

## Status of Salmon Stocks and Fisheries in the North Pacific Ocean

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Overall, the status of Pacific salmon stocks and fisheries is currently viewed as favorable by scientists around the Pacific – although there are some areas of definite concern. Stocks in the Pacific Northwest of the United States are at historically low levels. Along the west coast of Canada, coho salmon stocks have been a concern for several years, and restrictions to coho and other fisheries have led to general increases in spawning stock sizes. Stocks of salmon in Alaska are generally at very high levels, although some salmon stocks declined rapidly in Western Alaska in the late 1990s. Stock status in the Russian Far East is somewhat mixed. In Japan, survival rates for chum salmon, the primary species, declined in the late 1990s but abundance is still at relatively high levels. The total commercial harvest, by weight, of Pacific salmon declined slightly more than 15% from 1993 to 2001, although the total harvest of pink and chum salmon remained almost constant throughout that period.

The situation for salmon stocks in the Pacific Northwest region of the United States is often referred to as one of “crisis” (e.g., NRC 1996, Lichatowich 1999). Stock trends are downward. In contrast, Alaska stocks that migrate in the Gulf of Alaska are generally at very high levels, although many stocks that migrate into the Bering Sea declined sharply in the late 1990s. For example, the commercial harvest of salmon in Bristol Bay reached a peak of over 44 million fish in 1995. The commercial catch of Bristol Bay sockeye salmon declined to just over 12 million in 1997, and then further declined to just over 10 million in 1998. In 2001, the commercial catch of Bristol Bay sockeye salmon was approximately 14 million. In Alaska, the period from 1900 to 1925 was the buildup period for the commercial fishery, when there was very little regulation. This period ended with the White Act, passed in 1924, which halted fishing at the midpoint of the run. From 1925 to 1945 major fishing districts were defined, and a number of management measures were introduced. Fishing effort increased up to 1930, when the number of fish traps was restricted. The commercial catch reached a peak of 126 million salmon in 1936. By the mid 1940s, the runs were severely over fished and catch trends were on their way down. Run sizes increased following the move to Alaskan state control in 1959, until 1970, when the run sizes dropped sharply. The all-species Alaska commercial harvest reached a low point of 22 million Pacific salmon in 1974 (Byerly et al. 1999). From the mid-1970s to the present, run sizes, salmon survival, sport and commercial fishery harvests have generally increased with peak in commercial catch (218 million salmon of all species) in 1995. The all-species catch reached 174 million salmon in the most recent year (2001).

The harvest of salmon in British Columbia increased from the late 1800s to a peak of about 30 million fish in the late 1920s and early 1930s. Harvest subsequently declined through the 1950s and 1960s, but then rebounded to record high levels of about 40 million fish in the early 1990s. This peak was followed by a rapid decline to the historical low harvest levels, about 8 million fish, in the late 1990s and early 2000s.

Sockeye and pink salmon are the most abundant species of salmon in Canada and account for most of the harvest. However, fisheries have been increasingly managed to conserve less abundant species and stocks, especially coho salmon from the interior Fraser River and interior Skeena River areas. The result of this management approach has been reduced harvest of both abundant species as well as less abundant species and stocks, a general increase in the proportion of the maturing fish reaching their spawning grounds, and increased escapement of many key stocks of concern during the past several years. Survival rate of juvenile salmon after entering the marine environment appears to be a key factor in the decline, and the recent partial recovery, of many salmon stocks throughout British Columbia.

The main stocks of pink and sockeye salmon remain in good condition in the Russian Far East; the Eastern Kamchatka stocks are an important exception. Catches of coho and chinook salmon have been declining in the Russian Far East. There is one principal stock of Russian chinook salmon in the Kamchatka River. By 1915 the

annual pink salmon catch in Russia reached 200–215 thousand tonnes. This level of harvest was maintained until 1922 when the odd-year catch declined, although the even-year catch remained at approximately 300 thousand tonnes. From 1934 to 1944, the odd-year catch increased and even-year catches declined. The historical catch reached 380 thousand tonnes (or 532 thousand tonnes of Asian pink salmon if Japanese high-seas driftnet fisheries are included). Pink salmon production has declined from this peak, with the catch near 110 thousand tonnes throughout the 1990s through 2001.

The Russian chum salmon catch has been more stable than pink salmon catch. The fishery developed rapidly in major rivers, with most of the catch made up of summer races. The chum salmon catch reached a peak of 138 thousand tonnes in 1910; by 1916 the catch declined to 21.7 thousand. The chum salmon catch increased and was fairly stable within a range of 50 to 80 thousand tonnes up to the end of the 1940s, when the harvest decreased. Chum salmon stocks increased after 1975, but recently they have declined again. Currently, most of the catch is made up of fall races of chum salmon. Russian stocks of chum salmon are currently at low levels in many far eastern regions, except for the northern Okhotsk Sea region. Most sockeye catches are concentrated off the Kamchatka Peninsula. The sockeye catch reached a peak in 1928 at 39.7 tonnes. The stocks and catches declined in the 1930 and remained depressed until the 1970s. In 1995, the total harvest (including the catches of Russian and foreign driftnet fleet within the Russian economic zone) exceeded 20 thousand tonnes for the first time since the 1930s, and the stocks have remained high.

Salmon harvest in Japan increased from the late 1800s to a peak of about 170 million fish in the 1930s, followed by decline through the 1940s. Catch levels increased in the 1950s, declined to the late 1970s, then increased to the mid 1990s. There has been a recent decline in the survival and abundance of chum salmon, the dominant species in Japan, but overall abundance is still at high levels. Offshore catches of pink, chum, and sockeye salmon account for the large portion of the total Japanese salmon catch from the early 1930s to 1980s. Since the 1970s, the landing of offshore catch was gradually decreased, at the same time the landing of coastal fisheries for chum and pink salmon was increased.

Japan has an extensive system of salmon hatcheries that maintain much of the salmon production. Chum salmon are the primary species. Hatchery production of chum salmon in Japan increased up through 1980, when production stabilized near 1.0–1.2 billion juveniles in Hokkaido and in 0.8–1.0 billion juveniles in Honshu through the 1980s and 1990s. Although return rates for hatchery-released chum salmon declined in the late 1990s, the abundance of returning adults is still at historically high levels. Hatchery production of pink salmon in Japan increased up to 1985, and has remained stable at 120–140 million juveniles through the late 1980s and 1990s.

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