



© Y. Yakovlev

# Pacific Halibut

# background

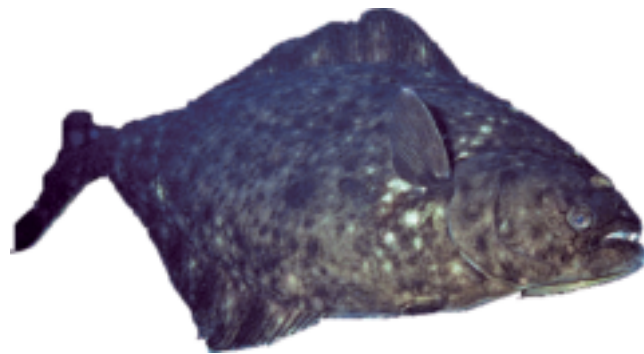
The International Pacific Halibut Commission (IPHC), originally called the International Fisheries Commission, was established in 1923 by a Convention between the governments of Canada and the United States of America. Its mandate is research on and management of the stocks of Pacific halibut (*Hippoglossus stenolepis*) within the Convention waters of both nations. Headquarters of the Commission are located on the University of Washington campus.

Pacific halibut are found throughout the coastal waters of Alaska, British Columbia, Washington, Oregon and into northern California. The center of abundance is the central Gulf of Alaska, particularly near Kodiak Island. The depth range for adult halibut ranges from 50 m in the summer to 600 m during winter spawning. Pacific halibut are generally found in temperatures from 3-9° C.

Pacific halibut mature at approximately 8 years of age. During the spawning season - generally November to March - adult fish move to deeper waters near the edge of the continental shelf. Halibut are broadcast spawners with fertilization occurring by random external contact. Halibut eggs and larvae drift in the surface currents for 6-7 months after spawning. During this long pelagic phase, halibut are moved generally west in the Gulf of Alaska and north into the Bering Sea by the dominant surface currents before settling to the bottom in shallow waters in late spring and summer. The relative distribution of recruited halibut (i.e. fish age eight and older) biomass by area remains relatively constant from year to year. To achieve this continuity, juvenile halibut migrate back to the south and east towards their spawning grounds.

This counter migration usually takes place between ages 2 and 6. Adult halibut show seasonal migration (to deeper water for spawning) but very little directed migration.

Pacific halibut is the largest flatfish in the world, reaching a length of 2.7 meters and weight of 300 kg. It has a flat, diamond shaped body; the colored side is a mottled brown and over 99% are dextral, i.e., the eyes are on the right side of the fish. The oldest identified halibut was a 55 year old male however fish over 25 years of age are uncommon. Females grow much larger than males.



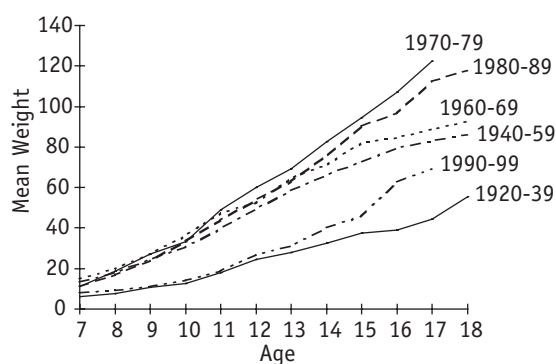
*Hippoglossus stenolepis* Photo Credit [Roberta Brooke]

## The Fishery

A commercial fishery for halibut has existed since 1888. During the 20<sup>th</sup> century, landings ranged between 17,000 and 40,000 metric tons. The current health of the fishery is attested to by the fact that some of highest landings on record were taken in the last 5 years of the 1990s. Since 1995, the fishery has been managed under an Individual Transferable Quota system. Currently, the ex-vessel value of the fishery is around \$US 175 million. In addition to the commercial fishery there is a growing sport fishery and halibut are also captured incidentally in other North Pacific groundfish fisheries.

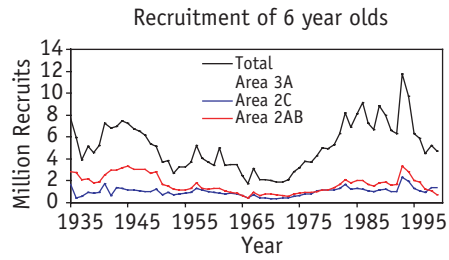
## Climate Influences

During the 20<sup>th</sup> century, there have been dramatic and persistent changes in the growth and recruitment of Pacific halibut that cannot be readily explained by changes in stock size. Over the last 15 years, the growth of halibut has decreased substantially, especially in Alaska. An eleven-year-old female halibut landed in Kodiak, Alaska averaged 40 pounds in weight in 1980. In 1995, the average weight for the same age female halibut was less than 20 lbs (Figure 151). Fifteen years ago fish of a given age were substantially larger in Alaska than in British Columbia; now there is no difference. In both respects, halibut growth is similar to what was observed in the 1920s and 1930s. An increase occurred sometime during the 1940s, and the present decrease began in the mid-1970s. Fish are also maturing at a smaller size now than they used to, while the age at maturity is quite close to what it has always been.

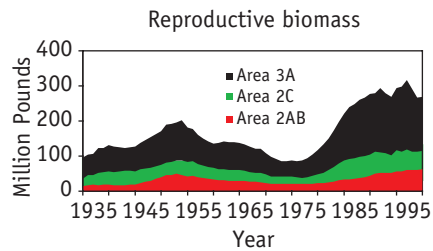


[Figure 151] Changes in mean weight at age for female Pacific halibut in Alaska, 1925-2000

There have been clear decadal variations in recruitment, at least since about 1935 (Figure 152). Most recently there was a run of good year-classes spawned in the late 1970's through late 1980's, apparently followed by a run of poor year-classes.

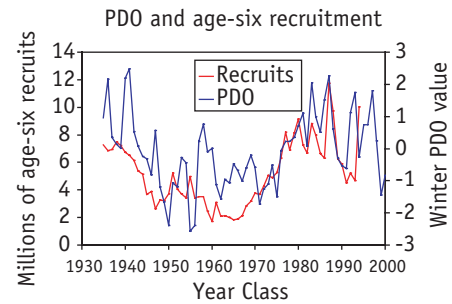


[Figure 152] Long-term trends in recruitment (measured as six-year olds) for IPHC areas 2AB (British Columbia), 2C (Southeast Alaska), and 3A (central Gulf of Alaska)



[Figure 153] Long-term trends in spawning biomass for IPHC areas 2AB (British Columbia), 2C (Southeast Alaska), and 3A (central Gulf of Alaska)

This kind of alternation has sometimes been viewed as a cycle, but could just as well reflect distinct periods of different environmental conditions. Recent work has strongly suggested that halibut recruitment is driven primarily by the Pacific Decadal Oscillation (see Ocean/Climate chapter). Stock size explains very little of the variability in recruitment; use of the PDO as a covariate explains much of the observed variation however. The PDO has alternated between positive (productive for halibut) and negative (unproductive) phases every 25-35 years (Figure 154).



[Figure 154] Timeseries of winter values of the Pacific Decadal Oscillation (PDO) and halibut recruitment at age 6





© Y. Yakovlev

## Authorship

**Steven Hare**

International Pacific Halibut Commission  
University of Washington Campus  
Bottom of 15th Ave NE  
Seattle, WA 98195-7951 U.S.A.  
E-mail: [hare@iphc.washington.edu](mailto:hare@iphc.washington.edu)