Fish Passage Center

Weekly Report #14 - 1

March 21, 2014

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Summary of Events

Water Supply

Precipitation throughout the Columbia Basin has varied between 170% and 306% of average at individual sub-basins over March. Precipitation above The Dalles has been 222% of average over March. Over the 2014 water year, precipitation has ranged between 77% and 100% of average.

Table 1. Summary of March precipitation and cumulative October through March 19, 2014, precipitation with respect to average (1971–2000), at select locations within the Columbia and Snake River Basins.

Location	Water Year 2014 March 1–19, 2014		Water Year 2014 October 1, 2013 to March 19, 2014	
	Observed (inches)	% Average	Observed (inches)	% Average
Columbia above Coulee	5.13	267	19.3	82
Snake River above Ice Harbor	2.79	195	10.4	80
Columbia above The Dalles	3.51	222	13.4	82
Kootenai	5.74	304	20.8	97
Clark Fork	3.55	235	12.9	88
Flathead	6.18	306	20.0	100
Pend Oreille/Spokane	4.85	268	16.8	91
Salmon River Basin	3.62	204	12.4	77
Upper Snake Tributaries	3.64	207	13.6	89
Clearwater	5.72	229	23.8	97
Willamette River above Portland	7.53	170	35.8	77

Snowpack within the Columbia Basin has been variable. Average snowpack in the Columbia River for basins above the Snake River confluence is 120% of average. For Snake River Basins the average snowpack is 99% of average, and for lower Columbia Basins between McNary and Bonneville Dam average snowpack is 63% of average.

Table 2 displays the March 20th ESP runoff volume forecasts for multiple reservoirs along with the March COE forecasts at Libby and Dworshak. The March 20th ESP forecast at The Dalles between January and July is 105,389 Kaf (104% of average).

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

Location	March 20, 2014 5-day QPF ESP	
	% Average (1981–2010)	Runoff Volume (Kaf)
The Dalles (Jan–July)	104	105389
Grand Coulee (Jan–July)	104	61885
Libby Res. Inflow, MT (Apr–Aug)	107	6294 5505*
Hungry Horse Res. Inflow, MT (Jan–July)	108	2276
Lower Granite Res. Inflow (Apr–July)	108	21528
Brownlee Res. Inflow (Apr–July)	67	3686
Dworshak Res. Inflow (Apr–July)	122	2944 2701*

* Denotes COE March Forecast

Grand Coulee Reservoir is at 1268.4 feet (3-20-14) and has drafted 4.1 feet over the last week. The April 10th FC Elevation at Grand Coulee is 1258.0 feet (based on March Water Supply Forecast). Outflows at Grand Coulee have ranged between 100.6 and 144.3 Kcfs over the last week.

The Libby Reservoir is currently at elevation 2423.1 feet (3-20-14) and has refilled 0.3 feet over the previous week. The April 10th FC Elevation at Libby is 2440.9 feet (based on March Final WSF). However the COE anticipates a significant increase in the April Water Supply forecast relative to that estimated in March, which will lower the Flood Control elevations at Libby. Daily average outflows at Libby Dam have been 4.0 Kcfs over the last week; however outflows are expected to increase to 9–12 Kcfs by next week.

Hungry Horse is currently at an elevation of 3527.5 feet (3-20-14) and has drafted 0.2 feet over the previous week. The April 10th FC Elevation at Hungry Horse is 3530.4 feet (based on March WSF). Outflows at Hungry Horse have been approximately 1.0 Kcfs over most of the previous week. However it has increased to 9.4 Kcfs (9:00 AM, 3/21/14) in anticipation of increasing Water Supply and decreasing Flood Control elevations.

Dworshak is currently at an elevation of 1529.1 feet (3-20-14) and has drafted 6.5 feet over the previous week. The April 10th System FC Elevation at Dworshak is 1502.3 feet (based on March Final WSF). The April 10th Local/Shifted FC Elevation at Dworshak is 1532.1 feet (based on March Final WSF). The COE anticipates an increase in the April Water Supply Forecast at Dworshak (decrease in FC elevations) which has resulted in elevated outflows from Dworshak, ranging between 14.0 and 17.1 Kcfs over the last week.

The Brownlee Reservoir was at an elevation of 2065.2 feet on March 20th, 2014, drafting 5.2 feet over the last week. Inflows to Brownlee Dam have ranged between 15.0 and 22.2 Kcfs last week. The April 10th FC Elevation at Brownlee is 2057.7 feet (based on March WSF).

Spill

Flow in the Snake and Columbia rivers has been relatively high over the past 2 weeks, as a function of increased precipitation and flood control operations. Consequently, involuntary spill has occurred at all of the mainstem projects as excess to hydraulic capacity, or generation needs at some time during this time period. Additionally, the lowering of the reservoir above Wanapum Dam has resulted in a reduced hydraulic capacity at this project, as well as at Rock Island Dam, and increased spill at both of these projects.

Variations in total dissolved gas levels for the implementation of the voluntary fish spill programs begin in April, therefore, the 110% standard for total dissolved gas is in place. However, since the spill is considered involuntary, the exceedences of the 110% standards are not considered violations.

Smolt Monitoring

Smolt monitoring activities began at Bonneville Dam on March 4th, with the first sample worked up on March 5th. SMP traps in the Snake River basin began sampling the first week of March (Lewiston, Grande Ronde, and Salmon River traps). However, high flows and debris loads prevented sampling at Grande Ronde, Imnaha, and Snake River traps for a period in early to mid-March.

Bonneville Dam is the only SMP dam that has sampled so far this season. Yearling Chinook and subyearling Chinook fry have made up the majority of the salmonids sampled at Bonneville. Over the past week the daily average passage index for subyearling Chinook was just over 600 per day. Passage indices for subyearling Chinook were even higher the previous week. To date, over 99% of the subyearling Chinook sampled at BON have been fry. This week's daily average passage index for yearling Chinook at BON was about 370 per day. As with subyearling Chinook, yearling Chinook passage index numbers were higher in the first week of sampling but have decreased since. Small numbers of coho, sockeye, and steelhead juveniles have been sampled at BON since sampling began. So far, no Pacific lamprey ammocoetes have been sampled at BON. However, samples of Pacific lamprey macropthalmia have increased over the past several days. The daily average collection for Pacific lamprey macropthalmia for this week was over 550 per day.

The Grande Ronde Trap is operated by the Oregon Department of Fish and Wildlife and is located at river kilometer two in the Grande Ronde River. Sampling at the Grande Ronde Trap began on March 5th with the first sample worked up on March 6th. However, due to high flows and debris loads, sampling from the Grande Ronde River Trap was suspended from March 6th to March 14th. Since March 14th, yearling Chinook have dominated the collections at the Grande Ronde River Trap, with an average daily collection of about 31 yearling Chinook per day. The Grande Ronde River Trap sampled its first hatchery yearling Chinook in the March 17th sample. In addition to yearling Chinook, the Grande Ronde Trap has sampled one subyearling

Chinook fry and a few steelhead juveniles so far this season.

The Salmon River Trap is located at river kilometer 103 and operated by Idaho Department of Fish and Game. Sampling at the Salmon River Trap began on March 2nd, with the first sample being worked up on March 3rd. To date, the Salmon River Trap has collected mostly yearling Chinook. The first hatchery yearling Chinook was collected in the March 18th sample. It is likely that these were hatchery spring Chinook from Rapid River Hatchery, which began its volitional release on March 17th. Over the past week, the daily average collection of yearling Chinook at the Salmon River Trap has been about 440 per day, although numbers have increased over the past 3 days. In addition to yearling Chinook, the Salmon River Trap has sampled a few steelhead juveniles and one Pacific macropthalmia (March 10th) so far this season. The Pacific macropthalmia that was collected in the March 10th sample was only the second lamprey juvenile that has been collected at this site since larval and juvenile lamprey became target species in 2011.

The Snake River Trap is located at river kilometer 225 and operated by Idaho Department of Fish and Game. Due to equipment failures, sampling at the Snake River Trap did not begin until March 6th, with the first sample being worked up on March 7th. Soon thereafter, sampling at the Snake River Trap was suspended due to high flows and debris loads. Sampling at this trap resumed on March 15th and has occurred since without interruption. To date, the Snake River Trap has collected very few fish. Of the fish that have been collected so far this year, most have been yearling Chinook and steelhead. The only other species that has been collected so far this year was one subyearling Chinook fry, which was collected in the March 18th sample.

The Imnaha River Trap is located at river kilometer seven and is operated by the Nez Perce Tribe. Sampling at the Imnaha River Trap is year-round. Due to the remote nature of the trap, the Nez Perce Tribe is only able to send collection data to the FPC periodically. Therefore, data for the Imnaha Trap may be several days behind. To date, we have received 2 days of collection data from the Imnaha River Trap. Yearling Chinook dominated collections on both days. The only other species that has been collected so far this season is steelhead.

In the next few weeks more SMP sites will begin reporting data. Lower Granite Dam will begin sampling on or around March 26th and other SMP sites at FCRPS and PUD dams will begin sampling by the first week of April.

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. To date, the Fish Passage Center has not received a complete preliminary hatchery release schedule from the Nez Perce Tribe for 2014 releases. Therefore, release estimates discussed for this zone are likely underestimates, as they do not include all releases conducted by the tribe. Release data from the Nez Perce Tribe will be entered into our database as soon as we receive them.

Approximately 5.37 million yearling spring Chinook juveniles were scheduled for release into this zone through March 21st. Of these, about 47% were scheduled for release from Rapid River Hatchery into the Little Salmon River. The release from Rapid River Hatchery began on March 17th and is expected to run through the end of April. Rapid River Hatchery was also scheduled to release about 200,000 (4%) yearling spring Chinook to the Little Salmon River at Pinehurst Bridge and 427,000 (8%) yearling spring Chinook into the Snake River, just below Hells Canyon Dam this week. Approximately 2.1 million (39%) of the yearling spring Chinook released into this zone so far this year were scheduled to be released into the Clearwater River and its tributaries. These Clearwater River releases began as early as March 10th. Finally, a volitional release of approximately 138,000 (3%) yearling spring Chinook from Catherine Creek Acclimation Pond on the Grande Ronde River began today. Due to disease, Hagerman NFH released approximately 114,500 summer steelhead to the Salmon River, near the Sawtooth Hatchery weir, on March 6th and 7th.

There are several releases of yearling spring Chinook juveniles scheduled to take place over the next two weeks. In all, these releases will total nearly 3.8 million spring Chinook juveniles. Of these, approximately 85% are scheduled for release into the Clearwater River and its tributaries by various hatcheries throughout the basin. The remaining releases of yearling spring Chinook over the next 2 weeks are scheduled to occur in the Grande Ronde (3%), Salmon (5%), and Tucannon (7%) rivers.

Nearly 3.1 million yearling summer Chinook are also scheduled for release into this zone over the next 2 weeks. Of these, approximately 34% are scheduled for release from McCall Hatchery on the Salmon River and 32% are scheduled for release from Pahsimeroi Hatchery into the Pahsimeroi River. A small proportion (3%) are scheduled for release into Johnson Creek, a tributary of the South Fork Salmon River. The remaining 31% of the summer Chinook releases anticipated over the next two weeks are scheduled for release into tributaries of the Clearwater River. This is the fourth year that yearling summer Chinook are to be released into the Clearwater River basin. As with previous years, these Clearwater summer Chinook are 100% unclipped but are tagged with coded-wire tags. Finally, over 2.4 million summer steelhead are scheduled for release to this zone over the next 2 weeks. Of these, about 49% are scheduled for release into the Salmon River, 30% are scheduled for release into the Pahsimeroi River, and 21% are scheduled for release into the Snake River, below Hells Canyon Dam.

Mid-Columbia Zone: The Mid-Columbia Zone encompasses the area of the Columbia River and its tributaries from McNary Dam to Chief Joseph Dam. Volitional releases of about 806,000 spring Chinook juveniles from Cle Elem Hatchery acclimation sites on the Yakima River were scheduled to begin on or around March 15th. These volitional releases are expected to run through mid-May. As in previous years, yearling spring Chinook released from Cle Elum Hatchery are marked with green, red, or orange Elasomer tags. There are three releases of juvenile salmonids scheduled for this zone over the next 2 weeks. The first is a release of about 250,000 yearling spring Chinook to the Walla Walla River. The second is a release of about 225 subyearling summer Chinook to the Methow River, as part of the WDFW Cooperative program. Finally, approximately 44,000 yearling summer Chinook are scheduled to be released into Omak Creek, a tributary of the Okanogan River. These yearling summer Chinook were reared at the new Chief Joseph Hatchery, which is operated by the Colville Tribe. Migration year 2014 is the first year of releases of fish reared at this new facility.

Lower Columbia Zone: The Lower Columbia Zone is defined as the Columbia River and its tributaries from Bonneville Dam to McNary Dam. Approximately 490,500 yearling fall Chinook were released into the Umatilla River on March 3rd. Of these, about 52% were clipped and tagged with coded-wire tags while the remaining 48% were unclipped but tagged with coded-wire tags. Klickitat Hatchery was scheduled to release about 549,000 yearling spring Chinook juveniles into the Klickitat River on or around March 3rd. Finally, Washougal Hatchery was scheduled to release about 2.5 million coho juveniles into the Klickitat River, beginning on or around March 20th.

There are three releases of juvenile salmonids to this zone over the next 2 weeks. The first of these releases is a release of approximately 250,000 coho to the Umatilla River, which is scheduled to begin next week. In addition, Umatilla Hatchery is scheduled to release about 150,000 yearling spring Chinook into the Umatilla River, beginning on or around April 1st. These yearling spring Chinook juveniles are 100% unclipped but are marked with coded-wire tags. Finally, Warm Springs National Fish Hatchery is scheduled to release about 711,000 yearling spring Chinook into the Deschutes River, beginning March 31st.

Adult Passage Report

Bonneville Dam uses video counts from January 1st through March 31st and direct counting after this period. Bonneville Dam counts adult salmon and steelhead year round. Lower Granite Dam uses video counts from March 1st through March 31st and direct counting after this period. Lower Granite Dam counts adult salmon and steelhead through December 30th each year. Willamette Falls Dam also uses video counts and reports adult counts year round. Video counts can cause a delay in posting the count data to the web, because the

counting staff at the projects have to review the tapes. The FPC collects the adult count data from projects throughout the day, continuously updating our Adult Dam Count report linked on our homepage (http://www.fpc.org/). During the winter season at Bonneville Dam (from 1/1/2014 through 3/19/2014), 15 adult Chinook and 1,634 adult steelhead were counted. In 2013 for the same time frame, 95 adult Chinook and 1,030 adult steelhead were counted. The 2014 Bonneville Dam winter season count of adult steelhead was about 1.6 times greater than the 2013 count, while the 2014 adult Chinook count is only 16% (80 fewer fish) of the 2013 winter count.

At Willamette Falls Dam 1 adult spring Chinook has been counted so far this year. The Willamette Falls cumulative steelhead count from January 1st through March 19th is 2,299. This count is somewhat lower than the 2013 number and the 10-year average for the same time period at this site. This year's Lower Granite steelhead count of 2,995 is close to the 2013 count of 2,937 and is 1.3 times greater than the 10-year average count of 2,321.

This winter, based on estimates made by the Technical Advisory Committee (TAC) for US v. Oregon, the spring Chinook run for 2014 is expected to be 308,000. The TAC reported that 193,700 spring Chinook had returned to the river in 2013 (see US v. Oregon Technical Advisory Committee, Columbia River Mouth Fish Returns 2013 Actual and 2014 Forecasts: Spring Chinook, Summer Chinook, Sockeye and Steelhead, December, 12, 2013. Oregon and Washington Departments of Fish and Wildlife, Vancouver, WA). This is available at: http://wdfw.wa.gov/fishing/forecasts/columbia_river/2014_chin_forecast_dec.pdf

Between March 1st and March 21st, a total of 32 steelhead and 7 other salmonid species were observed over the separator at the Bonneville Juvenile Monitoring Facility (JMF). 2014 Kelt passage at the Bonneville JMF can be found at: http://www.fpc.org/adultsalmon/bonkeltcounts.htm.

Hatchery Releases Last Two Weeks

Hatchery Release Summary

From: 3/7/2014 to 03/20/14

Agency	Hatchery	Species	Race	MigYr	NumRel	RelStart	RelEnd	RelSite	RelRiver
Idaho Dept. of Fish and Game	Clearwater Hatchery	CH1	SP	2014	265,000	03-17-14	03-17-14	Kooskia Hatchery	Clearwater River M F
Idaho Dept. of Fish and Game	Clearwater Hatchery	CH1	SP	2014	525,000	03-18-14	03-18-14	Powell Acclim Pond	Lochsa River
Idaho Dept. of Fish and Game	Rapid River Hatchery	CH1	SP	2014	427,000	03-17-14	03-20-14	Hells Canyon Dam	Snake River
Idaho Dept. of Fish and Game	Rapid River Hatchery	CH1	SP	2014	2,500,000	03-17-14	04-25-14	Rapid River Hatchery	Little Salmon River
Idaho Dept. of Fish and Game Total					**3,717,000**				
Nez Perce Tribe	Clearwater Hatchery	CH1	SP	2014	405,000	03-19-14	03-21-14	Selway River	Clearwater River M F
Nez Perce Tribe	Kooskia NFH	CH1	SP	2014	630,000	03-15-14	03-31-14	Clear Creek	Clearwater River M F
Nez Perce Tribe Total					**1,035,000**				
U.S. Fish and Wildlife Service	Dworshak NFH	CH1	SP	2014	276,000	03-10-14	03-10-14	Meadow Creek - CLES	S Fk Clearwater River
U.S. Fish and Wildlife Service Total					**276,000**				
Washington Dept. of Fish and Wildlife	Washougal Hatchery	CO	NO	2014	2,500,000	03-20-14	04-01-14	Klickitat River	Klickitat River
Washington Dept. of Fish and Wildlife Total					**2,500,000**				
Yakama Tribe	Cle Elem Hatchery	CH1	SP	2014	258,316	03-15-14	05-15-14	Clark Flat Acclim Pond	Yakima River
Yakama Tribe	Cle Elem Hatchery	CH1	SP	2014	270,653	03-15-14	05-15-14	Jack Creek Acclim Pond	Yakima River
Yakama Tribe	Cle Elem Hatchery	CH1	SP	2014	277,151	03-15-14	05-15-14	Easton Pond	Yakima River
Yakama Tribe Total					**806,120**				
Grand Total					**8,334,120**				

Hatchery Releases Next Two Weeks

Hatchery Release Summary

From: 3/21/2014 to 4/3/2014

Agency	Hatchery	Species	Race	MigYr	NumRel	RelStart	RelEnd	RelSite	RelRiver
Colville Tribe	Chief Joseph Hatchery	CH1	SU	2014	44,000	04-01-14	04-15-14	Omak Creek	Okanogan River
Colville Tribe Total					**44,000**				
Idaho Dept. of Fish and Game	Clearwater Hatchery	CH1	SP	2014	1,186,000	03-25-14	04-01-14	Red River	S Fk Clearwater River
Idaho Dept. of Fish and Game	Clearwater Hatchery	CH1	SU	2014	487,000	03-24-14	03-24-14	Crooked River	S Fk Clearwater River
Idaho Dept. of Fish and Game	McCall Hatchery	CH1	SU	2014	234,000	03-29-14	04-03-14	Knox Bridge	Salmon River (ID)
Idaho Dept. of Fish and Game	McCall Hatchery	CH1	SU	2014	814,000	03-29-14	04-03-14	Knox Bridge	Salmon River (ID)
Idaho Dept. of Fish and Game	Niagara Springs	ST	SU	2014	2,300	03-30-14	03-30-14	Hells Canyon Dam	Snake River
Idaho Dept. of Fish and Game	Niagara Springs	ST	SU	2014	547,700	03-24-14	03-30-14	Hells Canyon Dam	Snake River
Idaho Dept. of Fish and Game	Niagara Springs	ST	SU	2014	800,000	03-31-14	04-10-14	Pahsimeroi River	Pahsimeroi River
Idaho Dept. of Fish and Game	Pahsimeroi Hatchery	CH1	SU	2014	143,242	04-01-14	04-14-14	Pahsimeroi Hatchery	Pahsimeroi River
Idaho Dept. of Fish and Game	Pahsimeroi Hatchery	CH1	SU	2014	834,059	04-01-14	04-14-14	Pahsimeroi Hatchery	Pahsimeroi River
Idaho Dept. of Fish and Game	Rapid River Hatchery	CH1	SP	2014	200,000	03-21-14	03-21-14	Pinehurst Bridge	Little Salmon River
Idaho Dept. of Fish and Game	Rapid River Hatchery	CH1	SP	2014	2,500,000	03-17-14	04-25-14	Rapid River Hatchery	Little Salmon River
Idaho Dept. of Fish and Game	Sawtooth Hatchery	CH1	SP	2014	193,000	04-01-14	04-02-14	Yankee Fk (Salmon R)	Salmon River (ID)
Idaho Dept. of Fish and Game Total					**7,941,301**				
Nez Perce Tribe	Clearwater Hatchery	CH1	SP	2014	405,000	03-19-14	03-21-14	Selway River	Clearwater River M F
Nez Perce Tribe	Kooskia NFH	CH1	SP	2014	630,000	03-15-14	03-31-14	Clear Creek	Clearwater River M F
Nez Perce Tribe	McCall Hatchery	CH1	SU	2014	95,000	04-01-14	04-02-14	Johnson Cr Idaho	South Fork Salmon River
Nez Perce Tribe Total					**1,130,000**				
Oregon Dept. of Fish and Wildlife	Umatilla Hatchery	CH1	SP	2014	150,000	04-01-14	04-01-14	Umatilla River	Umatilla River
Oregon Dept. of Fish and Wildlife Total					**150,000**				
U.S. Fish and Wildlife Service	Dworshak NFH	CH1	SP	2014	2,042,652	03-31-14	04-24-14	Dworshak Hatchery	Clearwater River M F
U.S. Fish and Wildlife Service	Dworshak NFH	CH1	SU	2014	487,000	03-24-14	04-05-14	Powell Acclim Pond	Lochsa River
U.S. Fish and Wildlife Service	Hagerman NFH	ST	SU	2014	126,000	04-03-14	04-04-14	McNabb/Salmon River	Salmon River (ID)
U.S. Fish and Wildlife Service	Hagerman NFH	ST	SU	2014	1,166,550	04-02-14	04-25-14	Sawtooth Hatchery	Salmon River (ID)
U.S. Fish and Wildlife Service	Warm Springs NFH	CH1	SP	2014	711,328	03-31-14	04-03-14	Warm Springs Hatchery	Deschutes River
U.S. Fish and Wildlife Service Total					**4,533,530**				
Umatilla Tribe	Carson NFH	CH1	SP	2014	249,091	04-01-14	04-01-14	Walla Walla River	Walla Walla River
Umatilla Tribe	Cascade Hatchery	CO	UN	2014	250,000	03-24-14	03-24-14	Pendelton Acclim Pond	Umatilla River
Umatilla Tribe	Lookingglass Hatchery	CH1	SP	2014	122,000	03-22-14	04-15-14	Grande Ronde Acclim Pond	Grande Ronde River
Umatilla Tribe	Lookingglass Hatchery	CH1	SP	2014	138,000	03-21-14	04-15-14	Catherine Cr Acclim Pond	Grande Ronde River
Umatilla Tribe Total					**759,091**				
Washington Dept. of Fish and Wildlife	COOP	CH0	SU	2014	225	03-30-14	03-30-14	Methow River	Methow River
Washington Dept. of Fish and Wildlife	Tucannon Hatchery	CH1	SP	2014	256,000	04-01-14	04-25-14	Curl Lake Acclim Pond	Tucannon River
Washington Dept. of Fish and Wildlife	Washougal Hatchery	CO	NO	2014	2,500,000	03-20-14	04-01-14	Klickitat River	Klickitat River
Washington Dept. of Fish and Wildlife Total					**2,756,225**				
Yakama Tribe	Cle Elem Hatchery	CH1	SP	2014	258,316	03-15-14	05-15-14	Clark Flat Acclim Pond	Yakima River
Yakama Tribe	Cle Elem Hatchery	CH1	SP	2014	270,653	03-15-14	05-15-14	Jack Creek Acclim Pond	Yakima River
Yakama Tribe	Cle Elem Hatchery	CH1	SP	2014	277,151	03-15-14	05-15-14	Easton Pond	Yakima River
Yakama Tribe Total					**806,120**				
Grand Total					**18,120,267**				

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

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

	Grand Coulee		Chief Joseph		Wells		Rocky Reach		Rock Island		Wanapum		Priest Rapids	
Date	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill
3/7/2014	97.3	0.0	98.2	0.0	101.8	0.0	92.6	0.0	90.1	88.6	95.4	5.3	103.6	0.0
3/8/2014	104.6	0.0	105.2	0.0	106.5	0.0	99.6	0.0	106.9	79.1	97.4	0.0	99.4	0.0
3/9/2014	91.7	0.0	72.2	0.0	38.4	0.0	106.0	15.3	92.6	80.3	96.1	0.0	72.4	0.0
3/10/2014	82.9	0.0	81.9	0.0	84.4	0.0	79.2	0.0	86.1	55.0	100.4	3.4	105.1	0.0
3/11/2014	98.6	0.0	97.1	0.0	98.7	0.0	99.4	0.0	108.4	63.0	94.8	9.8	100.3	0.0
3/12/2014	114.1	0.0	117.2	0.0	115.6	0.0	111.5	0.0	117.8	40.1	116.7	21.6	113.6	0.7
3/13/2014	125.5	0.0	122.3	0.0	122.5	2.2	118.5	0.0	127.3	32.9	125.4	30.5	127.9	13.0
3/14/2014	101.4	0.0	99.0	0.0	112.6	11.0	117.0	1.0	125.1	26.9	131.4	25.5	141.7	20.8
3/15/2014	132.3	2.0	131.2	11.8	124.0	0.4	112.8	0.4	121.7	33.3	117.8	14.6	123.9	5.2
3/16/2014	132.1	3.0	133.8	25.1	133.8	14.2	129.5	14.4	134.1	17.1	133.9	45.0	137.4	43.7
3/17/2014	132.1	2.3	130.2	25.1	135.3	20.1	129.9	13.5	137.0	21.3	142.5	44.7	152.0	28.7
3/18/2014	141.8	2.9	140.0	25.0	146.6	17.9	144.7	7.9	155.6	31.1	152.3	60.2	159.1	43.7
3/19/2014	144.0	4.2	143.4	25.0	149.1	18.9	148.1	13.1	156.5	22.2	153.7	55.9	166.8	52.3
3/20/2014	144.4	0.0	144.1	25.0	152.3	19.1	154.3	13.1	162.1	23.0	162.6	58.5	176.9	52.3

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

	Dworshak		Brownlee	Hells Canyon	Lower Granite		Little Goose		Lower Monumental		Ice Harbor	
Date	Flow	Spill	Inflow	Outflow	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill
3/7/2014	10.6	0.0	20.4	24.1	105.6	4.7	101.6	0.0	111.7	14.0	112.8	36.3
3/8/2014	10.6	0.0	20.0	28.8	93.3	0.0	86.8	0.0	95.5	0.4	101.0	24.7
3/9/2014	10.5	0.0	19.6	28.0	90.0	0.0	84.5	0.0	92.5	0.0	89.8	31.4
3/10/2014	10.5	0.0	20.9	28.1	124.1	21.6	113.0	10.3	121.8	28.0	124.2	58.1
3/11/2014	12.2	1.7	26.2	27.1	129.7	22.8	125.6	11.4	140.7	43.4	141.8	62.9
3/12/2014	14.0	3.6	29.1	27.9	110.6	1.8	106.6	11.1	118.3	20.5	127.3	55.0
3/13/2014	14.0	3.6	27.7	26.0	93.8	0.0	84.8	0.0	92.7	0.0	87.0	14.1
3/14/2014	14.0	3.6	22.2	23.9	85.9	0.0	77.1	0.0	85.8	0.0	89.6	12.4
3/15/2014	14.0	3.6	19.3	20.0	81.4	15.2	78.4	15.1	82.5	15.0	82.9	12.7
3/16/2014	17.1	6.6	18.0	25.9	77.9	20.2	74.5	17.0	74.2	18.1	75.0	15.9
3/17/2014	17.1	6.5	17.0	22.2	74.1	9.8	72.6	11.1	78.8	10.8	79.0	15.7
3/18/2014	17.1	6.5	16.1	20.7	74.7	4.1	72.5	8.8	70.7	11.1	76.3	15.7
3/19/2014	17.1	6.5	15.7	25.0	69.1	1.9	67.8	2.3	73.6	6.8	73.0	11.9
3/20/2014	17.1	6.5	15.0	21.1	70.7	0.0	65.1	0.0	70.1	0.0	71.9	5.8

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

	McNary		John Day		The Dalles		Bonneville			
Date	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	PH1	PH2
3/7/2014	211.9	31.2	216.7	0	217.5	0	252.4	13.1	122.3	110
3/8/2014	234.9	46.7	236.7	0	235.7	0	271.9	31.7	125.1	108
3/9/2014	228.1	34.9	222.5	0	200.6	0	269.1	29.9	128.1	107.7
3/10/2014	245.1	46.4	235	0	237.1	0	279.3	40.8	126	105.6
3/11/2014	263.7	114.8	270.1	0	272.9	0	303	68.4	130.3	97.3
3/12/2014	255.3	126.7	272.9	0	278.6	0	301	60.2	124.4	109.4
3/13/2014	234.8	84	240.7	0	241.7	0	284.4	42.6	128.2	106.6
3/14/2014	239.9	47	234.4	0	234.5	0	257.2	20.5	126.1	103.1
3/15/2014	245.4	55.2	238	7.5	239.9	19	267.5	47.2	111.5	101.4
3/16/2014	224.1	46.1	223.8	19.8	219.4	46.2	246.9	69.7	81.8	87.9
3/17/2014	234.1	47.8	240.5	13.7	235	31.8	263.3	38.2	105.7	108.9
3/18/2014	241.3	47.9	238.9	16	235.8	34.4	262.2	40	102.9	106.9
3/19/2014	252.9	69.6	242.7	8	240.2	18.7	267.5	49.2	100.7	105.2
3/20/2014	260.5	71.4	255.6	15.5	249.7	14.5	273.3	59.6	97.7	103.7

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

	Hungry H. Dnst				Boundary				Grand Coulee				Grand C. Tlwr				Chief Joseph			
	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#
Date	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr
3/7	96.7	96.9	97.1	24	---	---	---	0	99.2	99.4	99.9	24	98.7	98.9	99.2	24	---	---	---	0
3/8	96.9	97.4	97.5	24	---	---	---	0	99.7	100.2	100.6	24	99.0	99.5	99.9	24	---	---	---	0
3/9	97.7	97.9	98.1	23	---	---	---	0	100.4	100.5	100.6	23	99.9	100.0	100.1	23	---	---	---	0
3/10	98.3	98.6	99.0	24	---	---	---	0	100.1	100.4	100.4	24	100.0	100.3	100.4	24	---	---	---	0
3/11	98.0	98.2	98.6	24	---	---	---	0	98.6	98.8	99.5	24	98.4	98.7	101.9	24	---	---	---	0
3/12	98.4	98.9	99.3	24	---	---	---	0	98.8	99.4	99.6	24	98.6	99.0	99.3	24	---	---	---	0
3/13	98.9	99.1	99.6	20	---	---	---	0	99.7	100.0	100.3	21	99.2	99.3	99.6	21	---	---	---	0
3/14	98.9	99.1	99.4	22	---	---	---	0	100.1	100.4	100.6	18	100.0	100.1	100.3	18	---	---	---	0
3/15	98.5	98.9	99.4	24	---	---	---	0	99.2	99.5	99.6	24	98.9	99.1	99.5	24	---	---	---	0
3/16	99.1	99.5	99.6	24	---	---	---	0	100.4	100.9	101.1	24	99.9	100.4	100.7	24	---	---	---	0
3/17	99.0	99.5	99.9	24	---	---	---	0	100.4	100.7	101.1	24	99.7	100.0	100.5	24	---	---	---	0
3/18	98.0	98.2	98.5	24	---	---	---	0	99.7	99.9	100.0	24	99.4	99.9	100.3	24	---	---	---	0
3/19	96.8	97.0	97.5	24	---	---	---	0	100.5	100.8	101.1	24	100.4	101.4	102.6	24	---	---	---	0
3/20	96.9	97.1	97.3	22	---	---	---	0	100.0	100.1	100.4	23	99.2	99.6	100.5	23	---	---	---	0

Total Dissolved Gas Saturation Data at Mid Columbia River Sites

	Chief J. Dnst				Wells				Wells Dwnstrm				Rocky Reach				Rocky R. Tlwr			
	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#
Date	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr
3/7	---	---	---	0	100.2	100.4	100.8	19	99.0	99.1	99.3	19	101.9	103.0	103.5	24	101.0	101.2	101.3	24
3/8	---	---	---	0	100.4	100.9	101.1	21	99.4	99.8	100.0	21	102.9	103.1	103.5	24	102.0	102.6	103.1	24
3/9	---	---	---	0	100.7	100.9	101.2	17	99.9	100.0	100.1	17	102.8	102.8	103.0	21	102.7	103.0	103.5	21
3/10	---	---	---	0	100.4	100.7	100.8	23	99.5	99.8	99.9	23	102.1	102.5	102.8	24	101.8	102.3	102.7	24
3/11	---	---	---	0	99.3	99.4	99.7	15	98.0	98.1	98.3	15	100.6	100.8	101.1	24	100.9	101.1	101.5	24
3/12	---	---	---	0	99.8	100.4	101.2	21	99.6	100.7	101.1	21	101.1	101.5	101.9	23	101.5	101.8	102.3	23
3/13	---	---	---	0	100.4	100.5	101.4	13	100.7	101.0	102.6	13	101.9	102.0	102.3	17	102.3	102.5	102.7	17
3/14	---	---	---	0	101.0	101.2	101.6	14	103.1	103.6	107.7	14	101.9	102.2	102.6	17	102.6	102.9	104.3	17
3/15	---	---	---	0	100.0	100.4	100.7	24	100.2	100.7	101.1	24	102.4	103.6	105.4	24	103.0	104.2	105.8	24
3/16	---	---	---	0	101.4	102.2	103.1	21	104.9	105.6	107.6	21	103.8	104.4	105.5	24	109.9	111.4	112.9	24
3/17	---	---	---	0	102.3	102.8	103.0	23	107.2	107.9	108.2	23	102.7	103.0	103.4	24	110.7	111.8	113.0	24
3/18	---	---	---	0	101.5	101.6	101.9	21	105.5	106.4	107.2	21	103.8	104.8	105.5	24	109.9	110.6	111.5	24
3/19	---	---	---	0	102.6	102.8	103.4	17	105.9	107.2	108.8	17	106.3	106.8	107.2	24	111.1	112.7	113.8	24
3/20	---	---	---	0	101.2	101.3	101.7	20	104.7	106.3	109.3	20	105.1	105.4	106.1	23	112.3	113.8	115.3	23

Total Dissolved Gas Saturation at Mid Columbia River Sites

	Rock Island				Rock I. Tlwr				Wanapum				Wanapum Tlwr				Priest Rapids			
	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#
Date	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr
3/7	99.7	100.2	101.7	24	106.2	111.8	116.8	23	---	---	---	0	110.1	110.9	113.5	24	105.5	107.4	108.2	24
3/8	100.7	101.2	101.6	24	111.3	114.8	117.6	24	---	---	---	0	111.5	112.7	115.0	23	109.4	110.7	112.1	23
3/9	101.8	102.1	102.6	21	112.2	113.6	114.9	21	---	---	---	0	114.4	114.6	115.3	23	110.9	111.3	112.6	23
3/10	101.3	101.7	102.2	24	108.7	111.2	114.9	24	---	---	---	0	110.9	111.5	113.1	24	112.1	112.8	113.0	24
3/11	100.0	100.3	100.5	24	107.6	110.0	114.9	24	---	---	---	0	109.3	112.0	115.7	24	107.4	108.0	109.1	24
3/12	101.9	103.6	130.6	23	107.3	110.9	135.1	23	---	---	---	0	110.8	113.1	113.8	24	110.1	112.1	112.6	24
3/13	101.6	101.7	102.1	17	104.8	105.8	108.3	17	---	---	---	0	112.5	115.0	120.9	24	112.7	114.8	118.3	24
3/14	103.2	103.9	127.1	16	105.3	106.1	129.0	16	---	---	---	0	108.8	109.5	110.1	24	111.0	112.9	117.1	24
3/15	101.0	101.6	102.3	24	105.4	108.4	111.7	24	---	---	---	0	106.3	108.1	109.3	24	108.7	109.4	109.9	24
3/16	105.4	106.5	107.1	24	106.4	107.4	108.1	24	---	---	---	0	112.8	113.8	115.1	24	108.8	110.4	112.4	24
3/17	103.9	104.2	104.7	24	105.4	105.9	106.3	24	---	---	---	0	111.0	111.6	112.6	24	110.1	111.6	112.9	24
3/18	105.1	105.8	106.5	21	107.4	108.3	109.3	24	---	---	---	0	110.5	110.5	113.0	11	107.2	107.2	108.0	11
3/19	106.7	107.3	107.9	24	107.8	108.5	109.8	24	---	---	---	0	115.4	116.9	118.9	24	115.7	117.2	118.0	24
3/20	107.5	107.9	108.2	23	108.5	108.8	109.5	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

	Priest R. Dnst				Pasco				Dworshak				Clrwtr-Peck				Anatone			
	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#
Date	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr
3/7	105.6	107.4	107.6	24	---	---	---	0	94.4	94.6	94.9	24	98.2	98.5	98.6	24	---	---	---	0
3/8	109.5	110.8	111.6	23	---	---	---	0	94.7	95.1	95.2	24	98.4	98.9	99.0	24	---	---	---	0
3/9	110.6	111.0	112.3	23	---	---	---	0	95.3	95.3	95.5	23	98.5	98.6	98.9	23	---	---	---	0
3/10	112.0	112.7	113.1	24	---	---	---	0	94.9	95.2	95.3	24	99.5	99.8	100.1	24	---	---	---	0
3/11	107.2	107.7	108.8	24	---	---	---	0	97.8	102.2	103.3	24	100.0	100.9	101.4	24	---	---	---	0
3/12	109.5	111.7	112.4	24	---	---	---	0	103.7	103.9	104.5	24	101.6	102.3	102.7	24	---	---	---	0
3/13	112.7	114.0	117.7	24	---	---	---	0	104.6	104.9	105.3	24	102.0	102.3	102.7	24	102.1	102.2	102.6	13
3/14	112.5	114.3	116.5	24	---	---	---	0	104.5	104.8	105.1	24	101.5	101.7	101.9	24	101.3	101.5	102.0	24
3/15	108.1	109.3	110.5	24	---	---	---	0	103.9	104.3	104.7	24	101.4	101.9	102.3	24	101.1	101.7	102.2	24
3/16	111.5	112.7	114.6	24	---	---	---	0	112.0	112.4	112.7	24	105.5	106.2	106.5	24	101.8	102.5	102.8	24
3/17	111.3	112.8	114.0	24	---	---	---	0	111.8	112.2	112.7	24	105.2	105.5	106.1	24	101.2	101.6	102.1	24
3/18	110.3	110.3	111.2	11	---	---	---	0	110.9	111.1	111.3	24	104.7	105.1	105.4	24	101.0	101.0	102.4	13
3/19	115.6	116.6	117.6	24	---	---	---	0	111.5	111.8	112.2	24	105.6	106.2	106.5	24	101.8	102.4	103.2	24
3/20	---	---	---	0	---	---	---	0	110.8	111.1	111.7	22	105.0	105.3	105.7	22	101.2	101.5	102.1	21

Total Dissolved Gas Saturation Data at Snake River Sites

	Clrwtr-Lewiston				Lower Granite				L. Granite Tlwr				Little Goose				L. Goose Tlwr			
	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#
Date	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr
3/7	---	---	---	0	---	---	---	0	102.4	104.8	108.2	24	---	---	---	0	100.5	100.8	101.2	24
3/8	---	---	---	0	---	---	---	0	100.3	100.6	100.9	24	---	---	---	0	100.7	101.1	101.5	24
3/9	---	---	---	0	---	---	---	0	101.4	101.7	101.8	23	---	---	---	0	101.8	102.2	102.8	23
3/10	---	---	---	0	---	---	---	0	110.5	117.6	121.8	24	---	---	---	0	109.3	115.8	140.4	24
3/11	---	---	---	0	---	---	---	0	111.5	115.8	121.9	24	---	---	---	0	112.6	124.5	141.7	24
3/12	102.6	102.6	103.5	13	---	---	---	0	101.7	103.2	107.6	24	---	---	---	0	113.2	115.5	118.7	24
3/13	124.7	125.1	125.6	24	---	---	---	0	102.4	102.9	103.0	24	---	---	---	0	109.3	110.5	110.8	24
3/14	110.5	120.2	124.0	24	---	---	---	0	102.9	103.2	103.4	24	---	---	---	0	103.9	105.1	106.0	24
3/15	100.4	101.4	102.1	24	---	---	---	0	109.2	112.7	114.3	24	---	---	---	0	107.0	110.3	110.8	24
3/16	102.8	104.6	105.1	24	---	---	---	0	111.3	111.8	112.1	24	---	---	---	0	108.8	109.1	109.3	24
3/17	102.8	103.3	104.1	24	101.7	101.7	102.5	13	106.5	110.4	111.3	24	---	---	---	0	109.3	113.7	115.8	24
3/18	102.4	103.3	104.0	24	101.5	101.8	102.1	24	103.8	106.1	109.9	24	104.7	104.9	105.3	14	111.1	115.0	116.0	24
3/19	103.3	104.3	105.1	24	102.2	102.3	102.4	24	103.0	104.0	111.6	24	106.5	106.8	107.2	24	107.7	109.0	111.8	24
3/20	102.5	103.1	104.0	22	101.3	101.5	101.7	22	101.1	101.2	101.6	21	104.5	104.7	105.8	21	104.3	104.6	105.8	21

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

	Lower Mon.				L. Mon. Tlwr				Ice Harbor				Ice Harbor Tlwr				McNary-Oregon			
	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#	24 h	12 h		#
Date	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr
3/7	---	---	---	0	110.1	112.7	116.5	24	---	---	---	0	112.9	113.8	114.9	24	---	---	---	0
3/8	---	---	---	0	101.0	101.7	108.5	24	---	---	---	0	110.4	110.9	111.2	24	---	---	---	0
3/9	---	---	---	0	100.7	100.8	101.1	23	---	---	---	0	112.6	113.7	114.0	23	---	---	---	0
3/10	---	---	---	0	112.3	117.9	119.0	24	---	---	---	0	116.6	119.2	119.9	24	---	---	---	0
3/11	---	---	---	0	117.9	118.5	120.6	24	---	---	---	0	117.4	118.3	119.2	24	---	---	---	0
3/12	---	---	---	0	114.7	121.5	122.1	24	---	---	---	0	117.2	117.6	117.8	24	---	---	---	0
3/13	---	---	---	0	105.9	108.5	109.4	24	---	---	---	0	114.5	115.5	116.4	24	---	---	---	0
3/14	---	---	---	0	110.5	111.6	112.6	24	---	---	---	0	111.4	113.4	116.0	24	---	---	---	0
3/15	---	---	---	0	112.3	114.7	116.8	24	---	---	---	0	109.9	111.0	113.8	24	---	---	---	0
3/16	---	---	---	0	113.4	114.0	114.6	24	---	---	---	0	112.1	113.6	114.8	24	---	---	---	0
3/17	---	---	---	0	110.3	113.5	114.8	24	---	---	---	0	111.5	113.1	113.4	24	---	---	---	0
3/18	103.6	103.6	106.0	11	110.2	113.7	114.8	23	107.8	107.8	108.1	15	111.0	112.8	112.9	23	---	---	---	0
3/19	104.0	105.0	105.4	24	108.6	111.7	114.2	24	107.5	107.8	108.1	24	109.6	111.7	112.5	24	---	---	---	0
3/20	106.0	106.7	107.2	21	107.1	107.5	108.1	22	107.2	107.4	107.6	21	107.3	108.2	112.2	21	---	---	---	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

	McNary-Wash				McNary Tlwr				John Day				John Day Tlwr				The Dalles			
	24 h	12 h		#	24 h	12 h		#	24h	12h		#	24h	12h		#	24h	12h		#
Date	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	AVG	High	hr
3/7	---	---	---	0	106.5	109.2	109.7	24	---	---	---	0	100.4	100.6	100.7	24	---	---	---	0
3/8	---	---	---	0	110.1	110.4	110.9	24	---	---	---	0	101.4	101.8	102.0	24	---	---	---	0
3/9	---	---	---	0	109.4	109.7	110.2	23	---	---	---	0	101.8	101.9	102.0	23	---	---	---	0
3/10	105.2	105.3	105.6	14	111.3	112.3	112.7	24	---	---	---	0	101.5	101.9	102.1	24	---	---	---	0
3/11	104.9	105.5	105.8	24	116.2	118.2	118.8	24	102.0	102.2	116.8	13	100.9	101.4	101.6	24	---	---	---	0
3/12	109.0	110.5	111.0	24	117.7	118.1	118.7	24	101.8	102.6	103.3	24	102.8	103.8	104.1	24	102.8	103.1	103.8	15
3/13	111.1	111.4	112.2	19	115.9	117.0	117.4	19	103.9	104.2	105.4	18	104.5	104.7	105.4	18	103.9	104.2	104.5	21
3/14	109.5	110.3	111.3	18	112.9	113.2	114.2	18	104.9	105.1	105.2	18	105.1	105.2	105.4	18	104.1	104.2	104.6	18
3/15	107.3	107.7	108.0	24	112.3	112.6	112.9	24	105.2	106.2	107.6	24	107.7	110.6	112.3	24	104.1	104.7	105.4	24
3/16	108.8	109.6	110.8	24	112.1	112.4	112.6	24	110.1	111.4	112.0	24	113.3	113.7	113.9	24	107.8	109.2	109.8	24
3/17	108.2	109.4	110.9	24	111.5	111.8	112.6	24	109.8	110.6	111.7	24	111.5	112.6	113.4	24	107.4	108.3	109.7	24
3/18	105.6	105.9	106.3	24	111.0	111.5	112.2	24	107.5	107.7	108.4	23	110.7	111.8	112.3	23	106.7	107.4	107.6	23
3/19	106.8	107.3	107.7	24	113.1	114.4	116.1	24	107.3	107.5	107.7	24	108.8	110.7	112.1	24	106.9	107.4	107.8	24
3/20	106.1	106.4	106.8	22	113.5	114.9	115.6	22	105.7	106.0	106.5	22	109.4	110.8	111.1	22	105.1	105.3	105.5	22

Total Dissolved Gas Saturation Data at Lower Columbia River Sites

	The Dalles Dnst				Bonneville				Warrendale				Camas\Washougal				Cascade Island			
	24 h	12 h		#	24 h	12 h		#	24h	12h		#	24h	12h		#	24h	12h		#
Date	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr
3/7	100.7	100.8	100.9	24	---	---	---	0	103.1	103.7	103.9	24	---	---	---	0	---	---	---	0
3/8	101.3	101.6	101.7	24	---	---	---	0	104.1	104.2	104.4	24	---	---	---	0	---	---	---	0
3/9	101.8	101.9	102.0	23	---	---	---	0	104.2	104.5	105.1	23	---	---	---	0	---	---	---	0
3/10	101.3	101.7	102.0	24	---	---	---	0	103.8	104.7	105.7	24	---	---	---	0	---	---	---	0
3/11	100.4	100.7	100.9	24	---	---	---	0	104.3	105.9	108.5	24	---	---	---	0	---	---	---	0
3/12	102.0	103.0	103.5	22	102.8	102.8	102.9	8	104.8	106.1	107.5	24	---	---	---	0	---	---	---	0
3/13	103.9	104.0	104.3	21	103.1	103.2	103.5	18	105.0	105.7	107.2	18	---	---	---	0	100.3	100.3	100.3	1
3/14	104.2	104.4	104.7	18	103.5	103.7	104.1	18	103.9	104.0	104.7	18	105.3	105.6	106.4	14	---	---	---	0
3/15	105.0	106.5	107.8	24	103.5	103.8	103.9	24	104.9	105.9	106.9	24	103.6	104.2	104.7	24	---	---	---	0
3/16	110.1	111.0	111.4	24	104.7	105.1	105.7	24	107.7	108.0	108.2	24	106.5	107.6	108.3	24	---	---	---	0
3/17	109.0	110.1	111.3	24	106.0	106.2	106.4	24	106.7	107.3	107.9	24	105.6	106.0	106.4	24	---	---	---	0
3/18	108.8	109.6	110.3	23	106.9	107.3	107.6	23	108.0	108.3	109.0	23	107.3	108.7	109.5	23	---	---	---	0
3/19	108.1	108.6	109.5	24	108.3	108.6	108.8	24	109.1	109.5	110.0	24	107.8	108.3	108.9	24	---	---	---	0
3/20	106.1	106.6	107.7	22	106.0	106.4	107.7	22	107.6	108.4	109.8	22	107.8	108.4	109.2	22	---	---	---	0

Two-Week Summary of Passage Indices

Source: Fish Passage Center Updated: 3/21/2014 8:43

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/currentsmpsubmitdata.asp

				COMBINED YEARLING CHINOOK								
		WTB	IMN	GRN	LEW	LGR	LGS	LMN	RIS	MCN	JDA	BO2
Date		(Coll)	(Coll)	(Coll)	(Coll)	(INDEX)	(INDEX)	(INDEX)	(INDEX)	(INDEX)	(INDEX)	(INDEX)
03/07/2014	*	74	---	---	3	---	---	---	---	---	---	368
03/08/2014	*	108	---	---	3	---	---	---	---	---	---	644
03/09/2014	*	42	---	---	0	---	---	---	---	---	---	1,168
03/10/2014	*	67	---	---	1	---	---	---	---	---	---	1,159
03/11/2014	*	139	---	---	---	---	---	---	---	---	---	1,560
03/12/2014	*	124	---	---	---	---	---	---	---	---	---	1,477
03/13/2014	*	159	---	---	---	---	---	---	---	---	---	618
03/14/2014	*	201	---	2	---	---	---	---	---	---	---	579
03/15/2014	*	187	208	1	---	---	---	---	---	---	---	285
03/16/2014	*	237	54	6	0	---	---	---	---	---	---	210
03/17/2014		121	---	15	1	---	---	---	---	---	---	258
03/18/2014	*	508	---	19	1	---	---	---	---	---	---	450
03/19/2014		1,306	---	78	1	---	---	---	---	---	---	452
03/20/2014		517	---	96	4	---	---	---	---	---	---	360
03/21/2014		---	---	---	---	---	---	---	---	---	---	---
Total:		**3,790**	**262**	**217**	**14**	**0**	**0**	**0**	**0**	**0**	**0**	**9,588**
# Days:		**14**	**2**	**7**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**14**
Average:		**271**	**131**	**31**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**685**
YTD		**3,960**	**262**	**221**	**14**	**0**	**0**	**0**	**0**	**0**	**0**	**9,744**

				COMBINED SUBYEARLING CHINOOK								
		WTB	IMN	GRN	LEW	LGR	LGS	LMN	RIS	MCN	JDA	BO2
Date		(Coll)	(Coll)	(Coll)	(Coll)	(INDEX)	(INDEX)	(INDEX)	(INDEX)	(INDEX)	(INDEX)	(INDEX)
03/07/2014	*	0	---	---	0	---	---	---	---	---	---	3,391
03/08/2014	*	0	---	---	0	---	---	---	---	---	---	2,775
03/09/2014	*	0	---	---	0	---	---	---	---	---	---	2,395
03/10/2014	*	0	---	---	0	---	---	---	---	---	---	1,707
03/11/2014	*	0	---	---	---	---	---	---	---	---	---	1,582
03/12/2014	*	0	---	---	---	---	---	---	---	---	---	810
03/13/2014	*	0	---	---	---	---	---	---	---	---	---	917
03/14/2014	*	0	---	1	---	---	---	---	---	---	---	718
03/15/2014	*	0	0	0	---	---	---	---	---	---	---	665
03/16/2014	*	0	0	0	0	---	---	---	---	---	---	631
03/17/2014		0	---	0	0	---	---	---	---	---	---	623
03/18/2014	*	0	---	0	1	---	---	---	---	---	---	731
03/19/2014		0	---	0	0	---	---	---	---	---	---	565
03/20/2014		0	---	0	0	---	---	---	---	---	---	340
03/21/2014		---	---	---	---	---	---	---	---	---	---	---
Total:		**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**17,850**
# Days:		**14**	**2**	**7**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**14**
Average:		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,275**
YTD		**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**19,293**

Two-Week Summary of Passage Indices

				COMBINED COHO								
		WTB	IMN	GRN	LEW	LGR	LGS	LMN	RIS	MCN	JDA	BO2
Date		(Coll)	(Coll)	(Coll)	(Coll)	(INDEX)	(INDEX)	(INDEX)	(INDEX)	(INDEX)	(INDEX)	(INDEX)
03/07/2014	*	0	---	---	0	---	---	---	---	---	---	48
03/08/2014	*	0	---	---	0	---	---	---	---	---	---	76
03/09/2014	*	0	---	---	0	---	---	---	---	---	---	39
03/10/2014	*	0	---	---	0	---	---	---	---	---	---	0
03/11/2014	*	0	---	---	---	---	---	---	---	---	---	22
03/12/2014	*	0	---	---	---	---	---	---	---	---	---	48
03/13/2014	*	0	---	---	---	---	---	---	---	---	---	64
03/14/2014	*	0	---	0	---	---	---	---	---	---	---	20
03/15/2014	*	0	0	0	---	---	---	---	---	---	---	76
03/16/2014	*	0	0	0	0	---	---	---	---	---	---	0
03/17/2014		0	---	0	0	---	---	---	---	---	---	11
03/18/2014	*	0	---	0	0	---	---	---	---	---	---	75
03/19/2014		0	---	0	0	---	---	---	---	---	---	57
03/20/2014		0	---	0	0	---	---	---	---	---	---	20
03/21/2014		---	---	---	---	---	---	---	---	---	---	---
Total:		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**556**
# Days:		**14**	**2**	**7**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**14**
Average:		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**40**
YTD		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**612**

				COMBINED STEELHEAD								
		WTB	IMN	GRN	LEW	LGR	LGS	LMN	RIS	MCN	JDA	BO2
Date		(Coll)	(Coll)	(Coll)	(Coll)	(INDEX)	(INDEX)	(INDEX)	(INDEX)	(INDEX)	(INDEX)	(INDEX)
03/07/2014	*	1	---	---	1	---	---	---	---	---	---	0
03/08/2014	*	1	---	---	1	---	---	---	---	---	---	9
03/09/2014	*	1	---	---	0	---	---	---	---	---	---	0
03/10/2014	*	1	---	---	0	---	---	---	---	---	---	21
03/11/2014	*	2	---	---	---	---	---	---	---	---	---	0
03/12/2014	*	3	---	---	---	---	---	---	---	---	---	0
03/13/2014	*	0	---	---	---	---	---	---	---	---	---	0
03/14/2014	*	1	---	1	---	---	---	---	---	---	---	0
03/15/2014	*	2	32	0	---	---	---	---	---	---	---	0
03/16/2014	*	1	13	0	0	---	---	---	---	---	---	21
03/17/2014		1	---	2	0	---	---	---	---	---	---	21
03/18/2014	*	0	---	0	1	---	---	---	---	---	---	19
03/19/2014		2	---	4	2	---	---	---	---	---	---	0
03/20/2014		0	---	4	1	---	---	---	---	---	---	0
03/21/2014		---	---	---	---	---	---	---	---	---	---	---
Total:		**16**	**45**	**11**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**91**
# Days:		**14**	**2**	**7**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**14**
Average:		**1**	**23**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**7**
YTD		**16**	**45**	**12**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**91**

Two-Week Summary of Passage Indices

				COMBINED SOCKEYE								
		WTB	IMN	GRN	LEW	LGR	LGS	LMN	RIS	MCN	JDA	BO2
Date		(Coll)	(Coll)	(Coll)	(Coll)	(INDEX)	(INDEX)	(INDEX)	(INDEX)	(INDEX)	(INDEX)	(INDEX)
03/07/2014	*	0	---	---	0	---	---	---	---	---	---	16
03/08/2014	*	0	---	---	0	---	---	---	---	---	---	0
03/09/2014	*	0	---	---	0	---	---	---	---	---	---	0
03/10/2014	*	0	---	---	0	---	---	---	---	---	---	0
03/11/2014	*	0	---	---	---	---	---	---	---	---	---	0
03/12/2014	*	0	---	---	---	---	---	---	---	---	---	24
03/13/2014	*	0	---	---	---	---	---	---	---	---	---	21
03/14/2014	*	0	---	0	---	---	---	---	---	---	---	20
03/15/2014	*	0	0	0	---	---	---	---	---	---	---	38
03/16/2014	*	0	0	0	0	---	---	---	---	---	---	84
03/17/2014		0	---	0	0	---	---	---	---	---	---	75
03/18/2014	*	0	---	0	0	---	---	---	---	---	---	56
03/19/2014		0	---	0	0	---	---	---	---	---	---	151
03/20/2014		0	---	0	0	---	---	---	---	---	---	160
03/21/2014		---	---	---	---	---	---	---	---	---	---	---
Total:		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**645**
# Days:		**14**	**2**	**7**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**14**
Average:		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**46**
YTD		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**659**

				COMBINED LAMPREY JUVENILES								
		WTB	IMN	GRN	LEW	LGR†	LGS	LMN	RIS	MCN	JDA	BO2
Date		(Coll)	(Coll)	(Coll)	(Coll)	(Samp)	(Coll)	(Coll)	(Coll)	(Coll)	(Coll)	(Coll)
03/07/2014	*	0	---	---	0	---	---	---	---	---	---	76
03/08/2014	*	0	---	---	0	---	---	---	---	---	---	100
03/09/2014	*	0	---	---	0	---	---	---	---	---	---	104
03/10/2014	*	1	---	---	0	---	---	---	---	---	---	104
03/11/2014	*	0	---	---	---	---	---	---	---	---	---	168
03/12/2014	*	0	---	---	---	---	---	---	---	---	---	56
03/13/2014	*	0	---	---	---	---	---	---	---	---	---	24
03/14/2014	*	0	---	0	---	---	---	---	---	---	---	96
03/15/2014	*	0	0	0	---	---	---	---	---	---	---	144
03/16/2014	*	0	0	0	0	---	---	---	---	---	---	208
03/17/2014		0	---	0	0	---	---	---	---	---	---	684
03/18/2014	*	0	---	0	0	---	---	---	---	---	---	456
03/19/2014		0	---	0	0	---	---	---	---	---	---	712
03/20/2014		0	---	0	0	---	---	---	---	---	---	1,592
03/21/2014		---	---	---	---	---	---	---	---	---	---	---
Total:		**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4,524**
# Days:		**14**	**2**	**7**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**14**
Average:		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**323**
YTD		**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4,588**

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:
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 macropthalmia, 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.

Cumulative Adult Passage at Mainstem Dams Through: 03/20

		Spring Chinook						Summer Chinook						Fall Chinook					
	END	2014		2013		10-Yr Avg.		2014		2013		10-Yr Avg.		2014		2013		10-Yr Avg.	
DAM	DATE	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack
BON	03/19	15	1	95	1	58	0	0	0	0	0	0	0	0	0	0	0	0	0
TDA		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JDA	03/17	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MCN		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IHR	02/28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LMN		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LGS		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LGR	03/19	0	0	0	0	0	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	03/19	1	0	13	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0

		Coho						Sockeye			Steelhead						Lamprey		
	END	2014		2013		10-Yr Avg.				10-Yr			10-Yr	Wild	Wild	10-Yr			10-Yr
DAM	DATE	Adult	Jack	Adult	Jack	Adult	Jack	2014	2013	Avg.	2014	2013	Avg.	2014	2013	Avg.	2014	2013	Avg.
BON	03/19	5	-2	0	0	0	0	2	0	0	1634	1030	1516	570	282	361	0	-1	0
TDA		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JDA	03/17	0	1	0	0	0	0	0	0	0	1990	0	1418	748	0	252	-1	0	0
MCN		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IHR	02/28	0	0	0	0	0	0	0	0	0	498	0	0	164	0	0	0	0	0
LMN		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LGS		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LGR	03/19	0	0	0	0	0	0	0	0	0	2995	2937	2321	1043	1030	562	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	03/19	9	0	2	0	0	0	0	0	0	2299	2985	3630	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.

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