2009 Vintage of Fraser River Sockeye Salmon: A Complex Full Bodied Redd with Mysterious Bouquet

by The Sockeye Sommelier

Some stories about the biology of Pacific salmon are more compelling than others, and this is one. While catches in Japan, Russia and Alaska have been sustained at high levels, salmon fishermen from southern British Columbia in Canada to California in the United States have suffered from few fishing opportunities for at least a decade. From Vancouver Island south to California, young salmon that went to sea in 2005 were particularly hard hit by an unproductive coastal ocean that caused a total closure of the lucrative Fraser River sockeye salmon fishery in 2007. Expectations for returns in 2008 are better, but not by much. *Alors, quel dommage!*

Chilko Lake has been the largest producer of sockeye salmon in the Fraser River over the last 50 years. It is located in the lee of the Coastal Mountain Range, high upon the Chilcotin Plateau of British Columbia. The lake is so deep and cold that most colour-sensing satellites cannot detect any trace of the colour that indicates plankton growth at the base of the food web. Yet, adult sockeye salmon continue to spawn in the Chilko River and the newly hatched fry migrate into the chilly lake to feed for one or two years before heading downstream to the sea.

With the signing of the Pacific Salmon Treaty between Canada and the United States in 1985, Fisheries and Oceans Canada inherited a responsibility from the now defunct International Pacific Salmon Fisheries Commission to count the number of young sockeye leaving Chilko Lake each year. It is the only sockeye stock of the more than 30 in the complex Fraser River system where a long record has been maintained. As a consequence, it is the only site where long-term changes in freshwater and marine survival can be distinguished. Since the 1950s, the average number of smolts making the annual journey to the sea is 18.5 million 1-year olds and 0.6 million 2-year olds. When fewer leave the lake, it is generally a sign that fewer adult sockeye salmon will return to spawn two years later.

Amid all of the bad news, something truly remarkable and equally mysterious has happened to sockeye salmon in Chilko Lake. The number of smolts that left the lake in the spring of 2007 was twice the previous maximum (**Fig. 1**). Note that this is not twice the average, but double the maximum ever observed since records began in the 1950s. The mystery deepens when pausing to notice that their average size, mostly a result of growth in the lake during the spring/summer of 2006, was slightly above the long-term average. It is common practice in salmon biology to expect that a dramatic increase in numbers will coincide with a smaller body size if they are all competing for the same limited food supply in the lake.

Was this apparent miracle something that occurred only in 2006 while this opus vintage was feeding and growing? Apparently not. The average size of 1-year old smolts that went to sea the year before this bumper crop, and will return as adults in 2008, was the largest on record. Evidence of this tremendous growth appeared in 2007 when the 2-year olds of the same cohort emigrated with the bumper crop of 1-year olds. They were the largest 2-year olds ever observed. None of this spectacular growth can be explained solely by a low abundance of parents in 2004, as these levels have occurred frequently in the past, but without any sign of an accompanying growth spurt in the fry. Something truly mysterious began in 2005 that made Chilko Lake far more friendly for sockeye salmon than normal.

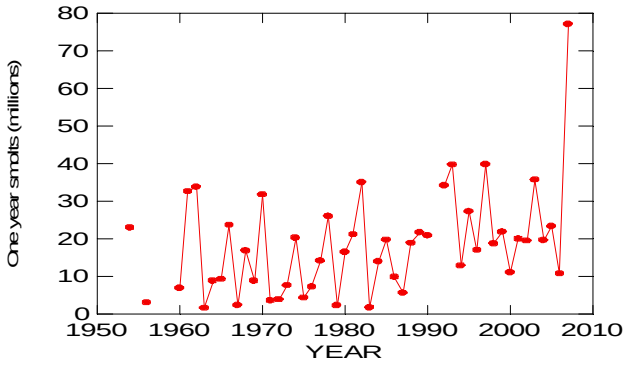

Fig. 1 Annual estimates of 1-year old sockeye smolts emigrating from Chilko Lake (Data from Fisheries and Oceans Canada).

So what to expect in 2009 from these 78 million smolts? One of two things will happen. Either the lowest marine survival of Chilko Lake sockeye in history will produce little benefit for anyone, or there will be a lot of Chilko Lake sockeye. There are not many options. Even at the lowest marine survival ever observed, returns to Chilko Lake alone would be ~1,000,000 sockeye. At the moment, there is no evidence that marine survival of this cohort will be so low. At average survival, returns will be about 6 million and if better than average (2007 was one of the more sockeye-friendly years to go to sea)…what a spectacular vintage it will be! For the moment the mystery around what happened in Chilko Lake in 2005-2006 remains unsolved. If anyone has a clue, be sure to pass it on. In the meantime, anticipating a fine vintage can be almost as much fun as tasting it. *Bon appetit!*