

Trends of Chum and Pink Salmon Production in Chukotka

Yury N. Khokhlov

*Chukotka Branch, Pacific Scientific Research Fisheries Center (TINRO-Center), 56, Otko St.,
Anadyr, Chukotsky Autonomous Region 689000, Russia*

Keywords: chum salmon, pink salmon, abundance, catch, Anadyr, Chukotka

Chukotka is a unique region in the Russian Far East where there are no hatcheries and salmon catches are low. Anadyr River chum salmon average approximately 90% of the total Chukotka salmon catch and abundance in even-numbered years. There are millions of fish that return annually, and in the last eight years the annual run of Anadyr chum salmon numbered about 3 million. The share of Anadyr chum within the total chum salmon catch in the Russian Far East from 1971 to 2010 varied from 0.2 to 27.8% and averaged 9.95%.

Anadyr chum salmon spawn in various locations and sometimes individual spawning grounds are located at considerable distances from one another. The large spatial separation of spawning areas initially led researchers to assume the presence of subpopulations, or even separate populations, in the stock structure of Anadyr chum salmon. But recent genetic results have shown the absence of significant distinctions between samples of Anadyr chum salmon from different spawning areas. Thus, for estimations of abundance Anadyr chum salmon are not divided into separate groups.

Chum salmon abundance is estimated on the basis of catches by beach seines and observations of fish in index areas in the middle section of the Anadyr River. To examine long-period fluctuations in Anadyr chum salmon abundance, a one-hundred year series of annual catch data were smoothed using an un-weighted sliding average. Results show there is a 40- to 50-year fluctuation in abundance of Anadyr chum salmon (Fig. 1). Anadyr chum salmon abundance increased in the 1930s-1940s and again in the 1980s, with annual catches averaging about 5000 tonnes and 4000 tonnes, respectively, during the two peak periods. According to this pattern of fluctuation, one would expect the next peak in abundance to occur about 2026-2036, but current and future natural processes, such as the climate warming currently observed in Chukotka, will need to be taken into account in order to make informed forecasts.

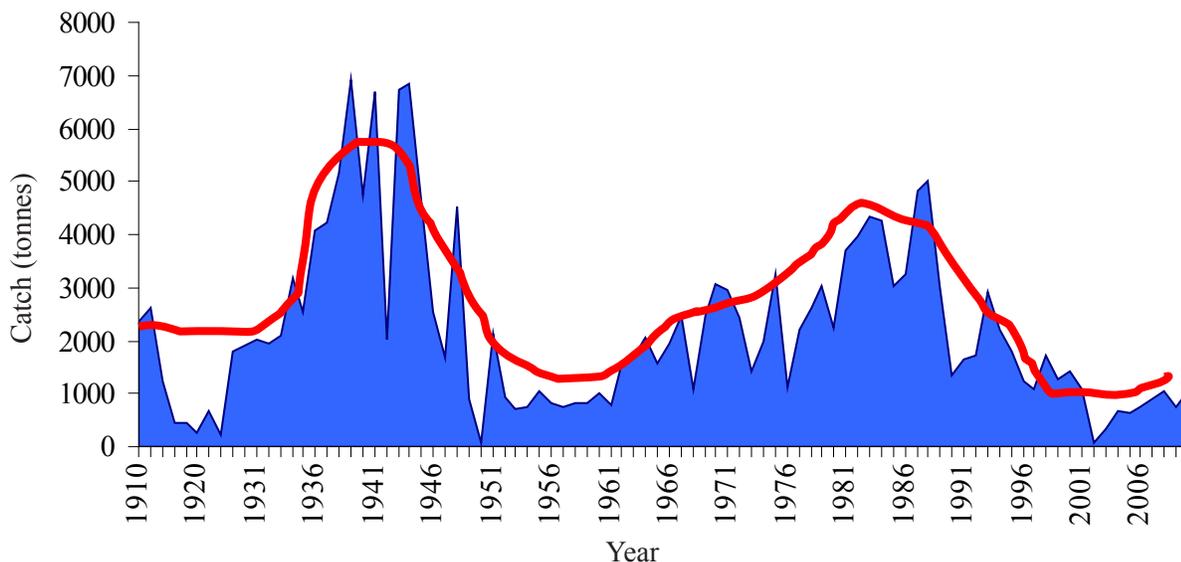


Fig. 1. Annual catch as a measure of abundance of Anadyr River chum salmon, 1910-2011. Red line indicates data smoothed using an un-weighted sliding average.

Fluctuations in Anadyr chum salmon abundance correlate with change in the temperature anomaly of the earth's average surface air temperature (Global dT). This is one of the basic climate indicators that characterizes long-period fluctuations in the earth's climate and has been correlated with changes in salmon productivity and productivity of other fish species (Klyashtorin and Lyubushin 2005). Within the long-period trend, there are short-term fluctuations in Anadyr chum salmon abundance caused by different local factors. For example, over the last 17 years of increasing chum salmon abundance there

have been 3- to 4-year short-term fluctuations in abundance. Local increases or decreases in abundance can be forecasted using data on chum salmon age structure. A low percentage of returning two-year old chum salmon in one year signals smaller runs the following year.

In odd-numbered years, pink salmon abundance and catch in Chukotka increases considerably, although it is difficult to estimate the total abundance of pink salmon returning. Despite the annual catch of pink salmon, the regular count of pink salmon catch has only been conducted in recent years. Aerial estimates of pink salmon abundance were conducted during special flights in 1985-1992. More recently, estimates were conducted by observers in the Mejnypilgynsky lake-river system and the Kajpylgin and Maynitz Lakes, where the largest pink salmon stocks exist and over half a million individuals were noted. In other lake systems draining to the Bering Sea, pink salmon abundance is less, and in the majority of these areas the number of fish does not exceed a thousand individuals. According to the aerial counts, pink salmon abundance in Chukotka was estimated at about seven hundred thousand. Recent results from counts in the Mejnypilgynsky lake-river system and other places suggested it was likely that pink salmon abundance in the beginning of 21st century was considerably higher than estimates obtained by observers on aircraft.

As clearly indicated by catches, Chukotka pink salmon abundance is dominated by runs in odd-numbered years. Pink salmon abundance in the last seven years is estimated at about 2-3 million fish, but this does not account for the abundance of fish escaping to spawning areas. There are three reasons for the lack of detailed information on pink salmon abundance in Chukotka. (1) There is an absence of reliable catch statistics in many rivers where indigenous people of Chukotka fish. In practice, fishing activities likely occur in almost all small watersheds. (2) There is a lack of commercial processing with the capability of handling large catches of pink salmon, and this leads to fishing that concentrates on higher-value species, i.e., sockeye and chum salmon. (3) Catch monitoring and research is nonexistent on many rivers where pink abundance is known to be high.

REFERENCES

- Klyashtorin, L.B, and A.A. Lyubushin. 2007. Cyclic climate changes and fish productivity. VNIRO Publishing, Moscow. 224 pp.