



THIS YEAR'S SOCKEYE BOOM HAS FISHERY EXPERTS TRYING TO IDENTIFY REASONS

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Eye popping numbers of sockeye returning to the Columbia River basin this year have fishery experts speculating about the cause of the spike.

Did the fish, as juveniles, enjoy ideal conditions that enhanced survival as they swam toward the ocean one and/or two years ago? Did the stars align and provide perfect feeding and growth during their saltwater maturation? Did increased hatchery output of young fish yield extraordinary returns?

Probably all of the above, and then some.

Through Thursday, 213,455 sockeye salmon had been counted crossing Bonneville Dam's fish ladders on their way upstream to spawn. That's the second highest count ever since the dam was built in 1938, according to data posted online by the Fish Passage Center. The run is now well past its peak with daily counts gradually shrinking. The peak count this year was 15,910 on June 23. Thursday's count was 39.

The highest count ever was 237,748 in 1953 for the entire season. Third on the list is a count of 184,645 in 1952. Last year only 24,376 sockeye were counted passing Bonneville. The species is notorious for its ups and downs. Counts spiked to 123,000 in 2004 and 115,000 in 2001 but averaged less than half of those totals in the intervening years.

The numbers are smaller but as impressive for the Snake River portion of the sockeye run. The count at Lower Granite Dam on the lower Snake River through Thursday totaled 814, easily surpassing the previous record of 513 in 1976, the year after the dam was built. Lower Granite is the eighth and final hydro project the sockeye must hurdle on their 950 mile journey from the ocean to central Idaho's Stanley basin; Bonneville is the first.

The 2008 pre-season forecast was for a total return of 75,600 to the Columbia basin with 13,700 bound for Wenatchee Lake and 61,200 for the Okanagan River's Osoyoos Lake. The Wenatchee and Okanagan are rivers branching from the mid-Columbia in central Washington.

The Snake River run was predicted to be 700 adult fish as counted at the mouth of the Columbia. There is a certain amount of mortality in river from downstream harvests and natural causes. The conversion rate – survival from Lower Granite to Sawtooth Hatchery and/or Redfish Lake Creek – has in the past ranged from 25 to 40 percent for the Snake River sockeye, according to Eagle Hatchery manager Dan Baker.

None of the fish had arrived in the high mountain basin as of this morning, Baker said. The first crossed Lower Granite – more than 400 river miles downstream – on June 23. Depending on the final return, as many as 100 could be captured and spawned for use in the Idaho Department of Fish and Game's sockeye captive broodstock program and the rest released to spawn on their own in Redfish and other nearby lakes.

The Snake River stock's severe decline prompted its listing as endangered under the Endangered Species Act in 1991. Only 16 naturally produced fish have returned to the basin

since the listing, the last in 1998.

The captive broodstock hatchery program was initiated in 1991 with all 16 returning anadromous adult sockeye salmon, several hundred Redfish Lake wild juvenile out-migrants, and several residual sockeye salmon adults were used to develop captive broodstocks at the IDFG's Eagle Fish Hatchery and at National Oceanic and Atmospheric Administration Fisheries Service facilities in Washington state.

In 2000, 257 adult sockeye made it back to the Stanley basin's Sawtooth Hatchery or Redfish Lake Creek, by far the biggest return to program. The next highest total is 27. In 2000, 299 sockeye were counted passing Lower Granite.

According to an analysis produced by the FPC staff, the total adult sockeye count at Bonneville through July 13 is nearly four times the 10-year average through that date. Based on counts at Priest Rapids Dam on the mid-Columbia and the first dam the sockeye reach on the lower Snake, Ice Harbor Dam, the vast majority of the sockeye adults returning to Bonneville are of Mid-Columbia origin.

Sockeye adult returns to Lower Granite are nearly 21 times the 10 year average, according to the analysis, which was produced at the request of the Northwest Sportfishing Industry Association's executive director, Liz Hamilton. It reviews the returns of adult sockeye in the Snake and Mid-Columbia rivers and analyzes the in-river conditions and hatchery releases during recent out-migration years.

The Snake River sockeye migrate to the ocean in their second year and return as 3-year-old jacks and as 4- and 5-year-olds.

The IDFG program has in recent years been releasing more smolts – young fish ready to migrate toward saltwater – than it did in the early years of the program. The smolts have proven to produce the best adult returns. The program also releases pre-smolts and plants "eyed" eggs in lakes, as well as releasing some of the adults that return.

This year's 4-year-old returns could well be from a release of 86,000 smolts in 2006 – the largest smolt release to that point. There were 100,000 smolts released in 2007 and 150,000 this year.

The FPC provides technical services to the fish agencies and tribes impacted by the operation of the FCRPS. The analysis signed by FPC Director Michele DeHart concludes that:

"The high returns of sockeye adults is likely due to a combination of conditions which occurred during the 2006 and 2007 juvenile out-migrations, including:

-- higher flow and spill during 2006;

-- higher proportion of river flow spilled in the lower flow year of 2007;

-- improved spill operations at McNary Dam in 2006 and 2007 changing the operation from the previous night time spill only, to 40 percent spill to the gas cap 24 hours per day;

-- improved spill operations at John Day in 2006 due to a T1 line outage which forced the project to spill 40 percent of river flow, 24 hours per day;

- lower proportion of juvenile sockeye transported at Snake River projects, and
- increased hatchery production in the upper Columbia River by Fisheries and Ocean, Canada."

"... it is likely that the increased adult returns of Snake River sockeye is likely the result of a combination of good in-river conditions (e.g., low water transit time in 2006 and high spill percent in 2006 and 2007), increased juvenile reach survivals in 2006 and 2007, and low transportation proportions in 2006 and 2007."

The July 14 analysis drew an inquiry from the Regional Forum's Technical Management Team, comprised of state, federal and tribal fish managers and hydro system officials. Member Scott Bettin of the Bonneville Power Administration sent a request to DeHart for the FPC to consider ocean conditions' potential effects in its analysis of the high sockeye numbers.

She responded this week by writing that "Ocean conditions are important for adult returns. However, out migration conditions that result in high juvenile survival and fast travel time, for optimum ocean entry, are critical in order for juvenile fish to benefit from good ocean conditions."

Previous FPC analysis that incorporates ocean conditions for "Chinook and steelhead indicates that juvenile passage conditions and specifically increased spill is related to increased adult returns," according to the response to Bettin. "Sockeye population numbers are extremely depressed so the numbers of marked fish are small. Therefore, a similar analysis on sockeye is not possible at this time."

NOAA Fisheries – the agency charged with protecting listed salmon – responded Thursday with a critique of the July 14 FPC memo.

The critique from Ritchie Graves said the agency agreed with the FPC on four points – that the 2008 sockeye run is the best in decades, that in-river survival was relatively high in 2006 and 2007, that more smolts reaching the ocean in good physical condition means more adults, on average, are likely to return, and that sockeye hatchery programs may effectively address some limiting factors by increasing abundance and spatial distribution.

"However, the memo suffers from several shortcomings," Graves said. The 11 technical "shortcomings" listed by NOAA include a failure to:

"-- consider how variability in ocean productivity may affect the number of returning adults and instead seeks to attribute the variance in returns primarily to in-river operations. Such attribution is not reasonable nor supportable given the likely magnitude of ocean productivity effects.

-- a failure to provide any analysis of Smolt to Adult Returns (SAR) -- a glaring omission considering that the apparent goal of the memo is to describe factors which likely contributed to the larger than expected returns of sockeye salmon in 2008.

-- provide any data supporting the claim that more adults returned because transport rates are lower than usual.

-- provide a figure relating average spill to the survival of sockeye detected at RIS [Rock Island Dam] as was done for sockeye detected at Lower Granite Dam. The analysis should be consistent for the two groups of fish being examined."

Graves' memo said FPC analysis of water transit time is "entirely driven by a single data point –

2001 – when essentially no spill occurred in the Snake River and substantially reduced spill occurred in the lower Columbia River. Thus, a much higher percentage of juvenile passed dams via turbines at the mainstem federal hydroelectric projects than was the case in any of the other years included in this analysis. This is a serious oversight which should be remedied by providing an analysis of the data without 2001. Such an analysis would show essentially no relationship without 2001."