



Fish Passage Center

Weekly Report #99 - 12

May 28, 1999

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SUMMARY OF EVENTS:

Water Supply: Light showers continue over the region. Moderate snowmelt was experienced during the past week. Flows are expected to crest on May 27, then gradually decrease through the remainder of the period as temperatures cool and snowmelt decreases.

Precipitation above Coulee was 78% of normal, Snake River above Ice Harbor was 83% of normal and Columbia above The Dalles was 83% of normal for the period of May 1-25. The subbasins with the highest precipitation remained the Hood/Lower Deschutes with 150% and the Willamette Valley with 176%. The lowest precipitation was at Clark Fork with 47%, Flathead with 56%, and Harney/Malheur Basin with 56%.

The new June 99 early Runoff Volume Forecast was issued. Cold weather conditions and showery patterns persisted in the region resulting in a further deterioration of the Runoff Volumes. Changes are in the range of -10% to +2% compared to the May Final. The January-July forecast for the Columbia River above The Dalles is 124 MAF, or 117% of average, which is the same as the May Final. The runoff volume forecast for Brownlee reservoir decreased 10% and for Dworshak it decreased 5% compared to the May Final. The summary of the May Final and June Early Runoff Volume Forecasts is given in the following Table:

Location	Period	May 99 Final		June 99 Early	
		MAF	%	MAF	%
<i>Libby</i>	Apr-Sep	7.16	106	7.28	108
<i>Hungry Horse</i>	Apr-Sep	2.31	106	2.27	104
<i>Grand Coulee</i>	Jan-Jul	72.4	114	73.1	116
<i>The Dalles</i>	Jan-Jul	124	117	124	117
<i>Lower Granite</i>	Jan-Jul	35.8	120	34.9	117
<i>Dworshak</i>	Apr-Jul	3.2	119	3.08	114
<i>Brownlee</i>	Apr-Jul	7.32	126	6.73	116

System Storage: Delayed snowmelt and low precipitation will result in most of the reservoirs not attaining refill by the specified Biological Opinion dates. It is expected that August flows will be very low in spite of forecasted high

runoff volumes at the beginning of the season. Deep drafts of the reservoirs during March for flood control resulted in low spring flows given the current weather pattern. Redistribution of the drafted flood control volumes from March into April could improve spring flows and refill of the reservoirs for fish needs.

- *Hungry Horse* operated to the Integrated Rule Curves defined by the State of Montana. Projected elevation on May 31 is 3510 ft. The reservoir is projected to be full by July 31, instead of June 30 as required by Biological Opinion. This could impact flows for summer migrants. The outflows continue to be in the range of 2.8-3.35 kcfs during working days and 200 cfs during weekends. The reservoir is currently operated to prevent floods below Columbia Falls.
- *Libby* continues to refill with a minimum outflow of 4 kcfs. The reservoir is projected to be at 2450 ft by July 31 instead of 2460 ft as required by Biological Opinion. The Sturgeon pulse is not expected to commence during the coming week, as the temperatures at Bonners Ferry are still below the required 45° F. Summer flows will be significantly impacted since the lower reservoir elevation at the end of July will result in 450KAF less water for flow augmentation.
- *Arrow* reservoir decreased outflow to 25 kcfs at the end of May because of the increased outflows from Kootenai Lake downstream of the Arrow Dam. There is a requested outflow of 30 kcfs below Arrow for protecting trout redds, but because of the high Kootenai river inflows (in the range of 50 kcfs) Arrow outflow is restricted. Trout redds are being protected because of the upstream backwater effect of Kootenai River.
- *Grand Coulee* reservoir was drafted to 1213 ft to support requested flows at Priest Rapids during the week of May 13-20 and then began refilling. Inflows were in the range of 138.8 kcfs-203.6 kcfs

during the week of May 20-27. Outflows were in the range of 99.8 kcfs-135.7 kcfs during the same period.

- *Dworshak* reservoir continues to refill with minimum outflows of 1.3 kcfs-1.4 kcfs after May 20. The latest projection of the SSARR shows the reservoir will not refill by the end of July. The highest projected elevation is 1582.8 ft at the end of the second week of July before summer flow augmentation begins. Deep drafting of the reservoir for flood control during March resulted in failure of the reservoir to refill by June 30 or July 31. It is expected that flows at Lower Granite during the whole month of August will be lower than BiOp required minimum flow target of 53.96 kcfs.
- *Brownlee* reservoir was operated with outflows in the range of 26 kcfs-33.4 kcfs during May 21-26. The reservoir increased outflows to 43.3 kcfs on May 26 because of the required lower elevation for reparationment of the spill gates. Currently the reservoir is on very low flow rates (16 kcfs on May 27) in order to refill to elevation of 2037 ft by May 29 for recreation purposes for Memorial Day weekend. Inflows increased to range of 36 kcfs-47 kcfs during the past week.

A summary of the current elevations on May 27 is given in the following Table:

Reservoir	Actual elev. As of May 26	Max Reservoir pool [ft]
<i>Libby</i>	2374.07	2459
<i>Hungry Horse</i>	3507.22	3560
<i>Grand Coulee</i>	1227.95	1290
<i>Brownlee</i>	2024.14*	2077
<i>Dworshak</i>	1488.19	1600

* as of May 26

Upper Snake reservoirs:

As of May 26, American Falls is at 94% of capacity, being slightly drafted for flood control during the previous week, Palisades is at 36% of full and Jackson Lake is 70% of full. Intensive snowmelt in the region has resulted in continuation of the higher flows at Minidoka of 15.7 kcfs but also higher temperatures initiated irrigation withdrawals at Milner diversion. Resulting flows downstream of Milner are 8.2 kcfs. The system is at 72% of capacity.

Boise and Payette River Basins:

Both systems are operated for flood control, but are also refilling. The Boise River system (Anderson Ranch, Arrowrock and Lucky Peak) is at 72% of capacity. The outflow from Boise River system is 1.2 kcfs (as of May 26).

The Payette River system (Cascade, Deadwood) is at 69% of capacity. The outflow from Payette river system is 11.3 kcfs (as of May 26).

Streamflow:

Biological Opinion spring flow targets based on the April Final Runoff Volume Forecast are: 100 kcfs at Lower Granite, and 260 kcfs at McNary. The commencement of Grand Coulee refill resulted in decreased flows at Priest Rapids in the Mid-Columbia reach compared to the previous week. Flows at Lower Granite were gradually peaking during the past week. The highest flow was 189 kcfs on May 27. Average weekly flows at McNary and Lower Granite were above required BiOp required flow targets, after a prolonged period of low spring flows. Daily average flows at Priest Rapids were fluctuating in the range of 111.0 kcfs to 178.6 kcfs. The total range of daily and hourly fluctuations is presented in the following Table:

Date	Average Daily Flow at Priest Rapids [kcfs]	Hourly fluctuations [kcfs]
May 21	152.5	141.6-154.2
May 22	125.4	111.2-126.7
May 23	111.0	109.3-111.0
May 24	133.7	120.9-150.1
May 25	136.4	118.1-153.9
May 26	163.3	149.3-199.5
May 27	178.6	159.9-187.4

The average discharge for the major run-of-river projects for May 13-27 period are given in the following Table:

Project	Average Discharge [kcfs]	
	May 14-20	May 21-May 27
<i>Priest Rapids</i>	172.8	143.0
<i>McNary</i>	260.6	280.6
<i>Lower Granite</i>	84.8	139.8
<i>Bonneville</i>	273.8	302.4

Spill: Outflow from Dworshak Dam was reduced to project minimum and no spill has occurred over the past week. Flows at the Hells Canyon Complex have also been reduced to hydraulic capacity with no spill occurring. However, a problem did occur at Brownlee Dam on May 26, which resulted in flows that exceeded 50 Kcfs for nine hours with corresponding spill above hydraulic capacity. The Biological Opinion spill program is presently being implemented at the lower Snake projects. The higher flows this past week have resulted in higher volumes of spill in the Snake River leading to higher dissolved gas

levels. A unit outage at Lower Granite Dam has resulted in high spill and TDG levels at this project. It is expected back in service next week.

The FERC spill program continues at the Mid Columbia projects.

Biological Opinion spill levels continue at the lower Columbia projects. The higher flows in the lower River have also resulted in correspondingly higher spill levels at these projects.

Towards the end of the week the levels of total dissolved gas were above 115/120% TDG waivers at all the Snake River monitors, except those above Lower Granite Dam. With the exception of the John Day forebay monitor and The Dalles monitors, all other lower River sites are out of compliance. These higher gas levels are due to uncontrolled spill at this time.

Monitoring for signs of gas bubble trauma (GBT) on fish collected through the Smolt Monitoring Program showed few fish with signs of GBT over the past week. It is anticipated that the GBT monitoring program will begin seeing more fish with signs of GBT next week reflecting the recent increase in total dissolved gas levels in the **Smolt Monitoring System**. Flows at Lower Granite Dam increased to over 100 Kcfs this past week for the first time since May 5th, and the trend in the passage indices of yearling chinook and steelhead reflected this increase in flow. Hatchery chinook at Lower Granite remained fairly stable, but wild chinook numbers increased three-fold. Hatchery steelhead passage indices increased significantly at Lower Granite, peaking at over 306,000 on May 26th. Wild steelhead passage indices exhibited a similar pattern reaching over 30,000 on the same date. Little Goose saw several days this past week where hatchery chinook passage indices exceeded 100,000 and wild chinook exceeded 10,000. Lower Monumental Dam has also had several days of relatively high yearling hatchery chinook passage indices this week. Hatchery steelhead passage indices increased steadily to over 100,000 at both these sites this past week and wild steelhead to over 20,000. The Snake River trap at Lewiston completed sampling for the 1999 season on 5/25, and the Whitebird Trap finished on 5/21.

In the Mid-Columbia River, this week's daily passage indices of yearling chinook at Rock Island Dam have decreased compared to last week, while those of coho and steelhead have increased and those of sockeye have decreased. Daily flows at Rock Island Dam this

week averaged 145 kcfs, which is lower than last week's average.

In the lower Columbia River, this week has seen McNary Dam's yearling chinook passage indices remain about the same as last week. Coho and steelhead passage indices continued to increase this week at McNary Dam, while sockeye were lower. At John Day and Bonneville dams, the trend in passage indices of yearling chinook has remained relatively flat over the past two weeks, with some increase occurring late this week for coho at both dams, and steelhead at John Day. Wild sockeye passage indices hit their season highs early last week at both John Day and Bonneville dams and have shown slow decreases this past week.

Fish are presently being bypassed back to the river at Lower Granite Dam. The plan called for barging to occur on alternate days beginning May 26th. Recent high flows and the reduced hydraulic capacity at Lower Granite Dam have resulted in higher spill levels that make it difficult to bring the barge in for loading. Loading the barge for this first alternate day transport required a spill curtailment that resulted in excessive spill both before and after the barge was loaded, with total dissolved gas levels increasing to a peak of 131%. Barging will resume when spill levels can be manipulated by ponding water during barge loading (i.e. when flows decrease and project is at full hydraulic capacity), while limiting TDG to 120%.

Adult Fish Passage: Numbers of adult spring chinook passing Bonneville Dam ranged from a high count of 343 on May 25, to a low of 226 on May 23 for the week ending May 27. Total adult spring chinook was 37,415 through May 27. This total was greater than 1998 count, but remained well below the 10-year average count of 65,284. Next week will signal the start of summer chinook at Bonneville (June 1). Of the chinook past Bonneville, 16,103 have been counted at The Dalles Dam, 12,853 at John Day Dam, and 7,928 at McNary Dam. About 43 percent of the spring chinook past Bonneville Dam have moved upstream past The Dalles Dam. This compares to the 10-year average of 58% and the 1998 percentage of about 65% of the Bonneville count moving upstream.

Through May 27, a total of 3,651 adult spring chinook were counted at the lower Snake River dam (Ice Harbor) with 1,587 adult spring chinook counted at Lower Granite Dam. In the Mid-Columbia River, 3,530 adult spring chinook have been counted at Priest Rapids

Dam. Fish counts received from Rock Island Dam are through 5/27 with 2,275 tallied. At Wells Dam, all spring chinook will be captured at trapping facilities located on West and East bank fish ladders. Steelhead will be released back into the fish ladder while the chinook will be taken to hatcheries for holding until spawning. This spring chinook trapping will continue through the first week of July.

As points of interest, 1236 adult and 123 jack chinook have been counted at Prosser Dam (Yakama R) through May 22 (information from Yakama Tribe). At 3-Mile Dam in the Umatilla River, about 1,270 adult spring chinook have been tallied through May 23 (information from ODFW). At Lower Granite Dam, most adult chinook sampled through the week were reported in good condition with about 2.5% of the fish reported with some type of lesion on the head area (information from NMFS).

The number of jack chinook salmon passing Bonneville Dam surpassed 8,300 for the spring season and compare to only 707 jacks in 1998 and 2,375 for the 10-year average. Daily counts of jack spring chinook decreased through the week to near 100 per day. About 3,160 have been tallied at McNary Dam, with 1,936 counted at Ice Harbor Dam and 301 at Priest Rapids Dam. Jack counts exceed the 10-year average at all projects and are record high according to our count totals back to 1977.

At Bonneville Dam, the daily passage of steelhead ranged between 30 to 80 fish per day for the past week, with the cumulative count for the season at 2,202. Of this total, 14% or 314 were "wild" origin steelhead. New steelhead passing Bonneville at this time of year are normally destined for Bonneville tributary streams (Skamania stock).

Hatchery Releases: During the past two weeks, approximately 3.7 million anadromous salmon were released from hatcheries, acclimation ponds, or were directly planted into streams. For the upcoming two weeks, about 7.4 million salmon are scheduled for release from basin hatcheries into the rivers and tributaries above Bonneville Dam. More than 79 million juvenile salmon of hatchery origin will be released into streams above Bonneville Dam for the 1999 Migration Year. Most yearling spring, summer, and fall chinook and coho have been released from the hatcheries in each River Reach. Steelhead releases are nearly completed for the year. Releases of

subyearling bright fall chinook will be made during the next two weeks with mid-June to late June being the peak time for releasing these fish. Subyearling summer chinook will be released in the Mid-Columbia in June.

Lower Columbia River (above Bonneville Dam to McNary Dam) – The spring migrants have been released from hatcheries for the season. Subyearling fall chinook will be released over the next month in the Klickitat, Little White Salmon, and Umatilla rivers.

Mid-Columbia River – Steelhead releases are nearly completed for the year in the Mid-Columbia. All yearling chinook, coho, and chinook have been released from acclimation ponds in the Yakama River. The last of the coho from Yakama River acclimation facilities were released this past week. All hatchery sockeye have been released for the 1999 migration. Most subyearling fall and summer chinook remain to be planted from hatcheries and acclimation ponds and are scheduled for release in June. Approximately 2 million subyearling fall chinook are in the process of being released (volitional release) from the Prosser Acclimation Ponds located in the Yakama River.

Snake River – Releases of yearling spring, summer fall chinook and coho from State, Federal or Tribal hatcheries have been completed for the 1999-migration season. Steelhead releases are nearing completion for the year. Approximately 565,000 subyearling fall chinook will be released in June from Big Canyon (Clearwater drainage) and CPT John (Snake R) acclimation facilities with another 200,000 released into the Snake River Lyons Ferry Hatchery. About 10,000 sockeye (Red Fish Lake stock) were released in the upper Salmon River this spring season.

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
05/14/99	153.3	0.0	159.1	0.0	169.6	12.1	164.1	23.0	163.4	40.4	150.5	29.9	166.4	125.3
05/15/99	148.0	0.0	147.1	0.0	157.9	12.1	165.5	23.6	170.5	40.8	163.8	33.2	179.9	134.9
05/16/99	153.8	0.0	157.1	0.0	169.2	12.1	168.5	25.6	171.3	41.0	157.2	31.6	166.8	125.4
05/17/99	147.6	0.0	151.0	0.0	159.5	13.0	161.4	25.5	164.7	41.1	161.9	32.8	180.7	136.2
05/18/99	149.7	0.0	150.6	0.0	161.1	13.8	161.2	26.7	163.2	41.1	152.1	30.5	161.9	121.9
05/19/99	137.2	0.0	145.5	0.0	161.2	13.8	165.3	24.9	169.0	41.0	157.9	31.7	175.1	131.2
05/20/99	135.7	0.0	134.4	0.0	157.4	13.8	158.4	24.8	165.1	40.9	166.3	33.5	178.5	133.8
05/21/99	116.7	0.0	120.4	0.0	121.4	11.2	124.0	23.2	128.5	41.0	136.5	27.2	152.5	114.4
05/22/99	100.2	0.0	94.9	0.0	104.6	11.1	105.8	20.8	109.6	40.8	104.8	21.2	125.4	94.2
05/23/99	103.8	0.0	111.3	0.0	125.0	26.3	118.2	19.6	122.4	40.9	98.4	19.8	111.0	83.4
05/24/99	108.0	0.0	106.5	0.0	134.2	14.2	141.2	24.4	154.4	40.9	135.1	27.3	133.7	100.5
05/25/99	104.0	0.0	109.9	0.0	140.5	13.3	145.6	14.3	159.9	34.3	128.7	24.5	136.4	102.0
05/26/99	120.0	0.0	124.4	0.0	146.7	11.4	155.4	12.4	168.0	30.3	157.4	25.4	163.3	123.6
05/27/99	128.1	0.0	121.6	0.0	145.4	11.5	154.8	0.0	170.0	30.3	167.6	27.8	178.6	133.7

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

Date	Hells		Lower		Little		Lower		Ice			
	Dworshak Flow	Spill	Brownlee Canyon Inflow	Outflow	Granite Flow	Spill	Goose Flow	Spill	Monumental Flow	Spill	Harbor Flow	Spill
05/14/99	14.0	3.6	35.7	30.7	86.6	35.4	83.0	22.4	85.9	18.9	91.0	61.8
05/15/99	14.0	3.6	33.2	30.4	83.1	35.2	80.8	22.9	83.2	18.0	86.4	61.9
05/16/99	14.0	3.6	33.2	30.3	81.1	36.1	78.2	24.8	80.4	20.5	86.9	59.7
05/17/99	13.3	3.0	32.2	30.4	82.7	35.3	78.8	22.5	81.6	19.1	85.9	59.5
05/18/99	10.3	0.0	32.9	30.4	82.3	35.0	78.2	22.7	78.6	19.5	84.3	56.8
05/19/99	8.5	0.0	34.1	30.4	88.7	35.2	84.1	22.1	88.2	18.6	89.8	61.8
05/20/99	1.4	0.0	34.4	29.3	88.9	35.3	86.4	22.0	88.9	19.1	94.3	70.7
05/21/99	1.3	0.0	36.5	34.5	94.4	34.8	89.8	21.9	91.3	17.6	98.3	65.8
05/22/99	1.3	0.0	38.0	27.1	113.6	44.3	107.5	22.2	113.3	19.8	117.4	66.1
05/23/99	1.3	0.0	39.8	26.3	115.7	35.0	111.5	22.7	115.5	19.9	116.4	70.0
05/24/99	1.3	0.0	43.0	30.6	131.4	42.3	124.9	26.5	131.0	19.2	132.2	72.9
05/25/99	1.3	0.0	44.7	33.3	154.8	56.2	144.5	37.4	150.9	34.4	157.1	80.2
05/26/99	1.4	0.0	47.2	40.6	181.2	78.8	172.8	73.6	184.5	62.4	178.5	107.0
05/27/99	1.4	0.0	---	---	187.5	84.6	178.5	63.3	186.1	66.1	195.9	125.9

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		
05/14/99	262.4	114.3	275.9	100.6	271.1	81.4	275.6	94.7	80.6	91.1
05/15/99	261.1	109.9	256.4	94.5	245.7	71.0	258.6	95.1	77.1	77.2
05/16/99	248.3	104.5	255.2	54.8	254.0	145.0	272.2	92.8	78.5	91.7
05/17/99	264.4	114.9	262.2	54.9	259.4	166.0	271.4	94.0	79.7	88.5
05/18/99	251.6	108.7	266.1	55.8	264.2	167.0	282.1	94.2	78.3	100.4
05/19/99	262.4	110.5	277.0	102.8	267.9	97.0	269.1	94.6	77.8	87.5
05/20/99	270.5	123.4	282.3	103.2	273.2	84.0	287.6	96.1	76.7	105.7
05/21/99	274.0	121.9	285.2	101.7	278.0	83.0	286.7	93.8	81.3	102.4
05/22/99	249.0	108.6	269.2	55.6	259.6	147.0	271.7	93.0	77.5	92.0
05/23/99	252.4	111.0	258.3	55.1	256.7	163.0	282.7	93.2	77.5	102.8
05/24/99	237.8	96.7	248.7	54.8	243.8	153.0	268.4	92.6	76.0	90.6
05/25/99	302.3	134.7	305.2	103.6	291.8	102.0	298.1	92.2	83.7	113.0
05/26/99	310.2	144.5	338.3	106.6	335.5	101.7	336.7	113.2	82.5	131.8
05/27/99	---	---	375.9	112.5	362.6	123.0	372.4	144.0	83.7	135.5

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

Total Dissolved Gas Saturation Data at Upper Columbia River Sites

Date	<u>Can. Boundary</u>			<u>Grand Coulee</u>			<u>Tlwtr G. Coulee</u>			<u>Chief Joseph</u>			<u>Tlwtr C. Joseph</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>				
5/14	112	112	112	24	111	112	112	24	109	109	109	24	108	108	109	24	109	110	111	24
5/15	111	111	111	24	111	111	111	24	108	109	109	24	109	109	109	24	110	110	111	24
5/16	110	111	111	24	111	111	111	24	108	109	109	24	109	109	109	23	110	110	111	23
5/17	110	111	111	24	111	111	111	24	109	109	109	24	109	109	109	23	111	111	111	23
5/18	111	111	111	24	111	111	112	24	109	109	110	12	109	109	110	23	110	111	111	23
5/19	110	111	112	24	111	112	113	24	109	109	110	21	109	109	111	23	109	109	109	23
5/20	110	111	112	24	112	113	113	24	109	110	110	22	109	110	110	23	110	111	113	23
5/21	111	111	111	24	111	112	112	24	109	109	110	24	110	110	110	23	111	112	112	23
5/22	111	112	114	24	111	111	112	24	109	109	110	24	109	110	110	23	111	112	112	23
5/23	113	113	114	17	112	113	114	24	110	110	111	20	110	111	112	23	112	112	113	23
5/24	---	---	---	0	113	114	116	24	111	112	112	24	112	112	113	23	113	113	114	23
5/25	---	---	---	0	113	114	115	24	110	111	112	24	112	112	113	23	114	114	115	23
5/26	---	---	---	0	112	112	112	24	109	110	111	24	111	112	112	23	112	112	113	23
5/27	---	---	---	0	114	115	115	24	110	111	112	24	112	112	113	22	113	113	114	22

Total Dissolved Gas Saturation Data at Mid Columbia River Sites

Date	<u>Wells</u>			<u>Rocky Reach</u>			<u>Tlwtr Rocky R.</u>			<u>Rock Island</u>			<u>Tlwtr Rock Isl</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>				
5/14	---	---	---	0	109	109	109	24	110	110	111	24	108	109	110	24	117	118	118	23
5/15	---	---	---	0	108	108	109	23	110	110	111	23	109	109	110	24	117	117	118	24
5/16	---	---	---	0	109	109	109	24	111	111	111	24	109	109	111	24	118	118	118	24
5/17	---	---	---	0	109	109	110	24	111	111	112	24	109	110	110	24	118	118	119	24
5/18	---	---	---	0	109	110	110	23	111	112	112	23	110	110	111	24	118	119	119	24
5/19	110	110	110	15	109	110	110	22	111	111	111	22	109	109	110	24	118	119	119	24
5/20	110	111	111	17	110	110	110	24	111	112	112	24	110	110	110	24	118	119	119	24
5/21	110	110	110	14	110	110	110	23	111	112	112	23	109	109	110	23	118	118	119	23
5/22	---	---	---	0	109	110	110	24	111	111	111	24	108	108	108	24	117	118	119	24
5/23	---	---	---	0	111	111	112	24	112	112	114	23	108	109	109	23	118	118	119	20
5/24	113	114	117	19	112	114	115	24	115	117	127	24	111	112	113	24	120	121	123	24
5/25	112	112	113	7	114	114	116	23	115	116	118	23	110	111	111	24	119	120	121	24
5/26	---	---	---	0	111	111	111	23	111	112	113	23	109	110	110	24	117	118	120	24
5/27	---	---	---	0	111	111	112	24	112	112	112	24	109	109	110	24	117	117	119	23

Total Dissolved Gas Saturation at Mid Columbia River Sites, and Dworshak

Date	<u>Wanapum</u>			<u>Dwns Wanapum</u>			<u>Priest Rapids</u>			<u>Dwns P Rapids</u>			<u>Dworshak</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>				
5/14	110	111	113	24	116	117	118	24	113	113	114	24	120	120	121	24	105	106	107	24
5/15	111	112	113	24	116	117	119	24	112	113	114	24	121	121	122	24	105	105	106	24
5/16	111	112	112	24	117	118	119	24	114	115	116	24	121	121	122	24	109	109	109	24
5/17	112	113	114	24	117	119	121	24	115	116	117	24	121	121	122	24	108	109	109	24
5/18	112	113	113	24	118	119	121	24	115	116	117	24	120	120	121	24	103	103	103	24
5/19	113	114	116	24	117	118	119	24	114	115	116	24	121	121	121	24	103	103	104	24
5/20	113	114	115	24	119	120	121	24	115	116	117	24	121	121	121	24	110	112	112	24
5/21	112	113	115	24	118	119	120	24	113	115	116	24	120	120	120	24	113	114	115	24
5/22	114	117	121	24	117	118	119	24	115	118	121	24	120	120	121	24	112	113	115	24
5/23	116	118	120	24	118	119	121	24	116	117	117	24	120	121	121	24	112	114	115	24
5/24	116	118	120	24	119	120	120	24	118	118	119	24	127	132	133	24	113	114	116	24
5/25	112	113	114	24	116	118	120	24	114	115	117	24	---	---	---	0	112	113	114	24
5/26	112	115	117	24	114	115	117	24	111	112	113	0	---	---	---	0	110	111	112	24
5/27	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0	108	109	110	24

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

Total Dissolved Gas Saturation Data at Clearwater and Snake River Sites

Date	Clearwater			#	Anatone			#	Snake-Lewiston			#	Lower Granite			#	Tlwtr L. Granite			#
	24 h	12 h	High		24 h	12 h	High		24 h	12 h	High		24 h	12 h	High		24 h	12 h	High	
	Avg	Avg	hr		Avg	Avg	hr		Avg	Avg	hr		Avg	Avg	hr		Avg	Avg	hr	
5/14	---	---	---	0	104	105	105	24	104	105	106	24	105	106	106	24	112	117	118	24
5/15	---	---	---	0	104	105	105	24	103	104	106	24	104	104	105	24	111	117	118	24
5/16	105	106	107	24	104	106	106	24	104	106	107	24	105	106	107	24	112	116	118	24
5/17	105	105	106	24	104	104	105	24	103	104	105	24	106	106	107	24	111	116	117	24
5/18	102	103	103	24	104	105	106	24	102	103	105	24	106	106	107	24	111	116	117	24
5/19	102	103	104	23	104	105	106	24	102	104	105	24	106	107	108	24	111	115	116	24
5/20	102	103	104	24	104	105	106	23	102	103	104	24	106	106	106	24	111	115	116	24
5/21	103	103	104	24	104	105	106	24	103	104	105	24	104	105	105	24	111	115	116	24
5/22	103	104	104	24	105	107	107	24	102	104	104	24	105	106	107	24	113	117	119	24
5/23	103	104	105	24	106	107	107	24	103	104	105	24	106	108	111	24	112	117	119	24
5/24	102	102	104	13	105	106	107	13	103	103	104	13	107	108	109	24	114	118	118	24
5/25	104	106	107	24	107	108	108	24	103	104	104	24	106	106	107	24	118	120	120	24
5/26	105	106	107	24	108	110	110	24	103	104	105	24	105	106	107	24	125	129	131	24
5/27	105	106	107	24	110	111	112	24	104	105	105	24	107	108	109	24	127	130	131	24

Total Dissolved Gas Saturation Data at Lower Snake River Sites

Date	Little Goose			#	Tlwtr L. Goose			#	L. Monumental			#	Tlwtr L. Monum			#	Ice Harbor			#
	24 h	12 h	High		24 h	12 h	High		24 h	12 h	High		24 h	12 h	High		24 h	12 h	High	
	Avg	Avg	hr		Avg	Avg	hr		Avg	Avg	hr		Avg	Avg	hr		Avg	Avg	hr	
5/14	110	111	111	24	114	118	119	24	114	114	115	24	117	119	119	24	113	114	115	24
5/15	111	112	112	24	115	118	119	24	113	115	116	24	116	118	120	24	113	114	114	24
5/16	112	114	115	24	116	119	120	24	113	115	116	24	116	118	119	24	114	115	115	24
5/17	114	116	118	23	116	119	119	24	115	117	119	24	117	118	119	24	115	115	116	24
5/18	114	116	117	24	117	119	120	24	116	117	118	24	117	118	120	24	115	115	116	24
5/19	113	114	115	24	116	118	119	24	115	117	119	24	117	119	120	24	115	116	117	24
5/20	115	116	117	24	116	118	119	24	116	117	119	24	118	119	120	24	116	116	117	24
5/21	113	114	115	24	116	117	119	20	116	117	119	24	117	118	119	24	116	117	119	24
5/22	115	117	123	24	116	118	119	24	116	117	118	24	118	119	120	24	116	117	117	24
5/23	117	120	126	24	116	119	119	24	118	119	122	24	118	119	120	24	118	119	121	24
5/24	115	119	121	24	117	120	120	24	118	120	121	24	120	121	124	24	120	122	125	24
5/25	113	115	117	24	117	119	120	24	117	119	120	24	122	122	123	24	118	119	119	22
5/26	115	117	119	22	123	126	129	22	116	117	119	24	127	130	132	24	117	118	120	23
5/27	120	122	124	24	124	126	127	20	127	129	130	24	129	131	133	24	122	124	125	24

Total Dissolved Gas Saturation Data at Lower Columbia River Sites

Date	Twtr Ice Har.			#	Pasco			#	McNary-Oregon			#	McNary-Wash.			#	Tlwtr McNary			#
	24 h	12 h	High		24 h	12 h	High		24 h	12 h	High		24 h	12 h	High		24 h	12 h	High	
	Avg	Avg	hr		Avg	Avg	hr		Avg	Avg	hr		Avg	Avg	hr		Avg	Avg	hr	
5/14	116	117	118	24	---	---	---	0	110	111	111	24	110	110	111	24	118	119	119	24
5/15	115	117	118	24	---	---	---	0	110	111	113	24	110	110	111	24	117	119	120	24
5/16	115	117	118	24	---	---	---	0	111	113	115	24	112	113	113	24	117	118	119	24
5/17	115	116	119	24	---	---	---	0	113	114	115	24	113	114	115	24	119	119	120	24
5/18	115	116	120	24	---	---	---	0	113	114	115	24	114	115	115	23	119	120	121	23
5/19	115	116	118	24	---	---	---	0	114	115	116	24	114	115	116	24	119	120	121	24
5/20	117	119	120	24	---	---	---	0	113	113	114	12	113	114	115	13	120	120	121	13
5/21	117	119	121	24	---	---	---	0	113	114	116	24	114	115	116	24	120	120	121	24
5/22	117	118	121	24	---	---	---	0	113	113	114	5	114	114	115	7	119	119	120	7
5/23	118	120	122	24	---	---	---	0	---	---	---	0	---	---	---	0	---	---	---	0
5/24	119	121	122	24	---	---	---	0	120	122	---	24	119	121	122	24	119	121	121	24
5/25	120	121	123	22	---	---	---	0	118	118	120	24	117	118	119	24	122	122	123	24
5/26	124	126	131	24	---	---	---	0	118	119	121	23	116	118	120	23	121	121	126	23
5/27	127	130	132	24	---	---	---	0	118	120	122	23	117	118	119	23	127	127	128	23

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

Total Dissolved Gas Saturation Data at Lower Columbia River Sites

Date	<u>John Day</u>			<u>Tlwtr John Day</u>				<u>The Dalles</u>				<u>Dnstr T. Dalles</u>				<u>Bonneville</u>				
	<u>24 h</u>	<u>12 h</u>	<u>High</u>	<u>#</u>	<u>24 h</u>	<u>12 h</u>	<u>High</u>	<u>hr</u>	<u>24h</u>	<u>12h</u>	<u>High</u>	<u>hr</u>	<u>24h</u>	<u>12h</u>	<u>High</u>	<u>hr</u>	<u>24h</u>	<u>AVG</u>	<u>High</u>	<u>#</u>
5/14	109	109	109	22	121	121	122	24	111	112	113	24	114	115	116	24	111	112	113	24
5/15	108	108	116	20	119	120	121	23	110	111	111	24	114	115	116	24	110	111	111	24
5/16	107	108	108	23	113	119	120	24	111	112	114	23	117	119	120	24	111	111	112	23
5/17	108	109	109	23	114	119	120	24	110	112	114	23	118	119	120	24	114	115	117	22
5/18	110	110	111	22	115	119	121	24	110	112	112	23	118	119	119	24	116	117	117	22
5/19	110	110	112	23	121	122	122	23	110	112	114	23	116	118	118	24	114	115	115	23
5/20	112	112	112	18	122	122	122	22	111	112	112	23	116	117	118	24	113	115	116	23
5/21	110	110	110	23	121	121	122	24	110	111	111	23	114	115	116	24	112	112	112	23
5/22	110	112	114	22	115	119	120	24	111	112	113	23	118	120	121	24	112	113	114	23
5/23	112	113	115	23	116	119	120	24	111	113	114	23	120	120	121	24	116	117	118	23
5/24	113	113	114	23	117	119	119	24	112	113	114	23	120	120	120	24	119	119	120	23
5/25	113	113	114	22	121	122	122	24	109	110	111	23	116	117	120	23	113	114	116	23
5/26	112	112	114	23	122	122	123	24	111	113	114	23	115	116	117	24	112	113	114	23
5/27	112	112	113	23	122	122	123	24	113	113	114	23	116	117	118	24	116	116	116	23

Total Dissolved Gas Saturation Data at Lower Columbia River Sites

Date	<u>Warrendale</u>				<u>Skamania</u>				<u>CamasWash.</u>			
	<u>24 h</u>	<u>12 h</u>	<u>High</u>	<u>#</u>	<u>24 h</u>	<u>12 h</u>	<u>High</u>	<u>hr</u>	<u>#</u>	<u>24h</u>	<u>12h</u>	<u>High</u>
5/14	115	115	117	24	114	116	117	24	114	116	118	24
5/15	114	115	116	23	112	114	116	24	113	115	116	24
5/16	114	115	116	23	114	115	117	22	114	116	118	24
5/17	116	117	118	23	115	116	118	23	115	115	117	13
5/18	118	118	119	23	116	118	120	23	116	117	118	20
5/19	117	117	118	23	115	116	117	19	116	118	120	24
5/20	116	117	118	23	115	117	118	23	115	116	118	24
5/21	115	116	116	23	113	115	117	23	114	115	117	23
5/22	115	116	117	23	114	114	115	19	114	116	117	24
5/23	117	118	119	23	116	116	117	23	115	116	117	24
5/24	119	119	120	23	118	118	119	23	117	119	121	24
5/25	115	116	118	23	114	116	117	23	115	116	117	24
5/26	117	118	119	23	114	115	116	23	114	116	117	23
5/27	120	121	121	23	118	119	120	23	117	118	119	24

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

Site	Date	Species	Number of Fish	Number w GBT signs	Number w Fin Signs	% Fin GBT	% Severe Fin GBT	Number of Fish with Fin GBT Listed by Highest Rank				Fish with L. Line GBT	
								Rank 1	Rank 2	Rank 3	Rank 4	Num Fish	Avg. Rank
Bonneville Dam													
5/20/99	Yearling Chinook	100	0	0	0.00%	0.00%	0	0	0	0	0	0	
5/20/99	Steelhead	100	1	0	0.00%	0.00%	0	0	0	0	1	1	
5/24/99	Yearling Chinook	100	1	0	0.00%	0.00%	0	0	0	0	1	1	
5/24/99	Steelhead	100	0	0	0.00%	0.00%	0	0	0	0	0	0	
5/27/99	Yearling Chinook	100	0	0	0.00%	0.00%	0	0	0	0	0	0	
5/27/99	Steelhead	100	1	0	0.00%	0.00%	0	0	0	0	1	1	
Ice Harbor Dam													
5/18/99	Yearling Chinook	100	7	0	0.00%	0.00%	0	0	0	0	6	1	
5/18/99	Steelhead	59	0	0	0.00%	0.00%	0	0	0	0	0	0	
5/21/99	Yearling Chinook	100	2	0	0.00%	0.00%	0	0	0	0	2	1	
5/21/99	Steelhead	50	1	0	0.00%	0.00%	0	0	0	0	1	1	
5/25/99	Yearling Chinook	84	3	0	0.00%	0.00%	0	0	0	0	3	1	
5/25/99	Steelhead	98	6	0	0.00%	0.00%	0	0	0	0	6	1	
Lower Granite Dam													
5/24/99	Yearling Chinook	100	2	2	2.00%	0.00%	2	0	0	0	0	0	
5/24/99	Steelhead	100	1	1	1.00%	0.00%	1	0	0	0	0	0	
Little Goose Dam													
5/19/99	Yearling Chinook	100	4	0	0.00%	0.00%	0	0	0	0	4	1	
5/19/99	Steelhead	100	0	0	0.00%	0.00%	0	0	0	0	0	0	
5/26/99	Yearling Chinook	100	0	0	0.00%	0.00%	0	0	0	0	0	0	
5/26/99	Steelhead	100	0	0	0.00%	0.00%	0	0	0	0	0	0	
Lower Monumental Dam													
5/24/99	Yearling Chinook	100	2	0	0.00%	0.00%	0	0	0	0	2	1	
5/24/99	Steelhead	100	0	0	0.00%	0.00%	0	0	0	0	0	0	
McNary Dam													
5/20/99	Yearling Chinook	100	0	0	0.00%	0.00%	0	0	0	0	0	0	
5/20/99	Steelhead	100	3	0	0.00%	0.00%	0	0	0	0	3	1	
5/24/99	Yearling Chinook	100	1	0	0.00%	0.00%	0	0	0	0	1	1	
5/24/99	Steelhead	100	5	0	0.00%	0.00%	0	0	0	0	5	1	
5/27/99	Yearling Chinook	100	6	0	0.00%	0.00%	0	0	0	0	4	1	
5/27/99	Steelhead	100	4	0	0.00%	0.00%	0	0	0	0	4	1	
Rock Island Dam													
5/20/99	Yearling Chinook	100	1	0	0.00%	0.00%	0	0	0	0	1	1	
5/20/99	Steelhead	100	3	0	0.00%	0.00%	0	0	0	0	3	1	
5/24/99	Yearling Chinook	100	8	6	6.00%	0.00%	5	1	0	0	2	1	
5/24/99	Steelhead	100	1	1	1.00%	0.00%	0	1	0	0	0	0	
5/27/99	Yearling Chinook	100	4	1	1.00%	0.00%	0	1	0	0	3	1	
5/27/99	Steelhead	100	1	0	0.00%	0.00%	0	0	0	0	1	1	

Hatchery Release Summary For the Last Two Weeks From 5/14/99 to 5/27/99

Hatchery	Species...	Migration Year	Number		...Release Dates...		Release Site	River Name
			Released		Begin	..End		
IDFG								
Magic Valley	SU	Steelhead	1999	100,095	4/27/99	5/15/99	Squaw Cr Acclim Pd	Salmon River
		Agency Total:		100,095				
ODFW								
Big Canyon	SU	Steelhead	1999	100,000	5/18/99	5/18/99	Big Canyon H	Grande Ronde River
	SU	Steelhead	1999	100,000	5/19/99	6/2/99	Big Canyon H	Grande Ronde River
Wallowa	SU	Steelhead	1999	106,750	5/12/99	5/26/99	Wallowa Acclim Pd	Grande Ronde River
		Agency Total:		306,750				
USFWS								
Winthrop	SU	Steelhead	1999	113,000	4/14/99	5/15/99	Winthrop H	Methow River
		Agency Total:		113,000				
WDFW								
Chiwawa	SU	Steelhead	1999	172,000	4/22/99	5/14/99	Chiwawa H	Wenatchee River
Turtle Rock	SU	Steelhead	1999	145,000	4/20/99	5/15/99	Wenatchee R	Wenatchee River
Wells	SU	Chinook	1999	410,000	4/15/99	5/15/99	Wells H	Mid-Columbia River
	SU	Steelhead	1999	30,000	4/15/99	5/20/99	Wells H	Mid-Columbia River
	SU	Steelhead	1999	216,700	4/15/99	5/31/99	Methow R	Methow River
	SU	Steelhead	1999	105,000	4/20/99	5/31/99	Chewuch R	Methow River
	SU	Steelhead	1999	148,000	4/20/99	6/4/99	Winthrop H	Methow River
	SU	Steelhead	1999	105,000	5/1/99	5/31/99	Twisp R	Methow River
		Agency Total:		1,014,700				
Yakima Tribe								
Clark Flat	SP	Chinook	1999	231,220	3/18/99	6/1/99	Clark Flat Acclim Pd	Yakama River
Cle Elum Slough		Coho	1999	210,000	5/10/99	5/25/99	Cle Elem Slough	Yakama River
Easton Pond	SP	Chinook	1999	156,718	3/18/99	6/1/99	Easton Pd	Yakama River
Jack Creek Pond		Coho	1999	240,000	5/10/99	5/25/99	Jack Creek Acclim Pd	Yakama River
Leavenworth		Coho	1999	419,000	4/28/99	5/30/99	Leavenworth H	Wenatchee River
Lost Creek		Coho	1999	320,000	5/7/99	5/25/99	Naches R	Yakama River
Prosser	FA	Chinook	1999	79,000	5/25/99	6/3/99	Prosser Acclim Pd	Yakama River
Stiles Pond		Coho	1999	182,000	5/7/99	5/25/99	Naches R	Yakama River
		Agency Total:		1,837,938				
		Total Release:		3,372,483				

Hatchery Release Summary
For the Last Two Weeks
From 5/28/99 to 6/10/99

Hatchery	Species...	Migration	Year	Number	...Release Dates...			Release Site	River Name
				Released	Begin	End			
Umatilla Tribe									
Imeques	FA	Chinook	1999	1,682,000	6/2/99	6/3/99	Imeques Acclim Pd	Umatilla River	
			Agency Total:	1,682,000					
WDFW									
Klickitat	FA	Chinook	1999	4,000,000	6/1/99	6/20/99	Klickitat H	Klickitat River	
			Agency Total:	4,000,000					
Yakima Tribe									
Prosser	FA	Chinook	1999	1,690,000	6/2/99	6/3/99	Prosser Acclim Pd	Yakama River	
			Agency Total:	1,690,000					
			Total Release:	7,372,000					

Two-Week Summary of Passage Indices

Yearling Chinook

Date	Hatchery							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)
05/14/99	35	28	4	40	73,464	90,179	60,387	1,105	98,955	51,819	14,411
05/15/99	---	---	---	---	60,533	115,537	48,039	1,281	121,280	39,579	10,513
05/16/99	---	---	---	---	64,675	86,372	60,124	1,165	143,044	47,452	9,314
05/17/99	14	15	5	36	74,311	84,297	150,204	1,003	120,979	92,843	15,956
05/18/99	16	21	2	46	71,705	161,238	84,349	773	86,814	75,112	18,124
05/19/99	108	11	5	36	58,946	115,919	44,302	790	121,740	56,381	17,171
05/20/99	138	4	6	150	51,754	86,802	34,965	909	126,623	43,342	15,178
05/21/99	119	0	2	244	49,000	116,597	40,850	286	116,011	53,777	9,138
05/22/99	---	---	---	762	55,987	63,607	29,144	318	89,892	71,132	7,790
05/23/99	---	---	---	513	69,013	144,648	36,350	407	94,690	57,463	8,646
05/24/99	---	---	2	513	48,727	120,735	30,300	453	100,562	39,577	7,435
05/25/99	---	---	3	203	40,837	116,925	52,045	276	88,391	67,488	6,765
05/26/99	---	---	0	---	38,599	116,855	68,075	245	115,215	52,775	15,720
05/27/99	---	---	0	---	17,267	41,916	32,711	187	66,680	31,060	11,760
Total:	430	79	29	2,543	774,818	1,461,627	771,845	9,198	1,490,876	779,800	167,921
# Days:	6	6	10	10	14	14	14	14	14	14	14
Average:	72	13	3	254	55,344	104,402	55,132	657	106,491	55,700	11,994

Wild Yearling Chinook

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (INDEX)	LGS (INDEX)	LMN (INDEX)
05/14/99	14	31	13	9	6,755	9,715	6,859
05/15/99	---	---	---	---	5,130	8,827	7,528
05/16/99	---	---	---	---	4,294	6,851	5,705
05/17/99	5	23	8	15	5,756	7,031	20,785
05/18/99	5	10	8	5	5,165	15,039	8,318
05/19/99	18	5	37	5	4,709	13,759	3,136
05/20/99	36	4	56	12	3,943	9,497	4,181
05/21/99	39	4	38	43	5,444	10,208	3,172
05/22/99	---	---	---	118	4,890	4,555	4,958
05/23/99	---	---	---	237	11,465	13,871	3,561
05/24/99	---	---	51	256	8,586	12,796	3,232
05/25/99	---	---	78	201	7,518	14,288	5,280
05/26/99	---	---	12	---	15,629	14,170	4,863
05/27/99	---	---	14	---	15,596	7,523	6,542
Total:	117	77	315	901	104,880	148,130	88,120
# Days:	6	6	10	10	14	14	14
Average:	20	13	32	90	7,491	10,581	6,294

Wild Subyearling Chinook

LGR (INDEX)	LGS (INDEX)	LMN (INDEX)
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	196	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	196	0
14	14	14
0	14	0

The data presented in the following passage index section is preliminary and has been derived from various sources. For verification and/or origin of data, contact the operators of the Fish Passage Data System at (503) 230-4099.

Smolt indices, wild & hatchery or combined, are presented in the following order: yearling chinook (chinook 1's), subyearling chinook (chinook 0's), steelhead, coho, and sockeye. Two classes of fish counts are shown in these tables: collection counts, which account for sample rates but are not adjusted for flow; and passage indices, which are collection counts divided by the proportion of water passing through the sampling system. Collection counts may be constrained due to sampling effort or river flow. 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 hour period that spans two calendar days. In this report, the date shown corresponds with the sample end date.

Two-Week Summary of Passage Indices
Hatchery Subyearling Chinook

Combined Subyearling Chinook

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (INDEX)	LGS (INDEX)	LMN (INDEX)	RIS (INDEX)	MCN (INDEX)	JDA (INDEX)	BO1 (INDEX)
05/14/99	0	0	0	0	0	0	0	7	1,404	9	42,703
05/15/99	--	--	--	--	0	0	0	13	361	79	46,548
05/16/99	--	--	--	--	0	0	0	0	533	208	16,417
05/17/99	0	0	0	0	0	0	0	2	342	25	9,541
05/18/99	0	0	0	0	0	0	0	0	2,130	33	4,810
05/19/99	0	0	0	0	0	0	0	5	1,257	48	1,938
05/20/99	0	0	0	0	0	0	0	8	1,224	19	1,017
05/21/99	0	0	0	0	0	0	0	14	1,281	246	1,296
05/22/99	--	--	--	0	0	0	0	12	1,486	15	1,423
05/23/99	--	--	--	0	0	0	0	15	1,255	0	918
05/24/99	--	--	0	0	0	0	0	29	2,936	203	546
05/25/99	--	--	0	0	0	0	0	42	2,665	23	690
05/26/99	--	--	0	--	0	0	0	88	6,167	45	834
05/27/99	--	--	0	--	0	0	0	107	15,666	76	1,215
Total:	0	0	0	0	0	0	0	342	38,707	1,029	129,896
# Days:	6	6	10	10	14	14	14	14	14	14	14
Average:	0	0	0	0	0	0	0	24	2,765	74	9,278

All Coho

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (INDEX)	LGS (INDEX)	LMN (INDEX)	RIS (INDEX)	MCN (INDEX)	JDA (INDEX)	BO1 (INDEX)
05/14/99	0	0	0	5	507	404	254	1,535	879	2,687	4,958
05/15/99	--	--	--	--	256	1,667	102	773	1,446	5,007	4,529
05/16/99	--	--	--	--	805	1,320	535	1,053	2,667	3,838	6,567
05/17/99	0	0	0	6	872	637	354	1,969	1,884	7,297	7,172
05/18/99	0	0	0	2	1,063	1,478	922	1,680	1,956	8,150	8,644
05/19/99	0	0	0	9	523	422	784	1,599	2,514	6,039	8,151
05/20/99	0	0	0	7	3,779	1,206	380	2,556	2,798	4,421	8,279
05/21/99	0	0	0	18	3,630	1,419	1,015	1,627	4,574	6,394	7,365
05/22/99	--	--	--	13	5,734	1,178	484	1,521	5,757	7,940	5,284
05/23/99	--	--	--	9	7,194	7,707	737	1,177	8,787	5,438	6,458
05/24/99	--	--	0	4	5,366	4,322	1,422	1,560	3,670	3,403	9,038
05/25/99	--	--	0	2	9,025	12,229	3,017	2,288	8,494	8,196	14,048
05/26/99	--	--	0	--	13,261	9,619	6,281	2,950	14,696	12,410	11,393
05/27/99	--	--	0	--	15,596	7,195	4,278	2,122	9,282	6,536	17,184
Total:	0	0	0	75	67,611	50,803	20,565	24,410	69,404	87,756	119,070
# Days:	6	6	10	10	14	14	14	14	14	14	14
Average:	0	0	0	8	4,829	3,629	1,469	1,744	4,957	6,268	8,505

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) }

Two-Week Summary of Passage Indices

Hatchery Steelhead

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (INDEX)	LGS (INDEX)	LMN (INDEX)	RIS (INDEX)	MCN (INDEX)	JDA (INDEX)	BO1 (INDEX)
05/14/99	122	144	38	113	79,882	72,197	44,369	825	12,007	12,306	6,346
05/15/99	---	---	---	---	51,556	87,340	44,181	690	15,907	15,100	3,688
05/16/99	---	---	---	---	46,963	40,881	79,877	708	20,974	6,384	7,639
05/17/99	108	172	48	231	49,541	35,916	67,757	664	13,348	9,619	5,461
05/18/99	85	314	76	112	38,780	31,466	52,827	680	10,952	9,278	9,968
05/19/99	175	1,318	82	559	48,657	33,102	14,114	615	10,055	12,442	7,416
05/20/99	66	860	172	311	34,010	25,669	21,030	651	15,568	13,227	6,173
05/21/99	45	342	362	418	63,023	74,604	20,552	428	10,783	14,874	5,728
05/22/99	---	---	---	343	96,966	51,932	24,428	304	8,728	19,297	4,945
05/23/99	---	---	---	524	127,685	104,629	43,473	266	16,328	10,363	5,152
05/24/99	---	---	565	774	171,296	134,844	51,821	361	14,134	9,481	5,082
05/25/99	---	---	615	546	211,882	144,742	102,958	474	22,472	12,866	4,349
05/26/99	---	---	145	---	306,184	189,021	134,733	1,028	28,495	24,763	3,454
05/27/99	---	---	69	---	182,415	191,944	153,237	2,689	22,477	15,789	3,775
Total:	601	3,150	2,172	3,931	1,508,840	1,218,287	855,357	10,383	222,228	185,789	79,176
# Days:	6	6	10	10	14	14	14	14	14	14	14
Average:	100	525	217	393	107,774	87,021	61,097	742	15,873	13,271	5,655

Wild Steelhead

Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (INDEX)	LGS (INDEX)	LMN (INDEX)	RIS (INDEX)	MCN (INDEX)	JDA (INDEX)	BO1 (INDEX)
05/14/99	7	105	11	19	5,742	3,843	3,341	425	1,072	4,619	3,570
05/15/99	---	---	---	---	3,334	6,879	3,569	429	907	5,404	1,876
05/16/99	---	---	---	---	3,757	2,417	7,397	430	1,779	4,443	1,407
05/17/99	4	157	8	31	4,884	2,337	9,530	397	1,540	5,707	2,138
05/18/99	6	193	19	24	3,020	2,957	7,173	436	1,788	3,708	2,021
05/19/99	11	401	55	34	3,837	2,110	2,156	462	2,156	4,418	2,138
05/20/99	6	86	91	86	4,765	6,032	3,801	758	1,576	3,316	2,324
05/21/99	16	20	137	44	5,939	7,504	4,313	460	3,306	7,654	2,114
05/22/99	---	---	---	54	17,707	5,489	5,321	419	2,786	6,833	1,897
05/23/99	---	---	---	89	19,108	9,966	10,684	432	2,331	11,611	2,223
05/24/99	---	---	127	118	16,958	17,693	10,149	422	2,202	6,862	2,660
05/25/99	---	---	147	45	23,803	24,093	21,308	573	4,680	14,429	2,451
05/26/99	---	---	55	---	30,074	24,856	20,463	1,125	8,712	22,911	2,382
05/27/99	---	---	27	---	26,736	21,060	16,859	1,710	5,362	11,161	2,300
Total:	50	962	677	544	169,664	137,236	126,064	8,478	40,197	113,076	31,501
# Days:	6	6	10	10	14	14	14	14	14	14	14
Average:	8	160	68	54	12,119	9,803	9,005	606	2,871	8,077	2,250

Definitions for Smolt Index Counts.

RIS (Index) = Rock Island Dam Second Powerhouse Bypass Trap : Passage Index Counts : Passage Index = Collection Counts / {Powerhouse 2 Flow / (Powerhouses 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) }

BO1 (Index)= Bonneville Dam First Powerhouse Bypass Trap : Passage Index Counts : Passage Index = Collection Counts / {Powerhouse 1 Flow / (Powerhouses 1 & 2 +Flow + Spill)}

Two-Week Summary of Passage Indices

Hatchery Sockeye											
Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (INDEX)	LGS (INDEX)	LMN (INDEX)	RIS (INDEX)	MCN (INDEX)	JDA (INDEX)	BO1 (INDEX)
05/14/99	2	0	0	3	0	0	0	11	702	540	0
05/15/99	---	---	---	---	256	0	0	21	181	0	97
05/16/99	---	---	---	---	268	0	0	20	894	82	268
05/17/99	3	0	0	4	0	0	8	20	342	1,220	66
05/18/99	6	0	0	3	0	0	0	28	1,420	117	209
05/19/99	6	0	0	10	349	0	0	19	539	102	0
05/20/99	6	0	0	37	0	0	0	57	1,224	106	73
05/21/99	0	0	0	33	0	0	0	29	732	97	0
05/22/99	---	---	---	25	0	0	0	26	745	466	68
05/23/99	---	---	---	40	450	0	123	56	364	15	106
05/24/99	---	---	0	30	429	188	178	29	367	380	136
05/25/99	---	---	0	7	220	0	0	80	666	376	0
05/26/99	---	---	0	---	237	608	203	83	916	414	159
05/27/99	---	---	0	---	278	278	0	73	620	200	87
Total:	23	0	0	192	2,487	1,074	512	552	9,712	4,115	1,269
# Days:	6	6	10	10	14	14	14	14	14	14	14
Average:	4	0	0	19	178	77	37	39	694	294	91

Wild Sockeye											
Date	WTB (Coll)	IMN (Coll)	GRN (Coll)	LEW (Coll)	LGR (INDEX)	LGS (INDEX)	LMN (INDEX)	RIS (INDEX)	MCN (INDEX)	JDA (INDEX)	BO1 (INDEX)
05/14/99	0	0	0	0	338	0	76	476	38,601	39,415	6,148
05/15/99	---	---	---	---	0	226	414	270	30,546	16,849	10,060
05/16/99	---	---	---	---	0	234	55	861	85,828	24,702	5,562
05/17/99	0	0	0	0	174	227	417	290	52,711	21,942	3,191
05/18/99	0	0	0	0	531	0	64	158	34,796	29,526	2,161
05/19/99	0	0	0	0	0	0	0	251	41,123	19,186	3,207
05/20/99	0	0	0	0	329	246	127	645	38,128	16,165	5,229
05/21/99	0	0	0	0	165	232	127	103	35,872	15,166	3,273
05/22/99	---	---	---	0	337	212	484	313	24,333	25,934	3,048
05/23/99	---	---	---	0	0	407	246	139	22,420	15,791	1,482
05/24/99	---	---	0	0	0	232	355	76	42,205	12,546	2,660
05/25/99	---	---	0	0	220	599	189	154	30,167	14,939	2,209
05/26/99	---	---	0	---	0	0	0	241	25,434	11,090	3,652
05/27/99	---	---	0	---	0	608	503	118	40,242	11,412	2,951
Total:	0	0	0	0	2,094	3,223	3,057	4,095	542,406	274,663	54,833
# Days:	6	6	10	10	14	14	14	14	14	14	14
Average:	0	0	0	0	150	230	218	293	38,743	19,619	3,917

LEW and WTB data collected for the FPC by Idaho Dept. of Fish and Game.
 JDA and BO1 data collected for the FPC by National Marine Fisheries Service.
 RIS data collected for the FPC by Chelan Co. PUD/Washington Dept. of Fish and Wildlife.
 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.

Cumulative Adult Passage at Mainstem Dams Through May 27, 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	37,415	8,308	37,183	707	65,284	2,375	0	0	0	0	0	0	0	0	0	0	0	0
TDA	16,103	5,633	24,122	455	37,922	1,488	0	0	0	0	0	0	0	0	0	0	0	0
JDA	12,853	4,387	21,105	326	29,025	1,182	0	0	0	0	0	0	0	0	0	0	0	0
MCN	7,928	3,160	17,953	262	27,580	1,264	0	0	0	0	0	0	0	0	0	0	0	0
IHR	3,651	1,936	11,020	93	13,208	434	0	0	0	0	0	0	0	0	0	0	0	0
LMN	2,224	1,501	8,874	69	11,388	428	0	0	0	0	0	0	0	0	0	0	0	0
LGS	1,814	1,376	7,999	48	**	**	0	0	0	0	**	**	0	0	0	0	**	**
LWG	1,587	1,134	7,212	36	8,938	294	0	0	0	0	0	0	0	0	0	0	0	0
PRD	3,530	301	3,624	16	8,278	91	0	0	0	0	0	0	0	0	0	0	0	0
RIS	2,275	194	2,443	25	5,489	62	0	0	0	0	0	0	0	0	0	0	0	0
RRH	771	41	465	18	1,046	10	0	0	0	0	0	0	0	0	0	0	0	0
WEL	0	0	*1	*19	497	11	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
	Adult	Jack	Adult	Jack	Adult	Jack	1999	1998	Avg.	1999	1998	Avg.	1999
BON	0	0	0	0	0	0	0	0	1	2,202	2,578	4,685	314
TDA	0	0	0	0	0	0	0	0	1	527	952	1,854	100
JDA	0	0	0	0	0	0	0	0	1	3,429	5,285	3,097	990
MCN	0	1	0	1	0	0	0	0	1	468	1,537	2,562	118
IHR	0	0	0	0	0	0	0	0	0	801	1,793	2,754	304
LMN	0	0	0	0	0	0	0	0	0	598	1,556	2,435	119
LGS	0	0	0	0	**	**	0	0	**	918	2,026	**	310
LWG	0	0	0	0	0	0	0	0	0	3,032	4,334	5,652	539
PRD	0	0	0	0	0	0	6	0	13	20	15	57	0
RIS	0	0	0	0	0	0	1	0	1	17	31	100	19
RRH	0	0	0	0	0	0	0	0	0	37	88	68	14
WEL	0	0	0	0	0	0	0	0	0	2	5	25	2

*NOTE: The data is not being received and/or not being updated in a timely fashion.

*LMN, PRD, RIS, RRH are through 05/26 and LGS is through 5/25.

*WEL - WDFW is trapping Spring Chinook on both fish ladders, so data not available at present.

*Bonneville and Lower Granite were doing video counts only until April 1, 1999. These counts were 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.

**Transportation Summary Report
Two-Week Transportation Summary
from 05/14/99 to 05/27/99**

	Yearling Chinook	Subyearling Chinook	Steelhead	Coho	Sockeye	Total
LOWER GRANITE DAM						
Collected	532,000	0	1,045,200	41,700	2,800	1,621,700
Bypassed	30,996	0	170,526	6,629	118	208,269
Trucked	0	0	0	0	0	0
Barged	497,113	0	874,324	35,019	2,610	1,409,066
Total Transported	497,113	0	874,324	35,019	2,610	1,409,066
LITTLE GOOSE DAM						
Collected	1,188,287	150	980,201	37,362	3,067	2,209,067
Bypassed	19,783	0	158,018	4,195	299	182,295
Trucked	0	0	0	0	0	0
Barged	1,158,646	150	820,578	33,140	2,518	2,015,032
Total Transported	1,158,646	150	820,578	33,140	2,518	2,015,032
LOWER MONUMENTAL DAM						
Collected	636,658	0	631,412	12,602	2,442	1,283,114
Bypassed	111,258	0	213,870	7,050	299	332,477
Trucked	0	0	0	0	0	0
Barged	524,958	0	417,362	5,552	2,141	950,013
Total Transported	524,958	0	417,362	5,552	2,141	950,013
M McNARY DAM						
Collected	832,184	20,502	145,575	38,211	307,604	1,344,076
Bypassed	831,694	20,498	145,515	38,202	307,419	1,343,328
Trucked	0	0	0	0	0	0
Barged	0	0	0	0	0	0
Total Transported	0	0	0	0	0	0
PROJECT TOTALS						
Collected	3,189,129	20,652	2,802,388	129,875	315,913	6,457,957
Bypassed	993,731	20,498	687,929	56,076	308,135	2,066,369
Trucked	0	0	0	0	0	0
Barged	2,180,717	150	2,112,264	73,711	7,269	4,374,111
Total Transported	2,180,717	150	2,112,264	73,711	7,269	4,374,111

**Cumulative Transportation Summary
through 05/27/99**

	Yearling Chinook	Subyearling Chinook	Steelhead	Coho	Sockeye	Total
LOWER GRANITE DAM						
Collected	2,083,346	1,316	3,027,742	45,607	7,758	5,165,769
Bypassed	101,947	0	214,572	6,637	118	323,274
Trucked	29,736	126	23,030	183	1,219	54,294
Barged	1,938,613	1,190	2,789,356	38,724	6,148	4,774,031
Total Transported	1,968,349	1,316	2,812,386	38,907	7,367	4,828,325
LITTLE GOOSE DAM						
Collected	3,350,957	150	2,660,206	52,679	9,554	6,073,546
Bypassed	19,783	0	158,018	4,195	299	182,295
Trucked	1,001	0	1,128	5	120	2,254
Barged	3,310,138	150	2,498,856	48,444	8,390	5,865,978
Total Transported	3,311,139	150	2,499,984	48,449	8,510	5,868,232
LOWER MONUMENTAL DAM						
Collected	1,749,574	7	1,515,666	14,955	5,614	3,285,816
Bypassed	137,406	0	214,404	7,050	299	359,159
Trucked	3,464	6	899	0	28	4,397
Barged	1,605,751	0	1,299,834	7,909	5,214	2,918,708
Total Transported	1,609,215	6	1,300,733	7,909	5,242	2,923,105
M McNARY DAM						
Collected	1,947,554	73,476	365,935	44,119	711,587	3,142,671
Bypassed	1,945,625	73,425	365,827	44,100	711,183	3,140,160
Trucked	0	0	0	0	0	0
Barged	0	0	0	0	0	0
Total Transported	0	0	0	0	0	0
PROJECT TOTALS						
Collected	9,131,431	74,949	7,569,549	157,360	734,513	17,667,802
Bypassed	2,204,761	73,425	952,821	61,982	711,899	4,004,888
Trucked	34,201	132	25,057	188	1,367	60,945
Barged	6,854,502	1,340	6,588,046	95,077	19,752	13,558,717
Total Transported	6,888,703	1,472	6,613,103	95,265	21,119	13,619,662

