



Fish Passage Center

Weekly Report #99 - 3

March 26, 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, meaning you will get your information sooner and help us utilize our resources more efficiently. 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 continues to be low over most of the region. Precipitation at the Columbia above The Dalles in the period of March 1 through 23 was 68% and at the Snake River above Ice harbor was 61%. The October-March total for the Columbia River above The Dalles is 116% and for the Snake River above Ice Harbor was 112%.

System Storage : The system continues to be operated for flood control with special operations for maintenance 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 fill the pool by June 30, while meeting requirements for sturgeon spawning flows. Although the actual inflow increased as the precipitation in the basin increased, it is uncertain that April 20, BiOp refill targets will be met after the reservoir was drafted to flood control elevations during the January through February period. The failure to refill the reservoir by April 20 can result in shifting some of the spring runoff volume into summer operations.

Arrow reservoir was operated from January through the end of this week for white fish protection operation; requiring release of minimum requested flows of 40 kcfs for protection of white fish

spawning sites. White fish spawning requirements end this week, at which point flows will decrease to 20 kcfs to limit trout spawning areas. The reservoir is projected to start releasing the requested minimum flows of 20 kcfs for trout spawning during next week. This will decrease inflows at Grand Coulee. Resulting flows at Priest Rapids will be rapidly decreasing by the end of March. The agencies submitted SOR #99-3 because of their concern for potential stranding of emergent fall chinook with the projected end of March decrease in flows.

Dworshak reservoir inflows increased to 14 kcfs and the reservoir is already at maximum powerhouse outflow of 14 kcfs, with some spill. Inflows in the mid-Snake reach increased, resulting in higher outflows at Hells Canyon Dam in the range of 56-58 kcfs, requiring spill.

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 25 [ft]	Max Reservoir pool [ft]	End of March Flood Control Elevation [ft]
Libby	2321.8	2459	2310.9
Hungry Horse	3488.4	3560	3507.1
Grand Coulee	1249.7	1290	1247.7
Brownlee	2008.5	2077	2006.8
Dworshak	1460.9	1600	1445.0

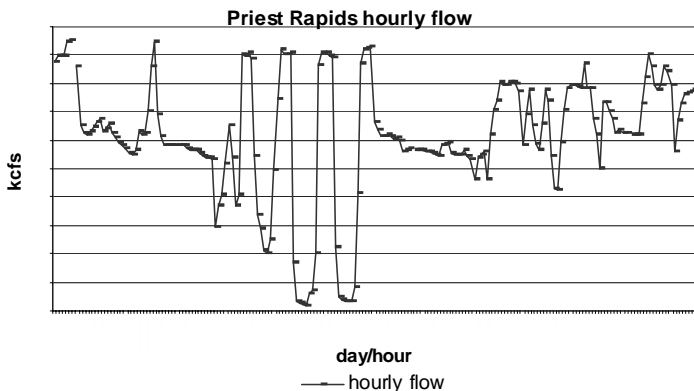
Upper Snake reservoirs:

Currently all reservoirs continue to be operated for flood control. As of March 25, BOR has been refilling American Falls to 87% of full during this week and drafted Palisades as required for flood control to 49% of full (from 59% of full on March 18). USBR plans to refill

American Falls to 90% of full by the end of March and to release flood control water during April depending on the April 1st runoff volume forecast. This operation will provide some benefits for Lower Snake flows at the beginning of the migration season. Flows at Milner increased from 8 kcfs in the previous week to 10.7 kcfs.

Streamflow: Spring flow target based on the March Final Runoff Volume Forecast is: at Lower Granite 100 kcfs; and at McNary 260 kcfs. The COE's SSARR projections are showing that seasonal spring flow targets at both projects will be met during the entire spring season.

Flows at Priest Rapids ranged from 98.1 kcfs to 131.6 kcfs last week. The lowest flow of 98.1 kcfs was on March 21. Hourly flows at Priest Rapids had their largest fluctuations on March 21, decreasing from 149.2 kcfs to 82 kcfs and then to 62.9 kcfs in a span of five hours. Flows increased to 146.9 kcfs in the following five hours.



The Salmon Managers submitted SOR# 99-3 for Bonneville and Priest Rapids projects operations to protect emerging naturally spawned chinook. The request was denied by the Corp of Engineers because the operation was not included within the Biological Opinion management time frame. Flows are increasing in the Snake River as snow begins to melt. The average discharge for the major run-off projects for March 11 through 25, are given in the following Table:

Project	Average Discharge [kcfs]	
	March 11-18	March 19-25
Priest Rapids	142.6	119.8
McNary	230.9	233.8
Lower Granite	80.7	104.4
Bonneville	254.9	245.6

The fishery agencies requirement to meet the minimum flow request Bonneville Dam during the entire fall season has been met. Although hourly flows have been fluctuating below Bonneville at higher than requested levels, a few instance of stranded fall chinook, coho and chum juveniles have been noted. Preliminary observations indicate that hourly fluctuations when flows exceed 270 kcfs result in stranding. This area is undergoing extensive monitoring and study to determine the best operation regime to protect spawning and emergence. Flows are required for protection of fall chinook on Ives Island.

Spill: On March 25, 1999 the project operators and regulators denied the salmon managers request to spill for fish passage at Bonneville dam through March 28. The original request was submitted in SOR #99-1. The salmon managers' request was based upon the significant passage index continuing to occur at Bonneville Dam. The tribes have requested spill at The Dalles Dam to facilitate the passage of an emergency release of fish due to a gasoline spill. The operators and regulators denied that request primarily for economic reasons.

Spill continues to occur at Dworshak and Hells Canyon projects to facilitate the draft to flood control elevations. Intermittent spill has occurred at Rock Island, Rocky Reach, Wanapum, Lower Granite and Little Goose dams. Some spill occurred due to debris spilling operations at the Snake River projects. Excess capacity spill has consistently occurred at McNary and Ice Harbor dams. The only specific spill for fish occurring last week was at Bonneville Dam. Total dissolved gas levels have exceeded the 110 % water quality standard at several Snake River projects and have approached the 120% level at some projects.

Smolt Monitoring. In the Snake River basin, the traps on the Salmon (WTB), Imnaha (IMN), and Grande Ronde (GRN) rivers collected large numbers of hatchery chinook from Rapid River, Imnaha, and Lookingglass hatcheries, respectively, this week. Commencing mid-March, these three hatcheries are volitionally releasing their fish over a half-to-one month period this year. PIT tagged hatchery chinook from Lookingglass Hatchery were also present downstream as far as the Snake River trap (LEW) located at Lewiston. Large numbers of wild chinook were collected at the Salmon River trap this week, with PIT tagged detections of fish originating in the South Fork Salmon River drainage (Secesh River and Lake Creek) and Lemhi River. The Snake River trap reported the collection of an excellent looking wild yearling fall chinook (144 mm) that had been tagged last June in the lower Grande Ronde River. The bypass/collection facility at Lower Granite Dam became operational the morning of March 25, with the first two-day collection of fish to be trucked on March 27. Collection numbers for Lower Granite Dam will be reported next week. During the next week, all remaining monitoring sites will begin operation.

In the lower Columbia River basin, Spring Creek Hatchery tule fall chinook dominated the 8-hr collections at Bonneville Dam this week. On March 19, the 8-hr passage index of tule fall chinook was approximately 270,000 fish. By March 25, the 8-hr passage index of tule fall chinook had dropped to approximately 400 fish, similar to the passage index of yearling chinook (hatchery and wild fish) during the latter half of this week.

Adult Fish Passage – During March, adult fish have been counted at Bonneville and Lower Granite dams. Bonneville began on March 15 (video taping) and Lower Granite on March 1 (video taping). On April 1, all Corps of Engineer dams will begin fish counting for the season at 16-h per day basis. Adult fish passage facilities are operating at full criteria in the lower Columbia River and Snake River at present. Priest Rapids

Dam is completing final work on their Gravity Intake Gate this upcoming week and then all Mid-Columbia projects will be operating their adult fish passage facilities at full capability. The Mid-Columbia projects will begin counting fish in mid-April.

At Bonneville Dam, spring chinook passage has been minimal and lags well behind the 1998 and 10-year average to date. Less than 100 adult spring chinook (74 total plus 1 jack) have been counted through March 24, and that total compares to 112 in 1998 and 120 for the 10-year average. Passage of adult steelhead at Bonneville has ranged between about 15-40 per day with the wild component comprising about 5% of the total since counting began on March 15. The adult steelhead count was 230 through March 24.

At Lower Granite Dam, steelhead passage normally ranged between 50 and 110 fish per day with the total through March 21 (last available count) of 1,433 with 86 or 6.0% being “wild” steelhead. So far, the steelhead total passage at Lower Granite remains nearly equal the 1998 count and greater than the 10-year average. No adult chinook have been counted at Lower Granite 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. The schedule for release of anadromous fish in the Columbia River basin above Bonneville Dam can be viewed on the FPC Web Site. These releases will be updated once a week on the Web Page (every Friday).

Lower Columbia River (above Bonneville Dam to McNary Dam) – To date, yearling spring chinook from Klickitat Hatchery, Umatilla River acclimation ponds, and from Warm Springs NFH have been released. The sluiceway at The Dalles Dam is presently operating and will offer an alternative route of passage for fish until

spill is initiated at the project. Also in the Umatilla River, 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. The release of coho salmon into the Umatilla River was started this week.

Mid-Columbia River – Yearling spring chinook released from Ringold Hatchery has been the only release to date with the remaining yearling spring chinook, coho, steelhead, and sockeye tentatively scheduled for April and May.

Snake River – A number of hatcheries released spring chinook in summer and fall 1998, with other production releases from Snake River hatcheries scheduled for late March and early April. Steelhead, coho, and spring chinook were released from hatcheries, acclimation ponds, and into rivers and tributaries during the week.

During the past two weeks, about 11.7 million salmon (species) were released into Columbia River basin rivers and tributaries. Another 9 million are scheduled for the next two weeks.

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
03/12/99	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	118.7	0.0	122.3	1.1	129.1	0.0
03/19/99	114.5	0.0	117.5	0.0	120.4	0.0	127.6	0.0	127.7	0.0	120.0	3.0	121.4	0.0
03/20/99	96.4	0.0	98.6	0.0	102.8	0.0	110.0	0.0	111.9	0.0	111.2	0.0	117.8	0.0
03/21/99	85.5	0.0	86.0	0.0	88.8	0.0	91.9	0.0	90.7	0.0	98.3	0.0	96.3	0.0
03/22/99	106.9	0.0	114.4	0.0	117.3	0.0	120.8	3.7	118.4	0.0	115.2	0.0	120.0	0.0
03/23/99	113.9	0.0	118.4	0.0	121.6	0.0	127.2	0.0	129.1	0.0	126.8	0.0	123.4	0.0
03/24/99	118.2	0.0	122.5	0.0	122.5	0.0	123.9	0.8	121.8	0.0	126.5	0.0	127.9	0.0
03/25/99	125.3	0.0	122.9	0.0	128.2	0.0	133.3	0.1	134.4	0.0	130.8	0.0	131.8	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
03/12/99	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
03/19/99	14.0	3.6	---	---	85.8	0.0	85.3	0.8	92.3	0.0	100.6	29.7
03/20/99	14.0	3.6	---	---	86.5	0.0	87.3	3.3	88.9	0.0	84.9	15.6
03/21/99	14.0	3.6	---	---	103.8	1.6	105.6	21.1	115.8	0.0	118.8	48.0
03/22/99	14.0	3.6	---	---	113.0	25.3	111.2	32.2	115.8	0.0	115.2	42.6
03/23/99	14.0	3.6	---	---	118.3	27.1	123.5	53.0	130.8	19.2	130.7	54.5
03/24/99	14.0	3.6	---	---	111.9	4.0	111.2	40.0	116.2	16.4	120.3	43.2
03/25/99	14.0	3.6	---	---	111.7	17.0	116.0	46.9	123.7	1.1	122.9	37.7

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
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	261.3	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	242.2	0.0	243.9	0.0	246.2	53.2	75.5	108.3
03/19/99	237.8	71.2	243.0	0.0	246.3	0.0	251.2	161.6	66.3	14.1
03/20/99	215.4	43.4	226.5	0.0	220.3	0.0	247.2	161.0	71.7	5.3
03/21/99	215.5	38.6	221.0	0.0	226.7	0.0	240.2	149.1	76.7	5.2
03/22/99	223.5	55.6	234.6	0.0	235.8	7.0	244.7	143.0	81.8	10.7
03/23/99	250.0	78.4	250.4	41.3	252.1	0.0	248.1	140.5	78.3	20.1
03/24/99	255.1	85.9	270.1	54.3	270.1	0.0	274.5	151.0	76.3	38.1
03/25/99	239.6	66.1	251.9	0.0	259.0	10.0	276.4	150.2	78.7	38.2

Hatchery Release Summary

For the Last Two Weeks

From 3/12/99 to 3/25/99

Hatchery	Species...	Migration Year	Number Released	...Release Dates... Begin... ..End	Release Site	River Name
IDFG						
Niagara Springs						
	SU Steelhead	1999	660,000	03/22/99 04/05/99	Hells Canyon Dam	Snake River
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:		4,007,500		
Nez Perce Tribe						
Clearwater						
	SP Chinook	1999	74,300	03/19/99 03/19/99	Newsome Cr	S Fk Clearwater River
	SP Chinook	1999	39,700	03/19/99 03/19/99	S Fk Clearwater R	Clearwater Rvr M F
	SP Chinook	1999	287,900	03/23/99 03/26/99	Selway R	Clearwater Rvr M F
Lyons Ferry						
	FA Chinook	1999	150,000	03/25/99 04/12/99	Cpt John Acclim Pd	Snake River
Willamette						
	Coho	1999	275,000	03/16/99 03/16/99	Lapwai Cr	Clearwater Rvr M F
Willard						
	Coho	1999	275,000	03/18/99 03/18/99	Potlatch R	Clearwater Rvr M F
	Agency Totals:		1,101,900		
ODFW						
Lower Herman C						
	Coho	1999	500,000	03/20/99 03/31/99	Umatilla R	Columbia River
Imnaha						
	SP Chinook	1999	89,000	03/16/99 04/15/99	Imnaha Acclim Pd	Imnaha River
	SP Chinook	1999	106,500	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:		1,007,500		
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		

WDFW

Lyons Ferry

SU	Steelhead	1999	250,000	03/25/99	04/30/99	Cottonwood Acclim Pd	Grande Ronde River
SU	Steelhead	1999	125,000	03/25/99	04/30/99	Dayton Acclim Pd	Walla Walla River
FA	Chinook	1999	450,000	03/25/99	04/12/99	Lyons Ferry H	Snake River

Tucannon

SP	Chinook	1999	25,000	03/09/99	04/20/99	Curl Lake	Tucannon River
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Agency Totals: 850,000

Total Release.. 11,032,132

Hatchery Release Summary

For the Next Two Weeks

From 3/26/99 to 4/8/99

Hatchery	Species...	Migration Year	Number Released	...Release Dates... Begin... ..End	Release Site	River Name
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Colville Tribe

Cassimer Bar

	Sockeye	1999	18,000	04/05/99	04/09/99	Okanogan R	Mid-Columbia River
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Agency Totals: 18,000

IDFG

Clearwater

SP	Chinook	1999	300,000	04/01/99	04/15/99	Red River Acclim Pd	S Fk Clearwater River
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McCall

SU	Chinook	1999	1,017,650	04/05/99	04/15/99	S Fk Salmon R	Salmon River
SU	Chinook	1999	122,900	04/05/99	04/15/99	S Fk Salmon R	Salmon River

Niagara Springs

SU	Steelhead	1999	30,000	04/06/99	04/06/99	Pine Bar/Salmon R	Salmon River
SU	Steelhead	1999	150,000	04/07/99	04/09/99	Hammer Cr	Salmon River

Agency Totals: 1,620,550

Nez Perce Tribe

Clearwater

SP	Chinook	1999	148,400	03/29/99	03/30/99	Lolo Cr	Clearwater Rvr M F
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Lookingglass

SP	Chinook	1999	12,000	04/01/99	04/05/99	Lostine R	Grande Ronde River
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McCall

SU	Chinook	1999	39,000	04/05/99	04/15/99	S Fk Salmon R	Salmon River
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Powell

SP	Chinook	1999	48,900	04/05/99	04/05/99	Papoose Cr	Clearwater Rvr M F
SP	Chinook	1999	77,900	04/06/99	04/06/99	Lochsa R	Clearwater Rvr M F
SP	Chinook	1999	19,600	04/08/99	04/08/99	Lochsa R	Clearwater Rvr M F

Agency Totals: 345,800

ODFW

Big Canyon

SU	Steelhead	1999	120,000	04/07/99	04/07/99	Big Canyon H	Grande Ronde River
SU	Steelhead	1999	120,000	04/08/99	04/22/99	Big Canyon H	Grande Ronde River

Cascade

	Coho	1999	250,000	03/30/99	04/08/99	Umatilla R	Columbia River
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Irrigon

SU	Steelhead	1999	137,500	04/01/99	04/15/99	Wallowa Acclim Pd	Grande Ronde River
SU	Steelhead	1999	125,000	04/05/99	04/09/99	Grande Ronde R	Snake 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
SP	Chinook	1997	10,300	04/05/99	04/06/99	Imnaha R	Snake River

Oak Springs

SU	Steelhead	1999	61,000	04/01/99	04/10/99	Hood R	Columbia River
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Round Butte

SU	Steelhead	1999	162,000	04/05/99	04/09/99	Bel. Pelton Dam	Deschutes River
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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: 1,432,028

USFWS

Dworshak

SP	Chinook	1999	1,050,000	04/03/99	04/09/99	Dworshak H	Clearwater Rvr M F
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Entiat

SP	Chinook	1999	359,000	04/01/99	04/01/99	Entiat H	Mid-Columbia River
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Kooskia

SP	Chinook	1999	630,000	03/30/99	03/30/99	Kooskia H	Clearwater Rvr M F
SP	Chinook	1999	50,000	04/01/99	04/09/99	Clear Cr	Clearwater Rvr M F

Agency Totals: 2,089,000

WDFW

Ringold

SP	Chinook	1999	840,000	04/01/99	04/08/99	Ringold Springs H	Mid-Columbia River
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Washougal

	Coho	1999	2,500,000	04/01/99	04/07/99	Klickitat R	Columbia River
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Wells

SU	Chinook	1999	589,900	04/05/99	04/26/99	Similkameen Acclim Pd	Okanogan River
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Agency Totals: 3,929,900

Warm Springs Tribe

Oak Springs

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>Tlwtr 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>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
3/12	102	102	103	24	103	103	103	23	101	102	102	23	---	---	---	0	---	---	---	0	---	---	---	0
3/13	102	102	102	23	103	103	104	23	102	102	102	23	---	---	---	0	---	---	---	0	---	---	---	0
3/14	102	103	103	24	104	104	104	23	102	103	103	23	---	---	---	0	---	---	---	0	---	---	---	0
3/15	102	103	103	24	103	104	104	23	102	102	103	23	---	---	---	0	---	---	---	0	---	---	---	0
3/16	102	102	103	24	103	103	104	23	102	102	103	23	---	---	---	0	---	---	---	0	---	---	---	0
3/17	101	101	102	24	103	103	103	23	102	102	103	23	---	---	---	0	---	---	---	0	---	---	---	0
3/18	101	101	102	24	103	103	103	23	102	102	107	23	---	---	---	0	---	---	---	0	---	---	---	0
3/19	101	101	102	24	103	103	103	23	101	101	102	23	---	---	---	0	---	---	---	0	---	---	---	0
3/20	106	111	121	24	103	104	104	23	102	103	103	23	---	---	---	0	---	---	---	0	---	---	---	0
3/21	121	124	125	24	104	104	105	23	103	103	104	23	---	---	---	0	---	---	---	0	---	---	---	0
3/22	125	125	126	24	104	104	105	23	102	103	103	23	---	---	---	0	---	---	---	0	---	---	---	0
3/23	124	125	126	24	104	105	105	23	103	103	105	23	---	---	---	0	---	---	---	0	---	---	---	0
3/24	126	127	128	24	105	105	105	23	103	103	105	23	---	---	---	0	---	---	---	0	---	---	---	0
3/25	127	128	129	24	105	105	106	23	103	104	105	23	---	---	---	0	---	---	---	0	---	---	---	0

Total Dissolved Gas Saturation Data at Mid Columbia Sites

Date	<u>Tlwtr. Rocky R.</u>			<u>Rock Island</u>			<u>Tlwtr. Rock Island</u>			<u>Wanapum</u>			<u>Tlwtr 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>						
	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr				
3/12	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/13	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/14	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/15	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/16	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/17	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/18	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/19	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/20	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/21	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/22	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/23	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/24	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/25	---	---	---	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>Tlwtr 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>						
	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr				
3/12	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	104	105	105	24	104	105	105	24
3/13	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	106	106	107	24	106	106	107	24
3/14	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	107	107	108	24	106	107	107	24
3/15	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	106	107	107	22	107	107	108	24
3/16	---	---	---	0	105	105	106	24	---	---	---	0	---	---	---	0	106	106	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
3/18	---	---	---	0	105	105	106	17	---	---	---	0	102	103	104	24	105	105	105	16	105	105	105	24
3/19	---	---	---	0	106	106	106	17	---	---	---	0	103	104	106	24	106	107	108	23	106	106	107	24
3/20	---	---	---	0	106	106	107	13	---	---	---	0	103	105	106	24	107	107	108	24	107	108	108	24
3/21	---	---	---	0	106	106	107	21	---	---	---	0	102	102	103	24	107	107	107	24	107	108	108	24
3/22	---	---	---	0	106	106	107	15	---	---	---	0	103	104	105	24	107	107	107	24	113	117	122	24
3/23	---	---	---	0	107	107	107	7	---	---	---	0	103	103	104	24	106	107	107	24	113	119	122	24
3/24	---	---	---	0	107	107	107	9	---	---	---	0	102	103	104	23	107	107	107	24	108	109	110	24
3/25	---	---	---	0	107	107	107	21	---	---	---	0	103	104	105	24	107	107	107	24	111	115	121	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>						
	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr				
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
3/19	105	105	107	24	105	106	109	21	104	104	105	24	---	---	---	0	104	104	106	24	111	111	112	24
3/20	105	106	106	24	106	106	110	22	107	107	108	24	---	---	---	0	105	106	107	24	109	110	110	24
3/21	105	106	106	24	110	110	113	11	105	106	107	24	---	---	---	0	105	105	106	24	111	113	114	24
3/22	106	106	107	24	117	118	---	16	106	107	110	24	---	---	---	0	106	106	107	24	113	114	115	24
3/23	107	108	109	24	120	122	123	24	113	115	117	24	---	---	---	0	106	107	107	24	113	115	116	24
3/24	111	113	115	24	118	120	122	24	117	120	122	24	---	---	---	0	111	112	113	24	114	115	115	24
3/25	113	115	117	24	119	121	122	24	120	121	122	24	118	119	120	24	115	116	117	24	112	113	114	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>						
	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr				
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
3/19	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/20	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/21	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
3/22	106	106	107	24	105	105	106	24	113	114	115	24	---	---	---	0	---	---	---	0	---	---	---	0
3/23	106	107	108	24	106	107	108	24	115	117	118	24	---	---	---	0	---	---	---	0	---	---	---	0
3/24	108	109	109	24	106	107	107	24	116	118	120	24	---	---	---	0	---	---	---	0	---	---	---	0
3/25	108	108	108	7	106	106	106	7	113	113	114	7	---	---	---	0	107	107	107	13	---	---	---	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>Camas/Wash.</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>						
	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr	Avg	Avg	High	hr				
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
3/19	---	---	---	0	103	103	104	24	115	115	116	24	119	121	122	24	109	111	115	19	---	---	---	0
3/20	---	---	---	0	103	104	104	24	114	115	115	24	120	122	122	24	117	118	119	23	---	---	---	0
3/21	---	---	---	0	103	103	104	24	113	114	114	24	120	120	121	24	117	118	119	23	---	---	---	0
3/22	---	---	---	0	104	104	105	24	113	114	114	24	120	121	121	24	116	117	118	23	---	---	---	0
3/23	---	---	---	0	106	106	107	24	114	114	115	24	118	119	120	24	116	117	117	23	---	---	---	0
3/24	---	---	---	0	107	107	108	24	115	115	116	24	118	118	119	24	116	116	117	23	---	---	---	0
3/25	---	---	---	0	107	108	109	24	114	115	115	24	117	117	118	24	116	116	117	23	---	---	---	0

Cumulative Adult Passage at Mainstem Dams Through March 24, 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	74	1	112	0	120	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	1	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.		10-Yr			10-Yr			Wild	Wild
	Adult	Jack	Adult	Jack	Adult	Jack	1999	1998	Avg.	1999	1998	Avg.	1999	1998
BON	0	0	0	0	0	0	0	0	0	230	263	384	9	41
TDA	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
MCN	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
LMN	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
LWG	0	0	0	0	0	0	0	0	0	1,433	1,462	1,284	86	122
PRD	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
RRH	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

***Bonneville's numbers are through March 24, 1999 - Lower Granite's numbers are through March 21, 1999.**

*Adult counts are not being updated daily by The Corp of Engineers.

*Bonneville and Lower Granite are doing video counts only until April 1, 1999. These counts are the 8 hour daytime video counts.

*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.

*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.

*NOTE: PRD, RIS, and RRH, are not reporting Wild Steelhead numbers.

*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.