State, Federal and Tribal Fishery Agencies
Joint Technical Staff

US Fish and Wildlife Service

Columbia River Inter-Tribal Fish Commission

Idaho Department of Fish and Game

Oregon Department of Fish and Wildlife

National Marine Fisheries Service

Washington Department of Fish and Wildlife

June 13, 2003

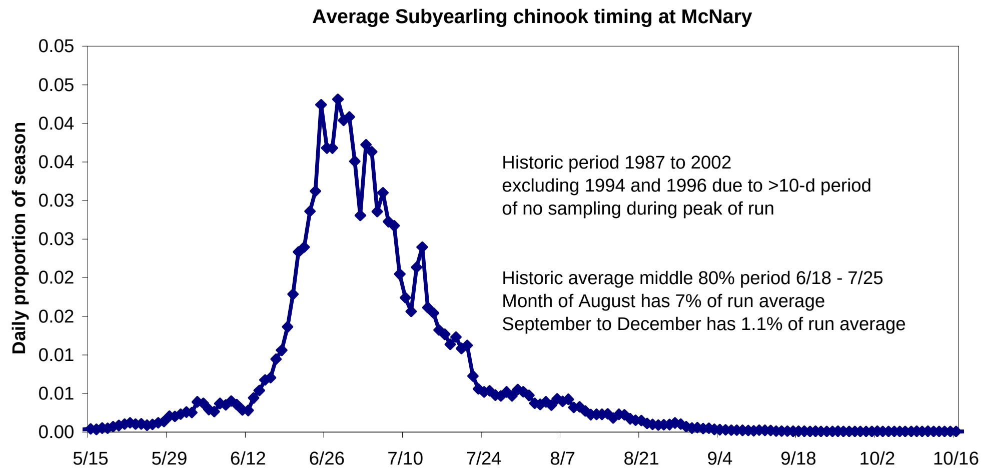
Mr. Doug Marker
Northwest Power and Conservation Council
851 SW Sixth Ave., Suite 1100
Portland, OR 97204

Dear Mr. Marker:

We have reviewed a recent analysis developed by Northwest Power and Conservation Council (Council) staff that addresses the question of the hydrosystem cost versus benefit of spill during the summer months. As our agencies have responsibility for salmon management in the Columbia Basin, our comments will focus on fish passage timing and the benefits of spill during the summer months. The graphs contained in the Council staff analysis are plots of passage indices and spill versus date. The passage indices used in the analysis include a combination of both hatchery and wild fish, and show that most of the fish pass through the lower Columbia River during July and, therefore, Council staff concludes that any changes to the summer spill program should be made in August.

We have reviewed the Smolt Monitoring Program passage data for the past thirteen years to determine the average proportions of combined hatchery and wild subyearling migrants present in the lower Columbia River during August. Based on the monitoring data approximately 7% of subyearling chinook migrants pass the McNary hydropower project during August (Figure 1).

Figure 1. Average subyearling chinook timing at McNary Dam.



However, plotting combined hatchery and wild chinook passage indices for subyearling chinook at the various spill sites does not present a complete picture and is a shortcoming of the analysis conducted by the Council staff. Different stocks of subyearling migrants, especially wild subyearlings, can display significantly different passage timing strategies. Hatchery releases and abundant stocks dominate the combined passage indices, whereas jeopardized stocks (with their low abundance) are underrepresented when displayed in this fashion.

The NOAA Fisheries recognized this phenomenon when they established planning dates for the provision of protection measures in the 1995 Biological Opinion. The 1995 Biological Opinion states that "Dates at which 95% of wild PIT-tagged subyearling chinook passed Lower Granite Dam were August 28, July 3, August 23 and September 1 in 1991, 1992, 1993 and 1994, respectively. Migration of juvenile fall chinook salmon to dams further downstream extends longer for fish not transported from Lower Granite Dam. The primary migration period for juvenile fall chinook salmon is defined as June 21 to August 31 in the Snake River and July 1 to August 31 in the lower Columbia River." These were the primary passage dates used to protect the majority of ESA listed wild fall chinook migrating from the Snake River through the lower Snake River and through Columbia River hydrosystem.

The Biological Opinion's August 31 date of the 95% passage for the subyearling fall chinook migrating from above Lower Granite Dam is conservative based on the more recent monitoring data (Table 1). There is some variability in the 95% passage date (ranging from August 16 to October 11) but it is not as extreme as observed in the earlier data set used by NOAA Fisheries. In part, this is a reflection of the more consistent sampling at Lower Granite Dam and marking above the project, but it is mainly a result of the improved survival shown for fish migrating in August due to improved summer flows and spill provided under the Biological Opinion beginning in 1995. Historically in low flow years (e.g. 1992), prior to the 1995 Biological Opinion, flows were extremely low during August and subyearling survival was low. This caused the passage indices to be truncated skewing the distribution towards an artificial earlier passage timing. The following table (Table 1) shows the 95% passage date at Lower

Granite Dam for the run at large, and for the wild PIT tagged population. In some cases the 95% passage dates do not correlate well for the wild PIT tagged fish and the population at large because of variations in PIT tagged fish sample size, as well as the timing and segment of the wild population marked.

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

As seen from Table 1 the 95% passage date often occurs late in September for the run at large and wild PIT tagged fish. With the exception of 2001 when the poor migration conditions likely truncated the population due to higher mortality rates, the August 31 planning date has not been adequate to protect 95% of the summer migrants. Thus the August 31 planning date represents a compromise where most of the fish are considered to be past Lower Granite Dam.

The salmon managers also expanded the analysis conducted by the Council staff by considering the passage timing of individual groups of subyearling fall chinook at the lower Columbia River hydropower projects. Available information is limited due to the relatively low abundance of these stocks and few numbers of fish marked. However, based on the PIT tag recaptures the following information is being provided: the Snake River Basin wild fall chinook passage timing at McNary Dam (Figure 2); the Hanford reach wild fall chinook passage timing at John Day Dam (Figure 3); and, the Yakima River Basin wild fall chinook passage timing at John Day Dam (Figure 4). We believe that these graphs more accurately reflect the passage of stocks of concern, which may be masked in a graph depicting the overall passage indices such as presented by the Council staff.

Figure 2. Snake River Basin wild fall chinook passage timing at McNary Dam.

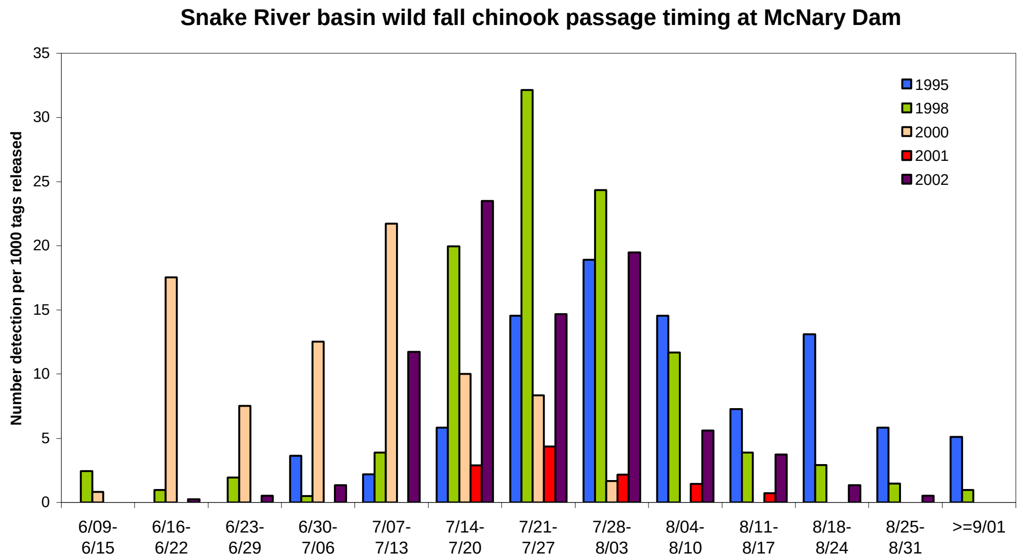


Figure 3. Yakima River Basin wild fall chinook passage timing at John Day Dam.

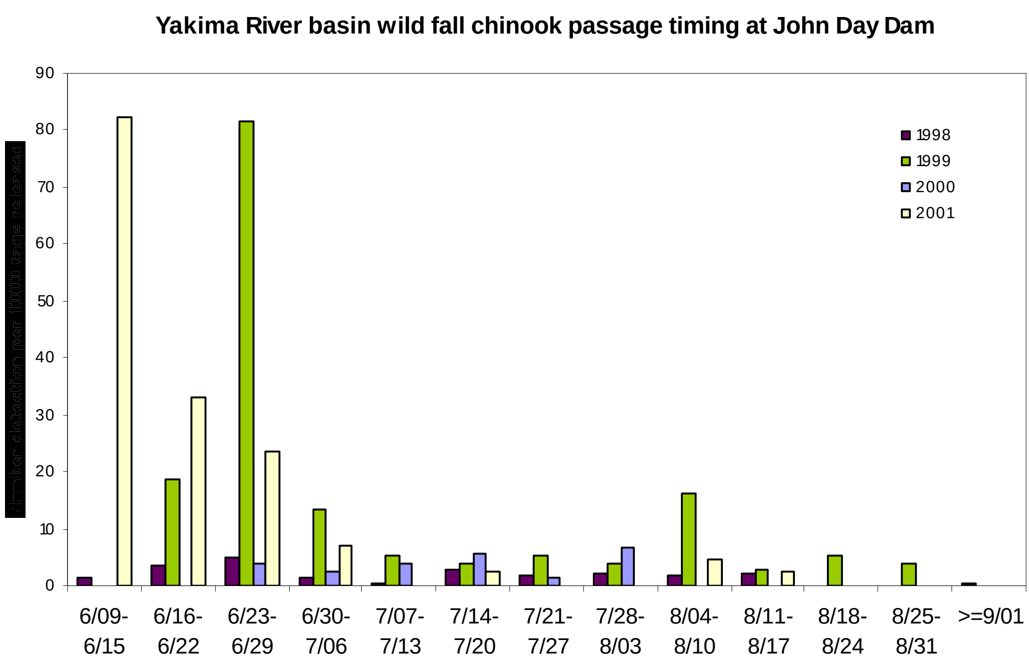


Figure 4. Hanford Reach wild fall chinook passage timing at John Day Dam.

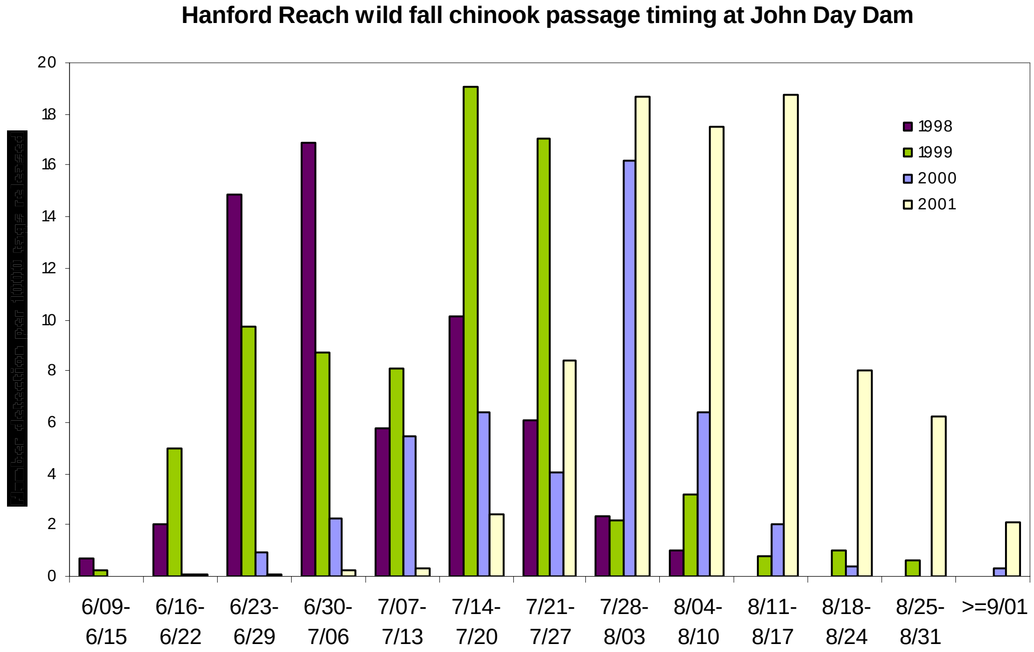


Table 2. Summary of proportions of individual groups of subyearling migrants passing through the lower Columbia during August.

Percentage of Subyearling Chinook Migrants Observed during August			
Year	**Snake River Wild***	**Yakima River Wild****	**Hanford Reach Wild****
1995	48.8		
1998	19.6	19.6	2.3
1999		20.0	9.2
2000	7.8	20.8	44.7
2001	21.4	4.5	66.7
2002	19.1		

* Observed at McNary Dam
** Observed at John Day Dam

As can be seen from both the graphs and Table 2, significant proportions of individual groups of subyearling migrants can and do pass into and through the Lower Columbia River during the month of August. Consequently, it is not advisable to use passage indices for the run-at-large to justify curtailing mitigation measures, such as spill. An analysis using only the total run-at-large may seem to indicate that the impacts of changing spill would only be imposed on a small portion of the run, whereas when specific groups of fish are considered, the impacts would be more significant. The need to protect most portions, unique life histories and genetic characteristics of the run was the foundation which led to the dates for providing spill protection that were specified in the Biological Opinion.

Moreover, summer spill is an essential element of providing improved inriver passage conditions, and it should be continued while the evaluation of juvenile fish transportation for summer migrants is being conducted. This becomes even more significant when the delayed mortality factor, i.e. the difference in mortality between transported and non-transported fish, or "D" value, is applied to the fish that are transported. The current information on "D" for subyearling fall chinook indicates that the survival of inriver fish is important to the overall survival of fall chinook.

The Council staff analysis did not evaluate the effect of adult passage past the projects in the absence of spill. Fallback estimates for adult fall Chinook from the 1998 radio telemetry indicated that a significant percentage of fish fall back throughout the system (Table 3).

Table 3. Fallback Rates of Fall Chinook in 1998 from Radio Tracking Studies by University of Idaho.

	Bonn	**TDA**	**JDA**	**MCN**	**IHR**	**LMN**	**LGS**	**LGR**
Rate	5%	10%	5%	2%	7%	2%	NA*	NA*

*Too few fish for statistical analysis

The mortality rate for fish that fall back varies greatly depending on the route of passage. Mortality through the spillway has been estimated to be approximately 2-3%, while bypass systems and turbines have much higher morality. Mortality from falling back through the turbines was particularly high with estimates of 22% and 41% for adult summer steelhead at Foster, Wagner and Ingram dams (1973). Buchanan and Moring (1986) reported a 51% mortality for adult steelhead at Foster Dam. Liscom and Stuehrenburg (1985) noted adult summer steelhead suffered a 46% turbine mortality when they were subjected to passage at Lower Monumental Dam. Mortality rates for falling back through bypass systems have not been studied extensively, but bypass systems have been shown to have much higher rates of mortality than spillways. In addition, adult salmonids have been noted with significant injuries after passing through gatewells and orifices. This is not surprising since juvenile bypass systems were not designed for adult passage. Without spill at hydropower projects the mortality rate associated with falling back will likely increase, since the remaining routes of passage have significantly higher mortality than the spillway. A comprehensive analysis to determine the impact of reduced spill should include impacts to adult salmonids, as well as the impacts to juvenile salmonids.

We hope that you find this information helpful when considering any potential recommendations for modifications to the Biological Opinion summer spill program. We urge the Council and staff to coordinate any proposed changes in summer spill or research needs with the region's federal, state and tribal salmon managers through the Regional Forum process. We offer to work closely with the Council and its staff on the specifics of actions that will meet the intent and performance standards of the National Marine Fisheries Service 2000 Biological Opinion, as well as the intent of the Council's Mainstem amendments to the fullest extent possible.

Sincerely,

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Steve Pettit, IDFG

Ron Boyce, ODFW

Tom Lorz, CRITFC

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Shane Scott, WDFW