



## British Columbia's Herring Fishery: are we "fishing down the food chain"?

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*There is no evidence that the BC herring fishery has increased in response to declining populations of other species.*

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HERRING ROE OR  
KAZUNOKO. PHOTO BY  
HOKKAIDO KAKOREN

### WHAT IS THE CONCERN?

For over 100 years, herring have been one of the most important species for BC commercial fisheries. Herring are harvested for roe, spawn-on-kelp, food and bait, creating employment and contributing significantly to revenue generated from fisheries in BC. The herring fisheries are also extremely important to BC First Nations, both commercially and as traditional food.

There is worldwide recognition that over the past half-century, as a result of declining numbers of larger, predatory species, many fisheries have targeted smaller sized species further down the marine food web. This practice, known as "fishing down the food chain" is evidenced by increased catches of smaller fish and invertebrates that are often relied upon as food by larger predators. One example of this trend in Canada is the large increase in the catch of shrimp that occurred after the collapse of the cod fishery in Eastern Canada.

The decline in the amount of salmon caught in BC in recent years raises the question whether the Pacific herring fishery in British Columbia might be an example of fishing down the food chain. If true, continued fishing pressure on herring might lead to further declines in salmon or other species that rely on herring as prey.

Pacific herring are part of a complex marine ecosystem. The abundance of commercial fish in this ecosystem including Pacific herring, Pacific hake and Chinook salmon, will fluctuate with changes in ocean climate. Each species in this system experiences differing levels of abundance over time. Cycles of herring abundance are due in large measure to the effect of natural environmental conditions on reproductive success, juvenile survival, growth rates and the abundance of predators.

Change in the abundance of herring relative to other species is more likely due to the dynamic nature of the ecosystem in which they live than to fishing down the food chain or changes to the long-term composition of this ecosystem. Nevertheless, the critical role played by herring in BC's fisheries makes this an essential area of concern.

### WHY IS IT IMPORTANT?

Pacific herring are the most abundant fish species in Canada's Pacific coastal waters and are a key component of the marine food web as prey for many other marine species including chinook salmon, Pacific hake, lingcod, Pacific cod,



**HERRING SPAWN IN NEARSHORE WATERS**

Pacific halibut and harbour seals. Pacific herring aggregate to spawn in protected coastal habitats and estuaries where the eggs provide food for shallow water marine organisms and seabirds.

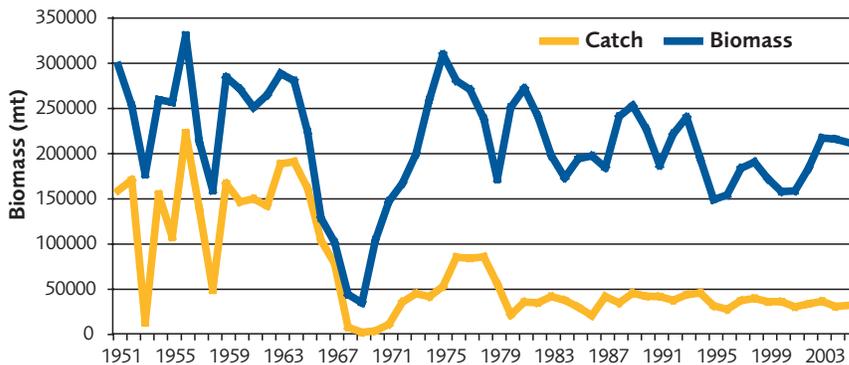
### WHAT ARE WE DOING ABOUT IT?

While Pacific herring are broadly distributed, they form geographically distinct populations. In BC, there are five major populations managed and fished independently. These populations are assessed each year using biological data, dive and hydroacoustic survey information. The herring fishery in BC uses a conservative and adaptive management approach to ensure that this industry is conducted in a sustainable and economically viable manner. Fishing does not occur if the stock size is below pre-determined cut off thresholds.

The herring roe fishery has adopted a pooled fishing strategy where a small group of boats fish alternately until the quota is harvested. This ensures that the quota is not exceeded and all catch is fully accounted for. In addition, by catching fewer fish, the herring fishery has moved from a high-volume, low-value reduction fishery prior to 1970 to one that now focuses on the production of high-value products.

Due in large part to these strategies, there is no evidence that the Pacific herring fishery in BC has escalated in response to declining populations of species higher up in the marine food web. In reality, current catches of Pacific

herring in BC are significantly lower than during the reduction fisheries of the 1950s and 1960s. During those years, harvest levels grew dramatically as new stocks were discovered and fishing technology improved until over-fishing and poor oceanic conditions led to a drastic crash in 1967. Current harvest rates are now maintained at a conservative level of less than 20% of each stock's estimated spawning biomass.



**COMMERCIAL CATCH OF PACIFIC HERRING IN RELATION TO ESTIMATED BIOMASS FROM 1951-2005**

Source: Fisheries and Oceans Canada, Nanaimo, BC

### WHAT MORE CAN BE DONE?

Pacific herring belong to a group of fish that are resilient and can often rebound from declines in the population that may be caused by over-fishing or environmental effects. Although BC's herring fishery is not an example of fishing down the food chain, herring are a key component of the north Pacific ecosystem and it is important that the fishery be managed in a conservative and adaptive manner. A better understanding of the relationship between oceanic conditions and the abundance of species that comprise the marine food web, including herring, is important for sustainable management of these species. The coastal areas where herring spawn are well known in British Columbia; it remains crucial to protect these sites from adverse impacts such as coastal development and pollution.

### FURTHER READING

Pacific herring information. Fisheries and Oceans Canada  
[http://www.pac.dfo-mpo.gc.ca/sci/herring/pages/herring\\_e.htm](http://www.pac.dfo-mpo.gc.ca/sci/herring/pages/herring_e.htm)

2005 Pacific Region State of the Ocean. Fisheries and Oceans Canada  
[http://www.pac.dfo-mpo.gc.ca/sci/psarc/OSRs/Ocean\\_SSR\\_e.htm](http://www.pac.dfo-mpo.gc.ca/sci/psarc/OSRs/Ocean_SSR_e.htm)