



## Fish Passage Center

# Weekly Report #98 - 1

March 20, 1998

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### SUMMARY OF EVENTS:

**1. Water Supply:** Precipitation for October-February period varied from 63% at flathead to 121% at Harney-Malheur basin. Precipitation in the basin fell within the 80-100% range for the period. Precipitation distribution for March 1-18 shows that the highest precipitation is in Okanogan Basin with 161% and lowest is at Snake River Plain with 38%. Most of the precipitation in the basin fell in 60-100% range.

Warm temperatures and dry conditions resulted in less than average snow water equivalent increases during February. March 1<sup>st</sup> snow water equivalents are 70-80% on the Kootenai, Pend Oreille, Spokane and Clearwater rivers. Above average snow was reported in the Cascade mountains in Washington, southwest Oregon and in most of eastern Oregon. The rest of the basin's snow fell near the average range. Runoff for most of the Columbia-Snake basin fell in the 70 to 90% range during February.

March Final Runoff Volume Forecast reflects the February weather conditions, showing a 2 to 8 % downturn. The exception to this trend is the area from southwest Oregon over to southern Idaho where volumes increased by 2 to 15%. The March Final Volume Forecast for Columbia River above The Dalles is 91.7 MAF for the January-July period, a drop of three percent from last month. This compares to a runoff of 159 MAF for the last water year.

The summary of the Runoff Volume Forecast shows that this year will be below average water year with most sites' runoff in the range of 80-100%. The March mid-month Forecast shows continuation of the decreasing trend from 1-9% in the upper Columbia to 18% at Brownlee.

The summary of the Runoff Volumes for different sites through the January-March period is

given in the following Tables.

| Location      | Period  | January 98 Final |    | February 98 Final |    |
|---------------|---------|------------------|----|-------------------|----|
|               |         | MAF              | %  | MAF               | %  |
| Libby         | Apr-Sep | 5.88             | 87 | 6.01              | 89 |
| Hungry Horse  | Apr-Sep | 1.66             | 76 | 1.79              | 82 |
| Grand Coulee  | Jan-Jul | 54.7             | 86 | 57.7              | 91 |
| The Dalles    | Jan-Jul | 86.4             | 82 | 95.2              | 90 |
| Lower Granite | Jan-Jul | 23.0             | 77 | 27.1              | 91 |
| Dworshak      | Apr-Jul | 2.2              | 81 | 2.3               | 85 |
| Brownlee      | Apr-Jul | 3.34             | 58 | 5.08              | 88 |

| Location      | Period  | March 98 Final |    | March 98 Midmonth |    |
|---------------|---------|----------------|----|-------------------|----|
|               |         | MAF            | %  | MAF               | %  |
| Libby         | Apr-Sep | 54.8           | 87 | 5.31              | 78 |
| Hungry Horse  | Apr-Sep | 1.62           | 74 | 1.79              | 82 |
| Grand Coulee  | Jan-Jul | 54.8           | 87 | 54.7              | 86 |
| The Dalles    | Jan-Jul | 91.7           | 87 | 89.1              | 84 |
| Lower Granite | Jan-Jul | 26.4           | 89 | 24.0              | 81 |
| Dworshak      | Apr-Jul | 2.0            | 74 | 1.96              | 73 |
| Brownlee      | Apr-Jul | 5.25           | 91 | 4.24              | 73 |

**2. System Storage and Streamflow:** The system continues to be operated for flood control purposes. Earlier in the season some of the major reservoirs as Grand Coulee and Dworshak have been drafted below flood control elevations for purposes of maintenance work. These operations will result in failure to refill reservoirs at April 20 to the BiOp required flood control elevations and meet BiOp requested spring flow targets. Fishery Agencies requested some changes in projected operations of Brownlee and Canadian reservoirs in order to mitigate for this inability to provide spring targets at Lower Granite and McNary. Requests have been denied by federal regulat-

ing agencies so far.

Summary of actual elevations and Required Flood Control elevations at the end of March is given in the following table:

| Reservoir    | Actual Elevation [ft] as of March 18 | Max. Reservoir Pool [ft] | End of March Flood Control Elev. [ft] |
|--------------|--------------------------------------|--------------------------|---------------------------------------|
| Libby        | 2391.0                               | 2459.0                   | 2413.2                                |
| Hungry Horse | 3505.6                               | 3560.0                   | 3533.1                                |
| Grand Coulee | 1254.3                               | 1290.0                   | 1283.3                                |
| Brownlee     | 2041.5                               | 2077.0                   | 2049.1                                |
| Dworshak     | 1531.9                               | 1600.0                   | 1578.0                                |

- Libby is projected to be on minimum outflow of 4 kcfs by the end of March in order to refill to end of March Flood Control Elevation.
- Hungry Horse is projected to be on minimum outflow of about 2.5 kcfs required to maintain minimum flow of 4.5 kcfs at Columbia Falls. The reservoir is projected to fill by April 20 to required flood control elevation.
- Grand Coulee is projected to pass inflow in the range of 70-140 kcfs at elevation of 1255 ft because of the maintenance work at drum gates which are planned to be finished by April 5.
- Brownlee is projected to refill to an end of March Flood Control Elevation. Actual outflow is in the range of 28-30 kcfs.
- Dworshak is projected to remain on the minimum outflow of 1.3-1.6 kcfs through April 20 in attempt to refill to BiOp required April 20 Flood Control Elevation.
- Upper Snake reservoirs:
  - Jackson Lake is projected to pass the inflow of 0.6 kcfs by the end of March. Currently the reservoir is 75% full
  - Palisades is projected to be drafted during coming week with increasing flow increments of 100 cfs due to testing of the channel capacity at the Blackfoot Reach. Current outflow is about 7.5 kcfs. Projected test outflows should not exceed 10 kcfs. Currently the reservoir is 73% full.
  - American Falls is projected to store additional 30-35 KAF of the water from upstream by the end of March. Currently reservoir is 91% full with about 135 KAF of empty space.

The projected outflow should not exceed 10.5-11 kcfs.

-Millner flow at the lowest point of Upper Snake system is projected not to exceed 11 kcfs through the end of March.

The average discharge for the run of river projects during March 13-19 period is given in the following Table:

| Project       | Average Discharge [kcfs] |
|---------------|--------------------------|
| Priest Rapids | 118.5*                   |
| McNary        | 165.6                    |
| Lower Granite | 42.8                     |
| Bonneville    | 190.2                    |

*\*average flow for the period of March 13-18.*

**3. Spill:** Upon request from the National Marine Fisheries Service the Oregon Department of Environmental Quality and the Washington Department of Ecology have granted waivers to the total dissolved gas standard for the spring and summer migration. Spill will be allowed up to total dissolved gas supersaturation (TDGS) levels of 120% at the tailrace monitors and 115% at the downstream forebay monitors. The Oregon DEQ denied the waiver for the March 13-23 spill period associated with the Spring Creek Hatchery fall chinook release. Consequently, the provision of spill is limited by the 110% total dissolved gas criteria.

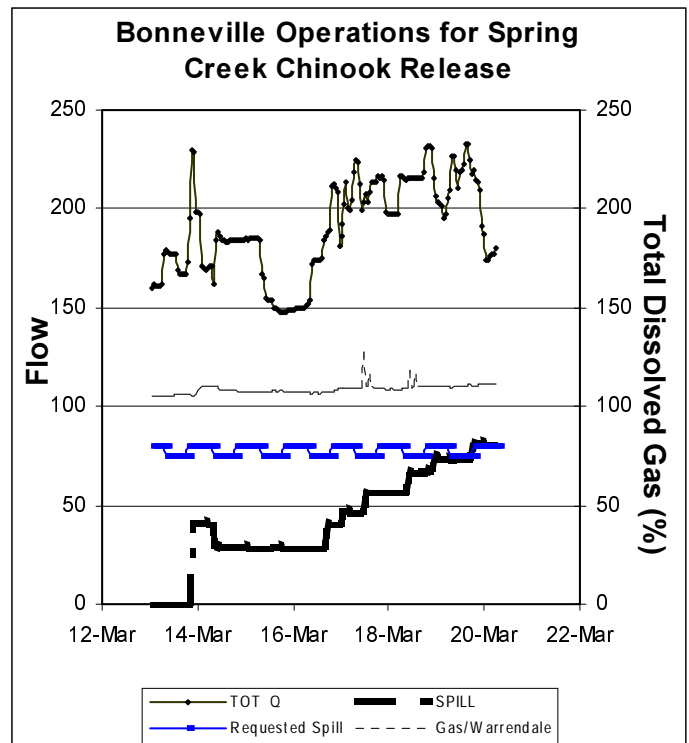
The fishery agencies and tribes submitted System Operational Request #98-5 requesting a spill level of 80 kcfs (the 110% TDGS level) with flat loading of the project at 160 kcfs for a ten-day period after the release. This recommendation was based on protection for both the Spring Creek Hatchery release and the fall and chum chinook redds located below Bonneville Dam. The instantaneous flow of 160 kcfs was based on providing sufficient water depth over the redds to compensate for the impact of the elevated total dissolved gas levels.

As in past years, the COE did not agree to the ten-day period. The COE planned to spill for a seven day period with spill continuing if there are still large numbers of juvenile fish migrating

at that time. The fishery agencies and tribes submitted a subsequent system operational request (SOR #98-7) on March 19, 1998 recommending the continuation of the spill for the ten-day period based on the fish passage pattern. The SOR points out the potential problems associated with trying to use the passage index at Bonneville Dam as absolute measurements.

BPA did not agree to an instantaneous flow of 160 kcfs. The instantaneous 160 kcfs was an increase from the 128.5 kcfs instantaneous minimum provisionally agreed to last December by the Implementation Team (IT). The increased level of flow was based on concerns regarding the effects of elevated total dissolved gas levels on the redds. In addition, this flow was well within the range of flows recently occurring on a daily average basis. The issue for BPA was load following rather than providing an instantaneous flow and the potential that flows could possibly be less than 160 kcfs on a daily average basis. A subsequent IT meeting occurred to address this issue. It was agreed at the IT meeting that spill would be decreased at flows between 150-160 kcfs so as not to exceed a TDGS level of 107% and to 105% TDGS at flows less than 150 kcfs because of concerns regarding the effects of TDGS on the redds.

The hatchery release occurred early on the morning of March 13, 1998. Daily average flow levels exceeded 160 kcfs at Bonneville Dam every day after the release. Spill levels for the Spring Creek Hatchery release were substantially less than requested in SOR #98-5. Spill was limited to 107% TDGS for three days after the release in spite of the agreement at the IT meeting, and was only changed after repeated calls to the RCC by the USFWS and WDFW. Spill did not reach the requested levels until the seventh day after the hatchery release.



**3. Smolt Monitoring:** 1998 smolt monitoring season has begun at the four Snake River drainage traps and Bonneville Dam. Monitoring began March 9 at the Idaho Department of Fish and Game traps on the lower Salmon River (WTB) and Snake River (LEW). The Salmon River Trap is an inclined (scoop) style trap located near the community of Twin Bridges, Idaho, and the Snake River trap is a dipper style trap located off the Lewiston-Clarkston highway bridge. Collection numbers on March 19 show increased movement of both hatchery and wild chinook yearlings at the lower Salmon River trap location. Monitoring began March 5 (following a one day sample February 27) at the Imnaha River trap (IMN) operated by the Nez Perce Tribe. The Imnaha Trap location is approximately 5 miles upstream of the river mouth. The tribe plans to operate two screw traps side-by-side in 1998, thus doubling the sampling effort this year compared to the previous years. Collection numbers beginning March 16 show increased movement of wild chinook yearlings at the lower Imnaha River trap location. Monitoring began March 16 at the Oregon Department of Fish and Wildlife trap on the lower Grande Ronde River. The Grande Ronde River trap

(GRN) is an inclined (scoop) style trap located approximately 2 miles upstream of the river mouth. Low numbers of wild chinook yearlings have been present in the first week of sampling.

Monitoring began March 9 at the first powerhouse of Bonneville Dam. Sampling is conducted by operating a trap for varied durations in the bypass channel over an 8-hr period between 16:00 and 24:00 hours. Samples are expanded hourly to collections and the 8-hr accumulated collection is expanded by the proportion of daily (24-hr) average flow passing through the first powerhouse. The Spring Creek Hatchery tule fall chinook (subyearlings) began arriving in the trap on March 14, a day after release, and have dominated the collections since that date.

**4. Adult Fish Passage:** Fish counting will begin at most dams on April 1. The Mid-Columbia projects normally start counting near April 15 with the exception of Wells Dam which initiates counting on May 1. Bonneville and Lower Granite dams are presently counting adult fish via video taping at the counting windows. Both are using 8-h counts (0800-1600h) for the record until April 1 when 16-h visual counting will begin.

At Lower Granite Dam, the adult count is presently comprised of steelhead that have overwintered in the pools below the project and then begin moving upstream to their natal streams to spawn in the late winter and spring months. The total count through March 14 was 789 for the season and that was about 5% greater than the 10-yr average through the same date.

The slightly warmer water temperature and lower flow levels so far seen in March 1998 may mean that the chinook run will be earlier than the past couple of years in the Columbia River. Numbers of jack spring chinook salmon that returned to the Columbia River in 1997 were less than 1,000 at Bonneville Dam, less than 100 in the Snake River, and less than 50 in the Mid-Columbia River. These jack spring chinook returns were about 5-20% of the 1996 return of jack spring chinook. This will likely result in extremely reduced returns of adult 4-year old (2-ocean) spring chinook in 1998. It is

highly likely that 5-year old fish will be the predominant returning age class in 1998.

The adult spring chinook count at Bonneville Dam was 28 through March 17 and was near the 1997 count of 24 through the same date. Based on previous counts in March, only about 1% of the spring chinook run passes Bonneville Project during this month.

The new powerhouse is still operating with only half the attraction flow as one of the two fish turbines is out of service. The Project expects the service to be back on-line by mid-April. All other adult fish passage facilities at the COE projects in the lower Columbia and Snake River dams are operating at normal criteria. As well, most of the PUD projects are running their adult fish facilities at full capacity.

**5. Hatchery Releases:** In the **Snake River**, yearling spring chinook from Clearwater H. were released below Hells Canyon Dam in the Snake River. The volitional release of spring chinook from Rapid River and Tucannon hatcheries was initiated during the week. Most of the yearling chinook will be released by early April this year.

Yearling coho salmon were released (direct stream release) into Lapwai Creek and Potlatch R. The Nez Perce are also monitoring smolt outmigrants from egg plants made in 1996 from designated streams in the Clearwater River Basin.

Sockeye were released into the upper Salmon River lakes during the fall and a percentage of them will be migrating this spring from Red Fish, Pettit, and Alturas lakes.

Steelhead releases will begin next week with the bulk of the steelhead planted from early April through mid-May. Again, projected steelhead releases will total about 10 million for the 1998 season.

In the **mid-Columbia Reach**, the first release of yearling chinook was completed on March 13 from Similkameen Hatchery located in the Okanogan River basin. Most yearling releases of chinook salmon will be completed in April 98.

At **lower Columbia River** hatcheries (from McNary Dam to above Bonneville Dam), yearling

spring and fall chinook were released into the Umatilla River from Imeques and Thornhollow acclimation ponds, and yearling spring chinook released into the Klickitat River from Klickitat Hatchery. In addition, yearling coho were released into the Klickitat River from Lewis River Hatchery and unconfirmed release of yearling coho into the Umatilla River from Lower Herman Creek Pd.

About 7.7 million subyearling fall chinook were released from Spring Creek NFH during the week. This will be the largest single release of salmon above Bonneville Dam for the year.

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Thanks!

**Hatchery Release Summary  
Schedule for Last Two Weeks  
From 03/05/98 to 03/18/98**

| Hatchery                      | Species              | FPC LotID | Number Released  | Release Dates |          | Release Site          | River Name                |
|-------------------------------|----------------------|-----------|------------------|---------------|----------|-----------------------|---------------------------|
|                               |                      |           |                  | Begin         | End      |                       |                           |
| <b><u>IDFG</u></b>            |                      |           |                  |               |          |                       |                           |
| Clearwater                    | SP Chinook           | 98005     | 160,100          | 03/16/98      | 03/16/98 | Hells Canyon Dam      | Snake River               |
|                               | SP Chinook           | 98006     | 145,300          | 03/17/98      | 03/17/98 | Hells Canyon Dam      | Snake River               |
| Rapid River                   | SP Chinook           | 98007     | 896,250          | 03/16/98      | 04/10/98 | Rapid River H         | Little Salmon River       |
|                               | <b>Agency Total:</b> |           | <b>1,201,650</b> |               |          |                       |                           |
| <b><u>Nez Perce Tribe</u></b> |                      |           |                  |               |          |                       |                           |
| Willard                       | Coho                 | 98136     | 250,000          | 03/16/98      | 03/16/98 | Lapwai Cr             | Clearwater River, Main Fk |
|                               | Coho                 | 98137     | 250,000          | 03/18/98      | 03/18/98 | Potlatch R            | Clearwater River, Main Fk |
|                               | <b>Agency Total:</b> |           | <b>500,000</b>   |               |          |                       |                           |
| <b><u>ODFW</u></b>            |                      |           |                  |               |          |                       |                           |
| Lower Herman C                | Coho                 | 98055     | 500,000          | 03/10/98      | 03/20/98 | Umatilla R            | Umatilla River            |
|                               | <b>Agency Total:</b> |           | <b>500,000</b>   |               |          |                       |                           |
| <b><u>Umatilla Tribe</u></b>  |                      |           |                  |               |          |                       |                           |
| Imeques                       | SP Chinook           | 98048     | 382,713          | 03/08/98      | 03/08/98 | Imeques Acclim Pd     | Umatilla River            |
|                               | SP Chinook           | 98049     | 172,999          | 03/08/98      | 03/08/98 | Imeques Acclim Pd     | Umatilla River            |
| Thornhollow                   | FA Chinook           | 98045     | 256,910          | 03/13/98      | 03/13/98 | Thornhollow Acclim Pd | Umatilla River            |
|                               | <b>Agency Total:</b> |           | <b>812,622</b>   |               |          |                       |                           |
| <b><u>USFWS</u></b>           |                      |           |                  |               |          |                       |                           |
| Spring Creek                  | FA Chinook           | 98073     | 7,750,000        | 03/16/98      | 03/16/98 | Spring Creek H        | Columbia River            |
|                               | SP Chinook           | 98056     | 350,000          | 03/16/98      | 03/16/98 | White Salmon R        | Columbia River            |
|                               | <b>Agency Total:</b> |           | <b>8,100,000</b> |               |          |                       |                           |
| <b><u>WDFW</u></b>            |                      |           |                  |               |          |                       |                           |
| Klickitat                     | SP Chinook           | 98093     | 600,000          | 03/01/98      | 03/13/98 | Klickitat H           | Klickitat River           |
| Tucannon                      | SP Chinook           | 98039     | 15,000           | 03/11/98      | 04/15/98 | Tucannon H            | Tucannon River            |
|                               | SP Chinook           | 98038     | 49,000           | 03/11/98      | 04/15/98 | Curl Lake             | Tucannon River            |
| Wells                         | SU Chinook           | 98018     | 539,000          | 03/13/98      | 03/20/98 | Similkameen Acclim Pd | Okanogan River            |
|                               | <b>Agency Total:</b> |           | <b>1,203,000</b> |               |          |                       |                           |

**Total Release: 12,317,272**

**Hatchery Release Summary  
Schedule for Next Two Weeks  
From 03/19/98 to 04/01/98**

| Hatchery                      | Species              | FPC LotID | Number Released  | Release Dates |          | Release Site       | River Name                |
|-------------------------------|----------------------|-----------|------------------|---------------|----------|--------------------|---------------------------|
|                               |                      |           |                  | Begin         | End      |                    |                           |
| <b><u>IDFG</u></b>            |                      |           |                  |               |          |                    |                           |
| Clearwater                    | SP Chinook           | 98004     | 8,900            | 04/01/98      | 04/15/98 | Selway R           | Clearwater River, Main Fk |
| Magic Valley                  | SU Steelhead         | 98118     | 50,000           | 04/01/98      | 04/01/98 | Squaw Cr Acclim Pd | Salmon River              |
| McCall                        | SU Chinook           | 98009     | 370,000          | 03/31/98      | 04/09/98 | S Fk Salmon R      | Salmon River              |
|                               | SU Chinook           | 98010     | 24,900           | 04/01/98      | 04/15/98 | S Fk Salmon R      | Salmon River              |
| Niagara Springs               | SU Steelhead         | 98120     | 660,720          | 03/23/98      | 04/06/98 | Hells Canyon Dam   | Snake River               |
|                               | <b>Agency Total:</b> |           | <b>1,114,520</b> |               |          |                    |                           |
| <b><u>Nez Perce Tribe</u></b> |                      |           |                  |               |          |                    |                           |
| Lyons Ferry                   | FA Chinook           | 98042     | 147,585          | 04/01/98      | 04/15/98 | Pittsburg Landing  | Snake River               |
|                               | FA Chinook           | 98044     | 135,710          | 04/01/98      | 04/15/98 | Cpt John Accl Pd   | Snake River               |
|                               | FA Chinook           | 98043     | 76,571           | 04/01/98      | 04/15/98 | Clearwater R       | Clearwater River, Main Fk |
|                               | <b>Agency Total:</b> |           | <b>359,866</b>   |               |          |                    |                           |
| <b><u>ODFW</u></b>            |                      |           |                  |               |          |                    |                           |
| Big Canyon                    | SU Steelhead         | 98104     | 97,500           | 03/31/98      | 03/31/98 | Big Canyon H       | Grande Ronde River        |
|                               | SU Steelhead         | 98103     | 97,500           | 04/01/98      | 04/15/98 | Big Canyon H       | Grande Ronde River        |
| Cascade                       | Coho                 | 98054     | 1,000,000        | 04/01/98      | 04/10/98 | Umatilla R         | Umatilla River            |
| Wallowa                       | SU Steelhead         | 98102     | 185,000          | 03/24/98      | 03/24/98 | Wallowa Acclim Pd  | Grande Ronde River        |
|                               | SU Steelhead         | 98101     | 189,500          | 03/25/98      | 04/08/98 | Wallowa Acclim Pd  | Grande Ronde River        |
|                               | <b>Agency Total:</b> |           | <b>1,569,500</b> |               |          |                    |                           |
| <b><u>USFWS</u></b>           |                      |           |                  |               |          |                    |                           |
| Dworshak                      | SP Chinook           | 98014     | 970,000          | 03/25/98      | 03/26/98 | Dworshak H         | N Fk Clearwater River     |
| Entiat                        | SP Chinook           | 98063     | 357,000          | 04/01/98      | 04/15/98 | Entiat H           | Entiat River              |
| Hagerman                      | SU Steelhead         | 98065     | 60,000           | 03/31/98      | 04/30/98 | Sawtooth H         | Salmon River              |
|                               | SU Steelhead         | 98067     | 605,000          | 03/31/98      | 04/30/98 | Sawtooth H         | Salmon River              |
| Kooskia                       | SP Chinook           | 98013     | 77,000           | 03/30/98      | 03/30/98 | Kooskia H          | Mid Fk Clearwater River   |
|                               | <b>Agency Total:</b> |           | <b>2,069,000</b> |               |          |                    |                           |
| <b><u>WDFW</u></b>            |                      |           |                  |               |          |                    |                           |
| East Bank                     | SU Chinook           | 98016     | 624,000          | 04/01/98      | 05/15/98 | Dryden Accl Pd     | Wenatchee River           |
|                               | SP Chinook           | 98015     | 15,000           | 04/01/98      | 04/30/98 | Chiwawa H          | Wenatchee River           |
| Lyons Ferry                   | FA Chinook           | 98041     | 450,000          | 04/01/98      | 04/15/98 | Lyons Ferry H      | Snake River               |
| Methow                        | SU Chinook           | 98017     | 346,000          | 04/01/98      | 04/30/98 | Carlton Accl Pd    | Methow River              |
| Tucannon                      | SP Chinook           | 98040     | 15,000           | 03/23/98      | 04/03/98 | Tucannon R         | Tucannon River            |
| Wells                         | SU Chinook           | 98027     | 357,000          | 04/01/98      | 04/20/98 | Wells              | Mid-Columbia River        |
|                               | <b>Agency Total:</b> |           | <b>1,807,000</b> |               |          |                    |                           |

**Total Release: 6,919,886**

**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 |
| 03/06/98 | 110.9        | 0.0   | 114.0        | 0.0   | 116.9 | 0.0   | 120.6       | 2.6   | 116.9       | 0.0   | 125.2   | 0.0   | 132.2         | 0.0   |
| 03/07/98 | 93.6         | 0.0   | 96.5         | 0.0   | 99.3  | 0.0   | 105.3       | 0.0   | 103.0       | 0.0   | 105.3   | 0.0   | 109.5         | 0.0   |
| 03/08/98 | 68.6         | 0.0   | 70.3         | 0.0   | 73.3  | 0.0   | 77.3        | 0.0   | 76.0        | 0.0   | 78.1    | 0.0   | 81.2          | 0.0   |
| 03/09/98 | 115.7        | 0.0   | 116.2        | 0.0   | 117.6 | 0.0   | 118.0       | 6.6   | 112.2       | 0.0   | 107.8   | 0.0   | 111.9         | 0.0   |
| 03/10/98 | 136.0        | 0.0   | 138.1        | 0.0   | 137.9 | 0.0   | 146.5       | 15.9  | 143.1       | 0.0   | 130.7   | 0.0   | 140.2         | 0.0   |
| 03/11/98 | 99.9         | 0.0   | 107.7        | 0.0   | 111.2 | 0.0   | 119.0       | 0.2   | 117.5       | 0.0   | 130.0   | 0.0   | 141.1         | 0.0   |
| 03/12/98 | 110.9        | 0.0   | 112.3        | 0.0   | 114.9 | 0.0   | 119.1       | 0.0   | 116.1       | 0.0   | 116.1   | 0.0   | 123.8         | 0.0   |
| 03/13/98 | 97.9         | 0.0   | 98.8         | 0.0   | 103.1 | 0.0   | 107.3       | 0.0   | 105.2       | 0.0   | 107.1   | 0.0   | 114.7         | 0.0   |
| 03/14/98 | 73.0         | 0.0   | 76.3         | 0.0   | 79.0  | 0.0   | 83.9        | 0.0   | 82.7        | 0.0   | 86.5    | 0.0   | 91.6          | 0.0   |
| 03/15/98 | 82.5         | 0.0   | 84.2         | 0.0   | 87.5  | 0.0   | 90.2        | 0.0   | 88.4        | 0.0   | 91.6    | 0.0   | 95.2          | 0.0   |
| 03/16/98 | 127.8        | 0.0   | 130.9        | 0.0   | 133.3 | 0.0   | 134.7       | 21.8  | 130.5       | 0.0   | 122.5   | 0.0   | 132.0         | 0.0   |
| 03/17/98 | 128.8        | 0.0   | 132.1        | 0.0   | 135.8 | 0.0   | 141.6       | 20.7  | 139.9       | 0.0   | 135.9   | 0.0   | 143.9         | 0.0   |
| 03/18/98 | 114.3        | 0.0   | 121.6        | 0.0   | 123.4 | 0.0   | 129.5       | 12.6  | 128.7       | 0.0   | 129.1   | 0.0   | 136.1         | 0.0   |
| 03/19/98 | 112.3        | 0.0   | 113.0        | 0.0   | 117.8 | 0.0   | 122.2       | 6.2   | 120.9       | 0.0   | 127.7   | 0.0   | 134.8         | 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 |
| 03/06/98 | 1.3      | 0.0   | ---      | ---   | 36.4          | 0.0   | 36.5         | 0.0   | 37.8             | 0.0   | 35.2       | 23.5  |
| 03/07/98 | 1.3      | 0.0   | ---      | ---   | 35.6          | 0.0   | 35.0         | 0.0   | 35.4             | 0.0   | 39.4       | 23.6  |
| 03/08/98 | 1.3      | 0.0   | ---      | ---   | 33.3          | 0.0   | 30.0         | 0.0   | 31.4             | 0.0   | 28.6       | 0.0   |
| 03/09/98 | 1.3      | 0.0   | ---      | ---   | 46.2          | 0.0   | 67.0         | 0.0   | 76.1             | 5.2   | 80.8       | 27.9  |
| 03/10/98 | 1.3      | 0.0   | ---      | ---   | 35.4          | 0.0   | 29.4         | 0.0   | 28.2             | 0.0   | 27.5       | 0.0   |
| 03/11/98 | 1.3      | 0.0   | ---      | ---   | 36.6          | 0.0   | 32.8         | 0.0   | 38.1             | 0.0   | 37.6       | 0.0   |
| 03/12/98 | 1.3      | 0.0   | ---      | ---   | 37.9          | 0.0   | 41.4         | 0.0   | 41.9             | 0.0   | 43.6       | 0.0   |
| 03/13/98 | 1.3      | 0.0   | ---      | ---   | 37.9          | 0.0   | 32.4         | 0.0   | 33.9             | 0.0   | 32.4       | 0.0   |
| 03/14/98 | 1.3      | 0.0   | ---      | ---   | 39.4          | 0.0   | 38.1         | 0.0   | 40.2             | 0.0   | 39.3       | 0.0   |
| 03/15/98 | 1.3      | 0.0   | ---      | ---   | 41.3          | 0.0   | 40.2         | 1.4   | 42.0             | 0.0   | 42.3       | 0.0   |
| 03/16/98 | 1.3      | 0.0   | ---      | ---   | 47.7          | 0.0   | 48.3         | 0.1   | 49.3             | 0.0   | 47.4       | 0.0   |
| 03/17/98 | 1.3      | 0.0   | ---      | ---   | 44.0          | 0.0   | 44.2         | 0.0   | 49.7             | 0.0   | 50.2       | 0.0   |
| 03/18/98 | 1.4      | 0.0   | ---      | ---   | 42.9          | 0.0   | 42.8         | 0.0   | 44.5             | 0.0   | 41.5       | 0.0   |
| 03/19/98 | 1.6      | 0.0   | ---      | ---   | 46.3          | 0.0   | 44.7         | 0.0   | 45.6             | 0.0   | 48.5       | 0.0   |

**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 |      |       |
| 03/06/98 | 161.4  | 0.0   | 192.1    | 0.0   | 192.4      | 0.0   | 204.4      | 0.0   | 63.3 | 135.9 |
| 03/07/98 | 156.5  | 0.0   | 156.7    | 0.0   | 161.4      | 0.0   | 174.7      | 0.0   | 44.7 | 124.8 |
| 03/08/98 | 140.0  | 0.0   | 170.0    | 0.0   | 168.2      | 0.0   | 161.2      | 0.0   | 37.9 | 118.1 |
| 03/09/98 | 154.9  | 0.0   | 147.4    | 0.0   | 148.6      | 0.0   | 173.6      | 0.0   | 52.2 | 116.2 |
| 03/10/98 | 155.6  | 0.0   | 174.0    | 0.0   | 170.4      | 0.0   | 164.3      | 0.0   | 42.8 | 116.3 |
| 03/11/98 | 164.2  | 0.0   | 173.6    | 0.0   | 173.4      | 0.0   | 180.2      | 0.0   | 63.9 | 107.6 |
| 03/12/98 | 157.5  | 0.0   | 159.8    | 0.0   | 156.8      | 0.0   | 176.6      | 0.0   | 66.5 | 101.2 |
| 03/13/98 | 166.7  | 0.0   | 184.8    | 0.0   | 185.5      | 0.0   | 178.0      | 6.8   | 60.5 | 101.7 |
| 03/14/98 | 150.2  | 0.0   | 159.4    | 0.0   | 157.6      | 0.0   | 180.5      | 32.5  | 66.9 | 72.2  |
| 03/15/98 | 127.5  | 0.0   | 136.8    | 0.0   | 134.5      | 0.0   | 161.4      | 28.8  | 59.9 | 63.5  |
| 03/16/98 | 159.4  | 0.0   | 168.5    | 0.0   | 167.3      | 0.0   | 175.3      | 33.0  | 65.7 | 67.4  |
| 03/17/98 | 179.2  | 14.7  | 186.4    | 0.0   | 184.9      | 0.0   | 208.9      | 51.9  | 69.3 | 78.5  |
| 03/18/98 | 195.4  | 20.0  | 205.7    | 0.0   | 206.0      | 0.0   | 214.2      | 63.7  | 64.6 | 76.7  |
| 03/19/98 | 180.9  | 8.0   | 197.2    | 0.0   | 194.2      | 0.0   | 213.3      | 75.4  | 60.3 | 68.4  |

**Total Dissolved Gas Saturation (%) - Average of  
12 Highest Hours, 24 h Average and 24 h High<sup>2</sup>**

**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>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> |
| 3/6  | 100                  | 101         | 101         | 24                  | 102         | 103        | 103         | 23                    | 101        | 101         | 102         | 23                  | ---         | ---         | ---         | 0            | ---         | ---        | ---                | 0           | ---        | ---        | ---         | 0         |
| 3/7  | 100                  | 100         | 101         | 24                  | 102         | 103        | 103         | 23                    | 101        | 101         | 102         | 23                  | ---         | ---         | ---         | 0            | ---         | ---        | ---                | 0           | ---        | ---        | ---         | 0         |
| 3/8  | 99                   | 99          | 99          | 24                  | 102         | 103        | 103         | 23                    | 102        | 102         | 103         | 23                  | ---         | ---         | ---         | 0            | ---         | ---        | ---                | 0           | ---        | ---        | ---         | 0         |
| 3/9  | 99                   | 100         | 101         | 24                  | 102         | 102        | 102         | 23                    | 101        | 101         | 102         | 23                  | ---         | ---         | ---         | 0            | ---         | ---        | ---                | 0           | ---        | ---        | ---         | 0         |
| 3/10 | 100                  | 101         | 101         | 24                  | 102         | 102        | 103         | 23                    | 101        | 101         | 101         | 23                  | ---         | ---         | ---         | 0            | ---         | ---        | ---                | 0           | ---        | ---        | ---         | 0         |
| 3/11 | 101                  | 102         | 103         | 24                  | 103         | 103        | 104         | 23                    | 101        | 101         | 102         | 23                  | ---         | ---         | ---         | 0            | ---         | ---        | ---                | 0           | ---        | ---        | ---         | 0         |
| 3/12 | 103                  | 103         | 104         | 24                  | 103         | 104        | 105         | 23                    | 102        | 102         | 103         | 23                  | ---         | ---         | ---         | 0            | ---         | ---        | ---                | 0           | ---        | ---        | ---         | 0         |
| 3/13 | 103                  | 103         | 104         | 24                  | 104         | 105        | 106         | 23                    | 102        | 102         | 104         | 23                  | ---         | ---         | ---         | 0            | ---         | ---        | ---                | 0           | ---        | ---        | ---         | 0         |
| 3/14 | 102                  | 102         | 102         | 24                  | 104         | 104        | 105         | 23                    | 102        | 103         | 103         | 23                  | ---         | ---         | ---         | 0            | ---         | ---        | ---                | 0           | ---        | ---        | ---         | 0         |
| 3/15 | 102                  | 102         | 103         | 24                  | 104         | 105        | 106         | 23                    | 102        | 103         | 104         | 23                  | ---         | ---         | ---         | 0            | ---         | ---        | ---                | 0           | ---        | ---        | ---         | 0         |
| 3/16 | 102                  | 102         | 103         | 24                  | 104         | 104        | 105         | 23                    | 102        | 102         | 103         | 23                  | ---         | ---         | ---         | 0            | ---         | ---        | ---                | 0           | ---        | ---        | ---         | 0         |
| 3/17 | 102                  | 102         | 103         | 20                  | 103         | 103        | 103         | 23                    | 101        | 101         | 102         | 23                  | ---         | ---         | ---         | 0            | ---         | ---        | ---                | 0           | ---        | ---        | ---         | 0         |
| 3/18 | 102                  | 102         | 103         | 24                  | 103         | 103        | 104         | 23                    | 101        | 101         | 102         | 23                  | ---         | ---         | ---         | 0            | ---         | ---        | ---                | 0           | ---        | ---        | ---         | 0         |
| 3/19 | 102                  | 102         | 102         | 24                  | 103         | 104        | 105         | 23                    | 101        | 101         | 102         | 23                  | ---         | ---         | ---         | 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>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> |
| 3/6  | ---                   | ---         | ---         | 0                  | ---         | ---        | ---         | 0                        | ---        | ---         | ---         | 0              | 103         | 103         | 103                 | 23          | 102         | 103                  | 103         | 23          | 107        | 109        | 115         | 23        |
| 3/7  | ---                   | ---         | ---         | 0                  | ---         | ---        | ---         | 0                        | ---        | ---         | ---         | 0              | 101         | 102         | 102                 | 23          | 101         | 102                  | 102         | 23          | 105        | 105        | 105         | 23        |
| 3/8  | ---                   | ---         | ---         | 0                  | ---         | ---        | ---         | 0                        | ---        | ---         | ---         | 0              | 101         | 102         | 102                 | 23          | 101         | 101                  | 102         | 23          | 103        | 103        | 104         | 23        |
| 3/9  | ---                   | ---         | ---         | 0                  | ---         | ---        | ---         | 0                        | ---        | ---         | ---         | 0              | 101         | 101         | 102                 | 23          | 101         | 101                  | 101         | 23          | 103        | 103        | 103         | 23        |
| 3/10 | ---                   | ---         | ---         | 0                  | ---         | ---        | ---         | 0                        | ---        | ---         | ---         | 0              | 101         | 101         | 101                 | 23          | 101         | 101                  | 101         | 23          | 102        | 103        | 103         | 23        |
| 3/11 | ---                   | ---         | ---         | 0                  | ---         | ---        | ---         | 0                        | ---        | ---         | ---         | 0              | 101         | 101         | 102                 | 23          | 101         | 101                  | 101         | 23          | 102        | 102        | 103         | 23        |
| 3/12 | ---                   | ---         | ---         | 0                  | ---         | ---        | ---         | 0                        | ---        | ---         | ---         | 0              | 102         | 103         | 103                 | 23          | 102         | 103                  | 103         | 23          | 103        | 104        | 104         | 23        |
| 3/13 | ---                   | ---         | ---         | 0                  | ---         | ---        | ---         | 0                        | ---        | ---         | ---         | 0              | 103         | 104         | 105                 | 23          | 103         | 103                  | 104         | 22          | 104        | 104        | 105         | 23        |
| 3/14 | ---                   | ---         | ---         | 0                  | ---         | ---        | ---         | 0                        | ---        | ---         | ---         | 0              | 104         | 104         | 104                 | 23          | 104         | 104                  | 105         | 23          | 104        | 105        | 106         | 23        |
| 3/15 | ---                   | ---         | ---         | 0                  | ---         | ---        | ---         | 0                        | ---        | ---         | ---         | 0              | 103         | 103         | 103                 | 23          | 103         | 103                  | 103         | 23          | 105        | 106        | 107         | 23        |
| 3/16 | ---                   | ---         | ---         | 0                  | ---         | ---        | ---         | 0                        | ---        | ---         | ---         | 0              | 102         | 103         | 103                 | 23          | 102         | 103                  | 103         | 23          | 104        | 105        | 105         | 23        |
| 3/17 | ---                   | ---         | ---         | 0                  | ---         | ---        | ---         | 0                        | ---        | ---         | ---         | 0              | 102         | 102         | 103                 | 23          | 102         | 102                  | 102         | 22          | 103        | 103        | 103         | 23        |
| 3/18 | ---                   | ---         | ---         | 0                  | ---         | ---        | ---         | 0                        | ---        | ---         | ---         | 0              | 102         | 102         | 103                 | 23          | 102         | 102                  | 103         | 23          | 103        | 103        | 104         | 23        |
| 3/19 | ---                   | ---         | ---         | 0                  | ---         | ---        | ---         | 0                        | ---        | ---         | ---         | 0              | 104         | 105         | 106                 | 23          | 104         | 105                  | 105         | 23          | 104        | 105        | 105         | 23        |

**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>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> |
| 3/6  | ---                    | ---         | ---         | 0               | 105         | 105        | 106         | 12                | ---        | ---         | ---         | 0                     | ---         | ---         | ---         | 0                    | 103         | 103        | 103                    | 24          | 102        | 102        | 102         | 24        |
| 3/7  | ---                    | ---         | ---         | 0               | ---         | ---        | ---         | 0                 | ---        | ---         | ---         | 0                     | ---         | ---         | ---         | 0                    | 102         | 102        | 102                    | 2           | 101        | 101        | 101         | 2         |
| 3/8  | ---                    | ---         | ---         | 0               | ---         | ---        | ---         | 0                 | ---        | ---         | ---         | 0                     | ---         | ---         | ---         | 0                    | 102         | 102        | 102                    | 24          | 101        | 101        | 102         | 24        |
| 3/9  | ---                    | ---         | ---         | 0               | 106         | 107        | 107         | 24                | ---        | ---         | ---         | 0                     | ---         | ---         | ---         | 0                    | 101         | 101        | 102                    | 21          | 101        | 103        | 110         | 24        |
| 3/10 | ---                    | ---         | ---         | 0               | 105         | 106        | 107         | 24                | ---        | ---         | ---         | 0                     | ---         | ---         | ---         | 0                    | 101         | 102        | 102                    | 24          | 101        | 102        | 104         | 24        |
| 3/11 | ---                    | ---         | ---         | 0               | 106         | 106        | 107         | 24                | ---        | ---         | ---         | 0                     | ---         | ---         | ---         | 0                    | 102         | 102        | 103                    | 24          | 101        | 102        | 103         | 24        |
| 3/12 | ---                    | ---         | ---         | 0               | 106         | 107        | 108         | 24                | ---        | ---         | ---         | 0                     | ---         | ---         | ---         | 0                    | 103         | 103        | 103                    | 2           | 101        | 101        | 101         | 2         |
| 3/13 | ---                    | ---         | ---         | 0               | 106         | 108        | 111         | 24                | ---        | ---         | ---         | 0                     | ---         | ---         | ---         | 0                    | 104         | 105        | 105                    | 24          | 103        | 103        | 103         | 24        |
| 3/14 | ---                    | ---         | ---         | 0               | 108         | 109        | 113         | 24                | ---        | ---         | ---         | 0                     | ---         | ---         | ---         | 0                    | 104         | 105        | 106                    | 24          | 103        | 103        | 104         | 24        |
| 3/15 | ---                    | ---         | ---         | 0               | 107         | 108        | 108         | 24                | ---        | ---         | ---         | 0                     | ---         | ---         | ---         | 0                    | 105         | 105        | 105                    | 2           | 103        | 103        | 103         | 2         |
| 3/16 | ---                    | ---         | ---         | 0               | 112         | 115        | 115         | 24                | ---        | ---         | ---         | 0                     | ---         | ---         | ---         | 0                    | 104         | 105        | 105                    | 24          | 104        | 104        | 104         | 24        |
| 3/17 | ---                    | ---         | ---         | 0               | 116         | 116        | 116         | 24                | ---        | ---         | ---         | 0                     | ---         | ---         | ---         | 0                    | 103         | 103        | 104                    | 24          | 103        | 103        | 103         | 24        |
| 3/18 | ---                    | ---         | ---         | 0               | 115         | 115        | 116         | 6                 | ---        | ---         | ---         | 0                     | ---         | ---         | ---         | 0                    | 103         | 104        | 106                    | 24          | 102        | 102        | 102         | 24        |
| 3/19 | ---                    | ---         | ---         | 0               | ---         | ---        | ---         | 0                 | ---        | ---         | ---         | 0                     | ---         | ---         | ---         | 0                    | 103         | 104        | 104                    | 24          | 102        | 102        | 103         | 24        |

<sup>1</sup> Data provided by the Corps of Engineers

<sup>2</sup> Dissolved gas readings and averages have been rounded to the nearest integer.

Total Dissolved Gas Saturation (%) - Average of  
12 Highest Hours, 24 h Average and 24 h High<sup>2</sup>

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 |     |     |     |    |
| 3/6  | ---                 | ---         | ---      | 0                     | ---         | ---      | ---               | 0           | 101      | 101                 | 102         | 24       | ---               | ---         | ---      | 0                       | 101         | 101      | 102  | 24 | 107 | 112 | 117 | 24 |
| 3/7  | ---                 | ---         | ---      | 0                     | ---         | ---      | ---               | 0           | 100      | 100                 | 101         | 24       | ---               | ---         | ---      | 0                       | 101         | 101      | 101  | 24 | 107 | 112 | 117 | 24 |
| 3/8  | ---                 | ---         | ---      | 0                     | ---         | ---      | ---               | 0           | 100      | 100                 | 101         | 24       | ---               | ---         | ---      | 0                       | 100         | 101      | 101  | 24 | 101 | 101 | 102 | 24 |
| 3/9  | ---                 | ---         | ---      | 0                     | ---         | ---      | ---               | 0           | 99       | 99                  | 100         | 24       | ---               | ---         | ---      | 0                       | 100         | 100      | 100  | 24 | 109 | 115 | 119 | 24 |
| 3/10 | ---                 | ---         | ---      | 0                     | ---         | ---      | ---               | 0           | 100      | 100                 | 100         | 24       | ---               | ---         | ---      | 0                       | 99          | 100      | 100  | 24 | 100 | 100 | 101 | 24 |
| 3/11 | ---                 | ---         | ---      | 0                     | ---         | ---      | ---               | 0           | 101      | 101                 | 104         | 24       | ---               | ---         | ---      | 0                       | 100         | 101      | 103  | 24 | 100 | 101 | 101 | 24 |
| 3/12 | ---                 | ---         | ---      | 0                     | ---         | ---      | ---               | 0           | 102      | 102                 | 102         | 2        | ---               | ---         | ---      | 0                       | 101         | 102      | 103  | 24 | 101 | 102 | 102 | 24 |
| 3/13 | ---                 | ---         | ---      | 0                     | ---         | ---      | ---               | 0           | ---      | ---                 | ---         | 0        | ---               | ---         | ---      | 0                       | 103         | 103      | 104  | 24 | 102 | 103 | 103 | 24 |
| 3/14 | ---                 | ---         | ---      | 0                     | ---         | ---      | ---               | 0           | ---      | ---                 | ---         | 0        | ---               | ---         | ---      | 0                       | 102         | 103      | 104  | 24 | 102 | 102 | 103 | 24 |
| 3/15 | ---                 | ---         | ---      | 0                     | ---         | ---      | ---               | 0           | ---      | ---                 | ---         | 0        | ---               | ---         | ---      | 0                       | 102         | 102      | 103  | 24 | 102 | 102 | 102 | 24 |
| 3/16 | ---                 | ---         | ---      | 0                     | ---         | ---      | ---               | 0           | 103      | 103                 | 104         | 24       | ---               | ---         | ---      | 0                       | 102         | 102      | 102  | 14 | 102 | 103 | 104 | 14 |
| 3/17 | ---                 | ---         | ---      | 0                     | ---         | ---      | ---               | 0           | 102      | 103                 | 103         | 24       | ---               | ---         | ---      | 0                       | 101         | 101      | 102  | 24 | 102 | 102 | 103 | 24 |
| 3/18 | ---                 | ---         | ---      | 0                     | ---         | ---      | ---               | 0           | 103      | 103                 | 104         | 24       | ---               | ---         | ---      | 0                       | 102         | 102      | 104  | 24 | 102 | 102 | 102 | 24 |
| 3/19 | ---                 | ---         | ---      | 0                     | ---         | ---      | ---               | 0           | 103      | 103                 | 104         | 24       | ---               | ---         | ---      | 0                       | 102         | 103      | 105  | 24 | 102 | 103 | 103 | 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 |     |     |     |   |
| 3/6  | 103                  | 104         | 104      | 24                  | 103         | 103      | 104                 | 24          | 103      | 103             | 103         | 24       | ---                   | ---         | ---      | 0                 | ---         | ---      | ---  | 0  | --- | --- | --- | 0 |
| 3/7  | 103                  | 104         | 104      | 24                  | 103         | 103      | 104                 | 24          | 103      | 104             | 104         | 24       | ---                   | ---         | ---      | 0                 | ---         | ---      | ---  | 0  | --- | --- | --- | 0 |
| 3/8  | 104                  | 105         | 105      | 24                  | 105         | 106      | 106                 | 24          | 105      | 106             | 106         | 24       | ---                   | ---         | ---      | 0                 | ---         | ---      | ---  | 0  | --- | --- | --- | 0 |
| 3/9  | 105                  | 105         | 106      | 24                  | 105         | 106      | 106                 | 24          | 105      | 106             | 106         | 24       | ---                   | ---         | ---      | 0                 | ---         | ---      | ---  | 0  | --- | --- | --- | 0 |
| 3/10 | 106                  | 106         | 107      | 24                  | 106         | 106      | 106                 | 24          | 105      | 106             | 106         | 24       | ---                   | ---         | ---      | 0                 | ---         | ---      | ---  | 0  | --- | --- | --- | 0 |
| 3/11 | 104                  | 104         | 106      | 7                   | 104         | 104      | 105                 | 7           | 104      | 104             | 104         | 7        | ---                   | ---         | ---      | 0                 | ---         | ---      | ---  | 0  | --- | --- | --- | 0 |
| 3/12 | ---                  | ---         | ---      | 0                   | ---         | ---      | ---                 | 0           | ---      | ---             | ---         | 0        | ---                   | ---         | ---      | 0                 | ---         | ---      | ---  | 0  | --- | --- | --- | 0 |
| 3/13 | 105                  | 106         | 108      | 24                  | 105         | 106      | 107                 | 24          | 104      | 104             | 105         | 24       | ---                   | ---         | ---      | 0                 | ---         | ---      | ---  | 0  | --- | --- | --- | 0 |
| 3/14 | 104                  | 105         | 105      | 24                  | 104         | 105      | 105                 | 24          | 104      | 104             | 104         | 24       | ---                   | ---         | ---      | 0                 | ---         | ---      | ---  | 0  | --- | --- | --- | 0 |
| 3/15 | 104                  | 104         | 104      | 2                   | 105         | 105      | 105                 | 2           | 104      | 104             | 104         | 2        | ---                   | ---         | ---      | 0                 | ---         | ---      | ---  | 0  | --- | --- | --- | 0 |
| 3/16 | 104                  | 105         | 105      | 24                  | 104         | 105      | 105                 | 24          | 104      | 104             | 105         | 24       | ---                   | ---         | ---      | 0                 | ---         | ---      | ---  | 0  | --- | --- | --- | 0 |
| 3/17 | 104                  | 104         | 105      | 24                  | 104         | 104      | 104                 | 24          | 107      | 110             | 111         | 24       | ---                   | ---         | ---      | 0                 | ---         | ---      | ---  | 0  | --- | --- | --- | 0 |
| 3/18 | 103                  | 104         | 105      | 24                  | 104         | 105      | 106                 | 24          | 110      | 110             | 111         | 24       | ---                   | ---         | ---      | 0                 | ---         | ---      | ---  | 0  | --- | --- | --- | 0 |
| 3/19 | 103                  | 104         | 104      | 24                  | 104         | 104      | 105                 | 24          | 107      | 109             | 110         | 24       | ---                   | ---         | ---      | 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>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 |     |     |     |    |
| 3/6  | ---                    | ---         | ---      | 0                 | 102         | 102      | 103               | 24          | 102      | 103             | 103         | 24       | 102                | 102         | 103      | 24                | 100         | 101      | 101  | 22 | 103 | 104 | 104 | 23 |
| 3/7  | ---                    | ---         | ---      | 0                 | 102         | 103      | 103               | 24          | 103      | 103             | 103         | 24       | 102                | 102         | 103      | 24                | 100         | 101      | 102  | 22 | 104 | 104 | 104 | 23 |
| 3/8  | ---                    | ---         | ---      | 0                 | 102         | 103      | 103               | 24          | 103      | 103             | 104         | 24       | 102                | 102         | 103      | 24                | 101         | 101      | 101  | 21 | 103 | 103 | 104 | 23 |
| 3/9  | ---                    | ---         | ---      | 0                 | 103         | 103      | 103               | 24          | 103      | 103             | 103         | 24       | 102                | 102         | 103      | 24                | 101         | 101      | 101  | 22 | 103 | 103 | 103 | 23 |
| 3/10 | ---                    | ---         | ---      | 0                 | 103         | 103      | 103               | 24          | 103      | 104             | 104         | 24       | 103                | 103         | 103      | 23                | 102         | 102      | 103  | 19 | 103 | 103 | 103 | 23 |
| 3/11 | ---                    | ---         | ---      | 0                 | 104         | 104      | 105               | 24          | 105      | 105             | 106         | 24       | 104                | 104         | 105      | 24                | 104         | 105      | 105  | 23 | 104 | 104 | 105 | 23 |
| 3/12 | ---                    | ---         | ---      | 0                 | 105         | 105      | 105               | 24          | 106      | 106             | 106         | 24       | 105                | 105         | 105      | 24                | 104         | 105      | 105  | 23 | 105 | 105 | 105 | 23 |
| 3/13 | ---                    | ---         | ---      | 0                 | 105         | 105      | 105               | 24          | 106      | 106             | 109         | 24       | 105                | 105         | 106      | 24                | 105         | 106      | 106  | 23 | 105 | 105 | 106 | 23 |
| 3/14 | ---                    | ---         | ---      | 0                 | 105         | 105      | 105               | 24          | 109      | 110             | 110         | 24       | 107                | 107         | 108      | 24                | 107         | 109      | 110  | 23 | 105 | 105 | 105 | 23 |
| 3/15 | ---                    | ---         | ---      | 0                 | 105         | 105      | 105               | 24          | 107      | 108             | 108         | 24       | 106                | 106         | 107      | 24                | 107         | 107      | 108  | 23 | 105 | 105 | 106 | 23 |
| 3/16 | ---                    | ---         | ---      | 0                 | 105         | 105      | 105               | 24          | 107      | 108             | 109         | 24       | 106                | 107         | 108      | 24                | 107         | 107      | 108  | 23 | 105 | 105 | 106 | 23 |
| 3/17 | ---                    | ---         | ---      | 0                 | 104         | 104      | 104               | 24          | 111      | 112             | 127         | 24       | 115                | 122         | 122      | 24                | 107         | 109      | 110  | 23 | 106 | 106 | 107 | 23 |
| 3/18 | ---                    | ---         | ---      | 0                 | 104         | 105      | 105               | 24          | 110      | 112             | 119         | 24       | 114                | 120         | 122      | 24                | 108         | 108      | 109  | 23 | 106 | 107 | 107 | 23 |
| 3/19 | ---                    | ---         | ---      | 0                 | 105         | 105      | 106               | 24          | 110      | 111             | 112         | 24       | 108                | 109         | 110      | 24                | 107         | 108      | 108  | 23 | 107 | 108 | 108 | 23 |

<sup>1</sup> Data provided by the Corps of Engineers

<sup>2</sup> Dissolved gas readings and averages have been rounded to the nearest integer.

## Two-Week Summary of Passage Indices

| Date            | Yearling Chinook |               |               |               |                |                |                | Hatchery/Wild Combined |     |     |       |
|-----------------|------------------|---------------|---------------|---------------|----------------|----------------|----------------|------------------------|-----|-----|-------|
|                 | Hatchery         |               |               |               |                |                |                | RIS                    | MCN | JDA | BO1   |
|                 | WTB<br>(Coll)    | IMN<br>(Coll) | GRN<br>(Coll) | LEW<br>(Coll) | LGR<br>(INDEX) | LGS<br>(INDEX) | LMN<br>(INDEX) |                        |     |     |       |
| 03/06/98        | ---              | 0             | ---           | ---           | ---            | ---            | ---            | ---                    | --- | --- | ---   |
| 03/07/98        | ---              | ---           | ---           | ---           | ---            | ---            | ---            | ---                    | --- | --- | ---   |
| 03/08/98        | ---              | ---           | ---           | ---           | ---            | ---            | ---            | ---                    | --- | --- | ---   |
| 03/09/98        | ---              | 0             | ---           | 0             | ---            | ---            | ---            | ---                    | --- | --- | 39    |
| 03/10/98        | 0                | 0             | ---           | 0             | ---            | ---            | ---            | ---                    | --- | --- | 59    |
| 03/11/98        | 0                | 0             | ---           | 0             | ---            | ---            | ---            | ---                    | --- | --- | ---   |
| 03/12/98        | 0                | 0             | ---           | 0             | ---            | ---            | ---            | ---                    | --- | --- | 40    |
| 03/13/98        | 0                | 0             | ---           | 0             | ---            | ---            | ---            | ---                    | --- | --- | 134   |
| 03/14/98        | ---              | ---           | ---           | ---           | ---            | ---            | ---            | ---                    | --- | --- | 610   |
| 03/15/98        | ---              | ---           | ---           | ---           | ---            | ---            | ---            | ---                    | --- | --- | 152   |
| 03/16/98        | ---              | 0             | 0             | 0             | ---            | ---            | ---            | ---                    | --- | --- | 76    |
| 03/17/98        | 4                | 0             | 0             | 0             | ---            | ---            | ---            | ---                    | --- | --- | 259   |
| 03/18/98        | ---              | 0             | 0             | 0             | ---            | ---            | ---            | ---                    | --- | --- | 238   |
| 03/19/98        | 168              | 0             | 0             | 1             | ---            | ---            | ---            | ---                    | --- | --- | 220   |
| <b>Total:</b>   | 172              | 0             | 0             | 1             | 0              | 0              | 0              | 0                      | 0   | 0   | 1,827 |
| <b># Days:</b>  | 6                | 10            | 4             | 9             | 0              | 0              | 0              | 0                      | 0   | 0   | 10    |
| <b>Average:</b> | 29               | 0             | 0             | 0             | 0              | 0              | 0              | 0                      | 0   | 0   | 183   |

| Date            | Wild Yearling Chinook |               |               |               |                |                |                | Wild Subyearling Chinook |                |                |
|-----------------|-----------------------|---------------|---------------|---------------|----------------|----------------|----------------|--------------------------|----------------|----------------|
|                 | WTB<br>(Coll)         | IMN<br>(Coll) | GRN<br>(Coll) | LEW<br>(Coll) | LGR<br>(INDEX) | LGS<br>(INDEX) | LMN<br>(INDEX) | LGR<br>(INDEX)           | LGS<br>(INDEX) | LMN<br>(INDEX) |
| 03/06/98        | ---                   | 5             | ---           | ---           | ---            | ---            | ---            | ---                      | ---            | ---            |
| 03/07/98        | ---                   | ---           | ---           | ---           | ---            | ---            | ---            | ---                      | ---            | ---            |
| 03/08/98        | ---                   | ---           | ---           | ---           | ---            | ---            | ---            | ---                      | ---            | ---            |
| 03/09/98        | ---                   | 4             | ---           | 0             | ---            | ---            | ---            | ---                      | ---            | ---            |
| 03/10/98        | 0                     | 2             | ---           | 0             | ---            | ---            | ---            | ---                      | ---            | ---            |
| 03/11/98        | 0                     | 0             | ---           | 0             | ---            | ---            | ---            | ---                      | ---            | ---            |
| 03/12/98        | 0                     | 4             | ---           | 0             | ---            | ---            | ---            | ---                      | ---            | ---            |
| 03/13/98        | 0                     | 10            | ---           | 0             | ---            | ---            | ---            | ---                      | ---            | ---            |
| 03/14/98        | ---                   | ---           | ---           | ---           | ---            | ---            | ---            | ---                      | ---            | ---            |
| 03/15/98        | ---                   | ---           | ---           | ---           | ---            | ---            | ---            | ---                      | ---            | ---            |
| 03/16/98        | ---                   | 239           | 14            | 0             | ---            | ---            | ---            | ---                      | ---            | ---            |
| 03/17/98        | 2                     | 464           | 10            | 0             | ---            | ---            | ---            | ---                      | ---            | ---            |
| 03/18/98        | ---                   | 501           | 20            | 0             | ---            | ---            | ---            | ---                      | ---            | ---            |
| 03/19/98        | 61                    | 317           | 14            | 1             | ---            | ---            | ---            | ---                      | ---            | ---            |
| <b>Total:</b>   | 63                    | 1,546         | 58            | 1             | 0              | 0              | 0              | 0                        | 0              | 0              |
| <b># Days:</b>  | 6                     | 10            | 4             | 9             | 0              | 0              | 0              | 0                        | 0              | 0              |
| <b>Average:</b> | 11                    | 155           | 15            | 0             | 0              | 0              | 0              | 0                        | 0              | 0              |

**Smolt Monitoring Program (SMP) site definitions:** Juvenile salmonids are sampled for the SMP at 11 dams or traps. Passage values are reported here as either collection or index counts. Collection counts are expanded, if necessary, for sub-sampling effort. Index counts are further expanded to account for non-sampled flow volume. Data are collected at Rock Island Dam PH2 (RIS) by Chelan Co. PUD. ODFW operates the Grande Ronde trap (GRN), and reports on data collected at Little Goose Dam (LGS). IDFG operates the Salmon River trap (LEW). The Nex Perce Tribe operates a trap on the Imnaha River (IMN). WDFW reports data from the collection facilities at Lower Granite Dam (LGR); Lower Monumental Dam (LMN); and McNary Dam (MCN). NMFS samples the Unit 3B gatewell at John Day Dam (JDA), and provides an index value based on 8 hour sampling at Bonneville PH1 (BON).

## Two-Week Summary of Passage Indices

| Date            | Hatchery Subyearling Chinook |               |               |               |                |                |                | Combined Subyearling Chinook |                |                |                |
|-----------------|------------------------------|---------------|---------------|---------------|----------------|----------------|----------------|------------------------------|----------------|----------------|----------------|
|                 | WTB<br>(Coll)                | IMN<br>(Coll) | GRN<br>(Coll) | LEW<br>(Coll) | LGR<br>(INDEX) | LGS<br>(INDEX) | LMN<br>(INDEX) | RIS<br>(INDEX)               | MCN<br>(INDEX) | JDA<br>(INDEX) | BO1<br>(INDEX) |
| 03/06/98        | ---                          | 0             | ---           | ---           | 0              | ---            | ---            | ---                          | ---            | ---            | ---            |
| 03/07/98        | ---                          | ---           | ---           | ---           | ---            | ---            | ---            | ---                          | ---            | ---            | ---            |
| 03/08/98        | ---                          | ---           | ---           | ---           | 0              | ---            | ---            | ---                          | ---            | ---            | ---            |
| 03/09/98        | ---                          | 0             | ---           | 0             | ---            | ---            | ---            | ---                          | ---            | ---            | 0              |
| 03/10/98        | 0                            | 0             | ---           | 0             | ---            | ---            | ---            | ---                          | ---            | ---            | 15             |
| 03/11/98        | 0                            | 0             | ---           | 0             | 0              | ---            | ---            | ---                          | ---            | ---            | ---            |
| 03/12/98        | 0                            | 0             | ---           | 0             | ---            | ---            | ---            | ---                          | ---            | ---            | 50             |
| 03/13/98        | 0                            | 0             | ---           | 0             | ---            | ---            | ---            | ---                          | ---            | ---            | 67             |
| 03/14/98        | ---                          | ---           | ---           | ---           | ---            | ---            | ---            | ---                          | ---            | ---            | 68,537         |
| 03/15/98        | ---                          | ---           | ---           | ---           | ---            | ---            | ---            | ---                          | ---            | ---            | 97,799         |
| 03/16/98        | ---                          | 0             | 0             | 0             | ---            | ---            | ---            | ---                          | ---            | ---            | 29,807         |
| 03/17/98        | 0                            | 0             | 0             | 0             | ---            | ---            | ---            | ---                          | ---            | ---            | 11,368         |
| 03/18/98        | ---                          | 0             | 0             | 0             | ---            | ---            | ---            | ---                          | ---            | ---            | 9,790          |
| 03/19/98        | 0                            | 0             | 0             | 0             | ---            | ---            | ---            | ---                          | ---            | ---            | 3,740          |
| <b>Total:</b>   | 0                            | 0             | 0             | 0             | 0              | 0              | 0              | 0                            | 0              | 0              | 221,173        |
| <b># Days:</b>  | 6                            | 10            | 4             | 9             | 3              | 0              | 0              | 0                            | 0              | 0              | 10             |
| <b>Average:</b> | 0                            | 0             | 0             | 0             | 0              | 0              | 0              | 0                            | 0              | 0              | 22,117         |

| Date            | All Coho      |               |               |               |                |                |                |                |                |                |                |
|-----------------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                 | WTB<br>(Coll) | IMN<br>(Coll) | GRN<br>(Coll) | LEW<br>(Coll) | LGR<br>(INDEX) | LGS<br>(INDEX) | LMN<br>(INDEX) | RIS<br>(INDEX) | MCN<br>(INDEX) | JDA<br>(INDEX) | BO1<br>(INDEX) |
| 03/06/98        | ---           | 0             | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | ---            |
| 03/07/98        | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | ---            |
| 03/08/98        | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | ---            |
| 03/09/98        | ---           | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/10/98        | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/11/98        | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | ---            |
| 03/12/98        | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/13/98        | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/14/98        | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/15/98        | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/16/98        | ---           | 0             | 0             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 303            |
| 03/17/98        | 0             | 0             | 0             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/18/98        | ---           | 0             | 0             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/19/98        | 0             | 0             | 0             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 34             |
| <b>Total:</b>   | 0             | 0             | 0             | 0             | 0              | 0              | 0              | 0              | 0              | 0              | 337            |
| <b># Days:</b>  | 6             | 10            | 4             | 9             | 0              | 0              | 0              | 0              | 0              | 0              | 10             |
| <b>Average:</b> | 0             | 0             | 0             | 0             | 0              | 0              | 0              | 0              | 0              | 0              | 34             |

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## Two-Week Summary of Passage Indices

| Hatchery Steelhead |               |               |               |               |                |                |                |                |                |                |                |  |
|--------------------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--|
| Date               | WTB<br>(Coll) | IMN<br>(Coll) | GRN<br>(Coll) | LEW<br>(Coll) | LGR<br>(INDEX) | LGS<br>(INDEX) | LMN<br>(INDEX) | RIS<br>(INDEX) | MCN<br>(INDEX) | JDA<br>(INDEX) | BO1<br>(INDEX) |  |
| 03/06/98           | ---           | 0             | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | ---            |  |
| 03/07/98           | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | ---            |  |
| 03/08/98           | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | ---            |  |
| 03/09/98           | ---           | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/10/98           | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/11/98           | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | ---            |  |
| 03/12/98           | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/13/98           | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/14/98           | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/15/98           | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/16/98           | ---           | 0             | 0             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/17/98           | 0             | 0             | 0             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/18/98           | ---           | 0             | 0             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/19/98           | 0             | 0             | 0             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| <b>Total:</b>      | 0             | 0             | 0             | 0             | 0              | 0              | 0              | 0              | 0              | 0              | 0              |  |
| <b># Days:</b>     | 6             | 10            | 4             | 9             | 0              | 0              | 0              | 0              | 0              | 0              | 10             |  |
| <b>Average:</b>    | 0             | 0             | 0             | 0             | 0              | 0              | 0              | 0              | 0              | 0              | 0              |  |

| Wild Steelhead  |               |               |               |               |                |                |                |                |                |                |                |  |
|-----------------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--|
| Date            | WTB<br>(Coll) | IMN<br>(Coll) | GRN<br>(Coll) | LEW<br>(Coll) | LGR<br>(INDEX) | LGS<br>(INDEX) | LMN<br>(INDEX) | RIS<br>(INDEX) | MCN<br>(INDEX) | JDA<br>(INDEX) | BO1<br>(INDEX) |  |
| 03/06/98        | ---           | 0             | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | ---            |  |
| 03/07/98        | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | ---            |  |
| 03/08/98        | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | ---            |  |
| 03/09/98        | ---           | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/10/98        | 0             | 1             | ---           | 1             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/11/98        | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | ---            |  |
| 03/12/98        | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/13/98        | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/14/98        | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/15/98        | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/16/98        | ---           | 2             | 1             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/17/98        | 0             | 15            | 1             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/18/98        | ---           | 24            | 1             | 1             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| 03/19/98        | 0             | 9             | 1             | 1             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |  |
| <b>Total:</b>   | 0             | 51            | 4             | 3             | 0              | 0              | 0              | 0              | 0              | 0              | 0              |  |
| <b># Days:</b>  | 6             | 10            | 4             | 9             | 0              | 0              | 0              | 0              | 0              | 0              | 10             |  |
| <b>Average:</b> | 0             | 5             | 1             | 0             | 0              | 0              | 0              | 0              | 0              | 0              | 0              |  |

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## Two-Week Summary of Passage Indices

| Hatchery Sockeye |               |               |               |               |                |                |                |                |                |                |                |
|------------------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Date             | WTB<br>(Coll) | IMN<br>(Coll) | GRN<br>(Coll) | LEW<br>(Coll) | LGR<br>(INDEX) | LGS<br>(INDEX) | LMN<br>(INDEX) | RIS<br>(INDEX) | MCN<br>(INDEX) | JDA<br>(INDEX) | BO1<br>(INDEX) |
| 03/06/98         | ---           | 0             | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | ---            |
| 03/07/98         | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | ---            |
| 03/08/98         | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | ---            |
| 03/09/98         | ---           | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/10/98         | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/11/98         | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | ---            |
| 03/12/98         | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/13/98         | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/14/98         | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/15/98         | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/16/98         | ---           | 0             | 0             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/17/98         | 0             | 0             | 0             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/18/98         | ---           | 0             | 0             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/19/98         | 0             | 0             | 0             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| <b>Total:</b>    | 0             | 0             | 0             | 0             | 0              | 0              | 0              | 0              | 0              | 0              | 0              |
| <b># Days:</b>   | 6             | 10            | 4             | 9             | 0              | 0              | 0              | 0              | 0              | 0              | 10             |
| <b>Average:</b>  | 0             | 0             | 0             | 0             | 0              | 0              | 0              | 0              | 0              | 0              | 0              |

| Wild Sockeye    |               |               |               |               |                |                |                |                |                |                |                |
|-----------------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Date            | WTB<br>(Coll) | IMN<br>(Coll) | GRN<br>(Coll) | LEW<br>(Coll) | LGR<br>(INDEX) | LGS<br>(INDEX) | LMN<br>(INDEX) | RIS<br>(INDEX) | MCN<br>(INDEX) | JDA<br>(INDEX) | BO1<br>(INDEX) |
| 03/06/98        | ---           | 0             | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | ---            |
| 03/07/98        | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | ---            |
| 03/08/98        | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | ---            |
| 03/09/98        | ---           | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/10/98        | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/11/98        | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | ---            |
| 03/12/98        | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/13/98        | 0             | 0             | ---           | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/14/98        | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/15/98        | ---           | ---           | ---           | ---           | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/16/98        | ---           | 0             | 0             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/17/98        | 0             | 0             | 0             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/18/98        | ---           | 0             | 0             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| 03/19/98        | 0             | 0             | 0             | 0             | ---            | ---            | ---            | ---            | ---            | ---            | 0              |
| <b>Total:</b>   | 0             | 0             | 0             | 0             | 0              | 0              | 0              | 0              | 0              | 0              | 0              |
| <b># Days:</b>  | 6             | 10            | 4             | 9             | 0              | 0              | 0              | 0              | 0              | 0              | 10             |
| <b>Average:</b> | 0             | 0             | 0             | 0             | 0              | 0              | 0              | 0              | 0              | 0              | 0              |

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Adult Fish Counts of Chinook and Steelhead at Bonneville & Lower Granite Dams

|                      | <b>Chinook</b> |             |                  | <b>Steelhead</b> |             |                  |
|----------------------|----------------|-------------|------------------|------------------|-------------|------------------|
| <b>Site</b>          | <b>1998</b>    | <b>1997</b> | <b>10-yr Ave</b> | <b>1998</b>      | <b>1997</b> | <b>10-yr Ave</b> |
| <b>Bonneville</b>    | 28             | 112         | 44               | 68               | 147         | 164              |
| <b>Lower Granite</b> | 0              | 0           | 0                | 789              | 848         | 740              |

1998 counts are through 3/14 at Lower Granite Dam.

1998 counts are through 3/17 at Bonneville Dam.

The U. S. Army Corps of Engineers provided all fish count data for 1998 and previous years.