FISH PASSAGE CENTER

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MEMORANDUM

TO: FPAC

FROM: FPC Staff

DATE: August 11, 2003

RE: Timing of the 2003 Migration

The purpose of the Biological Opinion Spill Program is to protect juvenile listed fall chinook from the Snake River migrating through the hydrosystem to below Bonneville Dam. In addition, the spill program gives protection to subyearling fall chinook migrating from the Mid Columbia above McNary Dam, and stocks migrating from tributaries below McNary Dam.

The Biological Opinion refers to protecting 95% of the wild fall chinook run. The questions remains as to how the 95% passage is assessed. Prior to the 1995 Biological Opinion the information regarding how the fall chinook migrated was difficult to ascertain. In earlier years sampling programs ended when transportation ended in early July. Subsequent to ESA listing sampling continued into October and the passage distribution was observed. The fall chinook migration timing is extremely variable and is a product of the environmental conditions experienced by these fish.

Passage timing distributions are presently considered in two ways 1) by considering specific PIT tagged mark groups or 2) by looking at the passage at large at a specific site. Passage timing in the Snake River considers the passage at Lower Granite Dam of wild fall chinook marked by USFWS as part of an on-going study. Marking of these designated 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 to fish the PIT tagged distribution is skewed early. This is consistent with what is observed when the PIT tagged subpopulation is compared to the run at large timing at Lower Granite Dam (Table 1).

Table 1. 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

*Last date category actual date may be later

In addition, the run at large 95% passage date appears to be getting earlier as the years progress. This is 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 over 1.1 million predicted for 2003). These supplementation fish are migrating earlier and in large numbers, which skews the distribution to look like it is now occurring earlier.

2003 Migration

The 2003 migration appeared to initially migrate earlier than it has in the last several years. However, the environmental conditions in 2003 (flow that are, and have been much below the Biological Opinion flow targets) have likely caused the migration to tail for a longer period of time. The following graph (Figure 1) depicts the proportion of the total run observed each day during August and compares it to the total passage index for that year. As you can see in the earlier years the proportion of the run in August comprised a greater amount of the total. However, in the more recent years the proportion of fish that migrates in August is diminished because of the observations of supplementation fish. This does not mean that the wild fall chinook timing has changed from what was observed historically, with a greater proportion of these fish migrating in August. In fact the 2003 data (dark heavy line) seems to be right where you would expect the proportion to be at this time of the year, given the impact of the supplementation fish.

In summary, it is difficult to predict in-season where a run is relative to the percent of passage. According to the data presented over six years (1993-1998) the predicted 95% date of passage based on the wild PIT tagged fall chinook is significantly earlier than the 95% date for the passage at large in 5 of the six years, and nearly the same in the sixth year. It is of concern, however, that on average the actual 95% passage date of the run at larger during this time period was 27 days LATER than predicted based on the wild PIT tags, reinforcing the concept that this statistic only represents the early portion of the run.

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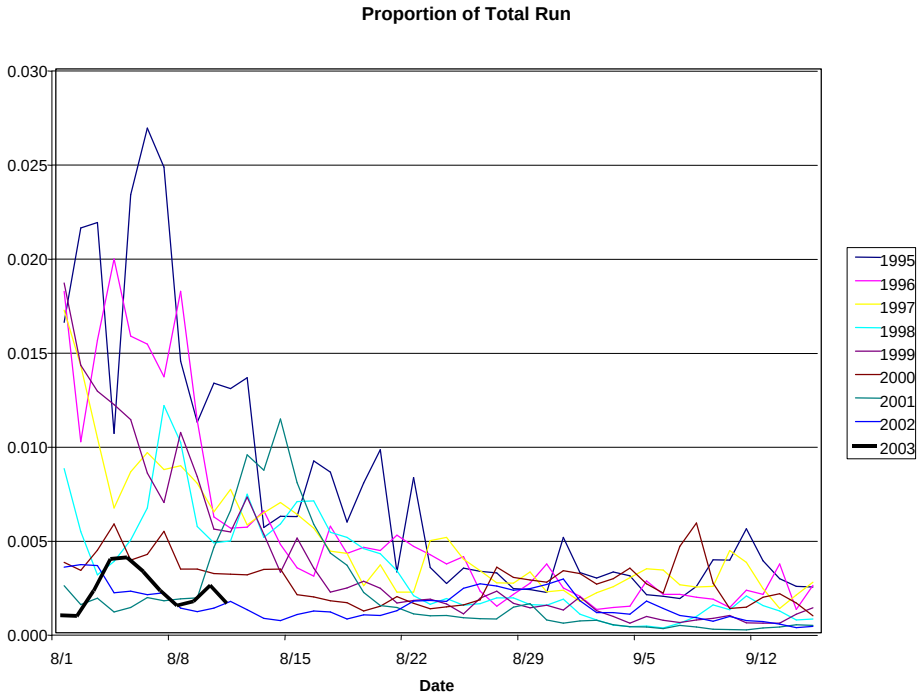
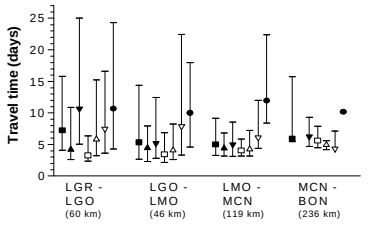
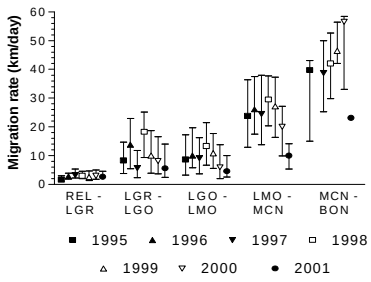


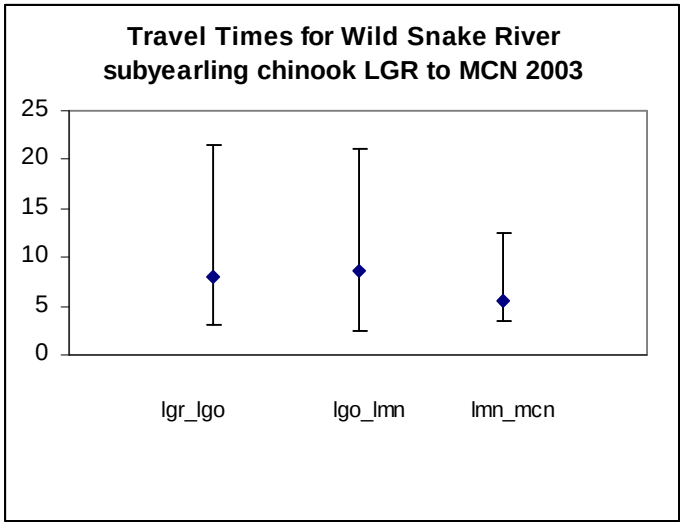
Travel Time

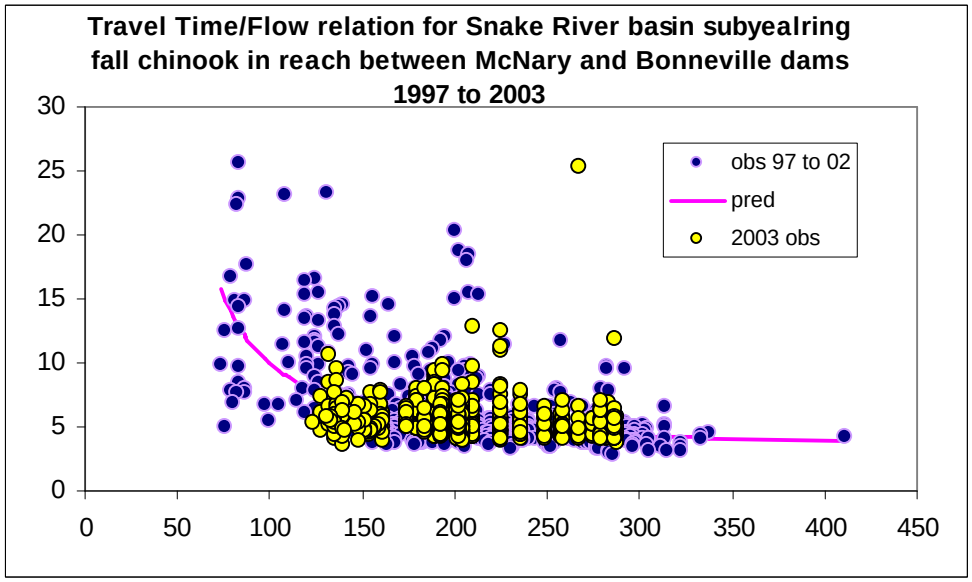
Once fish pass Lower Granite Dam it takes several days to pass through the hydrosystem. The concept of establishing a 95% date of August 31 at Lower Granite Dam is flawed in the 2000 Biological Opinion, since it does not take migration time into consideration. The following graphs were developed by NOAA Fisheries and presented to the ISAB on December 17, 2002. The graphs show the travel time of marked subyearling fall chinook from Lower Granite to Bonneville dams from 1995 to 2001. On average it takes fish between 24 and 30 days to migrate from Lower Granite Dam to below Bonneville Dam. A majority of that time is spent in the Snake River.





Travel time for subyearling chinook shows a similar trend to the NMFS data. The first figure below shows timing for wild subyearling chinook in the Snake River 2003, while the second depicts 2003 travel times for all supplementation and wild subyearlings from the Snake River, in the Lower Columbia plotted against average flows at McNary Dam as well as historic travel time data. As can be seen from these graphs, the travel time from Lower Granite to McNary for wild subyearling chinook appears to be slower than in recent years. While the McNary to Bonneville travel time of all Snake River Subyearling chinook appears to be similar to past years.





Any passage date at Lower Granite should include at least twenty days for fish to get out of the Snake River and one month to pass through the hydrosystem. Nearly 29,000 juvenile fall

chinook have passed Lower Granite Dam since the first of the month. A sufficient travel time estimate should be added to these passage dates to assure that these fish pass through the system.

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 11% of the run-to-date is passing in August. Also, it shows the earlier timing of the supplementation fish.