

# A Brief on Korean Chum Salmon: Past and Future

While salmon consumption is very popular in Korea today, only a small percentage of the fish consumed is commercially-caught Korean salmon. Chum, pink, and masu salmon are distributed in eastern Korea (Machidori and Kato 1984, INPFC Bull. No. 43; Heard 1991, Pacific Salmon Life Histories p. 122), but nowadays only chum salmon is abundant enough to support commercial fisheries. In 2010 the commercial catch of chum salmon was 139 metric tonnes, which pales in comparison to the 9,334 metric tonnes of imported salmon products sold in South Korea (2010 NPAFC Statistical Yearbook; 2010 Ministry for Food, Agriculture, Forestry, and Fisheries, MIFAFF Statistics). Most of the salmon sold in the marketplace is farmed Atlantic salmon, which originates predominately from Norway and Chile. Pacific salmon products are imported from Russia, Canada, and the United States.



Fig. 1. Locations on the Korean Peninsula (shown in blue) where salmon have been harvested in historical and recent times. On the northeastern Korean Peninsula, the Dooan (Tumen) River forms the border between Russia, China, and North Korea and has historically produced many salmon. Map credit: Google Maps.

Despite current low commercial chum salmon catches, the Korean fishery has a long history. According to the 1454 Sejongillok almanac, salmon was a local product available from the eastern provinces of Hamkyung-do, Gangwon-do, and Gyoungsang-do (Fig. 1). Fisheries research from the 1890's observed plentiful salmon distributed near Youngheung Bay, where fishermen speared as many as 2,000-3,000 salmon a day. Other documents from the early 1900's tell of salmon returning to spawn in the Dooan River in numbers so large that most fishermen set their nets there to catch the abundant run.

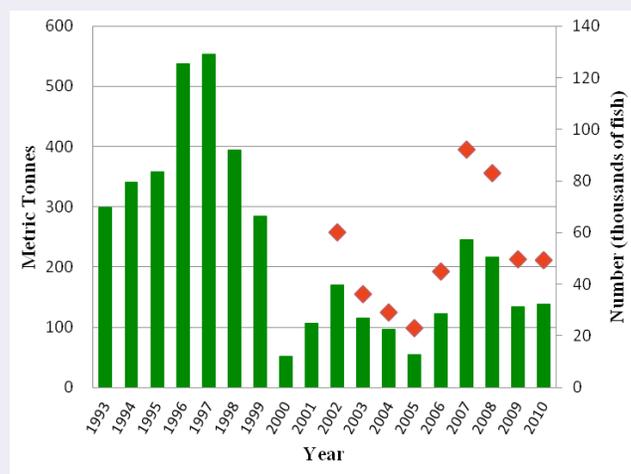


Fig. 2. Annual commercial catch of chum salmon in the Republic of Korea. Green columns indicate 1993-2010 catches in metric tonnes. Red points indicate 2002-2010 catches in thousands of fish. Data source: NPAFC Statistical Yearbook.

However, in recent decades commercial catches of chum salmon in South Korea have seen sharp declines. Since the 1990's (1993-1999), the average commercial catch of 395 metric tonnes has dropped to nearly one third, or 132 metric tonnes, during the 2000's (2000-2010; Fig. 2).

Artificial production of chum salmon began in 1913 in Hamkyung-do, which is located in the northeastern region of the peninsula. In 1967 the South Korean government built hatcheries in the cities of Samchuk, Gangwon-do, and Milyang, Gyoungsang-do, but initial production was very low (Fig. 3).

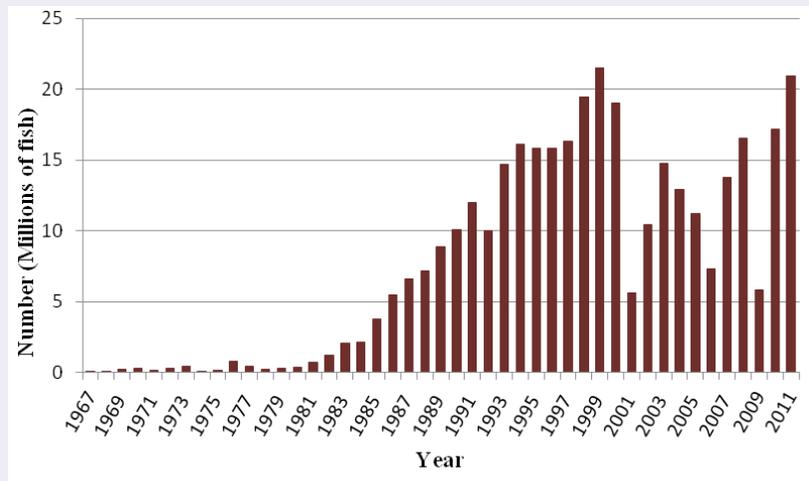


Fig. 3. Number (millions) of chum salmon fry released in the Republic of Korea (1967-2011). Data source: FIRA, unpublished statistics.

In 1984 the government established the Yangyang Salmon Station in Gangwon-do, now a branch of the Korea Fisheries Resources Agency (FIRA). The FIRA is the primary salmon research institution in Korea, and with their salmon restocking project, FIRA is taking the lead in the area of anadromous fish scientific investigations. The agency is currently conducting scientific studies aimed at building a system for salmon resource management that ensures chum salmon survive and return in healthy numbers to Korean waters. The Yangyang Station has worked hard to continuously improve its rearing and research facilities and, because of this effort, the total number of chum salmon fry releases has increased significantly from around 2 million in 1984 to over 20 million in 2011 (Fig. 3).

Despite increases in the number of salmon fry released, commercial catches have decreased. Declining commercial catches may be related to unusually low and decreasing brood-year return rates of adult chum salmon to the fisheries since 1990 (Fig. 4). According to a 2006 Korean report to CSRS (Kang et al. 2006, NPAFC Doc 976), the survival rate (i.e., return rate) of Korean chum salmon was about 1.5% in the 1990s and 0.2% in the 2000s. This is quite low as compared to a typical return rate in the range of 1-2% for chum salmon returning to Honshu, Japan (Hiroi 1998, NPAFC Bull. 1:23-27). Negative correlations between adult returns of Korean chum salmon and mean spring coastal water temperatures have suggested a link between lower fish survival during the early marine period and higher water

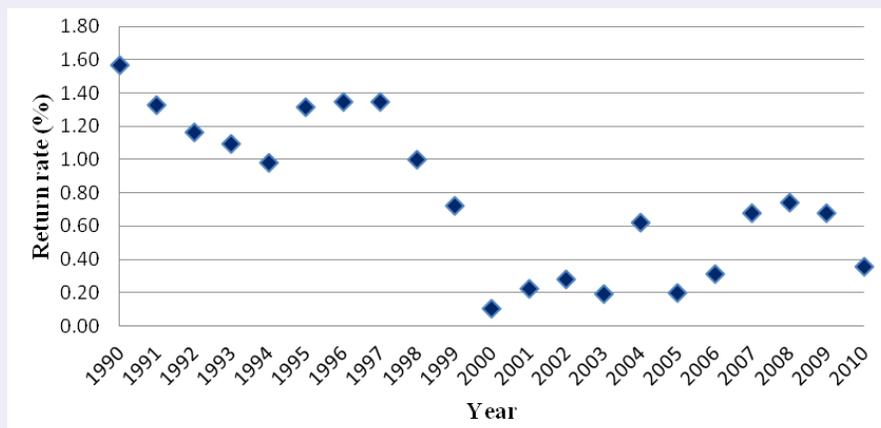


Fig. 4. Brood-year return rate (%) of hatchery chum salmon released as fry from hatcheries and captured as adults in fisheries in the Republic of Korea. Brood-year return rate is based on 3-year old fish, which is the predominant age of maturity. Date source: FIRA, unpublished statistics.

temperatures (Kang et al. 2006, NPAFC Doc 976). Korean salmon scientists consider recent low return rates of chum salmon to Korean rivers are related primarily to warming water temperatures in rivers and the coastal marine environment that is detrimental to Korean chum survival and related secondarily to heavily skewed sex ratios in the 2000s, with a preponderance of male chum salmon returning to Korean rivers.

Every March, FIRA sponsors a salmon-fry releasing ceremony with many citizens and school children participating (Fig. 5). The ceremony helps people become more informed about their salmon resources and about the importance of river and coastal ecosystems. Continued research combined with growing public awareness of salmon issues are crucial components in the efforts to improve salmon returns to Korean rivers for current and future generations.



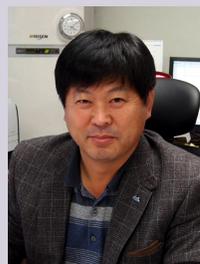
Fig. 5. Ceremonial release of chum salmon fry by school children in Korea. (Photo credit: Ju Kyoung Kim, FIRA.)

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Youngho Park graduated from the Seoul National University, Republic of Korea, with a Bachelor's in Economics and has completed the coursework for a Master's in Public Policy. He joined the Ministry for Food, Agriculture, Forestry, and Fisheries (MIFAFF) in 2003, where he initially managed supply and demand of Korean agricultural products, promoted Korean cuisine, and developed food-safety strategy. In 2010 he moved to the Division of Distant-Water Fisheries at MIFAFF and began working on fisheries enforcement.

The opportunity arose for a two-year training period abroad, and he applied to the NPAFC, joining the Secretariat as an on-the-job trainee in January 2012 to increase his exposure to international organizations. Youngho enjoys travelling and has visited North and South America, Africa, Europe, and Asia. During his stay in Vancouver, he and his wife have made excursions in western Canada and the United States. Youngho plans to return to Korea in late spring, 2013.



Kwan Eui Hong was born in Gangneung, Gangwon-do, Republic of Korea. After obtaining a Bachelor's and Master's degrees, he completed a PhD in the field of Aquaculture. For 34 years he has worked as a public official conducting research at the National Fisheries Research and Development Institute (NFRDI) and the National Marine Biological Resources Construction Executive Agency in the Ministry of Maritime Affairs and Fisheries. Kwan Eui currently serves as the Director of the Yangyang Salmon Station of the Korea

Fisheries Resources Agency (FIRA). Throughout his career, he has endeavored to recover and enhance inland fish and chum and pink salmon resources in the area of Korea's east coast. Kwan Eui is a life-long sports enthusiast. During his school years, he was an avid soccer player and now enjoys the practice of Taekwondo.