

# The population of chum salmon (*Oncorhynchus keta*) in the Anadyr River basin, Chukotka



Semyon B. Baranov  
Chukotka Branch of Pacific Research Fisheries Centre (ChukotTINRO), Anadyr, RUSSIA  
sam1salmon@yandex.ru

## Chum salmon

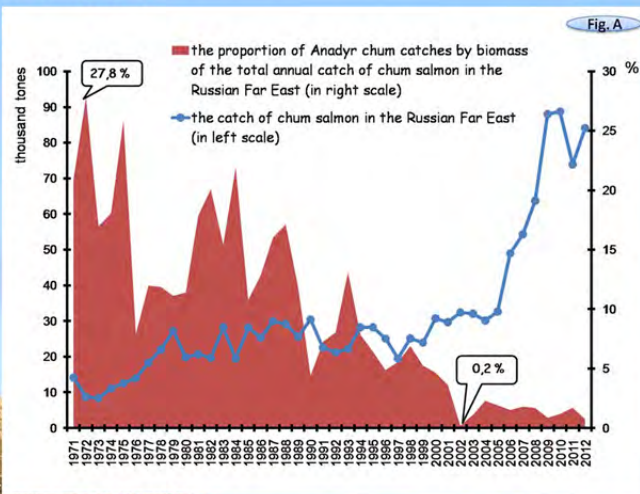


We estimated the abundance dynamics of Anadyr chum salmon by interannual fluctuations of commercial fish catches that started a hundred years ago.

The largest chum salmon stock on the Russian Northeast Asian coast spawns in the rivers of the Anadyr basin at Chukotka (Korotaev and e.g., 2002).

## The monitoring of Anadyr chum

The proportion of chum catches in the Anadyr basin is 75.3 % in average to all catches of other Pacific salmon in Chukotka and is up to 12 % by biomass of the total annual catch of chum salmon in the Russian Far East (fig. A).

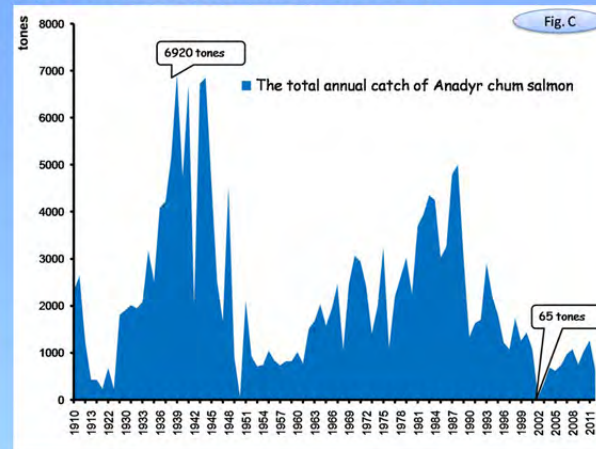


Anadyr chum plays the important role in traditional life of the Chukotka natives (Fig. B).



The annual monitoring of Anadyr Chum salmon stock includes recording of commercial and non-commercial catches and biological data sampling from adult migrants. The harvest of Anadyr chum salmon has been going since 1910 (fig. C).

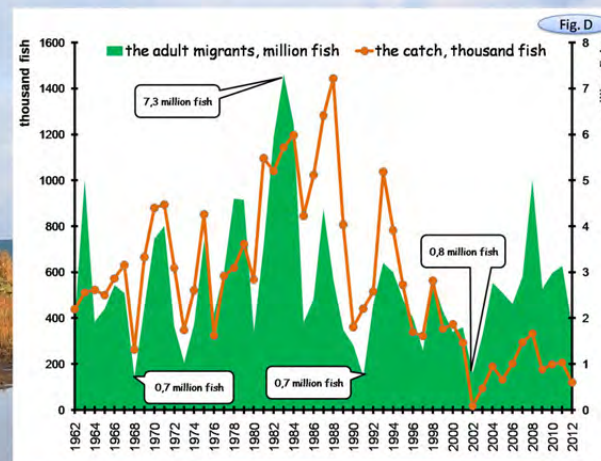
The collected data are essential for accurate estimations of population size and quota limits for chum salmon.



The smallest number of adult migrants was observed in 1968 (0.7 M), 1991 (0.7 M), and 2002 (0.8 M); the biggest number was observed in 1983 (7.3 M); and the annual average is 2.8 M fish (Chereshnev, 2008) (fig. D).

The main spawning grounds are concentrated in the middle and upper rivers of the Anadyr estuary basin, which principal rivers are Anadyr, Velikaya, and Kanchalan (Putivkin, 1994).

The quantity of chum salmon on spawning grounds changes over a wide range from 0.234 up to 2.81 M fish with an annual average (optimum) of 1.5-2.0 M fish. The number of smolts varies from 34 M in 1992 up to 495 M in 1990 with average annual catch 265 M fish (Putivkin, 1999, Korotaev and e.g., 2002, Chereshnev, 2008).



## The freshwater period

The reproduction of Anadyr chum salmon occurs in extreme conditions for this species: the level of water decreases to a minimum on the spawning grounds causing the destruction of eggs by frost penetration. Juveniles develop in freshwater habitats at low temperatures for about 7-9 months and then migrate to the sea under the ice shield during April - June seasonal period. Inconsistencies in the timeline of larval release from redds, in the periods of downstream migrations, in the lengths of the migration routes and in the hydrological conditions between the rivers are the major causes of uneven growth of Anadyr chum juveniles during both freshwater and marine stages (Shtundyk, 1982, Korotaev, 1997, Putivkin, 1999, Korotaev and e.g., 2002, Chereshnev, 2008).

## The marine period

The oceanic feeding grounds are located to the south and southeast from central part of Aleutian Island chain (Ostroumov, 1967, Atlas..., 2002, Chereshnev, 2008) (fig. E).

Smolts differ in length and weight during their migration down into the sea, but their finite sizes become equalized on the marine stage (Shuntov, Temnykh, 2008). Implicitly, we assume a high level of food availability during marine feeding period.



Extreme conditions of egg incubation, the larval growth during first months of life cycle, the considerable length of migration, and some other factors may also contribute to larger body length and mass of chum salmon adult migrants in comparison with populations from other regions.

Particularly, Anadyr chum salmon competes more actively for food with other stocks in the sea and, although low in number, it is much more viable.

## The Predators

Population of Anadyr chum salmon is affected by predation from other fishes and animals on different stages of its life cycle.

Grayling and char consumption of Anadyr chum salmon eggs is significant on the spawning grounds, and jack pike also preys on its juveniles in the river.

During the adult spawning migration, Larcha (spotted) seals feed on 260.5 K Anadyr chums in average, and belugas consume 77.5 K fish (fig. F).

Anadromous fish species (chars, toothed smelt) eat juveniles of chum salmon at the coastal zone.

There are some species that predated on a chum salmon (e.g., daggertooth and longnose lancetfish). The injury occurrence caused from predation is less than 1%.

An expert estimate of the chum salmon illegal catch is equal to the official statistics in Chukotka. By the coastal fishing data, the portion of chum salmon catch with driftnets is about 1.5%.



## This is important

The Anadyr chum population plays an important role in gene pool preservation as a source stock of wild chum salmon in the North Pacific.

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