

To show an alarming trend, the data for the older years of 1988-2004 are colored pale grey, except for three relatively bad years which are pale pink (1989, 1997, and 1999). The years starting with 2005 are plotted in the bright colors. Of interest here are the general trends (because there are seasonal variations in addition to some variations in the test set-up from day to day and year to year). Note that nine of the twelve worst years have occurred starting with 2005, and even the best of these recent years (2010) is still near the lower end of the graphs for all years (1988 and on).

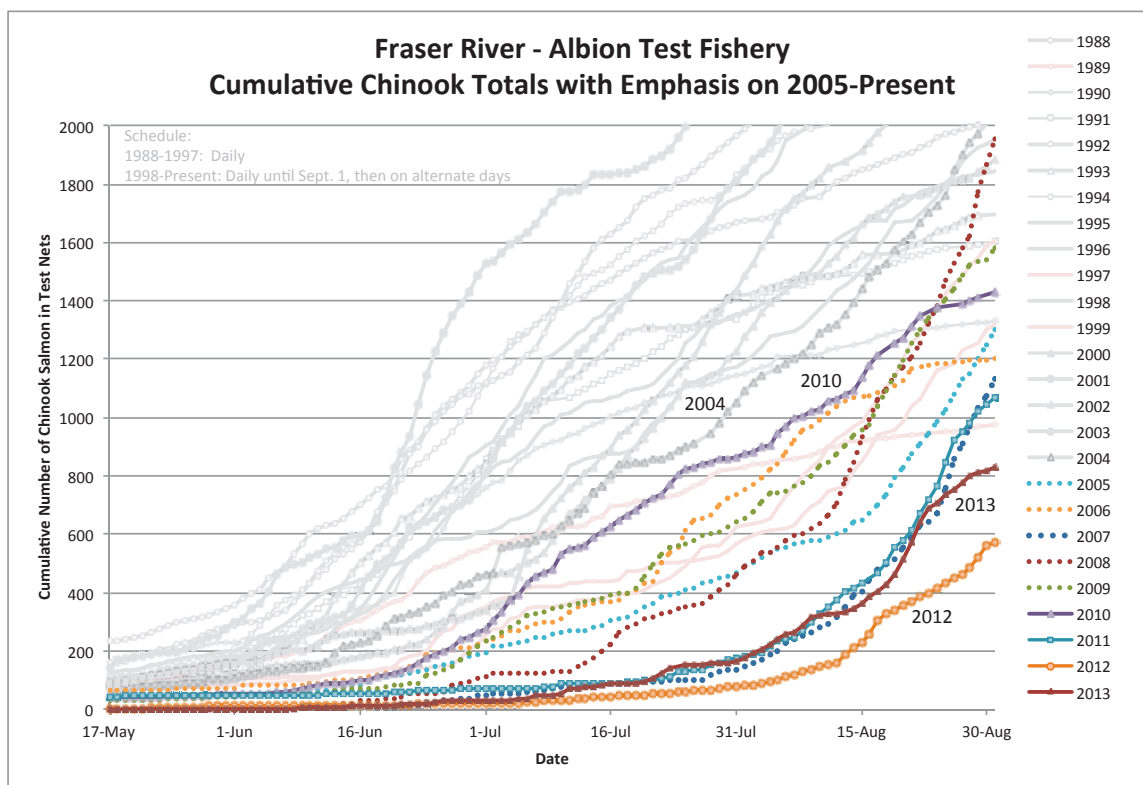


Figure 14. Fraser River Albion Test Fishery – Cumulative Chinook Counts from Mid-May through August

Could the 2010 test fishery data explain why the whales were here for so many consecutive days in 2010 and why more L pod whales were here in 2010 (Table 1)?

Although 2012 appears to be the worst of all years, 2013 was only a little better than 2012. Does the apparent lack of Fraser River Chinook salmon in 2013 explain the chronic absence of the J pod whales from May through August? Does this explain why so few Southern Resident whales were present throughout July of 2013 (Table 3)? Even the J pod whales were not seen in the area 28 days in a row in the June-July time frame, and were here for only five days in July before disappearing again for another 29 consecutive days.

Looking at trends yet another way, in the plot below (Figure 15) the mountainous region represents the cumulative Chinook totals for the first day of each month, and the 15th day of each month. Of more interest are the general trends -- how these Chinook counts change from year to year. A "trend line" function was used to do the curve-fitting, choosing second and third order curve fits over straight-line approximations.

For the early summer sampling periods, there is an obvious downward trend from 1988 to 2013. For the late summer and early fall sampling periods, the Chinook counts are boosted in the middle years because of some late season bursts in Chinook counts in the 2001-2003 time frame; however, over all and especially in the past decade, there is a sharp decline in Chinook counts in these late season counts.

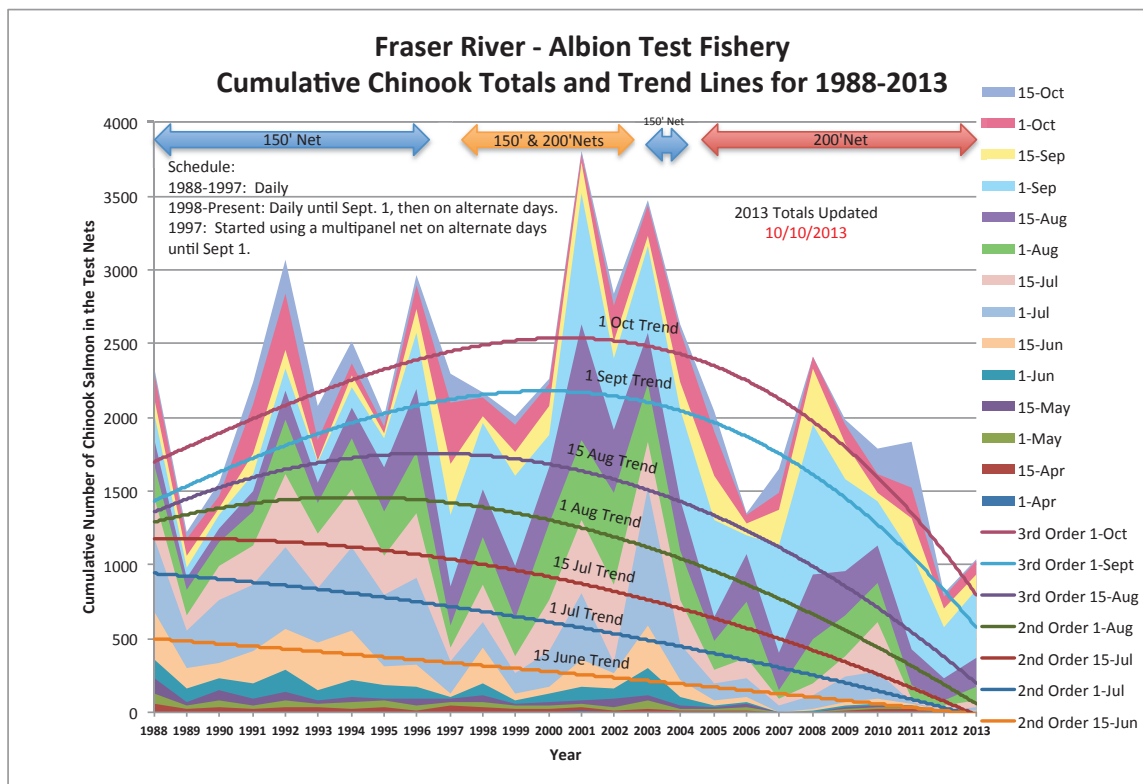


Figure 15. Fraser River Albion Test Fishery – Cumulative Chinook Counts and Trend Lines for 1988-2013

As mentioned earlier, the fisheries folks use something called CPUE. It is my understanding that “CPUE” is way of normalizing the fish counts to account for variations in the size of the net, the time the nets are down, etc.

Here is the mountain chart using cumulative CPUE instead of fish counts (Figure 16). Since a shorter net was used in the early years (presumably reducing the number of fish caught back then), it seems the earlier years look better (in a relative sense) using CPUE — CPUE is helping to level the playing field when the test set-up changes. However, the conclusion remains the same. It appears that the preferred measure of salmon abundance is pointing to a serious decline that has persisted for more than a decade. That being said, CPUE still remains something of an abstract parameter because there is no obvious connection with the actual number of Chinook salmon or Chinook salmon abundance.

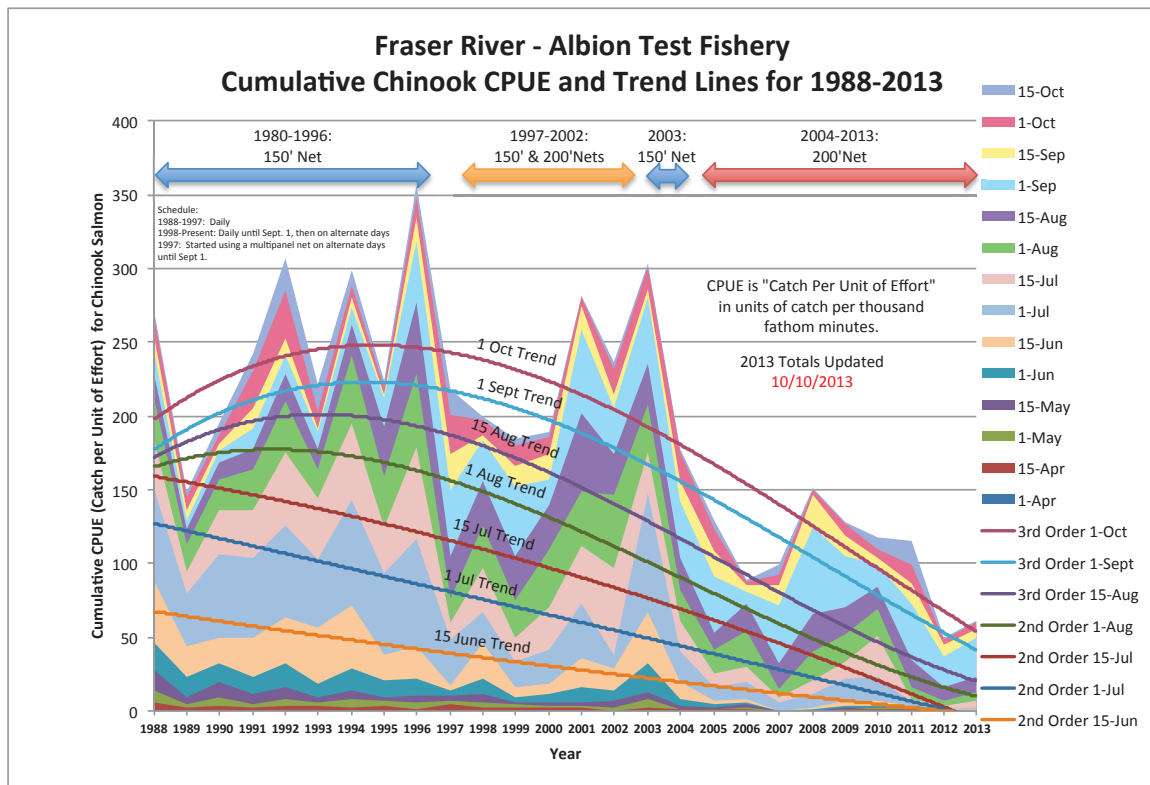


Figure 16. Fraser River Albion Test Fishery – Cumulative Chinook CPUE and Trend Lines for 1988-2013

Conclusions

There does appear to be a correlation between the presence of the Southern Resident killer whales in local waters and the Chinook salmon trends that are visible in the Albion test fishery data. How this will affect the Southern Resident killer whale population in the long run is not obvious.

As for sightings of Southern Resident killer whales in the waters of the Salish Sea, 2013 is proving to be cause for concern. These “resident” whales, even the J pod whales, were quite simply absent.

Regarding the matter of the Fraser River Chinook stocks, based on the Albion test fishery data it does appear that the measures of salmon abundance show an alarming decline over the past decade. What is the prognosis for the abundance of the spring, summer, and fall Fraser River Chinook stocks?

The J pod is showing the best growth rate of the three pods, but how long can this continue if the Critical Habitat where these whales have been spending the vast majority of their time from April through September no longer has enough Chinook salmon to sustain the 26 members of J pod?

Then there is the bigger picture. What does it mean to declare a region to be Critical Habitat for an endangered population while at the same time basic food supplies are becoming depleted with no real solution in sight? What protection does the endangered status really offer to the Southern Resident killer whales and Chinook salmon? What individual or agency is responsible for ensuring these endangered whales have enough Chinook salmon to eat in their core summer habitat?

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Acknowledgments

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<http://www.pac.dfo-mpo.gc.ca/fm-gp/mplans/2013/smon/smon-sc-cs-2013-eng.pdf>

Center for Whale Research

<http://www.whaleresearch.com>

Critical Habitat Map (US and Canada)

<http://www2.epa.gov/sites/production/files/orca-critical-habitat.jpg>

Critical Habitat (Canadian Waters)

http://publications.gc.ca/collections/collection_2008/ec/En3-4-46-2007E.pdf

Critical Habitat (US Waters)

http://www.nmfs.noaa.gov/pr/pdfs/criticalhabitat/killerwhale_sr.pdf

Environmental Protection Agency Chinook Status

<http://www2.epa.gov/salish-sea/chinook-salmon>

Orca Network Sightings Network

<http://www.orcanetwork.org>

Orca Network Sightings Archives

<http://www.orcanetwork.org/sightings/archives.html>

Pacific Salmon Commission

<http://www.psc.org/index.htm>

Pacific Salmon Commission Joint Chinook Technical Committee Annual Report of Catch and Escapement for 2012

<http://www.psc.org/pubs/TCCHINOOK13-1.pdf>

Pacific Salmon Commission Joint Chinook Technical Committee Report Catch and Escapement of Chinook Salmon 2001 (background information on Fraser River stocks)

<http://www.psc.org/pubs/TCCHINOOK02-1.pdf>

SRKW Workshop, March, 2012: Brad Hanson's Presentation

<http://essa.com/wp-content/uploads/HansonkwsalmonwkspacousticrecordersummaryMar12.ppt>

Whale of a Purpose (Jeanne Hyde)

<http://whale-of-a-porpoise.blogspot.com>

Supplemental Data

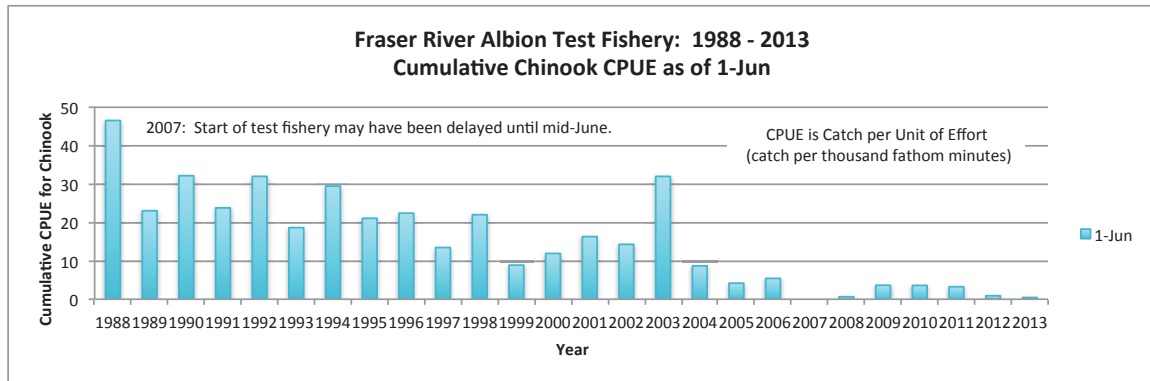


Figure S- 1. Fraser River Albion Test Fishery – Cumulative Chinook CPUE as of June 1 for 1988-2013

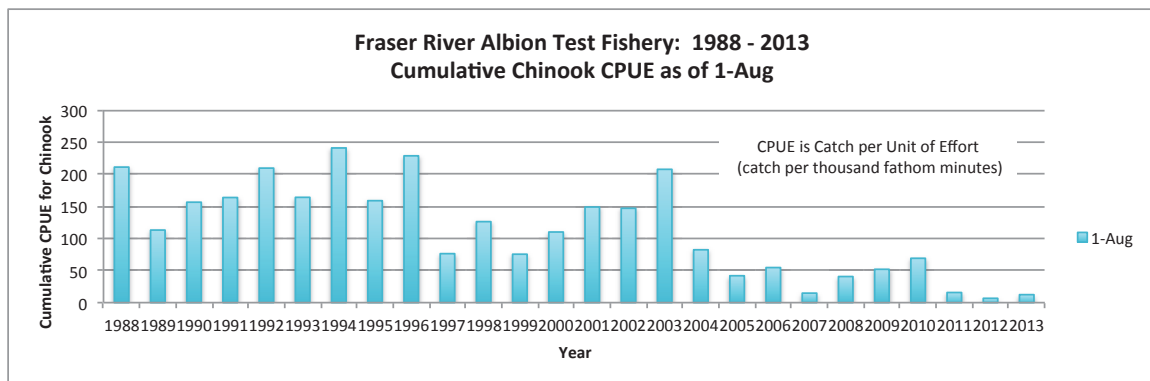


Figure S- 2. Fraser River Albion Test Fishery – Cumulative Chinook CPUE as of August 1 for 1988-2013

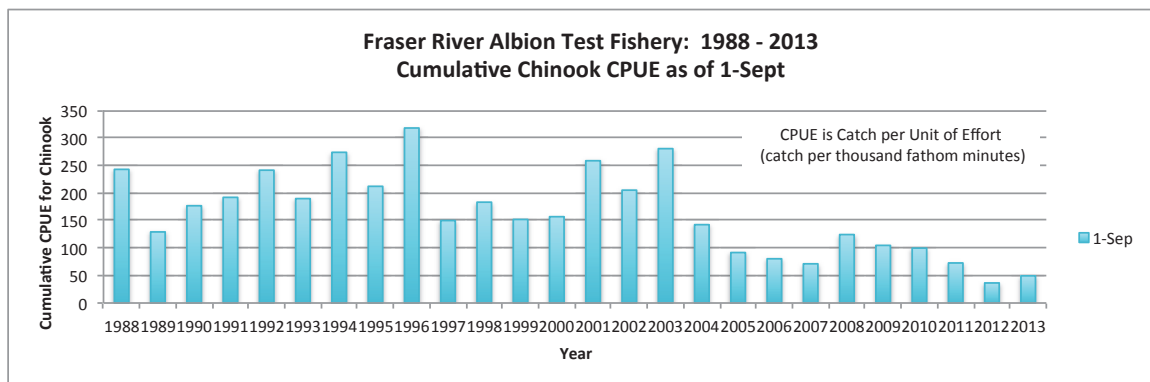


Figure S- 3. Fraser River Albion Test Fishery – Cumulative Chinook CPUE as of September 1 for 1988-2013

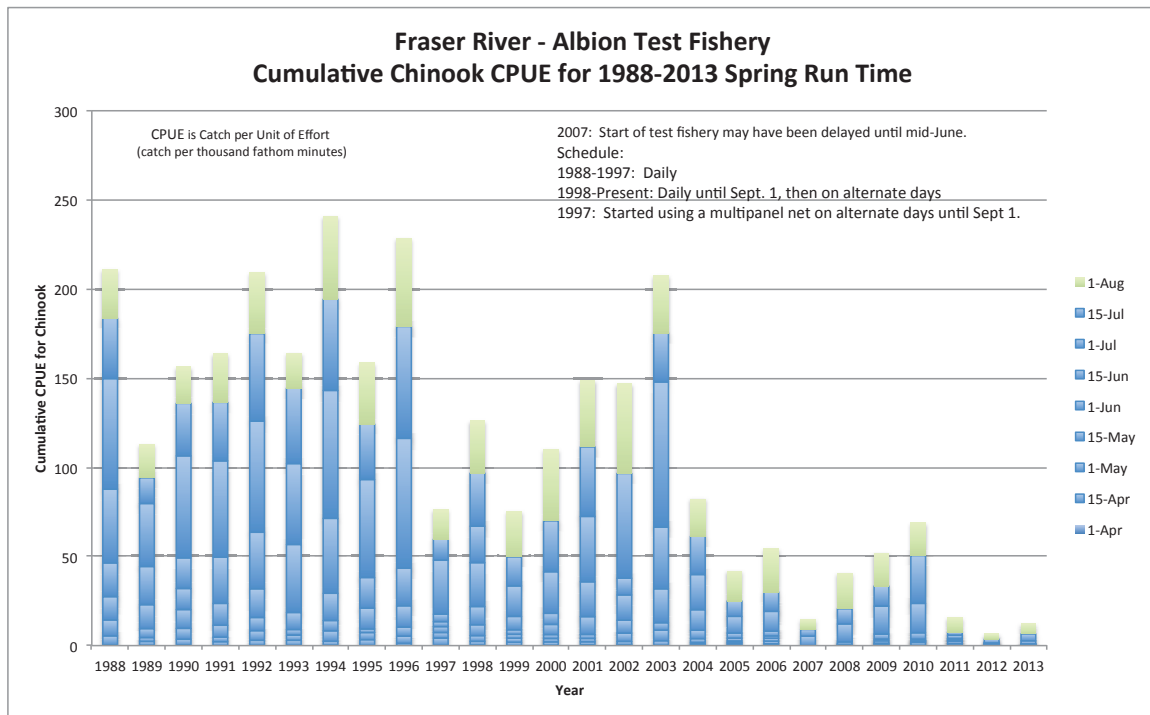


Figure S- 4. Fraser River Albion Test Fishery - Cumulative CPUE for Spring Run Time (April - July)

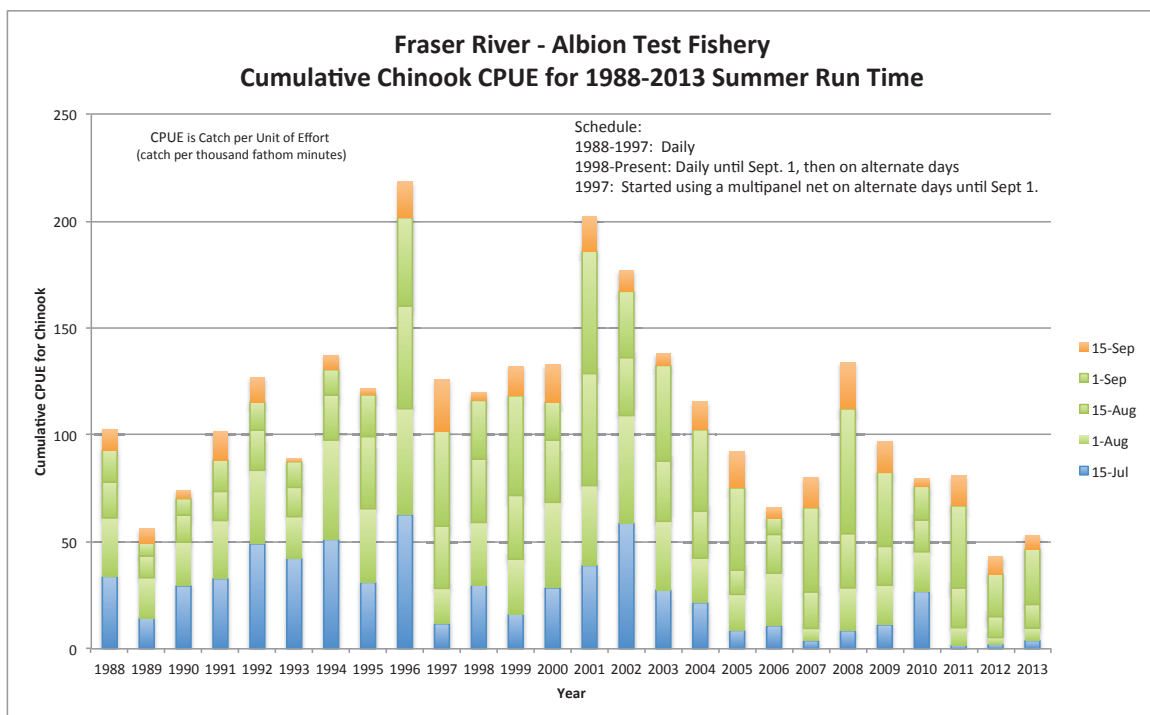


Figure S- 5. Fraser River Albion Test Fishery - Cumulative CPUE for Summer Run Time (July – mid September)