



Fish Passage Center

Weekly Report #16–21

August 5, 2016

Summary of Events

Water Supply

Precipitation throughout the Columbia Basin has varied between 0% and 109% of average at individual sub-basins over early August. Precipitation above The Dalles has been 59% of average over early August. Over the 2016 water year, precipitation has ranged between 83% and 106% of average.

Table 1. Summary of August precipitation and cumulative October through August 3rd precipitation with respect to average (1981–2010), at select locations within the Columbia and Snake River Basins.

Location	Water Year 2016		Water Year 2016	
	August 1–3, 2016		October 1, 2015 to August 3, 2016	
	Observed (inches)	% Average	Observed (inches)	% Average
Columbia above Coulee	0.18	97	33.7	99
Sneke River above Ice Harbor	0.00	0	19.2	92
Columbia above The Dalles	0.06	59	24.7	97
Kootenai	0.21	109	33.3	98
Clark Fork	0.00	0	21.7	86
Flathead	0.00	2	34.3	104
Pend Oreille River Basin above Waneta Dam	0.01	4	28.9	96
Salmon River Basin	0.00	0	24.2	90
Upper Snake Tributaries	0.00	0	20.2	83
Clearwater	0.00	0	37.2	98
Willamette River above Portland	0.00	0	66.8	106

Table 2 displays the August 4th ESP runoff volume forecasts for multiple reservoirs along with the June COE forecasts at Libby and Dworshak. The August 4th ESP forecast at The Dalles between April and August is 79,108 Kaf (90% of average).

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

Location	August 4, 2016 5-day QPF ESP	
	% Average (1981–2010)	Runoff Volume (Kaf)
The Dalles (Apr–Aug)	90	79,108
Grand Coulee (Apr–Aug)	93	52,544
Libby Res. Inflow, MT (Apr–Aug)	92 110*	5,423 6,445*
Hungry Horse Res. Inflow, MT (Apr–Aug)	87	1,683
Lower Granite Res. Inflow (Apr–July)	83	16,479
Brownlee Res. Inflow (Apr–July)	72	3,949
Dworshak Res. Inflow (Apr–July)	85 86*	2,064 2,083*

* Denotes COE June Forecast

Grand Coulee Reservoir is at 1,286.0 feet (8-4-16) and drafted 1.6 feet over the last week. Outflows at Grand Coulee have ranged between 94.7 and 115.5 Kcfs over the last week.

The Libby Reservoir is currently at elevation 2,447.2 feet (8-4-16) and has refilled 0.5 feet over the previous week. Daily average outflows at Libby Dam have been 7.0 Kcfs over the last week.

Hungry Horse is currently at an elevation of 3,557.2 feet (8-4-16) and has drafted 0.6 feet over the last week. Outflows at Hungry Horse have been 2.0 Kcfs over the last week.

Dworshak is currently at an elevation of 1,564.0 feet (8-4-16) and has drafted 7.2 feet over the last week. Dworshak has decreased outflows over the last week from 12.0 Kcfs to 9.9 Kcfs.

The Brownlee Reservoir was at an elevation of 2,058.6 feet on August 4th, 2016, and has drafted 2.7 ft. over the last week. Outflows at Hells Canyon have ranged between 7.5 and 16.8 Kcfs over the last week.

The Summer Biological Opinion flow period began on June 21st with a flow objective of 50.4 Kcfs at Lower Granite. Over the Summer Flow Period, flows at Lower Granite Dam have averaged 34.9 Kcfs and 28.2 Kcfs over the last week.

The Summer Biological Opinion Flow Objectives will be 200 Kcfs at McNary Dam (began July 1st). Over the Summer Flow Period, flows at McNary have averaged 160.2 Kcfs and 154.8 Kcfs last week.

Spill and River Temperature

Dworshak Dam discharge decreased from 12 Kcfs to 9.8 to 9.9 Kcfs on Monday, and has operated at this level since then. No spill has occurred after the reduction in discharge to powerhouse capacity.

Summer spill for juvenile fish passage began on June 21st and will continue through August 31st. Summer spill for fish passage at the Snake River projects is to occur at the following amounts described in the 2016 Fish Operations Plan (FOP).

Project	Spill Level Day/Night
Lower Granite	18 Kcfs/18 Kcfs
Little Goose	30%/30%
Lower Monumental	17 Kcfs/17 Kcfs
Ice Harbor	July 13-August 31: 45 Kcfs/Gas Cap

At Lower Granite Dam the removable spillway weir was closed on June 29th to reduce the amount of surface warm water transferred from the forebay to the tailrace. The spill pattern was changed from a “bulk” spill pattern to a “uniform” spill pattern. Over the past week spill has ranged from 13.4 to 17.9 Kcfs. At Little Goose Dam spill was changed on July 6th from spilling 30% of instantaneous flow, to a fixed volume spill operation to maintain compatibility with Lower Granite and Lower Monumental operations. Presently, spill is a fixed volume of 8.9 Kcfs. At Lower Monumental Dam “doble testing” has occurred over the past week.

This testing requires one unit of the project be run at “speed – no load” conditions, which equaled 5 Kcfs. All additional water was spilled during the daytime test hours. Total daily spill over the past week ranged from 12.6 Kcfs to 17 Kcfs. At Ice Harbor Dam spill has occurred at the 2016 FOP levels. (At low flows, which have occurred at some Snake River projects this week, BIOP spill levels are considered met if all flow in excess of that needed for the operation of one turbine unit at a project is provided as spill.)

Summer spill for fish passage began on June 16th at the middle Columbia River projects. Spill for fish passage at the middle Columbia River projects is to occur at the following amounts described in the 2016 FOP.

Project	Spill Level Day/Night
McNary	June 16-Aug 31: 50%/50%
John Day	July 20-August 31: 30%/30%
The Dalles	40%/40%
Bonneville	95 Kcfs/95 Kcfs

This past week all Middle Columbia River projects (McNary, John Day and The Dalles dams) have spilled at the 2016 FOP levels. Spill at Bonneville Dam has been changed to 95 Kcfs to address erosion concerns below the project. Towards the end of the week, spill was less than the 95 Kcfs, but was equal to all flow in excess of powerhouse minimums.

All sites were within TDG criteria over the past week.

Note: The State of Oregon TDG waiver requires compliance only with 120% TDG in the tailrace, while the State of Washington requires compliance with both a 115% TDG forebay requirement and a 120% tailrace TDG requirement. The State of Oregon and the State of Washington also use different methodologies to estimate the 12-hour average TDG. For Oregon, the 12-hour average is based on the 12 highest hourly TDG measurements in a single calendar day (not necessarily consecutive). For Washington, the 12-hour average is based on 12-hour rolling averages. The highest of the rolling averages is what is reported as the 12-hour average for a given day. The location of a TDG monitor will dictate which of these methodologies is used for compliance monitoring. The Washington methodology

will apply to all the lower Snake River projects, as well as the middle Columbia River forebay monitors. On any given day the compliance of the tailrace monitors at the middle Columbia River projects will be determined using either the Washington or Oregon methodology, whichever is the most restrictive, and spill will be decreased if needed.

Low fish numbers precluded sampling for GBT at several sites this past week. Monitoring for signs of gas bubble trauma (GBT) occurred at McNary and Bonneville dams over the past week. Sampling for GBT at McNary Dam has been decreased to one time per week due to high river temperatures and increased mortality in the sample. No fish were observed with signs of GBT over the past week.

Temperature: At present, water temperatures are above the 68°F temperature standard at the forebays of Bonneville, McNary and Ice Harbor dams. The forebay temperatures at Lower Granite Dam are about a degree warmer than last week. The daily average temperature in the Lower Granite forebay for August 4th was 66.23° F. It is above 70°F (70.5°F) downstream at the forebay of Ice Harbor Dam, where the temperature is slightly warmer than last week. At McNary and Bonneville dams the forebay temperatures were 69.9°F and 70.6°F, respectively on August 4th. These forebay temperatures are about the levels measured at this time last year. High temperature sampling program protocols (to be implemented at temperatures above 70°F) have been initiated at both projects.

Smolt Monitoring

Smolt Monitoring Program (SMP) sampling was ongoing at all SMP bypass facilities this week. High temperature sampling protocols remained in effect at Bonneville, John Day, and McNary dams this week. Subyearling Chinook dominated this week's samples at all of the SMP bypass facilities. However, when compared to the previous week, subyearling Chinook passage decreased at the Upper and Middle Columbia bypass facilities. Subyearling Chinook passage increased at Lower Granite and Little Goose dams but stayed the same at Lower Monumental Dam. Finally, passage of spring migrants (i.e., yearling Chinook, steelhead, coho, and sockeye) was extremely low at all SMP bypass facilities.

The high temperature sampling protocol remained in effect at Bonneville Dam (BON) this week. Under this sampling protocol, sampling at BON occurs every-other-day (24-hour sample), with a target sample size of 100 fish. This sampling protocol will remain in place until temperatures in the Bonneville Forebay drop below 69.5°F. Samples at BON continued to be dominated by subyearling Chinook this week. This week's daily average passage index for subyearling Chinook at BON was approximately 2,900 per day, which is a substantial decrease from last week's daily average passage index of nearly 48,000 per day. No spring migrants were encountered in this week's samples at BON. Furthermore, the only lamprey juveniles that were encountered at BON this week were Pacific macrophthalmia, which were only encountered one day this week (August 4th).

The high temperature sampling protocol remained in effect at John Day Dam (JDA) this week. Under this protocol, sampling at JDA occurs twice per week (6-hour sample) for condition only. These condition monitoring samples will occur on Mondays and Thursdays, with FPC receiving the data on Tuesdays and Fridays. This protocol will remain in place until temperatures in the John Day Forebay drop below 69.5°F. Because the high temperature protocol at JDA calls for a partial sample (i.e., 6-hour sample), it is not appropriate to use the passage index as a measure of magnitude of juvenile passage. Subyearling Chinook dominated the collections at JDA this week. In fact, subyearling Chinook were the only target species encountered this week's two condition samples at JDA.

The high temperature sampling protocol remained in effect at McNary Dam (MCN) this week. Under this sampling protocol, sampling at MCN remains every-other-day (24-hour sample), with a reduced target sample size of 100 fish. This sampling protocol will remain in place until temperatures in the McNary Forebay drop below 69.5°F. This week's samples at MCN were dominated by subyearling Chinook, with a daily average passage index of about 600 per day. This is a decrease over last week's daily average passage index of about 1,600 subyearling Chinook per day. The only spring migrants that were encountered in this week's samples were steelhead, which were encountered in two of this week's three samples (August 1st and 2nd). Pacific lamprey macrophthalmia were encountered in all three of this week's samples.

Collection estimates for Pacific macrophthalmia this week ranged from 8-15 fish per day.

This week's samples at Lower Granite Dam (LGR) were again dominated by subyearling Chinook, with a daily average passage index of approximately 1,200 per day. This is an increase over last week's daily average passage index of about 950 subyearling Chinook per day. Passage of spring migrants remained extremely low this week. Among the spring migrants that were encountered this week were yearling Chinook, coho, and steelhead. Finally, Pacific lamprey ammocoetes were encountered in three of this week's samples. No Pacific lamprey macrophthalmia were encountered in this week's samples at LGR.

Sampling at Little Goose Dam (LGS) was limited to a 24-hour sample every-other-day until transportation began, at which time sampling switched to daily. Subyearling Chinook dominated this week's collections at LGS. This week's daily average passage index for subyearling Chinook at LGS was about 800 per day, which is an increase from last week's daily passage index of approximately 700. The only spring migrants that were encountered in this week's samples were sockeye and steelhead, but in very low numbers. Finally, Pacific lamprey ammocoetes were encountered in four of this week's samples while Pacific macrophthalmia were encountered every day this week. This week's daily average collection for Pacific macrophthalmia at LGS was nearly 10 fish per day.

Sampling at Lower Monumental Dam (LMN) was limited to a 24-hour sample every-third-day through the April 14th every-other-day from April 16th to April 30th, and every day with the initiation of transportation. This week's samples at LMN were again dominated by subyearling Chinook, with a daily average passage index of only about 50 per day. This is nearly identical to last week's daily average passage index. The only spring migrants that were encountered in this week's samples at LMN were steelhead, which were encountered in five of this week's samples. Finally, both Pacific lamprey ammocoetes and macrophthalmia were encountered in this week's samples. Pacific ammocoetes were encountered in two samples (July 30th and August 1st) while macrophthalmia were encountered in four of this week's samples.

Subyearling Chinook continued to dominate the samples at Rock Island Dam (RIS) this week. This

week's daily average passage index for subyearling Chinook at RIS was about 50 per day, which is lower than last week's daily average passage index of about 130 per day. Sockeye migrants were observed on one sample day (August 2nd). No other spring migrants were encountered in this week's samples. Finally, Pacific lamprey macrophthalmia were encountered in only two of this week's samples (July 31st and August 3rd) and no ammocoetes were encountered at RIS this week.

Hatchery Release

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. No new releases were scheduled for this zone this week. Furthermore, no releases are scheduled for this zone over the next two weeks.

Mid-Columbia Zone: The Mid-Columbia Zone encompasses the area of the Columbia River and its tributaries from McNary Dam to Chief Joseph Dam. No new releases were scheduled for this zone this week and no new releases are scheduled over the next two weeks.

Lower Columbia Zone: The Lower Columbia Zone is defined as the Columbia River and its tributaries from Bonneville Dam to McNary Dam. No new releases were scheduled for this zone this week and no new releases are scheduled over the next two weeks.

Adult Passage

Fall Chinook began to pass Bonneville Dam on August 1st. Daily adult fall Chinook passage numbers at Bonneville Dam ranged between 510 and 820 last week. The adult fall Chinook count of 2,677 has 43 more fish than the 2015 count of 2,634 and has 994 more fish than the 10-year average count of 1,683. The 2016 Bonneville Dam fall Chinook jack count of 269 has 47 fewer fish than the 2015 count of 316 and 139 fewer fish than the 10-year average count of 408. The 2016 adult summer Chinook count of 10,870 at Lower Granite Dam in the Snake River is about 78.6% of the 2015 count and 67.2% of the 10-year average count. The 2016 Lower Granite summer Chinook jack count of 1,961 is about 49.8% of the 2015 count and about 30% of the 10-year average count.

The 2016 Bonneville Dam adult steelhead count of 67,899 is about 72.7% of the 2015 count of 93,433 and about 55.3% of the 10-year average count of 122,766. The 2016 Bonneville Dam adult wild steelhead count of 25,655 is about 55.4% of the 2015 count of 46,283 and 47.6% of the 10-year average count of 53,953. Daily adult steelhead counts at Lower Granite Dam ranged from 55 to 136 adults per day last week. This year's Lower Granite steelhead count of 8,275 is about 81.2% of the 2015 count of 10,193 and 63.3% of the 10-year average count of 13,070. The 2016 Lower Granite Dam adult wild steelhead count of 4,549 is 91% of the 2015 count of 4,994 and is about 89.8% of the 10-year average count of 5,068. At Willamette Falls, the 2016 count for steelhead was 25,648 as of August 3rd. This year's steelhead count is about 3.7 times greater than the 2015 count of 6,962 and about 1.2 times greater than the 10-year average count of 21,721.

Daily adult sockeye passage numbers at Bonneville Dam ranged between 88 and 222 last week. The 2016 adult sockeye count at Bonneville Dam of 341,930 is about 67.1% of the 2015 count and 1.2 times greater than the 10-year average count. The 2016 adult sockeye count at McNary Dam of 261,165 is about 94.5% of the 2015 count, while being about 1.3 times greater than the 10-year average count. The Lower Granite Dam 2016 adult sockeye count of 794 has 414 more fish than the 2015 count of 380 and 163 fewer fish than the 10-year average count. As of August 4th at Bonneville Dam, the adult shad count was 1,766,208. This year's shad count is about 97.4% of the 2015 count of 1,813,703 and 78% of the 10-year average count of 2,263,326.

Hatchery Releases Last Two Weeks

Hatchery Release Summary

From: 7/23/2016 to 08/05/16

Agency	Hatchery	Species	Race	MigYr	NumRel	RelStart	RelEnd	RelSite	RelRiver
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No Releases Scheduled

Hatchery Releases Next Two Weeks

Hatchery Release Summary

From: 8/6/2016 to 8/19/2016

Agency	Hatchery	Species	Race	MigYr	NumRel	RelStart	RelEnd	RelSite	RelRiver
No Releases Scheduled									

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

Date	Grand Coulee		Chief Joseph		Wells		Rocky Reach		Rock Island		Wanapum		Priest Rapids	
	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill
07/22/2016	87.9	0.1	82.8	0.0	85.4	8.1	91.7	10.3	98.5	21.8	103.6	19.8	99.9	28.8
07/23/2016	95.5	0.1	96.5	0.0	99.3	8.8	96.8	8.6	101.4	19.4	98.7	20.1	93.6	29.2
07/24/2016	91.1	0.1	91.5	0.0	96.1	8.6	92.2	10.0	96.1	23.0	101.7	25.3	99.4	29.7
07/25/2016	101.0	0.1	101.2	0.0	108.0	9.5	107.3	10.6	111.0	22.2	114.3	20.4	111.5	29.8
07/26/2016	105.0	0.1	101.8	0.0	106.2	8.2	106.8	10.1	108.9	22.4	113.4	20.1	111.5	29.4
07/27/2016	113.5	0.1	113.8	0.0	117.8	11.1	114.9	11.6	116.7	21.5	127.3	21.2	127.1	29.1
07/28/2016	116.1	0.1	116.8	0.0	121.4	10.0	123.6	12.0	129.0	22.9	136.3	33.7	133.0	31.0
07/29/2016	113.4	0.2	115.3	0.0	123.3	9.3	124.2	10.5	127.9	22.8	133.9	19.9	131.9	28.7
07/30/2016	101.1	0.1	100.1	0.0	107.0	8.5	110.8	10.6	116.1	22.3	115.9	20.2	110.2	29.1
07/31/2016	95.1	0.1	95.9	0.0	101.4	7.9	100.9	8.7	103.3	20.0	113.7	19.5	113.6	28.4
08/01/2016	105.9	0.1	107.8	0.0	109.9	8.0	108.5	10.8	109.7	24.1	132.5	18.5	133.7	25.1
08/02/2016	94.6	0.1	93.1	0.0	100.6	8.6	98.2	10.1	101.6	22.8	101.0	19.0	97.0	25.4
08/03/2016	106.9	0.1	105.1	0.0	109.3	9.0	108.7	10.0	112.3	23.0	114.4	19.6	107.2	26.0
08/04/2016	115.5	0.1	112.6	39.7	114.8	9.6	111.4	10.4	112.9	22.2	116.6	19.3	113.4	26.7

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

Date	Dworshak		Brownlee Inflow	Hells Canyon		Lower Granite		Little Goose		Lower Monumental		Ice Harbor	
	Flow	Spill		Outflow	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	
07/22/2016	9.6	0.0	---	10.1	33.5	17.9	31.4	10.5	31.1	16.3	32.6	21.3	
07/23/2016	11.9	2.2	---	9.7	30.9	17.7	27.8	10.6	26.4	14.0	29.7	18.7	
07/24/2016	11.9	2.2	---	10.4	30.5	17.9	30.0	9.0	28.7	15.5	28.8	18.2	
07/25/2016	12.0	2.2	---	10.8	33.0	18.0	30.8	10.5	29.5	17.0	31.7	21.3	
07/26/2016	12.0	2.2	---	9.4	33.1	17.9	30.2	10.5	30.4	16.5	32.0	21.3	
07/27/2016	11.9	2.2	---	10.1	30.7	17.9	30.2	10.5	29.2	17.0	31.6	20.6	
07/28/2016	12.0	2.2	---	10.1	30.7	18.0	28.6	10.5	27.4	13.9	28.9	18.1	
07/29/2016	12.0	2.2	---	9.3	30.7	17.9	28.2	10.5	28.0	17.0	28.8	17.8	
07/30/2016	11.9	2.1	---	9.2	30.7	17.8	26.9	10.5	25.8	14.5	28.7	17.6	
07/31/2016	12.0	2.1	---	8.9	28.1	15.3	27.0	8.9	26.2	15.2	29.5	18.6	
08/01/2016	9.9	0.0	---	9.1	27.7	14.9	25.3	8.9	24.1	13.2	27.3	16.4	
08/02/2016	9.8	0.0	---	10.6	27.0	14.2	25.5	8.9	24.1	13.4	26.8	15.9	
08/03/2016	9.9	0.0	---	8.3	27.3	14.7	25.1	8.9	24.2	13.5	27.9	17.1	
08/04/2016	9.9	0.0	---	11.4	26.1	13.4	24.6	8.9	23.2	12.6	26.6	15.8	

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

Date	McNary		John Day		The Dalles		Bonneville			
	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	PH1	PH2
07/22/2016	137.9	69.2	122.9	37.0	111.3	44.4	140.7	94.4	1.0	33.0
07/23/2016	133.8	67.0	139.5	41.9	128.8	51.5	137.9	93.8	0.0	31.6
07/24/2016	143.2	71.9	131.2	39.2	119.3	47.7	138.0	93.8	0.0	31.9
07/25/2016	144.0	72.2	140.8	42.1	127.7	51.3	140.4	93.4	0.0	34.6
07/26/2016	150.3	75.4	141.9	42.6	132.9	53.1	146.0	93.6	0.4	39.6
07/27/2016	162.4	81.5	154.6	46.4	135.1	54.2	154.3	93.5	0.9	47.5
07/28/2016	164.2	82.4	157.6	47.3	144.8	57.9	153.8	93.8	0.9	46.7
07/29/2016	169.2	84.9	160.3	48.1	146.8	58.6	157.1	94.5	0.9	49.3
07/30/2016	157.2	78.9	139.3	41.7	126.6	50.8	139.2	94.5	0.9	31.4
07/31/2016	160.7	80.6	154.0	46.3	140.4	56.1	152.2	94.9	0.9	44.0
08/01/2016	173.6	87.1	171.5	51.6	157.7	63.5	164.4	94.7	0.9	56.3
08/02/2016	141.5	70.9	128.8	38.9	114.7	46.0	146.9	94.5	0.9	39.1
08/03/2016	131.5	65.9	128.2	38.4	117.0	47.0	133.0	89.2	1.0	30.5
08/04/2016	150.7	75.5	144.9	43.3	132.7	53.2	129.4	85.5	1.0	30.4

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

Site	Date & Species	Number of Fish	Number w/ GBT signs	Number w/ Fin Signs	% Fin GBT	% Severe Fin GBT	Number of Fish with Fin GBT Listed by Highest Rank			
							Rank 1	Rank 2	Rank 3	Rank 4
Lower Granite Dam										
Little Goose Dam										
Lower Monumental Dam										
McNary Dam										
	07/25/16 Chinook + Steelhead	100	0	0	0.00%	0.00%	0	0	0	0
	07/31/16 Chinook + Steelhead	27*	0	0			0	0	0	0
Bonneville Dam										
	07/23/16 Chinook + Steelhead	100	0	0	0.00%	0.00%	0	0	0	0
	07/26/16 Chinook + Steelhead	100	0	0	0.00%	0.00%	0	0	0	0
	07/30/16 Chinook + Steelhead	22*	0	0			0	0	0	0
	08/01/16 Chinook + Steelhead	100	0	0	0.00%	0.00%	0	0	0	0
Rock Island Dam										

* Sample size criteria not met, therefore no % fish with GBT estimated for this sample day.

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

Total Dissolved Gas Saturation Data at Upper Columbia River Sites

Date	<u>Hungry H. Dnst</u>			#	<u>Boundary</u>			#	<u>Grand Coulee</u>			#	<u>Grand C. Tlwr</u>			#	<u>Chief Joseph</u>			#
	<u>24 h</u>	<u>12 h</u>			<u>24 h</u>	<u>12 h</u>			<u>24 h</u>	<u>12 h</u>			<u>24 h</u>	<u>12 h</u>			<u>24 h</u>	<u>12 h</u>		
	Avg	Avg	High		Avg	Avg	High		Avg	Avg	High		Avg	Avg	High		Avg	Avg	High	
7/22	104.4	104.7	105.3	24	---	---	---	0	103.8	103.9	104.1	24	102.9	103.3	103.8	24	103.4	103.6	103.8	24
7/23	104.3	104.3	104.4	6	---	---	---	0	103.8	104.0	104.4	24	102.6	103.3	103.8	24	103.5	103.8	104.1	24
7/24	---	---	---	0	---	---	---	0	103.9	104.2	104.7	24	103.1	103.8	104.2	24	103.9	104.3	104.7	24
7/25	105.4	105.4	105.7	9	---	---	---	0	104.2	104.5	104.8	24	103.5	104.6	107.1	24	104.6	104.9	105.1	24
7/26	104.8	105.0	105.3	24	---	---	---	0	104.3	104.5	105.1	24	102.8	103.3	103.7	24	104.6	104.9	105.2	24
7/27	104.9	105.3	105.9	24	---	---	---	0	104.1	104.3	104.5	24	102.6	103.1	103.5	24	104.3	104.5	104.7	24
7/28	104.9	105.3	106.0	24	---	---	---	0	104.0	104.4	104.7	24	102.6	103.2	103.4	24	103.9	104.3	104.6	24
7/29	105.2	105.8	106.3	24	---	---	---	0	104.6	104.9	105.3	24	103.0	103.7	104.1	24	104.3	104.9	105.2	24
7/30	115.7	117.8	117.9	24	---	---	---	0	105.0	105.2	105.3	24	103.4	104.0	104.4	24	104.9	105.2	105.6	24
7/31	117.7	117.7	117.9	10	---	---	---	0	104.2	104.5	105.0	24	102.8	103.1	103.4	24	104.0	104.3	104.5	24
8/1	117.5	117.6	117.6	16	---	---	---	0	103.8	104.1	104.4	24	102.4	102.8	103.0	24	103.5	103.8	104.0	24
8/2	117.5	117.6	117.7	24	---	---	---	0	103.9	104.2	104.6	24	102.3	103.0	103.6	24	103.5	103.7	104.1	24
8/3	117.4	117.5	117.6	24	---	---	---	0	103.1	103.3	103.4	24	101.4	101.9	102.2	24	103.1	103.3	103.7	24
8/4	117.4	117.5	117.6	23	---	---	---	0	103.5	103.9	104.1	23	101.9	102.6	102.9	23	103.2	103.6	104.0	23

Total Dissolved Gas Saturation Data at Mid Columbia River Sites

Date	<u>Chief J. Dnst</u>			#	<u>Wells</u>			#	<u>Wells Dwnstrm</u>			#	<u>Rocky Reach</u>			#	<u>Rocky R. Tlwr</u>			#
	<u>24 h</u>	<u>12 h</u>			<u>24 h</u>	<u>12 h</u>			<u>24 h</u>	<u>12 h</u>			<u>24 h</u>	<u>12 h</u>			<u>24 h</u>	<u>12 h</u>		
	Avg	Avg	High		Avg	Avg	High		Avg	Avg	High		Avg	Avg	High		Avg	Avg	High	
7/22	103.6	103.9	104.3	24	103.6	103.9	104.6	24	106.2	106.6	108.6	24	105.6	105.7	105.8	24	111.5	112.4	116.6	24
7/23	103.4	103.6	103.9	24	103.3	103.8	104.5	24	106.0	106.3	106.6	24	105.6	106.0	106.6	24	110.7	111.9	112.2	24
7/24	104.1	104.4	104.5	24	104.2	105.2	105.9	24	106.3	106.7	107.1	24	106.1	106.6	107.4	24	111.1	112.7	113.2	24
7/25	104.1	104.3	104.8	24	105.0	105.9	106.7	24	107.2	107.9	108.7	24	106.6	106.8	107.2	24	112.0	113.1	113.7	24
7/26	104.2	104.3	104.6	24	105.0	105.7	106.7	24	107.4	107.9	109.2	24	106.8	107.2	107.7	24	112.1	113.5	114.1	24
7/27	103.9	104.0	104.4	24	104.9	105.7	106.3	24	107.7	108.8	110.4	24	107.2	107.6	108.0	24	112.6	113.9	116.2	24
7/28	103.7	104.0	104.3	24	105.2	105.8	106.3	24	107.5	108.3	108.8	24	107.3	107.7	108.1	24	113.4	114.3	116.6	24
7/29	104.3	104.7	104.9	24	105.3	105.9	106.4	24	107.6	108.3	108.9	24	108.4	108.9	109.5	24	113.5	114.6	115.1	24
7/30	104.8	105.1	105.4	24	105.4	105.9	106.3	24	107.3	108.0	108.7	24	108.2	108.4	108.7	24	113.3	114.0	114.9	24
7/31	103.9	104.3	105.0	24	104.4	104.8	105.3	24	106.3	107.0	107.6	24	106.7	106.9	107.2	24	111.5	112.6	113.2	24
8/1	103.3	103.5	103.6	24	104.2	105.0	105.6	23	106.2	107.2	107.9	23	105.7	106.2	106.6	24	112.2	113.3	114.1	24
8/2	103.6	104.0	104.5	24	104.0	104.5	104.9	24	106.1	106.4	106.8	24	105.8	106.1	106.1	24	111.4	112.1	112.6	24
8/3	103.0	103.2	103.5	24	102.9	103.5	104.1	23	105.0	105.6	106.1	23	105.0	105.2	105.5	24	111.1	112.3	112.9	24
8/4	103.0	103.2	103.4	23	103.9	104.7	105.3	21	106.1	107.0	107.6	21	105.2	105.7	106.1	23	111.6	112.7	113.0	23

Total Dissolved Gas Saturation at Mid Columbia River Sites

Date	<u>Rock Island</u>			#	<u>Rock I. Tlwr</u>			#	<u>Wanapum</u>			#	<u>Wanapum Tlwr</u>			#	<u>Priest Rapids</u>			#
	<u>24 h</u>	<u>12 h</u>			<u>24 h</u>	<u>12 h</u>			<u>24 h</u>	<u>12 h</u>			<u>24 h</u>	<u>12 h</u>			<u>24 h</u>	<u>12 h</u>		
	Avg	Avg	High		Avg	Avg	High		Avg	Avg	High		Avg	Avg	High		Avg	Avg	High	
7/22	107.0	107.5	108.6	24	111.7	113.1	114.7	24	107.7	108.3	109.1	24	111.5	112.0	112.9	24	109.4	109.6	110.2	24
7/23	106.3	106.7	107.2	24	111.4	112.0	112.4	24	106.8	107.8	108.9	24	111.1	111.7	113.0	24	108.9	109.1	109.4	24
7/24	106.8	107.4	108.3	24	113.0	114.0	114.4	24	109.0	110.4	111.0	24	112.7	113.5	116.1	24	110.0	110.5	112.1	24
7/25	107.7	108.3	108.7	24	113.2	114.1	115.3	24	111.9	113.7	115.3	24	112.5	112.9	113.4	24	112.2	112.4	112.5	24
7/26	107.3	108.0	108.2	24	112.6	113.4	114.7	24	109.6	110.7	112.3	24	111.8	112.3	113.4	24	111.1	111.4	111.9	24
7/27	107.7	108.4	109.0	24	112.6	114.0	114.6	24	111.0	112.9	114.5	24	112.3	112.6	113.4	24	110.7	110.8	111.0	24
7/28	108.4	109.2	109.5	24	113.1	114.3	114.7	24	110.2	111.5	112.4	24	113.5	115.4	123.7	24	112.2	113.7	116.8	24
7/29	108.7	109.7	110.7	24	113.3	114.7	115.3	24	110.1	111.3	112.3	24	112.2	112.6	113.7	24	112.8	113.1	114.3	24
7/30	108.8	109.1	110.0	24	113.8	114.7	115.3	24	108.0	108.4	109.6	24	111.8	112.3	112.7	24	111.9	112.4	112.9	24
7/31	107.2	107.6	108.4	24	112.1	112.7	114.6	24	105.8	106.5	107.2	24	110.3	110.7	111.5	24	109.7	109.9	110.5	24
8/1	106.6	107.5	108.7	24	112.6	114.0	114.8	24	106.5	108.1	109.6	24	109.9	110.5	111.6	24	109.2	109.4	109.8	24
8/2	106.1	106.6	108.1	24	112.4	113.5	114.5	24	105.5	106.5	106.9	24	110.6	111.8	114.4	24	109.0	109.3	109.5	24
8/3	106.1	106.7	107.2	24	112.0	113.0	113.5	23	---	---	---	0	---	---	---	0	---	---	---	0
8/4	106.5	107.1	107.8	23	112.5	113.4	114.2	23	---	---	---	0	---	---	---	0	---	---	---	0

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

Total Dissolved Gas Saturation Data at Lower Columbia and Snake River Sites

Date	<u>Priest R. Dnst</u>			<u>Pasco</u>			<u>Dworshak</u>			<u>Clrwrtr-Peck</u>			<u>Anatone</u>							
	<u>24 h</u>	<u>12 h</u>	<u>#</u>	<u>24 h</u>	<u>12 h</u>	<u>#</u>	<u>24 h</u>	<u>12 h</u>	<u>#</u>	<u>24 h</u>	<u>12 h</u>	<u>#</u>	<u>24 h</u>	<u>12 h</u>	<u>#</u>					
	Avg	Avg	High	Avg	Avg	High	Avg	Avg	High	Avg	Avg	High	Avg	Avg	High					
7/22	112.6	113.2	115.3	24	---	---	---	0	99.2	99.5	99.7	24	101.6	102.6	103.4	24	102.0	103.2	104.4	24
7/23	113.0	113.6	115.9	24	---	---	---	0	103.5	103.8	104.1	24	103.8	105.2	106.1	24	102.1	103.9	105.6	24
7/24	113.2	113.7	115.0	24	---	---	---	0	103.9	104.2	104.6	24	104.3	105.4	106.4	24	102.4	104.3	105.9	24
7/25	114.0	114.3	114.5	24	---	---	---	0	104.0	104.4	104.8	24	104.4	105.6	106.5	24	102.5	104.5	106.6	24
7/26	113.1	113.6	114.2	24	---	---	---	0	104.3	104.7	105.0	24	104.7	105.9	107.0	24	102.2	104.1	105.9	24
7/27	112.8	113.2	114.9	24	---	---	---	0	104.1	104.4	104.7	24	104.5	105.6	106.6	24	102.0	104.0	105.8	24
7/28	113.6	114.3	115.8	24	---	---	---	0	104.2	104.5	104.9	24	104.5	105.6	106.5	24	102.0	104.1	105.9	24
7/29	113.6	114.0	115.2	24	---	---	---	0	104.5	104.9	105.2	24	104.9	106.0	107.0	24	102.0	104.0	105.5	24
7/30	112.9	113.3	113.6	24	---	---	---	0	104.6	104.9	105.4	24	104.8	106.0	107.1	24	102.0	103.6	105.1	24
7/31	111.2	111.6	113.0	24	---	---	---	0	104.1	104.4	104.7	24	104.0	105.1	106.0	24	101.2	102.9	104.7	24
8/1	110.7	111.2	111.4	24	---	---	---	0	99.8	100.2	100.5	24	100.6	101.8	102.4	24	101.3	103.3	105.1	24
8/2	112.3	113.9	116.5	24	---	---	---	0	99.8	100.2	100.6	24	99.9	101.3	102.5	24	101.2	102.9	104.7	24
8/3	---	---	---	0	---	---	---	0	99.1	99.4	99.7	24	99.2	100.5	101.6	24	100.9	103.1	105.1	24
8/4	---	---	---	0	---	---	---	0	99.8	100.2	100.5	23	98.8	99.9	100.8	23	101.9	104.1	105.8	23

Total Dissolved Gas Saturation Data at Snake River Sites

Date	<u>Clrwrtr-Lewiston</u>			<u>Lower Granite</u>			<u>L. Granite Tlwr</u>			<u>Little Goose</u>			<u>L. Goose Tlwr</u>							
	<u>24 h</u>	<u>12 h</u>	<u>#</u>	<u>24 h</u>	<u>12 h</u>	<u>#</u>	<u>24 h</u>	<u>12 h</u>	<u>#</u>	<u>24 h</u>	<u>12 h</u>	<u>#</u>	<u>24 h</u>	<u>12 h</u>	<u>#</u>					
	Avg	Avg	High	Avg	Avg	High	Avg	Avg	High	Avg	Avg	High	Avg	Avg	High					
7/22	103.5	105.5	106.9	24	101.2	101.5	102.0	24	111.5	111.6	111.8	24	108.0	108.2	108.4	24	108.7	109.1	109.4	24
7/23	104.0	106.8	108.7	24	101.4	101.8	102.2	24	111.9	112.3	112.7	24	106.9	107.3	107.7	24	108.8	109.3	109.7	24
7/24	104.8	107.2	108.8	24	102.5	102.9	103.0	24	112.2	112.6	112.9	24	106.6	107.1	107.4	24	108.5	109.0	109.4	24
7/25	104.9	107.4	109.1	24	103.0	103.2	103.4	24	112.2	112.4	112.7	24	106.5	106.7	107.1	24	108.6	109.3	109.7	24
7/26	105.0	107.5	109.3	24	102.0	102.2	102.8	24	112.1	112.3	112.7	24	107.0	107.3	107.6	24	108.6	109.1	109.6	24
7/27	105.1	107.4	109.1	24	101.1	101.4	101.6	24	112.1	112.4	112.7	24	106.7	106.9	107.1	24	108.5	108.9	109.4	24
7/28	105.1	107.5	109.2	24	102.3	102.8	102.9	24	112.2	112.6	112.9	24	106.4	106.6	107.0	24	108.9	109.5	110.0	24
7/29	105.3	107.8	109.5	24	102.9	103.2	103.6	24	112.4	112.7	113.0	24	107.5	108.0	108.5	24	109.0	109.6	110.3	24
7/30	105.3	107.7	109.5	24	103.9	104.2	104.5	24	112.2	112.6	113.1	24	108.7	109.2	109.4	24	108.6	109.0	109.5	24
7/31	104.5	106.8	108.3	24	103.6	103.8	104.2	24	109.8	110.4	111.4	24	108.2	108.5	108.9	24	108.1	108.5	109.0	24
8/1	104.1	106.2	107.8	24	103.1	103.3	103.5	24	109.3	109.8	110.5	24	107.6	108.0	108.5	24	108.3	109.0	109.4	24
8/2	103.3	105.3	107.3	24	103.1	103.3	103.4	24	108.8	109.2	109.4	24	106.9	107.4	108.1	24	107.8	108.4	108.7	24
8/3	103.2	105.6	107.2	24	102.4	102.5	102.6	24	109.6	110.9	111.6	24	106.0	106.5	107.1	24	109.0	109.3	109.6	24
8/4	103.8	106.1	107.8	23	101.9	102.1	102.4	23	109.0	109.6	110.0	23	106.1	107.0	108.0	23	109.2	109.7	110.2	23

Total Dissolved Gas Saturation Data at Snake and Lower Columbia River Sites

Date	<u>Lower Mon.</u>			<u>L. Mon. Tlwr</u>			<u>Ice Harbor</u>			<u>Ice Harbor Tlwr</u>			<u>McNary-Oregon</u>							
	<u>24 h</u>	<u>12 h</u>	<u>#</u>	<u>24 h</u>	<u>12 h</u>	<u>#</u>	<u>24 h</u>	<u>12 h</u>	<u>#</u>	<u>24 h</u>	<u>12 h</u>	<u>#</u>	<u>24 h</u>	<u>12 h</u>	<u>#</u>					
	Avg	Avg	High	Avg	Avg	High	Avg	Avg	High	Avg	Avg	High	Avg	Avg	High					
7/22	105.2	105.6	106.5	24	115.2	115.7	116.4	24	111.4	111.6	112.0	24	113.0	113.5	114.1	24	---	---	---	0
7/23	105.9	106.2	106.4	24	113.1	113.6	115.3	24	111.6	111.8	112.1	24	113.2	113.8	114.4	24	---	---	---	0
7/24	106.9	107.7	108.0	24	114.8	116.8	117.7	24	112.1	112.4	112.6	24	113.1	113.7	114.2	24	---	---	---	0
7/25	106.9	107.1	107.5	24	115.3	116.2	116.6	24	112.0	112.2	112.4	24	113.0	113.6	114.3	23	---	---	---	0
7/26	106.6	107.2	107.4	24	114.3	114.6	115.0	24	111.9	112.3	112.7	24	113.1	113.7	114.3	24	---	---	---	0
7/27	107.7	107.9	108.0	24	113.9	114.0	114.2	24	112.1	112.4	113.0	24	113.2	113.7	114.2	24	---	---	---	0
7/28	107.5	107.8	107.9	24	112.9	114.1	114.5	24	112.6	113.0	113.6	24	112.4	112.9	113.6	24	---	---	---	0
7/29	107.7	108.1	108.5	24	115.1	116.3	117.5	24	114.0	114.4	115.0	24	111.3	112.4	113.6	24	---	---	---	0
7/30	108.0	108.2	108.6	24	114.2	116.4	117.0	24	114.1	114.3	114.5	24	110.3	111.8	113.9	24	---	---	---	0
7/31	106.7	106.9	107.5	24	113.6	116.2	117.4	24	113.1	113.3	113.9	24	109.6	110.5	113.1	24	---	---	---	0
8/1	106.9	107.3	107.7	24	113.2	116.3	117.3	24	112.4	112.7	112.8	24	109.8	111.3	113.4	24	---	---	---	0
8/2	106.8	107.2	107.6	24	113.0	116.5	118.0	24	111.7	112.2	112.6	24	108.1	108.9	109.9	24	---	---	---	0
8/3	105.2	105.4	105.7	24	112.9	116.6	117.4	24	108.9	109.3	110.2	24	108.8	109.4	110.2	24	---	---	---	0
8/4	105.9	106.3	106.7	23	113.6	117.5	118.3	23	109.6	110.1	110.5	23	108.7	109.4	110.1	23	---	---	---	0

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

Total Dissolved Gas Saturation Data at Lower Columbia River Sites

Date	<u>McNary-Wash</u>			#	<u>McNary Tlwr</u>			#	<u>John Day</u>			#	<u>John Day Tlwr</u>			#	<u>The Dalles</u>			#
	<u>24 h</u>	<u>12 h</u>	<u>High</u>		<u>24 h</u>	<u>12 h</u>	<u>High</u>		<u>24h</u>	<u>12h</u>	<u>High</u>		<u>24h</u>	<u>12h</u>	<u>High</u>		<u>24h</u>	<u>12h</u>	<u>High</u>	
	<u>Avg</u>	<u>Avg</u>	<u>High</u>		<u>hr</u>	<u>Avg</u>	<u>Avg</u>		<u>High</u>	<u>hr</u>	<u>Avg</u>		<u>Avg</u>	<u>High</u>	<u>hr</u>		<u>Avg</u>	<u>Avg</u>	<u>High</u>	
7/22	107.4	107.5	108.1	24	114.8	115.1	115.4	24	105.3	105.6	106.1	24	112.4	112.5	113.1	24	106.2	107.1	107.9	24
7/23	107.4	107.8	108.3	24	114.9	115.4	116.1	24	104.9	105.4	105.7	24	113.5	114.0	114.5	24	104.2	104.8	105.1	24
7/24	108.2	108.4	108.5	24	115.0	115.4	115.8	24	105.5	105.9	106.2	24	113.3	114.0	114.4	24	106.7	107.4	107.8	24
7/25	108.4	108.6	108.8	24	115.0	115.6	116.2	24	105.7	105.9	106.0	24	113.4	114.0	114.5	24	108.3	108.9	109.4	24
7/26	109.7	110.9	111.2	24	115.9	116.7	117.4	24	105.8	106.1	106.4	24	113.3	113.9	114.4	24	106.6	107.1	107.5	24
7/27	110.7	111.1	111.4	24	116.5	117.0	117.4	24	105.7	106.2	106.6	24	113.6	114.2	114.9	24	106.0	106.5	107.0	24
7/28	110.3	110.6	111.0	24	116.8	117.2	117.8	24	106.4	106.9	107.3	24	113.9	114.3	114.6	24	108.2	108.7	108.9	24
7/29	111.1	111.6	111.9	24	116.9	117.2	117.6	24	107.9	108.5	109.0	24	114.1	114.4	114.9	24	108.9	109.2	109.4	24
7/30	111.2	111.3	111.9	24	116.3	116.8	117.2	24	107.7	108.0	108.3	24	114.3	114.5	114.8	24	107.1	108.2	108.5	24
7/31	109.3	109.9	110.3	24	115.8	116.8	117.2	24	106.0	106.3	106.8	24	114.1	114.6	115.1	24	103.9	104.3	104.4	24
8/1	108.5	109.0	109.6	24	116.5	117.1	117.8	24	105.9	106.3	106.8	24	114.0	114.4	114.9	24	106.1	106.8	107.3	24
8/2	106.0	106.8	107.7	24	114.5	114.9	115.7	24	105.0	105.5	106.0	24	112.7	113.2	113.4	24	106.0	106.9	107.4	24
8/3	104.1	104.4	104.6	24	114.0	114.4	115.0	24	104.1	104.4	105.0	24	113.0	113.2	113.6	24	103.9	104.5	105.1	24
8/4	105.2	105.6	105.8	23	115.1	116.0	116.8	23	104.8	105.0	105.5	23	113.1	113.4	113.6	23	107.8	109.2	109.6	23

Total Dissolved Gas Saturation Data at Lower Columbia River Sites

Date	<u>The Dalles Dnst</u>			#	<u>Bonneville</u>			#	<u>Warrendale</u>			#	<u>Camas\Washougal</u>			#	<u>Cascade Island</u>			#
	<u>24 h</u>	<u>12 h</u>	<u>High</u>		<u>24 h</u>	<u>12 h</u>	<u>High</u>		<u>24h</u>	<u>12h</u>	<u>High</u>		<u>24h</u>	<u>12h</u>	<u>High</u>		<u>24h</u>	<u>12h</u>	<u>High</u>	
	<u>Avg</u>	<u>Avg</u>	<u>High</u>		<u>hr</u>	<u>Avg</u>	<u>Avg</u>		<u>High</u>	<u>hr</u>	<u>Avg</u>		<u>Avg</u>	<u>High</u>	<u>hr</u>		<u>Avg</u>	<u>Avg</u>	<u>High</u>	
7/22	111.3	111.9	112.7	24	106.7	107.2	108.0	24	115.3	115.9	116.1	24	110.8	111.6	112.6	24	116.9	117.0	117.2	24
7/23	111.1	111.5	111.6	24	106.0	106.2	106.4	24	115.7	116.0	116.3	24	112.9	113.7	114.4	24	116.7	116.8	116.9	24
7/24	112.1	113.5	113.8	24	106.1	106.7	107.0	24	116.3	116.8	117.1	24	114.0	115.5	116.3	24	116.9	117.0	117.1	24
7/25	113.3	114.1	114.6	24	107.4	107.9	108.0	24	115.8	116.1	116.3	24	114.0	114.8	115.5	24	116.9	117.1	117.3	24
7/26	112.7	113.1	113.4	24	106.1	106.4	106.8	24	114.9	115.4	116.0	24	111.9	113.0	113.6	24	117.0	117.2	117.5	24
7/27	112.3	113.1	113.3	24	105.7	106.3	106.6	24	114.9	115.4	115.9	24	112.1	113.1	113.9	24	116.8	117.0	117.2	24
7/28	113.8	114.5	114.7	24	107.2	108.1	108.6	24	115.3	116.5	117.1	24	112.3	113.0	113.4	24	117.1	117.4	117.7	24
7/29	114.1	114.8	115.2	24	109.0	109.7	110.1	24	115.9	116.5	117.1	24	113.8	115.0	115.7	24	117.1	117.4	117.4	24
7/30	112.6	113.0	113.3	24	107.2	107.8	108.6	24	115.0	115.7	116.4	24	111.3	112.5	113.2	24	117.1	117.2	117.4	24
7/31	110.9	111.3	111.7	24	104.2	104.7	105.7	24	115.1	115.9	116.3	24	111.0	112.4	113.5	24	117.0	117.2	117.3	24
8/1	112.1	112.9	113.4	24	103.7	104.3	104.7	24	114.0	114.2	114.4	24	110.8	111.7	112.5	24	116.8	117.0	117.3	24
8/2	111.3	111.6	112.9	24	103.9	104.1	104.3	24	114.5	115.1	115.7	24	108.4	109.5	110.0	24	116.9	117.0	117.3	24
8/3	110.9	111.1	111.3	24	104.6	105.4	105.9	24	115.5	115.8	116.1	24	111.6	113.9	115.1	24	115.1	116.3	116.9	24
8/4	112.7	114.0	114.6	23	106.4	107.0	107.7	23	116.2	116.8	117.3	23	114.2	115.1	115.7	23	114.1	114.2	114.3	23

Two-Week Summary of Passage Indices

Source: Fish Passage Center

Updated: 8/5/2016 8:29

Two-Week Summary of Passage Indices

* One or more of the sites on this date had an incomplete or biased sample.

See Sampling Comments: <http://www.fpc.org/currentDaily/smpcomments.htm>

For clip information see: <http://www.fpc.org/CurrentDaily/catch.htm>

For sockeye and yearling chinook (Snake only) race information see: <http://www.fpc.org/smoltqueries/currentsmppsubmitdata.asp>

COMBINED YEARLING CHINOOK											
Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (INDEX)	LGS (INDEX)	LMN (INDEX)	RIS (INDEX)	MCN (INDEX)	JDA (INDEX)	BO2 (INDEX)
07/22/2016	*	---	---	---	---	0	3	0	0	0	0
07/23/2016	*	---	---	---	---	0	0	0	0	---	0
07/24/2016	*	---	---	---	---	0	0	0	0	0	0
07/25/2016	*	---	---	---	---	0	0	0	0	---	0
07/26/2016	*	---	---	---	---	0	0	5	0	0	0
07/27/2016	*	---	---	---	---	0	3	5	0	---	0
07/28/2016	*	---	---	---	---	5	0	4	0	0	---
07/29/2016	*	---	---	---	---	0	0	0	0	---	0
07/30/2016	*	---	---	---	---	5	0	0	0	---	---
07/31/2016	*	---	---	---	---	0	0	0	0	---	0
08/01/2016	*	---	---	---	---	0	0	0	0	---	---
08/02/2016	*	---	---	---	---	4	0	0	0	---	0
08/03/2016	*	---	---	---	---	0	0	0	0	---	---
08/04/2016	*	---	---	---	---	0	0	0	0	---	0
08/05/2016		---	---	---	---	---	---	---	---	---	---
Total:		0	0	0	0	14	6	14	0	0	0
# Days:		0	0	0	0	14	14	14	14	7	5
Average:		0	0	0	0	1	0	1	0	0	0
YTD		27,295	56,779	16,183	7,757	5,899,048	3,490,956	4,892,141	44,783	2,181,660	1,456,048

COMBINED SUBYEARLING CHINOOK											
Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (INDEX)	LGS (INDEX)	LMN (INDEX)	RIS (INDEX)	MCN (INDEX)	JDA (INDEX)	BO2 (INDEX)
07/22/2016	*	---	---	---	---	1,383	1,020	87	91	2,935	---
07/23/2016	*	---	---	---	---	568	723	41	383	---	460
07/24/2016	*	---	---	---	---	672	1,340	65	125	811	---
07/25/2016	*	---	---	---	---	873	602	42	99	---	458
07/26/2016	*	---	---	---	---	1,155	558	39	97	1,439	---
07/27/2016	*	---	---	---	---	1,360	347	42	63	---	610
07/28/2016	*	---	---	---	---	608	389	45	79	1,220	---
07/29/2016	*	---	---	---	---	763	742	47	90	---	27
07/30/2016	*	---	---	---	---	948	847	36	39	1,043	---
07/31/2016	*	---	---	---	---	812	919	32	43	---	---
08/01/2016	*	---	---	---	---	993	629	50	51	354	---
08/02/2016	*	---	---	---	---	1,631	719	82	48	---	33
08/03/2016	*	---	---	---	---	1,596	1,190	52	33	449	---
08/04/2016	*	---	---	---	---	1,866	654	71	37	---	---
08/05/2016		---	---	---	---	---	---	---	---	---	---
Total:		0	0	0	0	15,228	10,679	731	1,278	8,251	1,588
# Days:		0	0	0	0	14	14	14	14	7	5
Average:		0	0	0	0	1,088	763	52	91	1,179	318
YTD		0	78	698	2,869	1,154,974	866,918	327,057	20,815	4,328,172	939,614

Two-Week Summary of Passage Indices

COMBINED COHO												
Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (INDEX)	LGS (INDEX)	LMN (INDEX)	RIS (INDEX)	MCN (INDEX)	JDA (INDEX)	BO2 (INDEX)	
07/22/2016	*	---	---	---	0	0	0	0	0	---	0	
07/23/2016	*	---	---	---	4	0	0	0	---	0	0	
07/24/2016	*	---	---	---	0	0	0	0	0	---	0	
07/25/2016	*	---	---	---	0	0	0	0	---	0	0	
07/26/2016	*	---	---	---	0	0	0	0	0	---	0	
07/27/2016	*	---	---	---	0	0	0	0	---	0	0	
07/28/2016	*	---	---	---	0	0	0	0	0	---	---	
07/29/2016	*	---	---	---	5	0	0	0	---	0	0	
07/30/2016	*	---	---	---	0	0	0	0	0	---	---	
07/31/2016	*	---	---	---	0	0	0	0	---	---	0	
08/01/2016	*	---	---	---	0	0	0	0	0	---	---	
08/02/2016	*	---	---	---	0	0	0	0	---	0	0	
08/03/2016	*	---	---	---	0	0	0	0	0	---	---	
08/04/2016	*	---	---	---	0	0	0	0	---	---	0	
08/05/2016		---	---	---	---	---	---	---	---	---	---	
Total:		0	0	0	9	0	0	0	0	0	0	
# Days:		0	0	0	14	14	14	14	7	5	10	
Average:		0	0	0	1	0	0	0	0	0	0	
YTD		0	0	0	316	198,072	147,678	60,123	45,366	154,245	58,662	802,520

COMBINED STEELHEAD												
Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (INDEX)	LGS (INDEX)	LMN (INDEX)	RIS (INDEX)	MCN (INDEX)	JDA (INDEX)	BO2 (INDEX)	
07/22/2016	*	---	---	---	31	27	5	0	0	---	0	
07/23/2016	*	---	---	---	26	18	0	0	---	0	0	
07/24/2016	*	---	---	---	10	16	0	0	0	---	0	
07/25/2016	*	---	---	---	20	12	0	0	---	0	0	
07/26/2016	*	---	---	---	54	22	5	0	10	---	0	
07/27/2016	*	---	---	---	22	22	5	2	---	0	0	
07/28/2016	*	---	---	---	15	25	4	0	0	---	---	
07/29/2016	*	---	---	---	15	50	5	0	---	0	0	
07/30/2016	*	---	---	---	15	44	5	0	0	---	---	
07/31/2016	*	---	---	---	14	29	0	0	---	---	0	
08/01/2016	*	---	---	---	0	6	0	0	8	---	---	
08/02/2016	*	---	---	---	18	31	5	0	---	0	0	
08/03/2016	*	---	---	---	4	13	5	0	8	---	---	
08/04/2016	*	---	---	---	9	12	5	0	---	---	0	
08/05/2016		---	---	---	---	---	---	---	---	---	---	
Total:		0	0	0	253	327	44	2	26	0	0	
# Days:		0	0	0	14	14	14	14	7	5	10	
Average:		0	0	0	18	23	3	0	4	0	0	
YTD		755	26,537	3,377	9,186	3,957,168	2,295,411	1,838,089	17,662	735,188	502,821	622,598

Two-Week Summary of Passage Indices

COMBINED SOCKEYE												
Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (INDEX)	LGS (INDEX)	LMN (INDEX)	RIS (INDEX)	MCN (INDEX)	JDA (INDEX)	BO2 (INDEX)	
07/22/2016 *	---	---	---	---	0	0	0	3	0	---	0	0
07/23/2016 *	---	---	---	---	0	0	0	1	---	0	0	0
07/24/2016 *	---	---	---	---	0	0	0	0	0	---	0	0
07/25/2016 *	---	---	---	---	0	0	0	0	---	7	0	0
07/26/2016 *	---	---	---	---	0	0	0	0	10	---	0	0
07/27/2016 *	---	---	---	---	0	0	0	0	---	0	0	0
07/28/2016 *	---	---	---	---	0	0	0	1	0	---	---	---
07/29/2016 *	---	---	---	---	0	0	0	0	---	0	0	0
07/30/2016 *	---	---	---	---	0	2	0	0	0	---	---	---
07/31/2016 *	---	---	---	---	0	2	0	0	---	---	0	0
08/01/2016 *	---	---	---	---	0	0	0	0	0	---	---	---
08/02/2016 *	---	---	---	---	0	0	0	3	---	0	0	0
08/03/2016 *	---	---	---	---	0	0	0	0	0	---	---	---
08/04/2016 *	---	---	---	---	0	0	0	0	---	---	0	0
08/05/2016	---	---	---	---	---	---	---	---	---	---	---	---
Total:	0	0	0	0	0	4	0	8	10	7	0	0
# Days:	0	0	0	0	14	14	14	14	7	5	10	10
Average:	0	0	0	0	0	0	0	1	1	1	0	0
YTD	1	0	0	133	43,851	32,774	24,148	56,638	861,061	303,206	801,582	

COMBINED LAMPREY JUVENILES												
Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR [†] (Samp)	LGS (Coll)	LMN (Coll)	RIS (Coll)	MCN (Coll)	JDA (Coll)	BO2 (Coll)	
07/22/2016 *	---	---	---	---	3	12	0	0	0	---	0	0
07/23/2016 *	---	---	---	---	1	10	0	2	---	5	67	0
07/24/2016 *	---	---	---	---	2	6	0	0	10	---	0	0
07/25/2016 *	---	---	---	---	1	2	0	0	---	5	0	0
07/26/2016 *	---	---	---	---	1	6	0	0	10	---	0	0
07/27/2016 *	---	---	---	---	3	8	0	0	---	5	0	0
07/28/2016 *	---	---	---	---	1	4	0	0	0	---	---	---
07/29/2016 *	---	---	---	---	3	4	2	0	---	0	0	0
07/30/2016 *	---	---	---	---	4	2	6	0	15	---	---	---
07/31/2016 *	---	---	---	---	0	6	2	1	---	---	0	0
08/01/2016 *	---	---	---	---	0	6	2	0	8	---	---	---
08/02/2016 *	---	---	---	---	2	24	0	0	---	0	0	0
08/03/2016 *	---	---	---	---	0	14	0	1	12	---	---	---
08/04/2016 *	---	---	---	---	0	16	2	0	---	---	8	8
08/05/2016	---	---	---	---	---	---	---	---	---	---	---	---
Total:	0	0	0	0	21	120	14	4	55	15	75	
# Days:	0	0	0	0	14	14	14	14	7	5	10	
Average:	0	0	0	0	2	9	1	0	8	3	8	
YTD	0	5	1	0	206	34,693	29,689	111	34,448	26,193	10,103	

Two-Week Summary of Passage Indices

* See sampling comments <http://www.fpc.org/currentDaily/smpcomments.htm>

Smolt indices, clipped & unclipped or combined, are presented in the following order: yearling chinook (chinook 1's), subyearling chinook (chinook 0's), steelhead, coho, sockeye, and lamprey juveniles.

Two 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.

The classes of counts presented in the report are defined below for each site. 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.

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.

† In 2013 it was confirmed that 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.

Definitions for Smolt Index Counts

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

Passage Index = Collection Counts / {Powerhouse Flow / (Powerhouse Flow + Spill)}

LGS (Index) = Little Goose Bypass Collection System : Passage Index Counts

Passage Index = Collection Counts / {Powerhouse Flow / (Powerhouse Flow + Spill)}

LMN (Index) = Lower Monumental Dam Bypass Collection System : Passage Index Counts

Passage Index = Collection Counts / {Powerhouse Flow / (Powerhouse Flow + Spill)}

RIS (Index) = Rock Island Dam Second Powerhouse Bypass Trap : Passage Index Counts

Passage Index = Collection Counts / {Powerhouse 2 Flow / (Powerhouse 1 & 2 Flow + Spill)}

MCN (Index) = McNary Dam Bypass Collection System : Passage Index Counts

Passage Index = Collection Counts / {Powerhouse Flow / (Powerhouse Flow + Spill)}

JDA (Index) = John Day Dam Bypass Collection System : Passage Index Counts

Passage Index = Collection Counts / {Powerhouse Flow / (Powerhouse Flow + Spill)}

BO2 (Index) = Bonneville Dam Second Powerhouse Bypass Collection System : Passage Index Counts

Passage Index = Collection Counts / {Powerhouse 2 Flow / (Powerhouse 1 & 2 Flow + Spill)}

JDA and BO2 data collected for the FPC by Pacific States Marine Fisheries Commission.

RIS data collected for the FPC by Chelan Co. PUD.

LGR, LMN, and MCN data collected for the FPC by Washington Dept. of Fish and Wildlife.

LGS and GRN data collected for the FPC by Oregon Dept. of Fish and Wildlife.

IMN data collected for the FPC by the Nez Perce Tribe.

Fall (post SMP season) trapping at the Imnaha River Fish Trap (IMN) is funded by the Lower Snake River Compensation Program (LSRCP)

WTB and LEW data collected for the FPC by Idaho Dept. of Fish and Game.

Two Week Transportation Summary

Source: Fish Passage Center

Updated:

8/5/16 8:28 AM

07/22/16 TO 08/05/16

		Species						
Site	Data	CH0	CH1	CO	ST	SO	CH	Grand Total
LGR	Sum of NumberCollected	6,718	6	4	110			6,838
	Sum of NumberBarged	6,306	6	3	114			6,429
	Sum of NumberBypassed	0	0	0	0			0
	Sum of Numbertrucked	0	0	0	0			0
	Sum of SampleMorts	34	0	0	0			34
	Sum of FacilityMorts	11	0	1	0			12
	Sum of ResearchMorts	0	0	0	0			0
	Sum of TotalProjectMorts	45	0	1	0			46
LGS	Sum of NumberCollected	6,828	4		208	2		7,042
	Sum of NumberBarged	6,652	3		212	2		6,869
	Sum of NumberBypassed	0	0		0	0		0
	Sum of Numbertrucked	0	0		0	0		0
	Sum of SampleMorts	42	0		0	0		42
	Sum of FacilityMorts	44	1		0	0		45
	Sum of ResearchMorts	0	0		0	0		0
	Sum of TotalProjectMorts	86	1		0	0		87
LMN	Sum of NumberCollected	312	6		18		2	338
	Sum of NumberBarged	309	8		15		1	333
	Sum of NumberBypassed	0	0		0		0	0
	Sum of Numbertrucked	0	0		0		0	0
	Sum of SampleMorts	2	0		0		1	3
	Sum of FacilityMorts	2	0		1		0	3
	Sum of ResearchMorts	0	0		0		0	0
	Sum of TotalProjectMorts	4	0		1		1	6
Total Sum of NumberCollected		13,858	16	4	336	2	2	14,218
Total Sum of NumberBarged		13,267	17	3	341	2	1	13,631
Total Sum of NumberBypassed		0	0	0	0	0	0	0
Total Sum of Numbertrucked		0	0	0	0	0	0	0
Total Sum of SampleMorts		78	0	0	0	0	1	79
Total Sum of FacilityMorts		57	1	1	1	0	0	60
Total Sum of ResearchMorts		0	0	0	0	0	0	0
Total Sum of TotalProjectMorts		135	1	1	1	0	1	139

YTD Transportation Summary

Source: Fish Passage Center

Updated:

8/5/16 8:28 AM

TO: 08/05/16

		Species						
Site	Data	CH0	CH1	CO	SO	ST	CH	Grand Total
LGR	Sum of NumberCollected	744,274	4,510,000	150,414	33,350	2,986,063		8,424,101
	Sum of NumberBarged	709,184	1,403,209	117,278	31,849	1,109,986		3,371,506
	Sum of NumberBypassed	31,770	3,104,914	33,069	650	1,875,866		5,046,269
	Sum of NumberTrucked	0	0	0	0	0		0
	Sum of SampleMorts	134	94	1	16	36		281
	Sum of FacilityMorts	2,144	1,361	66	830	103		4,504
	Sum of ResearchMorts	202	422	0	5	68		697
	Sum of TotalProjectMorts	2,480	1,877	67	851	207		5,482
LGS	Sum of NumberCollected	602,601	2,438,124	104,356	22,900	1,600,715		4,768,696
	Sum of NumberBarged	598,246	1,022,201	90,698	22,684	670,852		2,404,681
	Sum of NumberBypassed	2,872	1,415,436	13,600	7	929,747		2,361,662
	Sum of NumberTrucked	0	0	0	0	0		0
	Sum of SampleMorts	126	23	1	22	12		184
	Sum of FacilityMorts	943	464	57	187	96		1,747
	Sum of ResearchMorts	0	0	0	0	0		0
	Sum of TotalProjectMorts	1,069	487	58	209	108		1,931
LMN	Sum of NumberCollected	183,201	3,510,225	40,585	11,370	1,285,406	2	5,030,789
	Sum of NumberBarged	179,853	1,897,394	34,346	11,348	630,497	1	2,753,439
	Sum of NumberBypassed	2,568	1,612,351	6,238	0	654,785	0	2,275,942
	Sum of NumberTrucked	0	0	0	0	0	0	0
	Sum of SampleMorts	46	127	0	5	23	1	202
	Sum of FacilityMorts	143	353	1	18	99	0	614
	Sum of ResearchMorts	0	0	0	0	0	0	0
	Sum of TotalProjectMorts	189	480	1	23	122	1	816
Total Sum of NumberCollected		1,530,076	10,458,349	295,355	67,620	5,872,184	2	18,223,586
Total Sum of NumberBarged		1,487,283	4,322,804	242,322	65,881	2,411,335	1	8,529,626
Total Sum of NumberBypassed		37,210	6,132,701	52,907	657	3,460,398	0	9,683,873
Total Sum of NumberTrucked		0	0	0	0	0	0	0
Total Sum of SampleMorts		306	244	2	43	71	1	667
Total Sum of FacilityMorts		3,230	2,178	124	1,035	298	0	6,865
Total Sum of ResearchMorts		202	422	0	5	68	0	697
Total Sum of TotalProjectMorts		3,738	2,844	126	1,083	437	1	8,229

Cumulative Adult Passage at Mainstem Dams Through: 08/04

DAM	ENDDATE	Spring Chinook						Summer Chinook						Fall Chinook					
		2016		2015		10-Yr Avg.		2016		2015		10-Yr Avg.		2016		2015		10-Yr Avg.	
		Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack
BON	08/04	137215	11145	220480	13314	146704	24884	119591	10834	161735	17730	95523	21451	2677	269	2634	316	1683	408
TDA	08/04	105504	9999	194116	12307	114381	21222	95764	8800	123915	15458	80170	17256	597	59	474	75	337	91
JDA	08/04	93659	8262	166015	11514	99110	19896	89887	7682	108301	10933	71145	16737	0	0	0	0	0	0
MCN	08/04	82626	7237	156151	8767	89797	16347	82570	6372	93010	8495	65745	12347	0	0	0	0	0	0
IHR	08/04	67484	5029	116462	5745	63912	10829	13287	1459	20743	2755	18023	4716	0	0	0	0	0	0
LMN	08/04	66115	6268	111511	8697	63840	10328	11610	2231	16852	4668	19276	5541	0	0	0	0	1	0
LGS	08/04	62597	6365	105124	8553	59587	11445	11522	1846	14373	4310	18189	6097	0	0	0	0	0	0
LGR	08/04	62050	5480	104873	8379	58449	12640	10870	1961	13832	3938	16175	6534	0	0	0	0	0	0
PRD	08/02	16843	1003	27716	1570	17080	1731	76659	4643	69597	2994	51514	1773	0	0	0	0	0	0
WAN	08/02	17164	919	25982	1077	16645	2069	76090	3690	67593	1825	48809	1431	0	0	0	0	0	0
RIS	08/03	18646	715	31748	1092	17101	2726	74525	2618	75197	2042	49923	4215	0	0	0	0	0	0
RRH	08/03	9449	351	15244	609	7441	1202	53478	2023	61882	1505	38032	2857	0	0	0	0	0	0
WEL	08/03	11789	833	19971	1520	7481	1542	38262	1891	44693	2547	26991	2398	0	0	0	0	0	0
WFA	08/03	29095	2076	50842	2025	35141	1250	0	0	0	0	0	0	0	0	0	0	0	0

DAM	ENDDATE	Coho						Sockeye			Steelhead						Lamprey		
		2016		2015		10-Yr Avg.		2016	2015	10-Yr Avg.	2016	2015	10-Yr Avg.	Wild 2016	Wild 2015	10-Yr Avg.	2016	2015	10-Yr Avg.
		Adult	Jack	Adult	Jack	Adult	Jack												
BON	08/04	1	0	3	7	3	2	341930	509522	284832	67899	93433	122766	25655	46283	53953	41618	30887	17929
TDA	08/04	0	0	1	0	0	0	287771	427886	243033	23162	31806	62492	10852	18447	29740	7965	9546	4434
JDA	08/04	0	0	0	0	0	1	289267	363477	234642	14189	14627	44760	7394	8383	20007	6491	6181	3492
MCN	08/04	-1	0	13	5	1	0	261165	276413	202723	12131	10331	32045	5838	5576	12967	846	1217	643
IHR	08/04	0	0	0	0	0	0	891	985	834	7352	5404	17970	3197	2608	5486	575	482	119
LMN	08/04	-2	0	0	0	0	0	997	850	978	6590	6469	19279	3491	3393	6595	158	125	30
LGS	08/04	0	0	0	0	0	0	936	546	914	6885	2699	8090	3756	1755	3387	112	96	14
LGR	08/04	0	0	0	0	0	0	794	380	957	8275	10193	13070	4549	4994	5068	58	31	1
PRD	08/02	0	1	0	0	0	0	310297	296817	237320	1794	2095	2867	0	0	0	3329	3633	960
WAN	08/02	0	0	0	0	0	0	321495	290296	201737	1602	1672	2836	0	0	0	1554	2399	460
RIS	08/03	0	0	0	0	0	0	308729	258007	229922	1300	1383	2031	585	809	1068	426	775	120
RRH	08/03	0	0	0	0	0	0	234347	209965	195200	904	810	1495	359	479	748	320	671	86
WEL	08/03	0	0	0	0	0	0	213839	181003	185039	620	500	656	247	287	328	1	0	0
WFA	08/03	0	0	1	0	0	0	0	0	0	25648	6962	21721	0	0	0	0	0	0

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

Columbia/Snake Project Forebay Temperatures

