									103.6	103.8	104.0	24	103.7	104.1	105.0	24	105.0	104.9	105.3	4	104.4	104.7	105.0	24	04/08
04/09									103.9	104.1	104.4	24	104.2	104.8	106.3	24	105.2	105.3	105.7	15	105.0	105.6	106.5	24	04/09
04/10									103.3	103.6	103.7	24	103.8	104.4	105.3	24	104.8	105.0	105.1	24	104.2	104.4	104.7	24	04/10
04/11									104.0	104.4	104.6	22	104.6	105.6	106.5	22	105.4	105.8	106.1	23	105.0	105.6	106.2	23	04/11

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
03/29	102.4	102.8	103.4	24	102.6	103.1	103.8	24	103.5	103.7	103.9	23	104.7	106.0	112.3	22	104.4	105.0	106.9	22	104.5	105.1	106.1	22	03/29
03/30	102.9	103.5	103.7	24	103.2	104.1	104.8	24	103.2	103.5	103.7	21	103.9	104.4	107.2	20	103.5	103.8	104.9	23	103.8	104.1	105.0	21	03/30
03/31	104.2	104.9	105.3	24	104.4	105.4	105.8	24	103.9	104.3	104.6	23	104.4	104.9	105.5	22	104.2	104.7	105.2	23	104.2	104.7	105.1	22	03/31
04/01	105.0	105.4	105.5	24	105.5	105.9	106.1	24	104.7	105.1	105.4	23	105.6	105.8	106.3	18	104.4	104.8	105.4	22	104.5	104.7	105.1	17	04/01
04/02	105.7	106.2	106.3	24	106.3	106.7	106.8	24	105.8	106.3	106.7	23	106.5	106.8	107.8	21	105.0	105.8	106.1	23	105.4	105.7	105.9	18	04/02
04/03	105.8	106.0	106.1	24	106.3	106.6	106.8	24	106.8	106.9	107.1	24	107.4	107.9	108.6	22	105.6	106.0	106.3	20	105.8	106.0	106.2	19	04/03
04/04	105.3	105.7	106.0	24	105.4	105.9	106.4	24	106.9	107.2	107.3	23	107.4	107.9	108.3	22	106.0	106.5	106.7	23	106.0	106.4	106.6	20	04/04
04/05	105.5	105.7	106.0	24	105.7	106.1	106.5	24	107.3	107.4	107.6	22	108.9	109.9	120.3	20	107.0	107.4	107.9	22	107.2	107.7	110.3	19	04/05
04/06	105.0	105.2	105.3	24	105.1	105.4	105.8	24	106.5	106.6	106.8	24	107.2	107.6	108.5	20	107.1	108.1	110.0	22	107.4	108.2	109.6	19	04/06
04/07	104.8	105.1	105.4	24	105.0	105.4	106.0	24	106.1	106.4	107.0	24	108.2	109.1	113.4	19	105.7	105.8	105.9	20	105.7	105.9	106.3	19	04/07
04/08	104.5	104.9	105.0	24	104.7	105.2	105.4	24	105.7	105.8	105.9	23	106.7	107.4	110.8	20	105.8	106.1	106.9	21	105.8	106.0	107.1	19	04/08
04/09	104.8	105.1	105.3	24	106.3	107.3	107.7	24	105.6	105.8	105.8	24	108.9	110.7	120.0	20	104.9	105.3	105.5	22	104.9	105.2	105.4	19	04/09
04/10	104.2	104.5	104.7	24	106.2	106.6	106.7	24	105.2	105.3	105.5	24	105.9	106.1	106.7	19	105.8	106.8	109.2	20	105.7	106.6	108.0	19	04/10
04/11	104.8	105.1	105.3	23	106.5	106.9	107.3	23	105.4	105.6	105.8	23	106.2	106.4	106.8	21	105.2	105.5	105.8	22	105.1	105.3	105.6	20	04/11

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

Date	Wanapum				Wanapum Tlwr				Priest Rapids				Priest R. Dnstr				Pasco				Date
	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	
03/29	103.8	104.1	104.4	24	107.2	110.3	123.0	24	104.7	105.0	105.6	24	105.4	105.9	107.6	24					03/29
03/30	105.1	106.2	107.1	24	107.7	110.9	117.3	24	105.2	106.1	106.4	24	106.3	107.8	110.1	24					03/30
03/31	106.9	107.2	107.5	24	107.0	108.5	117.8	24	106.8	107.7	108.9	24	107.9	109.0	111.0	24					03/31
04/01	107.8	108.6	110.0	24	106.9	107.6	108.0	24	107.2	107.7	108.6	24	107.9	108.4	110.1	24					04/01
04/02	109.4	109.6	110.0	24	108.0	108.5	108.8	24	107.7	107.9	108.1	24	108.5	109.0	110.0	24					04/02
04/03	108.5	109.0	109.8	24	109.5	111.2	116.0	24	106.5	106.9	107.5	24	107.6	107.9	108.0	24					04/03
04/04	107.2	107.5	108.3	24	110.6	114.0	117.2	24	106.1	106.8	107.5	24	107.6	108.6	108.9	24					04/04
04/05	107.9	108.1	108.4	24	109.0	110.9	116.2	24	108.0	108.4	108.6	24	109.7	110.9	112.7	24					04/05
04/06	106.9	107.0	107.2	24	107.1	107.6	109.3	24	106.6	107.2	108.0	24	108.1	108.8	110.3	24					04/06
04/07	106.0	106.6	106.8	24	111.3	116.1	122.6	24	105.7	106.1	106.5	24	107.2	107.7	109.0	24					04/07
04/08	105.7	106.4	106.6	24	107.1	108.0	113.8	24	106.1	107.2	108.9	24	108.6	110.9	113.8	24					04/08
04/09	106.1	106.5	106.8	24	107.9	109.8	118.8	24	107.1	108.6	109.2	24	108.2	109.8	112.5	24					04/09
04/10	104.2	104.5	104.9	24	105.6	107.2	116.5	24	102.5	102.7	103.3	24	104.0	104.7	105.3	24					04/10
04/11	103.3	103.8	104.8	24	105.1	105.5	106.0	24	103.2	104.0	105.1	24	105.2	106.1	108.2	24					04/11

Total Dissolved Gas Data at Snake and Clearwater Sites

Date	Dworshak				Clrwr Peck				Anatone				Clrwr-Lewiston				Lower Granite				Lower G. Tlwr				Date
	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	24 h Avg	12 h Avg	High	# Hr	
03/29	95.7	96.0	96.3	24	99.3	99.6	100.0	24	101.3	101.6	102.0	24					101.0	101.4	101.8	24	100.4	100.8	101.0	24	03/29
03/30	95.5	95.9	96.4	24	99.6	100.3	100.8	24	101.8	102.6	103.2	24					100.2	100.5	101.1	24	99.8	100.1	100.3	24	03/30
03/31	96.0	96.6	97.2	24	99.9	100.6	101.2	24	101.9	102.6	103.2	24					101.3	101.7	102.3	24	100.7	101.2	101.5	24	03/31
04/01	96.5	97.1	97.7	24	99.9	100.7	101.4	24	102.1	102.8	103.5	24					102.6	103.0	103.6	24	102.0	102.5	103.0	24	04/01
04/02	97.3	97.9	98.6	24	100.4	101.2	101.7	24	101.9	102.5	103.2	24					104.1	104.3	104.6	24	103.5	104.0	104.5	24	04/02
04/03	96.8	97.0	97.4	24	99.6	99.9	100.4	24	101.3	101.6	102.1	24					103.6	103.9	104.3	24	115.3	117.6	118.8	24	04/03
04/04	96.6	96.8	97.2	24	99.8	100.1	100.3	24	101.4	101.9	102.3	24					102.9	103.0	103.1	24	116.0	118.2	119.0	24	04/04
04/05	97.1	97.4	97.7	24	100.1	100.4	100.7	24	101.7	102.1	102.7	24					102.6	103.0	103.3	24	116.3	119.2	119.9	24	04/05
04/06	101.4	102.5	102.9	24	100.2	100.4	100.5	24	101.1	101.4	101.5	24					101.5	101.6	101.6	24	116.3	119.4	119.7	24	04/06
04/07	101.9	102.4	103.2	24	100.6	100.6	100.8	11	101.1	101.4	101.6	24					101.4	101.6	101.8	24	116.4	119.4	119.6	24	04/07
04/08	100.5	100.9	101.3	24	101.9	102.1	102.3	15	101.2	101.7	101.9	24					100.8	101.1	101.4	24	117.2	119.5	119.9	24	04/08
04/09	99.6	100.0	100.4	24	101.8	101.9	102.2	24	101.8	102.1	102.3	24					101.5	101.6	101.8	24	120.3	123.3	126.1	24	04/09
04/10	98.6	99.0	99.4	24	101.9	102.1	102.2	24	103.6	104.3	104.7	24					100.9	101.2	101.5	24	126.5	128.7	129.8	24	04/10
04/11	100.2	101.4	102.5	23	102.0	102.2	102.5	23	104.7	105.1	105.4	23					103.3	104.2	104.5	23	120.9	121.5	122.0	23	04/11

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 Lower Snake Sites

Little Goose				L. Goose Tlwr				Lower Mon.				Lwr. Mon. Tlwr				Ice Harbor				Tlwtr 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
03/29	101.2	101.5	102.0	24	100.9	101.3	101.6	24	102.6	103.1	103.6	24	102.6	103.0	103.2	24	104.0	104.1	104.4	24	113.3	113.7	113.9	24	03/29
03/30	100.3	100.4	100.5	24	100.3	100.7	101.0	24	101.5	101.6	101.8	24	101.6	101.8	102.1	24	103.5	103.6	103.9	24	112.4	113.3	113.9	24	03/30
03/31	100.9	101.2	101.4	24	101.1	101.5	101.7	24	101.5	101.6	101.9	24	101.8	102.0	102.2	24	103.4	103.6	103.7	24	113.0	113.2	113.4	24	03/31
04/01	101.5	101.8	101.9	24	101.8	102.3	102.9	24	101.9	102.1	102.2	24	102.3	102.7	103.1	24	103.4	103.5	103.7	24	112.2	113.2	113.4	24	04/01
04/02	102.1	102.3	102.4	24	102.7	103.1	103.6	23	102.7	103.1	103.3	24	103.4	103.9	104.4	24	103.7	103.9	104.1	24	108.9	110.3	113.3	24	04/02
04/03	102.8	102.9	103.0	24	114.5	117.8	118.6	24	103.2	103.4	103.6	23	118.1	119.3	120.3	24	103.3	103.5	103.6	24	113.0	115.4	115.7	24	04/03
04/04	102.5	102.8	103.0	24	116.3	119.2	119.8	24	102.8	103.0	103.2	24	119.2	120.0	121.1	24	103.0	103.4	104.2	24	114.1	116.0	116.3	24	04/04
04/05	103.3	103.5	103.9	24	116.6	119.4	119.8	24	109.2	112.1	113.4	24	119.5	120.2	121.4	24	109.5	112.0	113.4	24	115.4	116.1	116.4	24	04/05
04/06	106.5	108.3	109.6	24	116.9	119.1	119.6	24	115.2	115.6	116.9	24	120.1	121.0	122.5	24	114.9	115.8	116.1	24	116.2	116.7	117.5	24	04/06
04/07	112.2	112.9	113.1	24	117.6	119.4	120.1	24	115.3	116.0	117.0	24	118.4	119.5	121.3	24	115.5	115.8	116.1	24	116.5	117.3	118.6	24	04/07
04/08	113.2	113.5	113.7	24	118.2	118.9	119.1	24	116.3	117.2	118.2	24	119.0	120.6	121.2	24	115.9	116.6	116.9	24	119.4	120.5	120.9	24	04/08
04/09	113.3	113.8	114.0	24	121.2	123.1	124.8	24	118.1	118.5	119.3	24	121.9	123.6	125.8	24	116.2	116.6	116.9	24	122.7	124.3	128.3	24	04/09
04/10	110.5	111.5	112.5	24	127.9	128.9	129.3	24	121.0	124.6	126.9	24	127.2	127.9	128.5	24	116.8	118.6	120.9	24	132.0	133.2	133.8	24	04/10
04/11	115.5	116.8	117.5	23	123.1	123.9	125.1	23	128.2	129.2	129.7	23	123.8	124.6	126.0	23	122.6	123.5	123.7	23	126.4	127.9	130.5	23	04/11

Total Dissolved Gas Data at Mid-Columbia Sites

McNary-Wash.				Tlwtr McNary				John Day				Tlwtr 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
03/29	106.5	107.1	107.7	24	106.1	106.4	106.9	24	107.2	107.5	107.9	24	106.1	106.3	106.6	24	106.0	106.2	106.4	24	105.3	105.4	105.6	24	03/29
03/30	107.6	107.8	108.4	24	107.1	107.4	107.6	24	106.8	107.0	107.2	24	106.0	106.4	106.7	24	105.8	106.1	106.3	24	105.0	105.4	105.6	24	03/30
03/31	108.6	109.0	110.0	24	107.9	108.3	108.5	24	107.4	107.8	108.6	24	106.4	106.8	107.0	24	106.7	107.0	107.2	24	106.1	106.9	107.3	24	03/31
04/01	109.7	110.0	110.3	24	108.9	109.1	109.2	24	108.1	108.4	108.7	24	107.0	107.2	107.3	24	106.9	107.1	107.3	24	106.5	107.1	107.4	24	04/01
04/02	110.3	110.4	110.6	24	109.5	109.8	110.2	24	108.6	108.8	109.8	24	107.1	107.2	107.3	24	107.3	107.5	107.7	24	106.9	107.6	107.8	24	04/02
04/03	109.5	109.8	110.2	24	108.8	109.1	109.2	24	107.8	108.1	108.3	24	107.2	107.4	107.8	24	106.7	106.9	107.0	24	106.0	106.2	106.3	24	04/03
04/04	109.1	109.4	109.7	24	108.5	108.9	109.2	24	107.7	108.1	108.5	24	107.2	107.5	107.8	24	106.1	106.6	106.9	24	105.4	105.6	105.8	24	04/04
04/05	108.6	109.0	109.6	24	108.1	108.7	108.8	24	108.5	108.7	109.0	24	107.9	108.2	108.6	24	107.3	107.7	108.0	24	106.3	106.7	107.1	24	04/05
04/06	107.9	108.0	108.1	24	107.2	107.4	107.5	24	107.9	108.1	108.4	24	107.4	107.5	107.8	24	106.5	106.6	106.8	24	105.6	105.7	106.0	24	04/06
04/07	107.4	107.9	108.3	24	107.2	107.5	107.7	24	107.6	107.9	108.3	24	106.9	107.2	107.4	24	106.4	106.9	107.2	24	105.3	105.7	106.0	24	04/07
04/08	107.1	107.5	108.1	24	108.1	109.5	111.4	24	107.2	107.3	107.4	24	106.4	106.5	106.7	24	105.9	106.0	106.2	24	105.0	105.1	105.4	24	04/08
04/09	107.1	107.9	108.6	24	113.6	114.7	115.3	24	106.3	106.8	107.2	24	110.0	111.8	120.1	24	104.7	105.4	105.8	24	104.8	105.1	105.4	24	04/09
04/10	106.3	107.3	108.3	24	119.2	119.8	120.0	24	104.1	104.4	104.9	24	120.3	121.3	121.9	24	108.0	112.1	113.5	24	113.1	115.7	116.6	24	04/10
04/11	112.6	115.6	118.8	23	119.4	120.0	120.2	23	103.9	104.1	104.4	23	118.9	119.5	119.7	23	110.1	110.5	111.1	23	115.4	116.2	118.1	23	04/11

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 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	
03/29	106.0	106.2	106.4	24	106.4	106.8	107.3	24	106.9	107.6	108.6	24	109.3	109.6	110.1	24	03/29
03/30	106.3	106.8	107.2	24	106.5	107.2	107.8	24	106.9	108.0	109.1	24	109.4	110.0	110.7	24	03/30
03/31	107.1	107.6	107.9	24	107.5	108.4	109.3	24	107.2	108.6	109.6	24	109.8	110.1	110.4	24	03/31
04/01	107.7	107.9	108.2	24	108.1	108.6	109.0	24	108.0	108.6	109.4	24	110.1	110.3	110.3	24	04/01
04/02	108.5	108.7	108.8	24	109.0	109.9	110.3	24	108.5	108.9	109.1	24	110.8	111.3	111.5	24	04/02
04/03	107.9	108.0	108.1	24	108.7	109.6	110.1	24	108.4	108.7	109.0	24	111.2	111.7	113.8	24	04/03
04/04	107.4	107.8	108.2	24	108.4	109.1	109.9	24	107.9	108.3	108.5	24	112.8	113.4	114.3	24	04/04
04/05	107.2	107.4	107.7	24	107.9	108.4	108.7	24	107.3	107.6	107.9	24	111.7	112.9	113.8	24	04/05
04/06	106.0	106.4	106.6	24	106.2	106.6	106.8	24	106.3	106.7	107.3	24	110.9	111.3	111.9	24	04/06
04/07	105.8	106.2	106.5	24	105.9	106.2	106.5	24	104.8	105.2	105.8	24	110.1	110.4	110.6	24	04/07
04/08	105.7	105.9	106.1	24	105.6	105.8	106.2	24	104.7	105.1	105.4	24	110.2	110.7	111.1	24	04/08
04/09	104.7	105.3	105.9	24	104.9	105.2	105.6	24	104.2	104.6	105.1	24	109.1	111.2	116.9	24	04/09
04/10	104.1	104.7	106.5	24	109.4	110.4	111.3	24	106.3	108.8	109.9	24	121.3	122.5	122.8	24	04/10
04/11	112.8	115.4	116.9	23	114.4	115.7	117.1	23	111.8	113.1	114.0	23	121.0	121.2	121.5	23	04/11

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 4/12/2019 7:16:23 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)
03/29/2019	476	32	0	12	3,380		8,800				107
03/30/2019		30	1	6	3,480					280	239
03/31/2019		29	9	3	12,951		7,900				173
04/01/2019	124	60	11	5	24,500		6,100	1		1,300	320
04/02/2019	171	50	13	1	31,100	303		7			254
04/03/2019	294	24	145	1	20,039		5,914	0		2,380	350
04/04/2019	932	33	168	7	17,721	1,185		2			403
04/05/2019	856	56	194		13,586		9,165	0	3,172	5,030	669
04/06/2019		55	714		9,246	1,676		1			1,171
04/07/2019		34			17,983		4,630	3	3,040	12,420	1,161
04/08/2019	1,217			149	30,656	7,456		2			2,618
04/09/2019	1,317			707	42,588		12,976	4	3,648	10,240	6,729
04/10/2019					94,197	15,034		4			7,180
04/11/2019					133,903		27,545	7	9,526	14,070	10,072
04/12/2019											
Total:	5,387	437	1,255	891	455,330	25,654	83,030	31	19,386	45,720	31,446
# Days:	8	11	9	9	14	5	8	11	4	7	14
Average:	673	40	139	99	32,524	5,131	10,379	3	4,847	6,531	2,246
YTD:	14,123	1,425	1,263	956	462,922	25,654	168,050	31	19,386	46,705	31,798

Number of hours sampled:

- No data available or no sample conducted

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

Smolt Monitoring Program Two Week Passage Index Report

Date 4/12/2019 7:16:23 AM

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COMBINED SUBYEARLING CHINOOK

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (Index)	LGS (Index)	LMN (Index)	RIS (Index)	MCN (Index)	JDA (Index)	BO2 (Index)
03/29/2019	0	0	3	7	840		0				4,080
03/30/2019		0	0	4	540					0	4,558
03/31/2019		0	0	1	600		0				3,021
04/01/2019	0	0	0	0	2,500		0	63		20	2,522
04/02/2019	0	0	0	1	1,200	0		75			1,357
04/03/2019	0	0	1	1	0		0	39		10	1,683
04/04/2019	0	0	0	2	1,074	24		50			1,244
04/05/2019	0	1	0		129		0	41	0	0	1,150
04/06/2019		0	0		578	0		25			1,126
04/07/2019		0			317		0	75	0	0	1,612
04/08/2019	0			6	1,308	0		65			1,955
04/09/2019	0			0	256		0	70	0	0	263,605
04/10/2019					7,939	0		122			906,590
04/11/2019					2,714		0	172	0	0	62,950
04/12/2019											
Total:	0	1	4	22	19,995	24	0	797	0	30	1,257,453
# Days:	8	11	9	9	14	5	8	11	4	7	14
Average:	0	0	0	2	1,428	5	0	72	0	4	89,818
YTD:	1	2	4	67	20,355	24	0	797	0	185	1,275,015

Number of hours sampled:

- No data available or no sample conducted

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

Smolt Monitoring Program Two Week Passage Index Report

Date 4/12/2019 7:16:23 AM

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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)
03/29/2019	0	0	0	2	0		0				117
03/30/2019		0	0	2	0					0	269
03/31/2019		0	0	6	700		0				433
04/01/2019	0	0	0	1	200		0	0		0	512
04/02/2019	0	0	17	0	1,700	0		0			543
04/03/2019	0	0	9	5	0		0	0		0	555
04/04/2019	0	0	5	3	1,074	0		0			567
04/05/2019	0	0	17		774		0	0	80	10	750
04/06/2019			29		809	0		1			1,243
04/07/2019		0			423		0	0	200	60	2,072
04/08/2019	0			4	561	38		0			2,113
04/09/2019	0			11	503		152	0	281	60	3,704
04/10/2019					2,070	96		0			6,527
04/11/2019					6,441		181	1	233	166	5,038
04/12/2019											
Total:	0	0	77	34	15,255	134	333	2	794	296	24,443
# Days:	8	11	9	9	14	5	8	11	4	7	14
Average:	0	0	9	4	1,090	27	42	0	199	42	1,746
YTD:	0	0	77	43	15,275	134	333	2	794	316	24,739

Number of hours sampled:

- No data available or no sample conducted

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

Smolt Monitoring Program Two Week Passage Index Report

Date 4/12/2019 7:16:23 AM

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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)
03/29/2019	0	32	35	20	5,280		300				10
03/30/2019		14	86	13	8,900					20	0
03/31/2019		20	89	37	19,200		1,050				0
04/01/2019	0	9	64	21	17,800		2,150	0		80	0
04/02/2019	1	226	45	7	27,100	1,000		0			0
04/03/2019	0	956	13	39	18,060		3,415	0		70	9
04/04/2019	1	1,472	39	74	6,981	8,228		0			41
04/05/2019	0	1,612	35		7,953		2,513	0	388	140	0
04/06/2019		1,010	62		11,095	4,032		1			45
04/07/2019		1,054			30,148		4,905	0	2,280	240	110
04/08/2019	34			70	61,965	9,678		1			521
04/09/2019	107			34	89,202		9,178	0	7,646	423	1,475
04/10/2019					319,855	104,270		1			327
04/11/2019					245,429		114,354	0	16,111	5,088	504
04/12/2019											
Total:	143	7,459	468	315	868,968	127,208	137,865	3	26,425	6,061	3,042
# Days:	8	11	9	9	14	5	8	11	4	7	14
Average:	18	678	52	35	62,069	25,442	17,233	0	6,606	866	217
YTD:	144	6,515	473	376	880,241	127,208	144,361	3	26,425	6,156	3,089

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)
03/29/2019	0	0	0	0	20		0				0
03/30/2019		0	0	0	20					0	10
03/31/2019		0	0	0	0		0				10
04/01/2019	0	0	0	0	0		0	0		0	9
04/02/2019	0	0	0	0	0	0		0			18
04/03/2019	0	0	0	0	0		0	0		0	26
04/04/2019	0	0	0	0	0	24		0			48
04/05/2019	0	0	0	0	0		0	0	4	0	41
04/06/2019		0	0		116	0		0			18
04/07/2019		0			106		0	0	0	0	40
04/08/2019	0			0	0	58		2			94
04/09/2019	0		0	0	0		30	2	0	0	589
04/10/2019					0	2		1			327
04/11/2019					0		181	1	0	0	0
04/12/2019											
Total:	0	0	0	0	262	84	211	6	4	0	1,230
# Days:	0	0	0	0	19	17	26	1	1	0	88
Average:	0	0	0	0	19	17	26	1	1	0	88
YTD:	0	0	0	0	272	84	219	6	4	0	1,230

Number of hours sampled:

- No data available or no sample conducted

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

Smolt Monitoring Program Two Week Passage Index Report

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COMBINED LAMPREY JUVENILES

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR* (Sample)	LGS (Coll)	LMN (Coll)	RIS (Coll)	MCN (Coll)	JDA (Coll)	BO2 (Coll)
03/29/2019	0	1	10	0	15		0				195
03/30/2019		1	4	0	4					1,150	410
03/31/2019		0	2	0	1		150				225
04/01/2019	0	0	0	0	2		2,500	4		1,780	130
04/02/2019	0	0	0	0	2	100		2			100
04/03/2019	0	0	0	0	0		300	2		660	175
04/04/2019	0	0	0	0	0	270		1			135
04/05/2019	0	3	0		0		1,250	0	92	840	115
04/06/2019		8	3		1	2,060		1			150
04/07/2019		14			2		480	3	310	1,420	85
04/08/2019	0			0	1	410		0			90
04/09/2019	2			0	1		80	4	600	1,080	313
04/10/2019					20	556		1			857
04/11/2019					8		0	4	2,100	5,340	1,429
04/12/2019											
Total:	2	41	19	0	57	3,396	4,760	22	3,102	12,270	4,409
# Days:	8	14	11	9	15	6	9	12	4	14	16
Average:	0	3	2	0	4	566	529	2	776	876	276
YTD:	2	58	85		212	3,396	4,964	22	3,102	50,880	7,164

- No data available or no sample conducted

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

Number of hours sampled:

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

Smolt Monitoring Program Two Week Passage Index Report

Date 4/12/2019 7:16:23 AM

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Smolt Monitoring Program Sites and Agency Collaborations:

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

- No data available or no sample conducted

Number of hours sampled:

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

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

FISH PASSAGE CENTER

Two Week Transportation Summary Report

3/29/2019 12:00:00 AM TO 4/12/2019 12:00:00 AM

Date 4/12/2019 7:18:05 AM

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Lower Granite Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	13,608	295,096	9,494	140	541,949	1,402,236
Sum of Number Barged	477	18,965	374	0	31,052	81,920
Sum of Number Bypassed	13,093	276,048	9,120	140	510,876	1,320,153
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	30	12	0	0	4	50
Sum of Facility Morts	8	70	0	0	17	112
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	38	82	0	0	21	162

Little Goose Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	10	13,221	70	41	65,513	144,368
Sum of Number Barged	0	0	0	0	0	0
Sum of Number Bypassed	10	13,172	70	40	65,492	144,276
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	0	4	0	0	2	8
Sum of Facility Morts	0	45	0	1	19	84
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	0	49	0	1	21	92

FISH PASSAGE CENTER

Two Week Transportation Summary Report

3/29/2019 12:00:00 AM TO 4/12/2019 12:00:00 AM

Date 4/12/2019 7:18:05 AM

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Lower Monumental Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	0	56,548	200	120	78,592	214,052
Sum of Number Barged	0	0	0	0	0	0
Sum of Number Bypassed	0	56,548	200	120	78,590	214,048
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	0	0	0	0	2	4
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	0	0	0	2	4

Total

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	13,618	364,865	9,764	301	686,054	1,760,656
Sum of Number Barged	477	18,965	374	0	31,052	81,920
Sum of Number Bypassed	13,103	345,768	9,390	300	654,958	1,678,477
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	30	16	0	0	8	62
Sum of Facility Morts	8	115	0	1	36	196
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	38	131	0	1	44	258

FISH PASSAGE CENTER

YTD Transportation Summary Report

Date 4/12/2019 7:17:42 AM

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Lower Granite Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	13968	302686	9514	150	553219	1432756
Sum of Number Barged	477	18965	374	0	31052	81920
Sum of Number Bypassed	13448	283638	9140	150	522146	1350668
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	35	12	0	0	4	55
Sum of Facility Morts	8	70	0	0	17	112
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	43	82	0	0	21	167

Little Goose Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	10	13221	70	41	65513	144368
Sum of Number Barged	0	0	0	0	0	0
Sum of Number Bypassed	10	13172	70	40	65492	144276
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	0	4	0	0	2	8
Sum of Facility Morts	0	45	0	1	19	84
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	0	49	0	1	21	92

FISH PASSAGE CENTER

YTD Transportation Summary Report

Date 4/12/2019 7:17:42 AM

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Lower Monumental Dam

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	0	141568	200	128	85088	312072
Sum of Number Barged	0	0	0	0	0	0
Sum of Number Bypassed	0	141562	200	128	85086	312062
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	0	6	0	0	2	10
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	6	0	0	2	10

Total

Data	Chinook Subyearlings	Chinook Yearlings	Coho	Sockeye	Steelhead	Grand Total
Sum of Number Collected	13978	457475	9784	319	703820	1889196
Sum of Number Barged	477	18965	374	0	31052	81920
Sum of Number Bypassed	13458	438372	9410	318	672724	1807006
Sum of Number Trucked	0	0	0	0	0	0
Sum of Sample Morts	35	22	0	0	8	73
Sum of Facility Morts	8	115	0	1	36	196
Sum of Reseach Morts	0	0	0	0	0	0
Sum of Total Project Mort	43	137	0	1	44	269

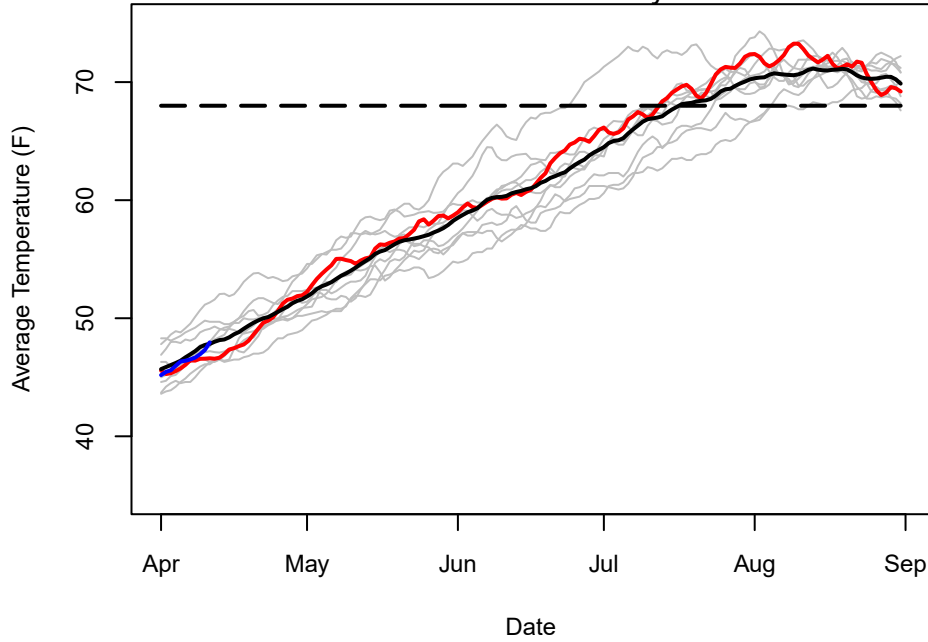
Cumulative Adult Passage at Mainstem Dams Through: 04/11

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	04/11	189	3	125	4	2392	1	0	0	0	0	0	0	0	0	0	0	0	0
TDA	04/07	35	2	24	0	289	0	0	0	0	0	0	0	0	0	0	0	0	0
JDA	04/02	7	0	14	-1	35	6	0	0	0	0	0	0	0	0	0	0	0	0
MCN	04/10	4	2	3	0	106	0	0	0	0	0	0	0	0	0	0	0	0	0
IHR	04/09	-1	0	6	0	38	0	0	0	0	0	0	0	0	0	0	0	0	0
LMN	04/08	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0
LGS	04/09	0	0	1	0	10	1	0	0	0	0	0	0	0	0	0	0	0	0
LGR	04/11	0	1	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
PRD		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WAN		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RIS		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RRH		0	0	0	0	0	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	04/09	126	0	38	2	207	0	0	0	0	0	0	0	0	0	0	0	0	0

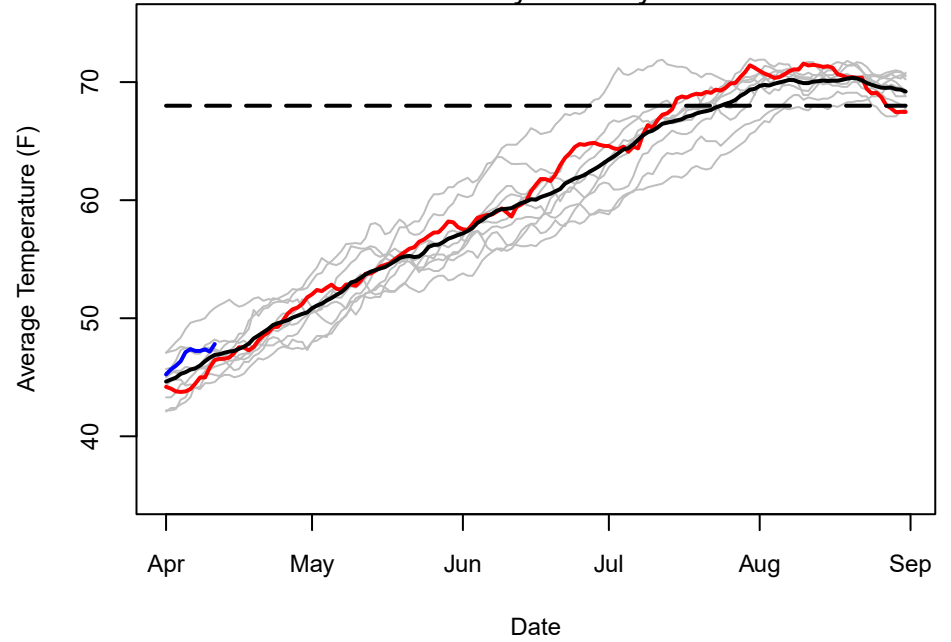
DAM	ENDDATE	Coho						Sockeye			Steelhead						Lamprey		
		2019		2018		10-Yr Avg.		2019	2018	10-Yr Avg.	10-Yr Unclipped		10-Yr Unclipped		10-Yr		2019	2018	10-Yr
		Adult	Jack	Adult	Jack	Adult	Jack	2019	2018	Avg.	2019	2018	Avg.	2019	2018	Avg.	2019	2018	Avg.
BON	04/11	4	1	1	-1	0	0	0	0	1477	2158	2892	806	906	1060	-39	0	0	
TDA	04/07	0	0	4	0	2	0	0	0	108	71	1397	54	25	620	0	0	0	
JDA	04/02	18	-12	0	0	0	1	0	0	155	247	1880	68	94	714	3	0	-1	
MCN	04/10	0	0	0	0	0	0	0	0	107	247	3149	43	115	1152	0	4	0	
IHR	04/09	1	0	0	0	0	0	0	0	726	897	2336	142	300	785	0	2	1	
LMN	04/08	0	0	0	0	0	0	0	0	450	319	6102	111	88	1667	0	0	0	
LGS	04/09	0	0	0	0	0	0	0	0	391	246	2963	41	52	1429	0	0	0	
LGR	04/11	0	0	0	0	0	0	0	0	2322	3464	6619	899	842	2527	1	0	0	
PRD		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
WAN		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
RIS		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
RRH		0	0	0	0	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	
WFA	04/09	0	0	0	2	7	7	0	0	2738	1169	4029	2423	1075	112	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.

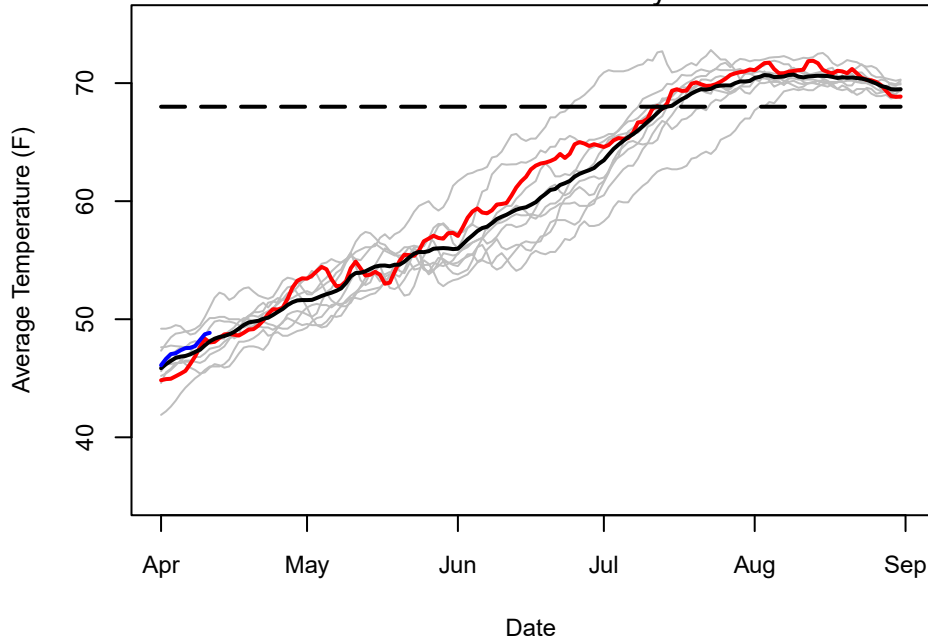
Bonneville Forebay



McNary Forebay



Ice Harbor Forebay



Lower Granite Forebay

