FISH PASSAGE CENTER

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MEMORANDUM

TO: Ryan Rodin
Senator Morton, staff, Washington State Legislature

FROM: Michele DeHart

DATE: April 4, 2011

RE: Historic passage index at Bonneville Dam for yearling Chinook juveniles

In response to your request, the FPC staff has summarized historic passage index data from the Smolt Monitoring Program, for Bonneville Dam for yearling Chinook juveniles over the past 25 years (1986-2010). Below is a figure (Figure 1) with the annual total passage indices for yearling Chinook from Bonneville Dam, over the span of years you requested. In addition, we are providing a table with these same data (Table 2).

When interpreting passage index data, it is important to note what the passage index is, how it is derived, and its intended purpose and application. Juvenile salmonids are sampled as part of the Smolt Monitoring Program and various dams throughout the Columbia River Basin. Based on daily operations and expected fish numbers, sub-samples are taken at variable time intervals throughout a daily twenty-four hour period. An estimate of collection is then derived from the timed sub-samples, based on the rate of the sub-samples for a given day. The daily passage index is computed by dividing the daily collection by the proportion of water passing through the powerhouse where the sampling takes place (Table 1). The daily passage index adjusts for daily changes in spill proportion under the conservative assumption that the proportion of fish passing through spill will be close to the proportion of water being spilled.

The passage index is not intended to be an estimate of the juvenile fish population at the dam. The passage index is most useful when estimating timing of juvenile salmonids passing the projects. The magnitude of the passage index is sensitive to changes in hatchery programs over the year. If hatchery output increases or decreases in a given year, the passage index at a project

would be expected to also increase or decrease. For an idea of fluctuations in hatchery output of yearling spring, summer, and fall Chinook, see the Hatchery Release section of the 2009 FPC Annual Report (http://www.fpc.org/documents/annual_FPC_report/FPC%202009%20ANNUAL%20REPORT--FINAL.pdf).

Finally, sampling at Bonneville Dam over the past 25 years has changed. From 1986 to 1999, samples of juvenile salmonids were taken from the powerhouse 1 bypass. Furthermore, these samples were 8 hour samples from 1986-1992 and 1996-1999, but 24-hours from 1993-1995. From migration year 2000 to present, the juvenile salmonid samples are taken from the bypass system in powerhouse 2 and are 24-hour samples (Table 1). In addition, a new surface passage structure (the powerhouse 2 corner collector) was added at BON and began operating in summer 2004. This new surface passage structure has had an effect on the proportion of fish being collected at the dam. This likely reduced the daily collections and thereby overall passage index for the years subsequent to the installation of this corner collector. In addition, significant hydrosystem management changes, such as the federal court ordered spill for fish passage program will affect the passage index by both increasing juvenile salmon survival and decreasing fish passage throught he power house.

Table 1 - Formulas for estimating collection and passage index at Bonneville Dam from 1986-2010.

Sampling Site	**Years**	**Collection**	**Flow expansion factor**
Bonneville Dam (PH 1)	1986-92 1993-95 1996-99	8 hr catch / sample rate 24 hr catch / sample rate 8 hr catch / sample rate	PH1/(PH1+PH2+SP)
Bonneville Dam (PH 2)	2000-2008	24 hr catch / sample rate	PH2/(PH1+PH2+SP)

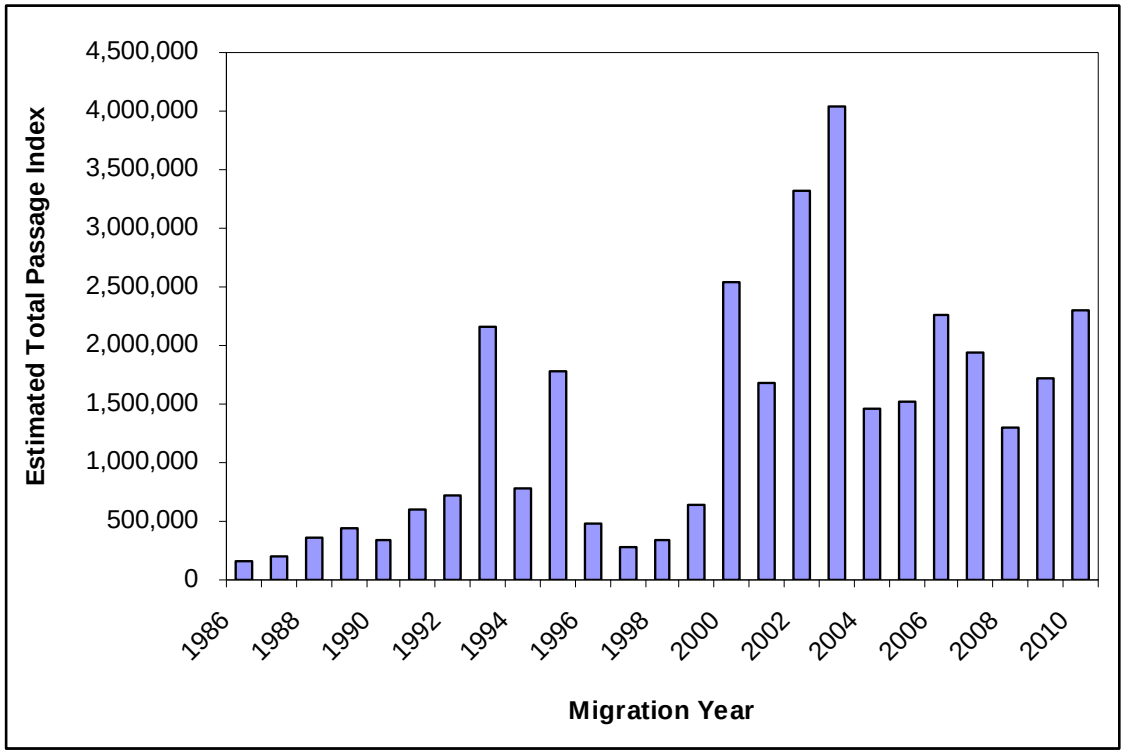
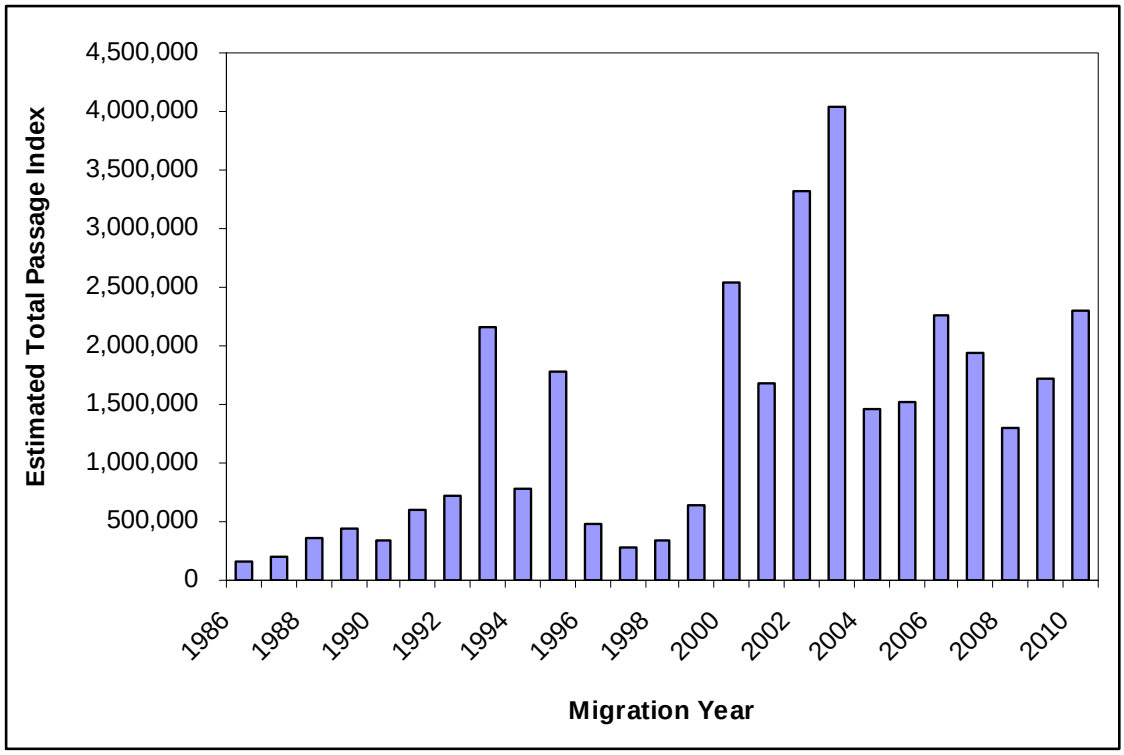


Figure 1 – Annual total passage index at Bonneville Dam for yearling Chinook from 1986-2010.

Table 2 – Annual total passage index at Bonneville Dam for yearling Chinook from 1986-2010.

Migration Year	Total Passage Index
1986	150,819
1987	191,388
1988	365,812
1989	435,451
1990	337,787
1991	609,417
1992	723,652
1993	2,168,048
1994	779,720
1995	1,776,322
1996	470,112
1997	286,142
1998	346,280
1999	638,608
2000	2,539,356
2001	1,687,845
2002	3,328,201
2003	4,043,764
2004	1,466,453
2005	1,527,239
2006	2,256,364

2007	1,949,995
2008	1,291,085
2009	1,717,115
2010	2,302,148



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DATA REQUEST FORM

Request Taken By: Michele **Date:** 4-4-2011

Data Requested By:
Name: Ryan Rodine **Phone:**
Address: Senator Murton WA **Fax:**
Email:

Data Requested:
passage index yearling chinook at Bonneville Dam
1986- 2010 -
TABLE AND BAR GRAPH

Data Format: **Hardcopy** ☐ **Text** ☒ **Excel** ☐

Delivery: **Mail** ☐ **Email** ☒ **Fax** ☐ **Phone** ☐

Comments:
Ryans email / ryan.rodine@leg.wa.gov

Data Compiled By: Brandon **Date:** 4-4-2011

Request # 27