



Fish Passage Center

Weekly Report #99 - 2

March 19, 1999

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NOTE: The Fish Passage Center Weekly Report is available on Friday of each week by 4:00 p.m. on our internet homepage at www.fpc.org. If you can get the information from the website, you will get your information sooner and help us utilize our resources more efficiently by saving postage and paper costs. Reduced use of paper also helps the environment. Please let us know if you want to be taken off the weekly report mailing list. You can email us at fpcstaff@fpc.org. Thanks!

SUMMARY OF EVENTS:

Water Supply: Precipitation for the first two weeks of March were much lower than February. The driest areas in the basin were Snake River Plain with 49% of average, Upper John day with 47% of average, and Upper Deschutes with 48% of average. The wettest areas and the only ones with precipitation above the average were Okanogan with 157% of average, Kootenai with 122% of average, Columbia above Castalgar with 104% of average and SW WA Cascades/Cowlitz with 102% of average. The October-March total for the Columbia River above The Dalles is 118%.

The March mid-month Runoff Volume Forecast reflects the March weather conditions, showing a decrease at some major sites compared to the March final. The greatest decreases were 7% in mid- Snake basin, and at Brownlee reservoir. Smaller increases of 2% were observed in the Upper Columbia area, at Libby reservoir. The January-July forecast for the Columbia River above The Dalles is 130 MAF, or 123% of average and remained the same as the March Final. The summary of the Runoff Volume for different sites through the January-March period is given in the following Table.

Location	Period	March 99 Final		March 99 Midmonth	
		MAF	%	MAF	%
Libby	Apr-Sep	7.53	111	7.63	113
Hungry Horse	Apr-Sep	2.48	114	2.39	109
Grand Coulee	Jan-Jul	74.1	117	74.6	118
The Dalles	Jan-Jul	130	123	130	123
Lower Granite	Jan-Jul	37.9	127	37.8	127
Dworshak	Apr-Jul	3.6	133	361	134
Brownlee	Apr-Jul	8.38	145	8.01	138

System Storage and Streamflow: The system continues to be operated for flood control purposes. Hungry Horse continues to be drafted below the end of March flood control elevation for maintenance work. COE decided at the beginning of March to operate Libby at minimum outflow in order to refill the reservoir to an end of April flood control elevation and later to the full pool elevation by June 30, while meeting requirements for sturgeon spawning flows. After the reservoir was drafted to flood control elevations during January-February period, it is uncertain that it can be refilled to the April 20 BiOp required elevation. A summary of the current elevations and end of March flood control elevations is given in the following Table:

Reservoir	Actual elevation as of March 18 [ft]	Max Reservoir pool [ft]	End of March Flood Control Elevation [ft]
Libby	2321.5	2459	2310.9
Hungry Horse	3492.6	3560	3507.1
Grand Coulee	1250.8	1290	1247.7
Brownlee	2023.8*	2077	2006.8
Dworshak	1463.6	1600	1445.0

Upper Snake reservoirs:

Currently all reservoirs continue to be operated for flood control with an operating strategy similar to the past year, drafting reservoirs during March and passing inflow during April. American Falls was projected to be 83% full by the end of March, but has reached that level on March 18. Flows at Milner decreased from 8 kcfs last week to 5 kcfs as the precipitation in the basin decreased.

Spring flow target based on the March Final Runoff Volume Forecast: at Lower Granite 100 kcfs; and 260 kcfs at McNary. The COE's SSARR projections are showing that seasonal spring flow targets at both projects will be met during the entire spring season. This doesn't imply that the weekly flow targets will be met at the beginning of the season. Weekly average flows during March are showing a decreasing trend as precipitation ceased over the basin. The average discharge for the major run-of-river projects for March 4-18, are given in the following Table:

Project	Average Discharge [kcfs]	
	March 4-10	March 11-18
Priest Rapids	153.0	142.6
McNary	239.1	230.9
Lower Granite	76.9	80.7
Bonneville	262.3	254.9

Fishery Agencies requirement to meet flow target of 125 kcfs below Bonneville dam during entire fall season has been met. Flows were required for protection of the spawning fall chinook in the Pierce Ives Island areas. The fishery agencies have requested that the operators and regulators maintain flows at Priest Rapids and Bonneville dams at a stable and increasing level, to avoid stranding fall chinook fry in these areas as emergence increases.

Spill: Approximately 4.1 million tule fall chinook were released from the Spring Creek Hatchery on the morning of March 18, 1999. Spill began on March 18, 1999 at 2000 hours and will occur for

24-hours a day, up to levels that reach the gas caps. The fishery agencies and tribes requested that the spill continue for a full ten days after initiation. However, the operating agencies have only agreed to spill for seven days with additional days contingent on juvenile passage information. Total dissolved gas waivers were requested and received from the State of Oregon Department of Environmental Quality and the Washington Department of Ecology

Spill is presently occurring at Dworshak Dam as that project continues at an increased outflow in order to achieve its flood control elevation. Spill is also occurring at the Hells Canyon complex for the same reason. Excess capacity spill has occurred at Ice Harbor Dam in the lower Snake River and in the Lower Columbia at McNary, John Day and Bonneville dams over the past week. Total dissolved gas levels at all reporting stations are presently below the 110% standard, with the exception of the monitors below Bonneville Dam.

Smolt Monitoring. The 1999 smolt monitoring season is now underway. The ESA permit was received Friday March 12, and the operation of traps on the Salmon, Snake, and Grande Ronde rivers began March 14. The Nez Perce Tribe had received their ESA permit earlier and began operation of the Imnaha River trap on March 1. Sampling at the Bonneville Dam Powerhouse 1 trap began March 13. Starting dates of sampling at the remaining dams scheduled to begin between March 25 and April 1 depending on site as noted in Weekly Report #99-1. This week saw mostly wild yearling chinook at the Imnaha (IMN), Salmon (WTB), and Snake (LEW) traps, with typical low numbers of fish collected per day. At the Grande Ronde River trap (GRN), hatchery chinook from the volitional release at Lookingglass Hatchery began showing up during the 24-hr period ending 09:00 March 17, with numbers collected jumping to 1,829 fish during the next day's sample period. In the lower Columbia River, mostly yearling chinook and subyearling chinook fry were being collected during the first week of sampling.

Adult Fish Passage: Presently, only Bonneville and Lower Granite dams are counting fish. Bonneville Dam began counting on March 15, so only a few of the early migrants have been counted to date. The adult spring chinook migration for 1999 is projected to be greatly reduced from last year's spring chinook migration above Bonneville Dam. No adult spring chinook have been counted during the first 4 days of counting at Bonneville.

At Lower Granite Dam, steelhead have been passing at about 100 fish per day, with a total through March 16 at 1,001. This total is nearly equal to the 1998 and 10-year average. These steelhead passing Lower Granite are those that have over-wintered in the Snake River pools and tributaries as well as in the Columbia River and that move upstream to spawn in the late winter and early spring. Therefore, when the other projects begin fish counting on April 1, the Lower Granite steelhead counts will exceed those at the lower Snake River dams and McNary Dam.

Hatchery Releases: The Hatchery Release Tables show the number of fish released in each section of the Columbia River basin during the past two weeks and for the upcoming two weeks. The schedules will be changed as they are received from the coordinators or hatcheries.

Lower Columbia River (above Bonneville Dam to McNary Dam) – Yearling spring chinook from Klickitat Hatchery, Umatilla River acclimation ponds, and from Warm Springs NFH have already been released. The sluiceway at The Dalles Dam was put into operation and will offer some protection for those fish when they arrive at the project. Normally, the sluiceway is operated starting on April 1st. Yearling fall chinook from Thornhollow Acclimation Pond were released on March 11th. The large release of about 4.1 million subyearling "tule" fall chinook from Spring Creek NFH took place as scheduled on March 18. This release is normally the largest single-point day release of fish above Bonneville Dam. A n SOR is in place to give special protection for these fish at Bonneville Dam.

Mid-Columbia River – 360,000 yearling spring chinook were released between 2/27 and 3/1 from Ringold Hatchery with the remaining yearling spring chinook is tentatively scheduled for April.

Snake River – A number of hatcheries released spring chinook in late fall 1998, with many other releases scheduled for late March and early April. All Permits have been received to allow release of fish.

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
03/05/99	133.1	0.0	134.6	0.0	134.5	0.0	142.7	1.9	144.6	0.0	153.7	0.0	159.4	0.0
03/06/99	138.8	0.0	138.0	0.0	137.5	0.0	140.3	0.0	141.1	0.0	146.2	0.0	150.1	0.0
03/07/99	126.4	0.0	129.0	0.0	133.9	0.0	141.7	3.1	140.4	0.0	138.4	0.0	143.4	0.0
03/08/99	159.1	0.1	158.4	0.0	154.1	0.0	152.2	10.2	151.2	0.0	148.6	0.0	150.0	0.0
03/09/99	154.1	0.0	153.3	0.0	155.2	2.9	161.8	19.3	161.5	0.0	148.2	0.3	151.3	0.0
03/10/99	130.7	0.0	141.8	0.0	145.4	0.0	150.9	14.5	150.4	0.0	161.5	2.4	159.3	0.0
03/11/99	134.1	0.0	134.7	0.0	137.3	0.0	142.8	4.7	142.5	0.0	147.6	0.0	156.5	0.0
03/12/99	135.5	0.0	141.2	0.0	143.9	0.0	152.3	10.1	151.9	0.0	154.4	0.0	149.3	0.0
03/13/99	126.5	0.0	122.7	0.0	118.2	0.0	117.3	1.3	116.9	0.0	124.2	0.0	125.5	0.0
03/14/99	113.9	0.0	116.6	0.0	121.0	0.0	132.3	6.6	132.8	0.0	132.7	0.0	139.3	0.0
03/15/99	143.9	0.0	144.2	0.0	148.5	0.0	147.8	8.3	144.7	0.0	146.1	2.6	147.0	0.0
03/16/99	136.4	0.0	139.1	0.0	135.9	0.0	143.2	3.2	144.8	0.0	140.9	3.1	146.7	0.0
03/17/99	113.0	0.0	115.2	0.0	120.5	0.0	130.6	0.2	130.1	0.0	137.1	2.9	133.9	0.0
03/18/99	114.2	0.0	120.5	0.0	120.7	0.0	122.5	0.0	113.8	0.0	122.3	1.1	129.1	0.0

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

Date	Dworshak		Brownlee		Lower Granite		Little Goose		Lower Monumental		Ice Harbor	
	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill
03/05/99	14.2	3.6	---	---	81.2	0.0	80.8	0.0	84.2	0.0	81.3	0.6
03/06/99	14.1	3.5	---	---	77.0	0.0	73.6	0.0	78.9	0.0	79.0	0.0
03/07/99	14.1	3.5	---	---	72.2	0.0	70.1	0.0	77.2	0.0	80.1	0.0
03/08/99	14.1	3.5	---	---	71.9	0.1	73.3	0.0	78.3	0.0	74.3	0.0
03/09/99	14.3	3.5	---	---	73.7	0.0	75.4	0.0	81.9	0.0	78.9	0.0
03/10/99	14.2	3.4	---	---	75.5	0.0	81.1	0.0	84.7	0.0	82.2	0.0
03/11/99	14.0	3.4	---	---	71.3	0.0	65.0	0.0	71.4	0.0	70.3	0.9
03/12/99	14.0	3.4	---	---	79.7	0.0	74.5	0.0	79.1	0.0	74.0	7.6
03/13/99	14.0	3.4	---	---	74.6	0.0	74.5	0.0	80.3	0.0	84.4	14.2
03/14/99	13.9	3.4	---	---	74.7	0.0	75.9	0.0	81.8	0.0	80.7	17.9
03/15/99	13.9	3.4	---	---	89.0	0.0	89.8	0.0	94.2	0.0	93.7	33.1
03/16/99	13.9	3.4	---	---	85.7	0.0	87.0	0.0	94.5	0.0	95.9	24.1
03/17/99	13.8	3.3	---	---	83.4	0.0	80.1	0.0	83.7	0.0	88.8	18.2
03/18/99	13.8	3.3	---	---	87.0	0.0	89.2	12.1	94.0	0.0	88.9	20.3

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

Date	McNary		John Day		The Dalles		Bonneville		PH1	PH2
	Flow	Spill	Flow	Spill	Flow	Spill	Flow	Spill		
03/05/99	269.5	55.5	287.5	11.6	284.9	9.0	294.2	32.3	86.8	166.3
03/06/99	239.3	20.9	249.6	0.0	253.4	0.0	271.0	13.2	86.4	162.6
03/07/99	218.4	0.0	233.9	0.0	238.8	0.0	263.7	0.0	92.0	162.9
03/08/99	214.0	0.0	231.3	0.0	230.4	0.0	231.1	0.0	72.0	150.3
03/09/99	223.3	13.2	222.3	0.0	224.9	0.0	225.2	2.6	69.0	144.7
03/10/99	255.1	40.6	256.0	0.0	257.0	0.0	278.6	30.5	82.6	156.7
03/11/99	230.8	14.2	260.0	0.0	256.8	0.0	286.1	23.7	90.8	162.8
03/12/99	224.5	7.1	243.7	0.0	241.7	0.0	238.1	0.0	84.6	144.7
03/13/99	237.4	29.9	244.1	20.0	233.2	41.0	251.8	35.1	83.2	124.8
03/14/99	222.6	3.3	221.3	0.0	221.8	6.0	234.1	14.9	81.4	129.4
03/15/99	213.8	46.1	233.6	0.0	238.3	0.0	241.3	10.7	82.8	139.0
03/16/99	260.2	92.5	244.1	3.8	235.4	0.0	273.7	30.4	86.1	136.0
03/17/99	223.7	54.3	247.5	5.6	251.4	0.0	252.8	23.4	85.8	134.4
03/18/99	234.1	65.7	244.8	0.0	243.9	0.0	246.2	53.2	75.5	108.3

Hatchery Release Summary

From 3/5/99 to 3/18/99

Hatchery	Species...	Migration Year	Released	Number	...Release Dates...	Begin...	...End	Release Site	River Name
Idaho									
Rapid River									
	SP	Chinook	1999	2,847,500	03/16/99	04/15/99		Rapid River H	Little Salmon River
	SP	Chinook	1999	200,000	03/17/99	03/19/99		Little Salmon R	Salmon River
	SP	Chinook	1999	300,000	03/18/99	03/19/99		Hells Canyon Dam	Snake River
	Agency Totals:			3,347,500	.....			
Nez Perce									
Clearwater									
	SP	Chinook	1999	287,900	03/12/99	03/12/99		Selway R	Clearwater Rvr M F
	Agency Totals:			287,900	.....			
Oregon									
Imnaha									
	SP	Chinook	1999	106,500	03/16/99	04/15/99		Imnaha Acclim Pd	Imnaha River
	SP	Chinook	1999	89,000	03/16/99	04/15/99		Imnaha Acclim Pd	Imnaha River
Lookingglass									
	SP	Chinook	1999	312,000	03/15/99	04/01/99		Lookingglass H	Grande Ronde River
	Agency Totals:			507,500	.....			
Umatilla Tribe									
Imeques									
	SP	Chinook	1999	255,000	03/08/99	03/08/99		Imeques Acclim Pd	Umatilla River
	SP	Chinook	1999	175,000	03/08/99	03/08/99		Imeques Acclim Pd	Umatilla River
Thornhollow									
	FA	Chinook	1999	240,000	03/11/99	03/11/99		Thornhollow Acclim Pd	Umatilla River
	Agency Totals:			670,000	.....			
USFWS									
Spring Creek									
	FA	Chinook	1999	4,065,232	03/18/99	03/18/99		Spring Creek H	Columbia River
	Agency Totals:			4,065,232	.....			
Washington									
Tucannon									
	SP	Chinook	1999	25,000	03/09/99	04/20/99		Curl Lake	Tucannon River
	Agency Totals:			25,000	.....			
	Total Release..			8,903,132					

Hatchery Release Summary

From 3/19/99 to 4/1/99

Hatchery	Species...	Migration Year Released	Number Released	...Release Dates... Begin...	...End	Release Site	River Name	
Idaho								
Clearwater								
	SP	Chinook	1999	300,000	04/01/99	04/15/99	Red River Acclim Pd	S Fk Clearwater River
Niagara Springs								
	SU	Steelhead	1999	660,000	03/22/99	04/05/99	Hells Canyon Dam	Snake River
Agency Totals:				960,000	.....		
Nez Perce								
Clearwater								
	SP	Chinook	1999	148,400	03/19/99	03/19/99	Lolo Cr	Clearwater Rvr M F
	SP	Chinook	1999	39,700	03/29/99	03/29/99	S Fk Clearwater R	Clearwater Rvr M F
	SP	Chinook	1999	74,300	03/29/99	03/29/99	Newsome Cr	S Fk Clearwater River
Lookingglass								
	SP	Chinook	1999	12,000	04/01/99	04/05/99	Lostine R	Grande Ronde River
Lyons Ferry								
	FA	Chinook	1999	150,000	03/25/99	04/12/99	Cpt John Acclim Pd	Snake River
Powell								
	SP	Chinook	1999	77,900	03/29/99	03/29/99	Lochsa R	Clearwater Rvr M F
	SP	Chinook	1999	19,600	03/29/99	03/29/99	Lochsa R	Clearwater Rvr M F
Sweetwater Spr								
	SP	Chinook	1999	420,000	04/01/99	04/15/99	Selway R	Clearwater Rvr M F
Agency Totals:				941,900	.....		
Oregon								
Cascade								
		Coho	1999	250,000	03/30/99	04/08/99	Umatilla R	Columbia River
Lower Herman C								
		Coho	1999	500,000	03/20/99	03/31/99	Umatilla R	Columbia River
Irrigon								
	SU	Steelhead	1999	137,500	04/01/99	04/15/99	Wallowa Acclim Pd	Grande Ronde River
Lookingglass								
	SP	Chinook	1997	167	03/30/99	03/30/99	Lookingglass H	Grande Ronde River
	SP	Chinook	1999	12,061	04/01/99	04/15/99	Lostine Accim Pd	Grande Ronde River
Oak Springs								
	SU	Steelhead	1999	61,000	04/01/99	04/10/99	Hood R	Columbia River
Wallowa								
	SU	Steelhead	1999	217,000	03/31/99	03/31/99	Wallowa Acclim Pd	Grande Ronde River
	SU	Steelhead	1999	217,000	04/01/99	04/15/99	Wallowa Acclim Pd	Grande Ronde River
Agency Totals:				1,394,728	.....		

Hatchery Release Summary

From 3/19/99 to 4/1/99

Hatchery	Species...	Migration Year	Number Released	...Release Dates... Begin...	...End	Release Site	River Name
USFWS							
Dworshak							
	SP Chinook	1999	1,050,000	03/22/99	04/09/99	Dworshak H	Clearwater Rvr M F
Entiat							
	SP Chinook	1999	359,000	04/01/99	04/01/99	Entiat H	Mid-Columbia River
Kooskia							
	SP Chinook	1999	630,000	03/22/99	04/09/99	Kooskia H	Clearwater Rvr M F
Agency Totals:			2,039,000	.....		
Washington							
Lyons Ferry							
	SU Steelhead	1999	250,000	03/25/99	04/30/99	Cottonwood Acclim Pd	Grande Ronde River
	FA Chinook	1999	450,000	03/25/99	04/12/99	Lyons Ferry H	Snake River
	SU Steelhead	1999	125,000	03/25/99	04/30/99	Dayton Acclim Pd	Walla Walla River
Ringold							
	SP Chinook	1999	840,000	04/01/99	04/08/99	Ringold Springs H	Mid-Columbia River
Washougal							
	Coho	1999	2,500,000	04/01/99	04/07/99	Klickitat R	Columbia River
Agency Totals:			4,165,000	.....		
Total Release..			9,500,628				

Total Dissolved Gas Saturation (%) - Average of 12 Highest Hours, 24 h Average and 24 h High²

Total Dissolved Gas Saturation Data at Upper Columbia Sites

Date	<u>Can. Boundary</u>			<u>Grand Coulee</u>				<u>Tlwr G. Coulee</u>				<u>Chief Joseph</u>				<u>Wells</u>				<u>Rocky Reach</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>	<u>24 h</u>		<u>12 h</u>	<u>#</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>	<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>	<u>hr</u>
3/5	102	103	103	24	102	102	102	23	100	100	101	23	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/6	103	103	104	24	102	102	103	23	101	101	102	23	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/7	103	104	104	24	103	103	103	23	101	102	102	23	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/8	103	103	104	23	103	104	104	23	102	102	103	23	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/9	103	104	104	24	103	104	104	23	102	102	102	23	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/10	102	103	103	24	102	102	103	23	101	101	102	23	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/11	102	103	104	24	102	102	103	23	101	101	102	23	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/12	102	102	103	24	103	103	103	23	101	102	102	23	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/13	102	102	102	23	103	103	104	23	102	102	102	23	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/14	102	103	103	24	104	104	104	23	102	103	103	23	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/15	102	103	103	24	103	104	104	23	102	102	103	23	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/16	102	102	103	24	103	103	104	23	102	102	103	23	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/17	101	101	102	24	103	103	103	23	102	102	103	23	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/18	101	101	102	24	103	103	103	23	102	102	107	23	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0

Total Dissolved Gas Saturation Data at Mid Columbia Sites

Date	<u>Tlwr. Rocky R.</u>				<u>Rock Island</u>				<u>Tlwr. Rock Island</u>				<u>Wanapum</u>				<u>Tlwr Wanapum</u>				<u>Priest Rapids</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>	<u>24 h</u>		<u>12 h</u>	<u>#</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>	<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>	<u>hr</u>
3/5	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/6	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/7	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/8	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/9	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/10	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/11	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/12	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/13	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/14	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/15	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/16	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/17	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/18	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0

Total Dissolved Gas Saturation at Mid Columbia, Clearwater and Snake Sites

Date	<u>Dwnstr P Rapids</u>				<u>Dworshak</u>				<u>Clearwater</u>				<u>Snake-Lewiston</u>				<u>Lower Granite</u>				<u>Tlwr L. Granite</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>	<u>24 h</u>		<u>12 h</u>	<u>#</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>	<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>	<u>hr</u>
3/5	---	---	---	0	105	105	105	24	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/6	---	---	---	0	105	105	105	24	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/7	---	---	---	0	105	105	106	24	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/8	---	---	---	0	105	105	105	6	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/9	---	---	---	0	105	105	106	19	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/10	---	---	---	0	105	105	105	18	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/11	---	---	---	0	105	105	105	5	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/12	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	104	105	105	24	104	105	105	24	104	105	105	24
3/13	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	106	106	107	24	106	106	107	24	106	106	107	24
3/14	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	107	107	108	24	106	107	107	24	106	107	107	24
3/15	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	106	107	107	22	107	107	108	24	107	107	108	24
3/16	---	---	---	0	105	105	106	24	---	---	---	0	---	---	---	0	106	106	107	6	107	107	107	6	107	107	107	6
3/17	---	---	---	0	105	105	105	22	---	---	---	0	102	103	104	24	105	105	105	24	105	105	106	24	105	105	106	24
3/18	---	---	---	0	105	105	106	17	---	---	---	0	102	103	104	24	105	105	105	16	105	105	105	24	105	105	105	24

Total Dissolved Gas Saturation (%) - Average of 12 Highest Hours, 24 h Average and 24 h High²

Total Dissolved Gas Saturation Data at Snake Sites

Date	<u>Little Goose</u>			<u>Tlwtr L. Goose</u>				<u>Lower Mon.</u>				<u>Tlwtr L. Mon</u>				<u>Ice Harbor</u>				<u>Tlwtr Ice Harbor</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>	<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	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr
3/5	101	101	101	24	---	---	---	0	---	---	---	0	---	---	---	0	102	104	110	24	105	107	111	20			
3/6	102	102	102	24	---	---	---	0	---	---	---	0	---	---	---	0	101	102	102	24	101	102	102	24			
3/7	102	103	103	24	---	---	---	0	---	---	---	0	---	---	---	0	102	102	102	24	---	---	---	0			
3/8	103	103	103	7	---	---	---	0	---	---	---	0	---	---	---	0	102	102	102	6	101	101	101	6			
3/9	103	104	105	24	---	---	---	0	---	---	---	0	---	---	---	0	102	103	103	24	101	101	101	24			
3/10	103	104	104	18	---	---	---	0	---	---	---	0	---	---	---	0	102	102	102	18	101	101	101	18			
3/11	104	104	105	24	---	---	---	0	102	102	102	11	102	102	104	13	102	102	102	24	101	101	101	24			
3/12	104	105	105	24	---	---	---	0	103	103	103	24	---	---	---	0	102	102	103	24	101	101	103	24			
3/13	105	105	106	24	---	---	---	0	104	104	105	24	---	---	---	0	103	104	104	24	106	107	108	24			
3/14	105	105	105	24	---	---	---	0	105	105	105	24	---	---	---	0	104	104	104	24	105	105	105	24			
3/15	105	106	106	24	---	---	---	0	104	105	105	24	---	---	---	0	105	105	105	24	107	108	109	24			
3/16	105	105	106	24	---	---	---	0	103	104	104	24	---	---	---	0	104	104	105	24	108	109	109	24			
3/17	105	105	105	24	---	---	---	0	103	103	103	24	---	---	---	0	104	104	104	24	109	110	111	24			
3/18	105	105	105	24	107	109	111	23	104	104	104	24	---	---	---	0	103	104	104	24	109	109	110	24			

Total Dissolved Gas Saturation Data at Lower Columbia Sites

Date	<u>McNary-Oregon</u>				<u>McNary-Wash.</u>				<u>Tlwtr McNary</u>				<u>John Day</u>				<u>Tlwtr John Day</u>				<u>The Dalles</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>	<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	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr
3/5	102	103	103	24	102	102	102	24	113	114	116	24	---	---	---	0	---	---	---	0	---	---	---	0			
3/6	102	102	102	2	---	---	---	0	112	112	112	2	---	---	---	0	---	---	---	0	---	---	---	0			
3/7	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0			
3/8	103	103	104	23	103	103	103	23	103	103	103	24	---	---	---	0	---	---	---	0	---	---	---	0			
3/9	102	102	103	24	102	102	103	24	106	108	109	24	---	---	---	0	---	---	---	0	---	---	---	0			
3/10	102	102	102	18	101	102	102	18	110	111	112	18	---	---	---	0	---	---	---	0	---	---	---	0			
3/11	102	102	103	24	102	102	102	24	106	109	113	24	---	---	---	0	---	---	---	0	---	---	---	0			
3/12	102	103	103	24	102	102	103	24	105	107	109	24	---	---	---	0	---	---	---	0	---	---	---	0			
3/13	103	103	103	2	103	103	103	1	103	103	103	2	---	---	---	0	---	---	---	0	---	---	---	0			
3/14	104	104	105	24	103	104	104	24	105	106	110	24	---	---	---	0	---	---	---	0	---	---	---	0			
3/15	105	106	107	24	104	105	105	24	110	114	115	24	---	---	---	0	---	---	---	0	---	---	---	0			
3/16	104	104	104	24	104	104	105	24	116	117	119	24	---	---	---	0	---	---	---	0	---	---	---	0			
3/17	104	104	105	14	104	104	104	13	112	112	113	14	---	---	---	0	---	---	---	0	---	---	---	0			
3/18	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0			

Total Dissolved Gas Saturation Data at Lower Columbia Sites

Date	<u>Dnstr T. Dalles</u>				<u>Bonneville</u>				<u>Warrendale</u>				<u>Skamania</u>				<u>CamasWash.</u>				<u>Wauna Mill</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>	<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	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr
3/5	---	---	---	0	101	102	102	24	105	107	108	24	103	104	105	24	---	---	---	0	---	---	---	0			
3/6	---	---	---	0	103	104	104	24	105	106	108	24	104	104	105	24	---	---	---	0	---	---	---	0			
3/7	---	---	---	0	104	104	104	24	104	105	105	24	104	104	104	24	---	---	---	0	---	---	---	0			
3/8	---	---	---	0	103	103	103	24	103	103	104	24	103	103	103	24	---	---	---	0	---	---	---	0			
3/9	---	---	---	0	102	102	103	24	103	103	104	24	102	102	102	24	102	102	103	20	---	---	---	0			
3/10	---	---	---	0	102	102	102	24	105	107	108	24	103	104	105	24	102	103	105	23	---	---	---	0			
3/11	---	---	---	0	102	103	103	24	105	106	107	24	103	104	104	24	104	104	105	23	---	---	---	0			
3/12	---	---	---	0	103	103	103	24	103	103	104	24	103	103	103	24	103	103	104	23	---	---	---	0			
3/13	---	---	---	0	103	103	104	24	106	107	109	24	105	106	107	24	103	103	103	23	---	---	---	0			
3/14	---	---	---	0	102	103	103	24	105	106	108	24	104	105	106	24	106	106	107	23	---	---	---	0			
3/15	---	---	---	0	105	106	107	24	106	107	109	24	105	106	106	24	103	104	105	23	---	---	---	0			
3/16	---	---	---	0	102	103	104	24	106	107	108	24	104	105	106	24	105	106	107	23	---	---	---	0			
3/17	---	---	---	0	102	103	103	24	105	106	107	24	104	104	105	24	104	104	105	23	---	---	---	0			
3/18	---	---	---	0	103	103	103	24	108	108	113	24	106	107	114	24	104	105	106	23	---	---	---	0			

Two-Week Summary of Passage Indices

Date	Yearling Chinook							Hatchery/Wild Combined			
	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (INDEX)	LGS (INDEX)	LMN (INDEX)	RIS (INDEX)	MCN (INDEX)	JDA (INDEX)	BO1 (INDEX)
03/05/99	---	0	---	---	---	---	---	---	---	---	---
03/06/99	---	---	---	---	---	---	---	---	---	---	---
03/07/99	---	---	---	---	---	---	---	---	---	---	---
03/08/99	---	1	---	---	---	---	---	---	---	---	---
03/09/99	---	1	---	---	---	---	---	---	---	---	---
03/10/99	---	2	---	---	---	---	---	---	---	---	---
03/11/99	---	0	---	---	---	---	---	---	---	---	---
03/12/99	---	0	---	---	---	---	---	---	---	---	---
03/13/99	---	---	---	---	---	---	---	---	---	---	304
03/14/99	---	---	---	---	---	---	---	---	---	---	189
03/15/99	0	0	0	0	---	---	---	---	---	---	225
03/16/99	0	2	0	0	---	---	---	---	---	---	258
03/17/99	0	0	303	8	---	---	---	---	---	---	193
03/18/99	1	34	1,829	35	---	---	---	---	---	---	126
Total:	1	40	2,132	43	0	0	0	0	0	0	1,295
# Days:	4	10	4	4	0	0	0	0	0	0	6
Average:	0	4	533	11	0	0	0	0	0	0	216

Date	Wild Yearling Chinook						
	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (INDEX)	LGS (INDEX)	LMN (INDEX)
03/05/99	---	78	---	---	---	---	---
03/06/99	---	---	---	---	---	---	---
03/07/99	---	---	---	---	---	---	---
03/08/99	---	32	---	---	---	---	---
03/09/99	---	29	---	---	---	---	---
03/10/99	---	27	---	---	---	---	---
03/11/99	---	22	---	---	---	---	---
03/12/99	---	19	---	---	---	---	---
03/13/99	---	---	---	---	---	---	---
03/14/99	---	---	---	---	---	---	---
03/15/99	0	21	2	3	---	---	---
03/16/99	0	30	7	9	---	---	---
03/17/99	2	37	8	7	---	---	---
03/18/99	43	58	51	5	---	---	---
Total:	45	353	68	24	0	0	0
# Days:	4	10	4	4	0	0	0
Average:	11	35	17	6	0	0	0

Wild Subyearling Chinook		
LGR (INDEX)	LGS (INDEX)	LMN (INDEX)
---	---	---
---	---	---
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---	---	---
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---	---	---
---	---	---
---	---	---
0	0	0
0	0	0
0	0	0

Cumulative Adult Passage at Mainstem Dams Through March 16, 1999

DAM	Spring Chinook						Summer Chinook						Fall Chinook					
	1999		1998		10-Yr Avg.		1999		1998		10-Yr Avg.		1999		1998		10-Yr Avg.	
	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack
BON	0	0	30	0	9	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	0	0	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	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
LWG	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
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

DAM	Coho						Sockeye			Steelhead			
	1999		1998		10-Yr Avg.		1999	1998	10-Yr Avg.	10-Yr		Wild	
	Adult	Jack	Adult	Jack	Adult	Jack				1999	1998		Avg.	1999
BON	0	0	0	0	0	0	0	0	0	9	59	81	2
TDA	0	0	0	0	0	0	0	0	0	0	0	0	0
JDA	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
IHR	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
LGS	0	0	0	0	0	0	0	0	0	0	0	0	0
LWG	0	0	0	0	0	0	0	0	0	1,001	1,060	894	64
PRD	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
RRH	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

* Adult count records at Little Goose Dam have been maintained since 1991, visual counts were not conducted at Little Goose Dam between 1982 and 1990.

*No Video counts at Lower Granite Dam on 3/1/99 and 3/2/99.

*From 3/3/99 to 3/31/99 at Lower Granite Dam counts will be from 8:00 AM to 4:00 PM.

*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.