



# FISH PASSAGE CENTER

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## MEMORANDUM

TO: FPAC

*Michele DeHart*

FROM: Michele DeHart

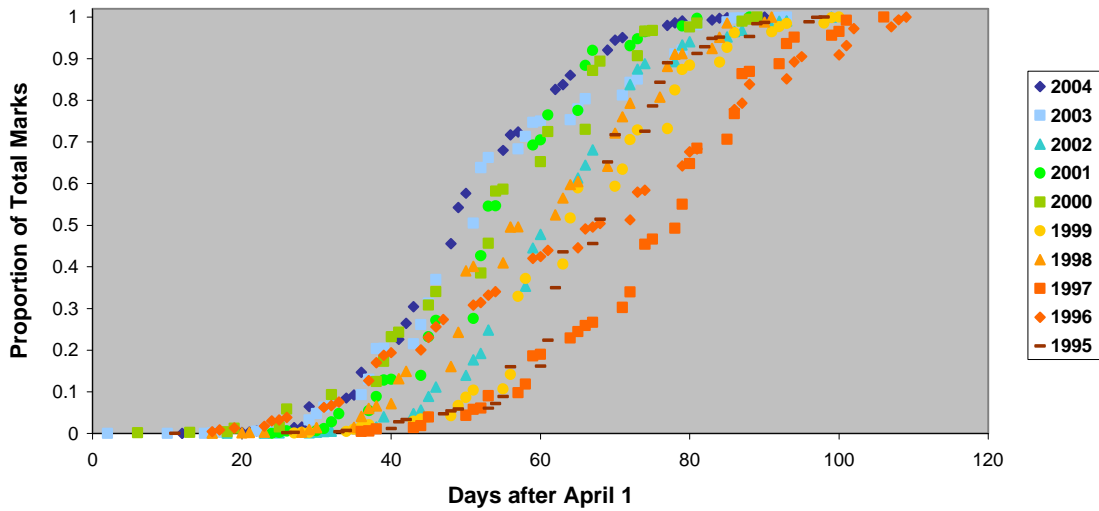
DATE: August 16, 2004

RE: Status of 2004 Fall Chinook Migration

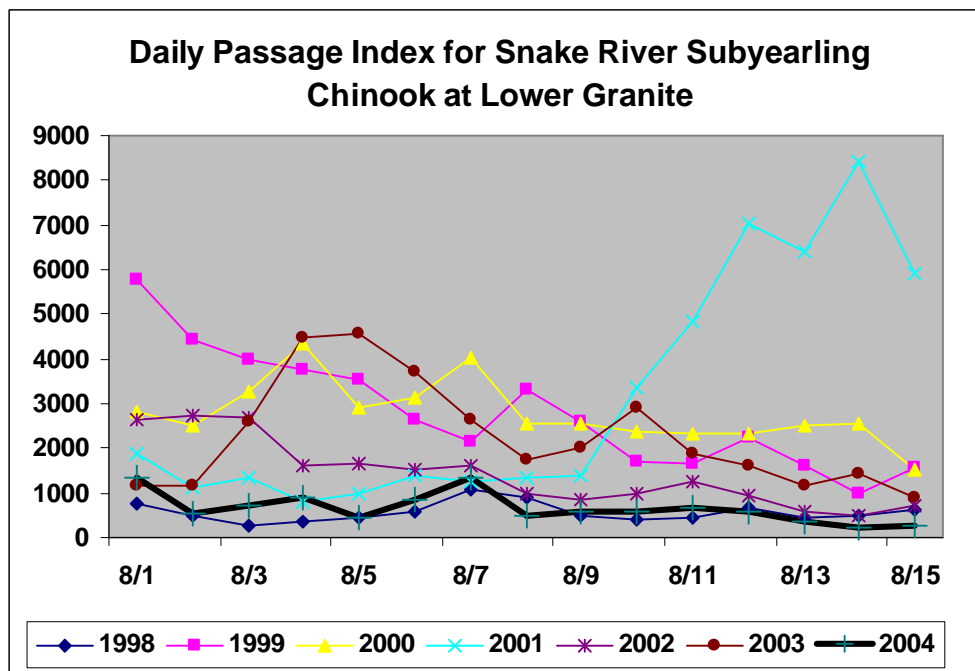
It is the time of year when people start looking at the decreasing fall chinook numbers and begin asking if the fall chinook migration from the Snake River is over. Often that question is based on predictions of the percent passage at Lower Granite Dam based on PIT tagged fish. Often overlooked in these analyses of percent passage are the inherent limitations associated with the marking program, and subsequent travel time and passage of fish through the mainstem Snake and lower Columbia Rivers. We are providing the following brief points updating subyearling chinook downstream passage on the basis of the present available information.

- As we have stated many times before, relying only on passage timing as determined on the basis of wild PIT tag recoveries has considerable limitation. Marking of the wild fall chinook is limited by two factors, the first is size at time of marking and the second is availability of fish to mark. As fish grow and mature they move from near shore areas and decrease in availability to beach seining techniques used for collection. Consequently, it is difficult to determine the portion of the run that is represented by the wild PIT tagged fall chinook. Likely, because of the accessibility of early fish the PIT tagged distribution is skewed early.
- The following graph shows the proportion of fish tagged by day beginning April 1. This graph shows that in the last few years marking has been earlier than observed in the other recent years. To some extent this represents the earlier emergence observed in these years. This may explain the earlier timing of PIT tags observed at Lower Granite Dam, but it does not address the fact that we do not know what proportion of the run is tagged under this program. When we look at the earlier years of data we know that the PIT tagged group generally yielded an earlier 95% passage date than the run-at-large passage index, suggesting an early bias to these data.

### Release/Mark Timing of WPC 15W in Snake River 1995 to 2004



- Passage at Lower Granite Dam does not represent passage through the Snake River. Even if fish have completed passage at Lower Granite, this does not account for the passage of these later fish through the Snake River and into the Lower Columbia River. Median Travel Time of Snake Origin wild subyearlings in 2004, from Lower Granite Dam to Bonneville Dam was 24.9 days, which means in-river migrants passing Lower Granite in July will pass Bonneville Dam through the end of August.
- The daily passage index at Lower Granite Dam for subyearling chinook is not any different than observed in past years' for passage during this time period.



- While smaller numbers of juveniles migrate during late July and August, it appears that the contribution of later migrating fall chinook to the overall adult survival appears to be very important. PIT tagged adult fall chinook actual returns from 1994 through 2001, that were detected as juveniles, indicate that a large proportion of the fall chinook that survived to return as adults migrated, as juveniles, past Ice Harbor in late July and August and past McNary in August.
- The following tables show the proportion of adult PIT tagged fall chinook returns, which passed McNary and Lower Granite Dam in August versus July as juveniles. These tables show that a significant proportion of returning adults may pass the projects in August. In addition, with an average 15 –20 day travel time from Lower Granite to Ice Harbor, the juvenile data indicates that a large proportion of Snake River juvenile fall chinook that survive to adult pass through the lower Columbia River in August.

**Table 1. Juvenile Passage Timing, at Lower Granite Dam of PIT tagged fall chinook, which survived to return as adults**

<b>Year Juvenile Migration</b>	<b>Transported 6/20-7/31 (%)</b>	<b>Transported 8/1-8/31 (%)</b>	<b>In-River 6/20-7/31 (%)</b>	<b>In-River 8/1-8/31 (%)</b>
1995	16.67	16.67	16.67	36.67
1996	0.00	50.00	12.20	43.90
1997	50.00	0.00	45.95	21.62
1998	80.00	0.00	38.00	28.00
1999	26.32	68.42	30.98	26.63
2000	0.00	33.33	39.13	21.74
2001	33.33	17.95	44.83	31.03

**Table 2. Juvenile Passage Timing, at McNary Dam of PIT tagged fall chinook, which survived to return as adults.**

<b>Year Juvenile Migration</b>	<b>Transported 7/1-7/31 (%)</b>	<b>Transported 8/1-8/31 (%)</b>	<b>In-River 7/1-7/31 (%)</b>	<b>In-River 8/1-8/31 (%)</b>
1995	0.00	0.00	10.53	10.53
1996	0.00	0.00	0.00	50.00
1997	0.00	0.00	38.46	46.15
1998	0.00	50.00	53.85	46.15
1999	0.00	100.00	17.07	70.73
2000	0.00	0.00	37.50	37.50
2001	50.00	0.00	16.67	16.67

- It is difficult to forecast 100% passage timing at Lower Granite with a great accuracy. In 2003 the tail end of PIT-tag Snake River origin subyearling migration was protracted, with the last detections occurring in October (detections end October 31 when the bypass was shut down despite 95% passage occurring in July).

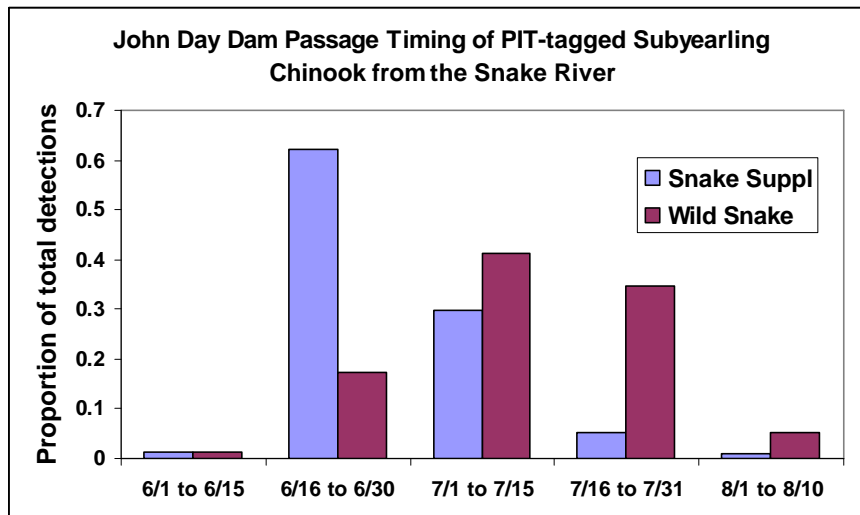
- In addition, the run-at-large 95% passage date appears to be getting earlier as the years progress. This is in part an artifact of the large numbers of supplementation fish that are being added to the system. (Passage indices at Lower Granite Dam ranged from a low of 18,500 in 1996 to near 1 million predicted for 2004). These supplementation fish are migrating earlier and in large numbers, which skews the distribution to look like it is now occurring earlier. Recent milder winters may also be contributing to an earlier emergence and earlier passage timing.
- In 7 out of nine years the 95% passage date based on PIT tagged fish has occurred earlier than the 95% passage date based on the run at large. This suggests that the PIT tagged fish are biased towards earlier migrating fish.

**Table 3. The 95% passage date at Lower Granite Dam for the run at large (hatchery and wild combined) and the wild PIT tagged fish.**

YEAR	95% Passage Date Run at Large	95% Passage Date Wild PIT Tagged Fish
1995	Oct 11	Sept 14*
1996	Sept 20	Aug 27
1997	Sept 23	Sept 14
1998	Sept 26	Aug 15
1999	Sept 22	Aug 15
2000	Sept 08	Sept 14*
2001	Aug 16	Aug 18
2002	Aug 31	July 28
2003	July 24	July 17

\*Last date category actual date may be later

- It is difficult to reduce passage protection for these fish based on their numbers relative to the overall passage, given the importance in producing adult returns. It is unclear if these later migrants are different from the majority of the migration.
- The plot below shows passage timing at John Day Dam, of Snake River wild subyearling chinook along with timing for pit-tagged supplementation fish. The data confirms that a significant portion of the wild run is still in-migration, since 5% of the run-to-date is passing in August. Also, it shows the earlier timing of the supplementation fish.



- Clearwater River origin PIT-tagged wild subyearling chinook average 95% passage date at Lower Granite Dam was October 18, based on 4 years of data (1995,1998, 2001, 2003).
- Based on PIT-tags of wild subyearlings in the Clearwater River, a large portion of that population is still rearing above Lower Granite Dam. A total of 1991 subyearling chinook were marked in the Clearwater River in 2004. As of August 12, 122 (or 6.1%) have been detected at Lower Granite or Little Goose dams. This is a higher percentage than observed in past years by this date.
- Much effort has been made this year to protect small numbers of late migrating fall chinook from the Clearwater drainage. Flow augmentation protection for fall chinook migrants passing during the month of August was decreased in order to protect these fish. It is inconsistent to hold water in reserve for these fish in September, while at the same time terminating spill mitigation in the lower Snake River.

In summary, given: 1) the potential for PIT tagged fall chinook to estimate an earlier run timing than seen based on the run at large; 2) the effect of the supplementation fish on skewing the distribution earlier; 3) the amount of time it is taking fall chinook to traverse the hydrosystem; 4) the relative contribution of late migrating juveniles to the overall adult returns; and, 5) the extraordinary measures that have been put in place to protect the Clearwater fall chinook, it would be most prudent to maintain the full Biological Opinion protection measures for fall chinook in the Snake/Columbia system.