



FISH PASSAGE CENTER

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MEMORANDUM

TO: Liz Hamilton, NSIA

FROM: Michele DeHart

DATE: July 12, 2011

RE: 2011 spring outmigration and ocean conditions compared to 1998 and 1999.

In response to your request, the FPC staff has reviewed the outmigration conditions that were experienced by spring out-migrants in 1998 and 1999 and compared these conditions to the spring outmigration conditions for 2011. Below is a brief summary of our findings, followed by a more detailed discussion of the data.

- The March-June outflow volumes at Lower Granite and The Dalles dams in 2011 were 29.6 and 80.1 MAF, respectively. These volumes for 2011 are higher than what was observed in either 1998 or 1999.
- Given the lower than average temperatures in 2011, the run-off from the 2011 snowpack has been delayed.
 - According to the July 7, 2011 STP, flows at LGR are expected to remain above 100 Kcfs through mid-July, and not drop below 50 Kcfs until early August.
 - The July 7, 2011 STP indicates that flows at TDA are expected to remain above 300 Kcfs through late July, and are not expected to drop below 200 Kcfs until mid-August.
- At all FCRPS projects, the average monthly flow and spill for March of 2011 was below what was observed in 1999, but above 1998. For the most part, the average monthly flow and spill volumes for April, May and June of 2011 were above that observed in 1998 and 1999.

- Of the 13 years (1998-2010) of NOAA ocean condition data; 1998 was ranked 12th and 1999 was ranked 2nd. At this time, there are no ocean ecosystem indicator data posted for 2011. However, according to the NOAA ocean ecosystem indicator website, early indications suggest that “ocean conditions in 2011 may be among the best of the past 15 years”.

Outflow Volumes:

For water years 1998 and 1999, the March-June outflow volumes at Lower Granite Dam (LGR) were 22.3 and 26.2 MAF, respectively (Table 1). Over the past 36 years (1976-2011), these LGR outflow volumes rank 11th (1998) and 9th (1999) highest. The March-June outflow volume at LGR for 2011 was 29.6 MAF, which ranks 5th highest among the last 36 years (Table 1).

At The Dalles Dam (TDA), the March-June outflow volumes in 1998 and 1999 were 59.1 and 68.5 MAF, respectively (Table 1). Over the past 48 years (1964-2011), the TDA March-June outflow volumes for 1998 and 1999 ranked 20th and 12th highest, respectively. The March-June outflow volume at TDA for 2011 was 80.1 MAF (Table 1), which is higher than both 1998 and 1999 and is the 6th highest outflow volume over the past 48 years (1964-2011).

Table 1. Actual March-June outflow volume (MAF) at Lower Granite and The Dalles dams for water years 1998, 1999, and 2011.

Water Year	March-June Outflow Volume (MAF)	
	Lower Granite Dam	The Dalles Dam
1998	22.3	59.1
1999	26.2	68.5
2011	29.6	80.1

Given the lower than average temperatures in the spring and early summer of 2011, the runoff from the 2011 snowpack has come off at a very gradual pace. Because of this, flows for the remainder of the juvenile migration season are expected to remain high in both the Snake and Lower Columbia Rivers. According to the July 7, 2011 STP, flows at LGR are expected to remain above 100 Kcfs through mid-July and not drop below 50 Kcfs until early August. The same STP indicates that flows at TDA are expected to remain above 300 Kcfs through late July and are not expected to drop below 200 Kcfs until mid-August.

Flow and Spill:

The FPC staff analyzed average daily flow and spill at all eight FCRPS projects from March 1st through June 30th for water years 1998, 1999, and 2011. To summarize these data, the FPC staff estimated average monthly flow and spill for each of these months at each project.

At all FCRPS projects, the average monthly flow for March of 2011 was below what was observed in 1999 but above 1998 (Table 2). For the most part, average monthly flows for April, May, and June of 2011 were above what was observed in 1998 and 1999 (Table 2). The only

exceptions to this were at LMN and LGS, where the average monthly flow in May 1998 was slightly higher or the same as the average monthly flow in May of 2011 (Table 2). Below are figures that illustrate the daily average outflows observed at LGR (Figure 1) and TDA (Figure 2) in 1998, 1999, and 2011 over the March 1st to June 30th period.

Table 2. Average monthly flows (Kcfs) at each of the FCRPS projects during water year 1998, 1999, and 2011.

Water Year	Month	LGR	LGS	LMN	IHR	MCN	JDA	TDA	BON
1998	March	48.0	48.0	51.0	50.9	172.5	184.7	184.0	196.4
	April	65.5	64.7	67.7	70.7	154.9	165.9	165.6	174.9
	May	141.0	135.0	141.8	145.0	320.4	336.0	328.2	335.2
	June	113.6	110.3	116.0	119.1	292.0	303.4	297.5	305.9
1999	March	92.6	93.1	100.0	100.6	243.1	253.0	253.0	265.1
	April	93.9	90.4	95.2	98.6	245.7	256.3	255.6	264.1
	May	112.5	107.5	111.8	115.7	282.2	294.9	289.0	301.2
	June	133.7	128.6	134.5	137.6	330.9	343.7	335.6	344.5
2011	March	67.4	63.6	70.2	69.9	213.5	210.5	212.5	228.7
	April	107.3	103.0	108.0	110.3	280.6	289.7	280.0	299.8
	May	142.1	134.4	141.8	145.3	370.5	386.9	372.5	385.7
	June	174.3	164.5	172.3	177.7	464.1	474.9	461.9	474.7

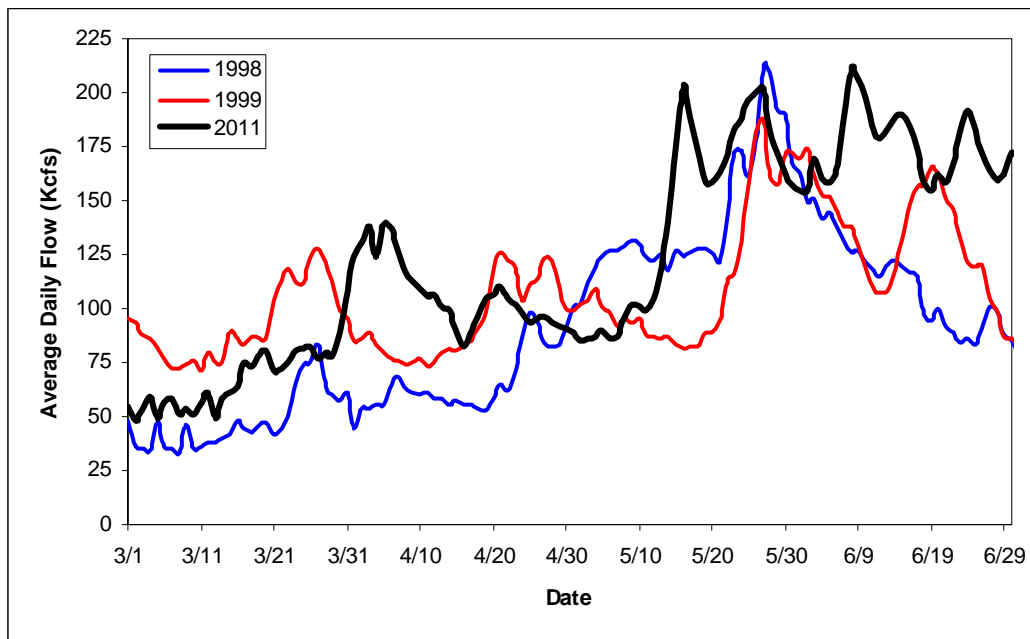


Figure 1. Daily average flows at Lower Granite Dam in 1998, 1999, and 2011 over the March 1st to June 30th period.

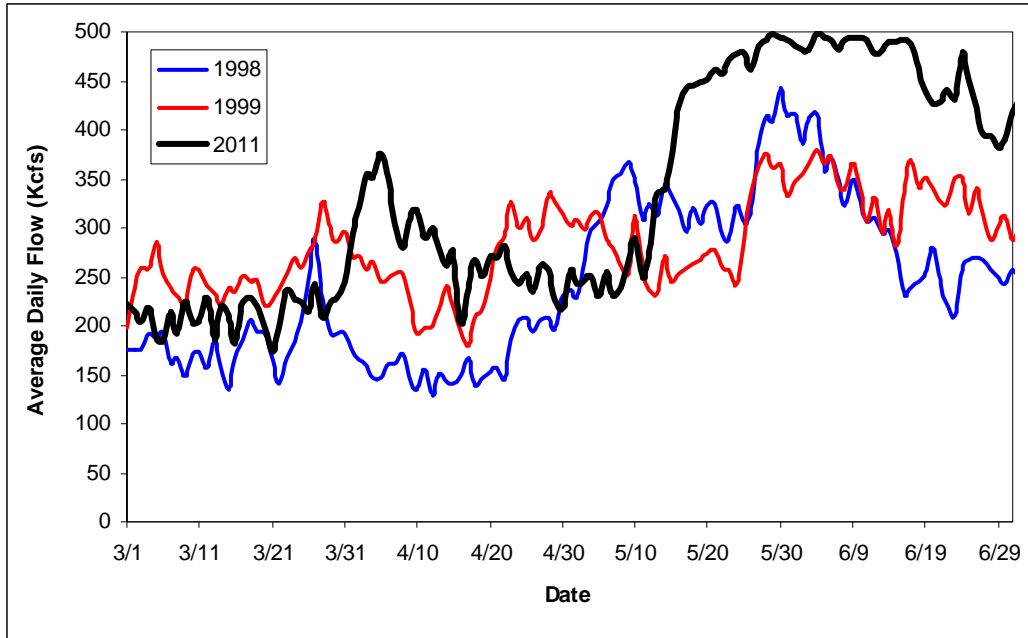


Figure 2. Daily average flows at The Dalles Dam in 1998, 1999, and 2011 over the March 1st to June 30th period.

At all FCRPS projects, the average monthly spill for March of 2011 was below what was observed in 1999 but above or close to what was observed in 1998 (Table 3). Voluntary spill begins on April 3rd at the Snake River projects and April 10th at the Lower Columbia River projects. Average monthly spill for April, May, and June of 2011 were above what was observed in 1998 and 1999 (Table 3). The only exceptions to this were at TDA and IHR, where the average monthly spill in May 1998 was slightly higher or the same as the average monthly spill in May of 2011 (Table 3). It is important to note that voluntary spill was not provided at Snake River projects past June 20th in 1998 and 1999. Below are figures that illustrate the daily average spill volumes observed at LGR (Figure 3) and TDA (Figure 4) in 1998, 1999, and 2011 over the March 1st to June 30th period.

Table 2. Average monthly spill (Kcfs) at each of the FCRPS projects during water year 1998, 1999, and 2011.

Year	Month	LGR	LGS	LMN	IHR	MCN	JDA	TDA	BON
1998	March	0.9	0.9	1.6	6.4	10.1	4.0	5.0	27.0
	April	13.5	18.6	15.2	44.2	24.1	22.0	33.1	31.7
	May	46.0	44.8	44.6	78.9	154.2	121.9	162.0	126.0
	June	27.5	28.9	22.1	65.9	129.5	89.3	144.2	117.2
1999	March	5.5	14.1	2.0	25.2	53.5	9.6	7.5	61.7
	April	33.3	21.9	16.2	58.8	82.7	38.1	65.4	58.7
	May	42.8	27.8	24.9	73.2	129.8	89.1	131.4	102.7
	June	45.2	23.8	22.4	73.4	166.6	83.5	152.1	121.6
2011	March	0.9	0.5	0.5	5.4	50.7	0.8	1.0	2.7
	April	36.2	29.7	28.1	67.7	135.6	90.6	101.9	104.3
	May	52.1	83.9	49.3	78.7	225.1	151.8	162.0	187.0
	June	64.5	71.4	59.7	95.9	305.8	209.8	216.3	273.8

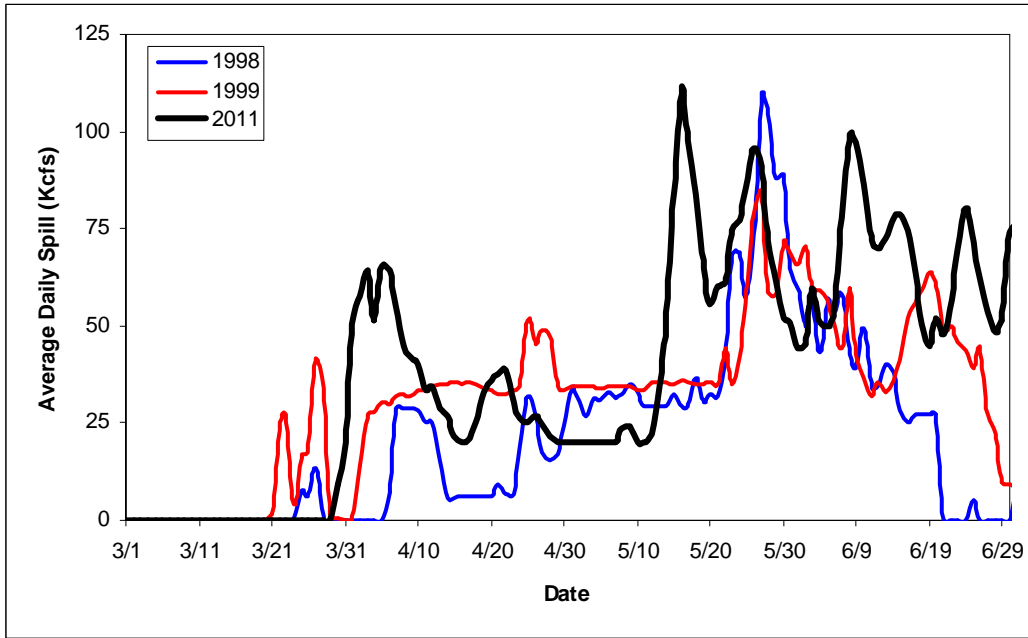


Figure 3. Daily average spill at Lower Granite Dam in 1998, 1999, and 2011 over the March 1st to June 30th period.

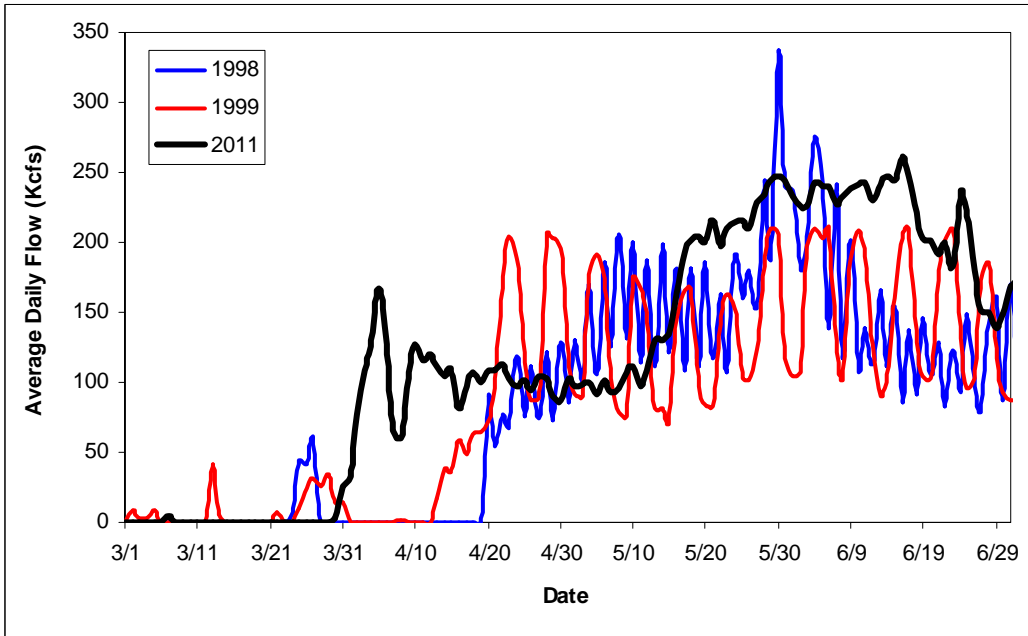
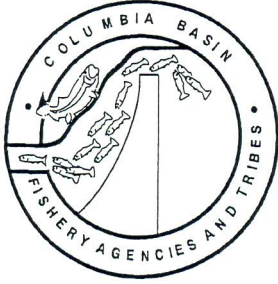


Figure 4. Daily average spill at The Dalles Dam in 1998, 1999, and 2011 over the March 1st to June 30th period.

Ocean Conditions:

The Northwest Fisheries Science Center of NOAA Fisheries (NOAA) provides information on ocean ecosystem indicators that they have determined to have an affect on juvenile salmonid abundance and survival. These indicators are measured each year and given ranks. These indicators and the annual ranks can be found at the following link: <http://www.nwfsc.noaa.gov/research/divisions/fed/oeip/g-forecast.cfm>. According to this NOAA website, the mean ocean ecosystem indicators for 1998 and 1999 were ranked 12th and 2nd, among the 13 years where ranks are provided (1998-2010). This indicates that 1998 may be considered a “poor” ocean year for juvenile salmonids, while 1999 may be considered a “good” ocean year for juvenile salmonids. At this time, the NOAA ocean ecosystem indicator website does not provide indicator data for 2011. However, NOAA states that the cold ocean conditions since the summer of 2010 suggest that “ocean conditions in 2011 may be among the best of the past 15 years”.



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DATA REQUEST FORM

Request Taken By: Michele DeHart Date: 17-May-2011

Data Requested By:

Name: Liz Hamilton Phone: _____
Address: _____ Fax: _____
Email: USEALICE@aol.com

Data Requested:

How do this year's outmigration conditions compare to
the outmigration for the adult CWS that returned in
2001. Do we have ocean condition data or information
on overall number of outmigrants?

Data Format: Hardcopy Text Excel
Delivery: Mail Email Fax Phone

Comments:

Data Compiled By: [Signature] Date: 12-July-2011

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