

NOAA Fisheries Service

Alaska Fisheries Science Center



Protecting
Conserving
Managing
Marine Resources
in
Alaska

The Alaska Fisheries Science Center is a scientific research organization responsible for the development and implementation of NOAA's scientific research on marine resources in Alaska waters. Our research focuses on more than 250 fish and 42 marine mammal stocks off the coasts of the Bering Sea, Gulf of Alaska and Aleutian Islands.



National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Pacific cod

Gadus macrocephalus

Length female 147 cm (58 in)*
male 141 cm (55 in)*
Weight female 25 kg (55 lbs)*
male 20 kg (44 lbs)*
Age 18 years old*
*maximum



Range/Habitat

A transoceanic species occurring at depths from shoreline to 500 m, Pacific cod is widely distributed in Alaskan waters. Their range is from southern California north to the Bering Strait. Studies have shown migration between the Gulf of Alaska and Bering Sea. Preferred substrate is soft sediment, from mud and clay to sand.

Diet/Role in Ecosystem

Pacific cod are opportunistic predators, feeding on a variety of fish and invertebrates, and scavenging as well. Small Pacific cod feed mostly on invertebrates, while large Pacific cod are mainly piscivorous (eat fish).

Reproduction

March is the peak spawning season for this oviparous (egg laying) and highly fecund (produce many eggs) species. About half of all female Pacific cod reach maturity by the time they attain a length of 58 cm in the Bering Sea/Aleutian Islands (BSAI) and 50 cm in the Gulf of Alaska (GOA), or an age of 4-5 years in both regions. Spawning takes place in the sublittoral-bathyal zone (40 to 290 m) near bottom. Eggs sink to the bottom after fertilization, and are somewhat adhesive.

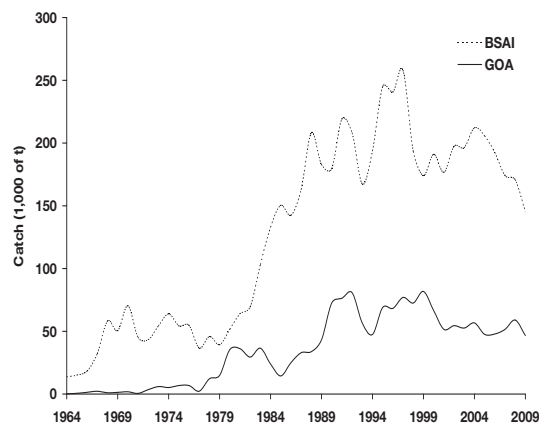
Population

Fishery and Catch History

From 1960s - early 1980s: Pacific cod have been fished commercially off and on since the 19th century. The modern commercial fishery began during the early 1960s, when a Japanese longline fishery harvested BSAI Pacific cod for the frozen fish market. By the time that the Magnuson Fishery Conservation and Management Act went into effect in 1977, foreign catches of Pacific cod in the BSAI had consistently been in the 30,000-70,000 t range for a full decade, while foreign catches in the GOA were much smaller, on the order of 3,000 t per year.

1980-1989: By 1980, a U.S. domestic trawl fishery and several joint venture fisheries had begun operations in both the BSAI and GOA. The foreign and joint venture sectors dominated catches through the mid-1980s, but the domestic fishery had displaced these sectors entirely by 1989 in the GOA and by 1991 in the BSAI.

Since 1990: Presently, Pacific cod are harvested by a multiple-gear fishery, including trawl, longline, pot, and jig components. From 1991 to 1999, trawl gear took more Pacific cod than any other gear type. On average during this period, trawl gear accounted for 52% of the catch, longline gear 37%, and pot gear 11%. From 2000 on, however, longline gear took more Pacific cod than any other gear type. On average from 2000-2006, trawl gear accounted for 37% of the catch, longline gear 46%, and pot gear 16%.



RESEARCH

Scientists at the AFSC are conducting research on how commercial fisheries impact Pacific cod. Recently, a multi-year study was completed that looked at the potential for commercial fishing to create localized depletions of Pacific cod, an important prey species for endangered Steller sea lions. Scientists are also studying the reproductive patterns of Pacific cod in the Bering Sea, in collaboration with fisheries observers. An extensive tagging study is also planned for Pacific cod in the Bering Sea to document movement patterns and rates.

AFSC scientists are also working with scientists from Oregon State University to describe how climate change may impact growth and development of early life stages of Pacific cod in the Bering Sea. This work will examine how temperature differences influence the timing and magnitude of plankton blooms in the Bering Sea which help determine the quality of habitat for larval and juvenile Pacific cod.



For more information

Most recent stock assessment

<http://www.afsc.noaa.gov/REFM/Stocks/assessments>

Research at AFSC:

http://www.afsc.noaa.gov/REFM/species/Pacific_cod

<http://www.afsc.noaa.gov/REFM/Stocks/fit>

Management:

<http://www.alaskafisheries.gov/npfmc>

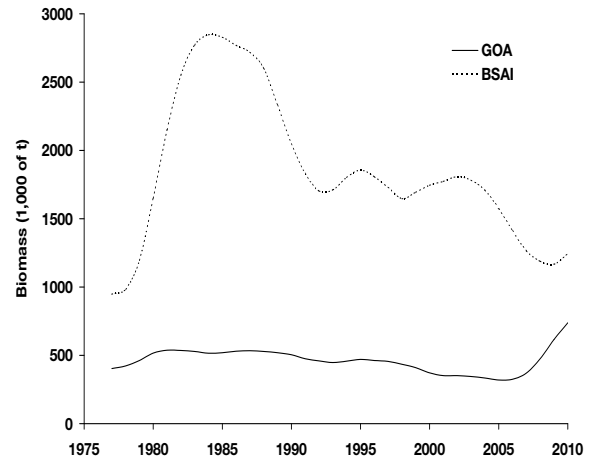
Photo credits: Phil Edgell and NOAA Fisheries Service

Questions or Comments?

email: afsc.outreach@noaa.gov

Resource Status

In Alaskan waters stocks are not overfished or approaching an overfished condition. Based on the most recent stock assessment, total biomass of Pacific cod in the BSAI increased rapidly during the late 1970s and early 1980s, and has declined slowly since the mid-1980s to the current level of about 1 million metric tons (t). A similar trend occurred in the GOA, though the overall level is lower and the trend is more stable than in the BSAI. Current total biomass in the GOA is estimated to be about 0.4 million t.



Stock Assessment

Information used in the Pacific cod stock assessments includes fishery catch, trawl survey biomass estimates, length composition of the fishery catch and survey samples, and age composition of the survey samples. These data are included in statistical models of the stock in the BSAI and GOA regions. The models are used to estimate parameters describing the life history of the stock and the interaction of the fisheries with the stock, and to estimate current and historical stock size and age structure. Biomass estimates from the Bering Sea model are inflated to include the Aleutian Islands component of the stock based on the ratio of biomass estimates from the surveys in the BSAI regions.

Management

A total allowable catch (TAC) is set for Pacific cod in both the BSAI and the GOA. As a prey species for Steller sea lions, the Pacific cod fisheries have been influenced by Steller sea lion protection measures through seasonal TAC apportionments and spatial restrictions. As of 2008, BSAI Pacific cod TAC is also allocated to the Community Development Quota Program (which benefits 65 fishery-dependent communities in western Alaska) and fishery sectors (defined by gear type, vessel size, and processing ability). In the GOA, Pacific cod TAC is allocated by management subarea, and is allocated 90% to the inshore sector, and 10% to the offshore sector.

Economics

Prices for Pacific cod have remained fairly stable for the past 15 years. The average product price from 1992 to 2008 is \$1.18/lb. In 2008, the price/lb was \$1.88. Primary products in order of volume include headed and gutted (eastern cut and western cut), fillets (skinless and boneless), salted and split, whole fish, and fish meal.

The inflation-adjusted prices shown in the graph are 1st wholesale (2008 U.S. currency). Numbers are from NMFS and ADF&G production and price data.

