Lingcod

AUTHORS

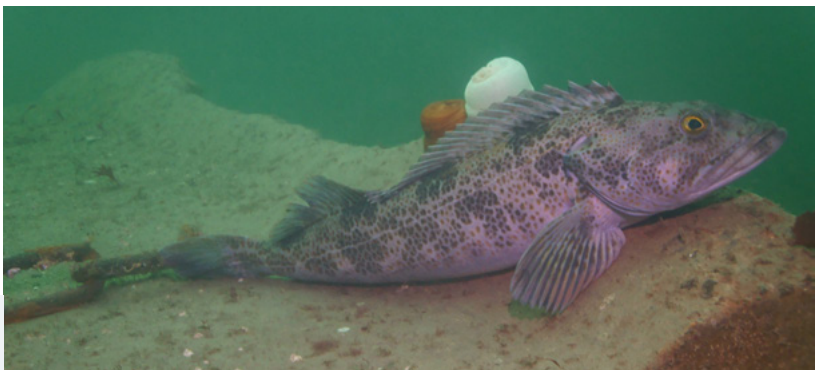
Jeff Marliave and **Laura Borden,** Howe Sound Research Program, Coastal Ocean Research Institute

REVIEWER

Scott Wallace, Ph.D., Research Scientist, David Suzuki Foundation

What's happening with lingcod?

Lingcod stocks in Howe Sound remain low despite commercial and recreational fishing closures for the last decade or more. During the last century, lingcod biomass was drastically reduced due to commercial fishing. By the late 1980s, lingcod stocks in Howe Sound hit a low of 1% of original biomass.[1] Commercial fishing closures were introduced in 1990, but lingcod abundance did not improve and in 1993 Porteau Cove and Whytecliff Park were designated as no-take closure areas under the Fisheries Act of Canada. An increase in the abundance of spawning lingcod was evident at the turn of the millennium, but levels were still far below those outside of Howe Sound. No discernible increase in large female spawners — typically the most successful spawners — has been evident since 1994 (Figure 1). Today, recreational fishing presents the greatest threat to Howe Sound lingcod populations despite fishing closures, and poaching is a likely contributor to the lack of recovery of spawner abundance. Research has shown that larger lingcod populations occur along island shorelines that are accessible only by boat.[2]



Adult lingcod with two plumose anemones. (Photo: Vancouver Aquarium)

Why are lingcod important?

Lingcod range from Northern California to the Aleutian Islands in Alaska and can be found throughout Howe Sound. They are typically found on rocky reefs between 10-100 metres deep, where crevices and large boulders provide ideal habitat for spawning during the winter. Lingcod are an important component of reef communities in Howe Sound. They act as a top-down control on mid-level predators such as rockfish and smaller greenlings, maintaining a balanced community structure.[3] Lingcod consume a variety of smaller fish including herring and bottom-dwelling fish, while marine mammals are their main predator.[4]

Do lingcod play a role in First Nations cultural and spiritual heritage?

Lingcod have been relied upon as a food source by First Nations during times of famine when salmon returns were low.

What is the current state?

Extensive commercial and recreational fishing pressures from the mid 1800s until the 1980s depleted lingcod stocks to a historic low. An annual lingcod spawning population survey — conducted in Howe Sound since 1994 — indicates a slow recovery may be taking place since the late 1990s based on diver surveys, with a notable increase in egg mass sightings in 2000 but no sustained increase since then (Figure 1). Abundance peaked in 2006 following a Fisheries and Oceans Canada (DFO) enforcement campaign along the Sea-To-Sky corridor in 2005, which targeted illegal recreational fishing. Prior to 2014, DFO assessments of lingcod stocks have excluded management areas 28 and 29 (Howe Sound, Indian Arm and the adjacent nearshore waters of the Strait of Georgia) due to confusion with historical catch data. In scenarios where these areas were included in the 2014 assessment,[5] increase of lingcod stock biomass compared to historical levels was lowest. However, in all scenarios of inclusion or exclusion of this region, spawning lingcod biomass was predicted with 100 percent certainty to be greater in 2014 than in 2006, when stocks were last assessed.

An annual lingcod egg mass survey runs each February-March and is organized by the Vancouver Aquarium Marine Science Centre's Howe Sound Research Program with help from divers up and down the coast

of British Columbia. During the spawning survey, information about egg mass size is collected to provide clues about the age structure of the female population, as older lingcod produce larger egg masses. At five years of age females begin to produce watermelon-sized egg masses. The percentage of large egg masses has fluctuated over the years of the survey, and 2015 represents an average year with 47 percent of females aged five or older (Figure 1). In contrast, areas of Northeast Vancouver Island consistently record greater than 90 percent of egg masses as watermelon-sized.

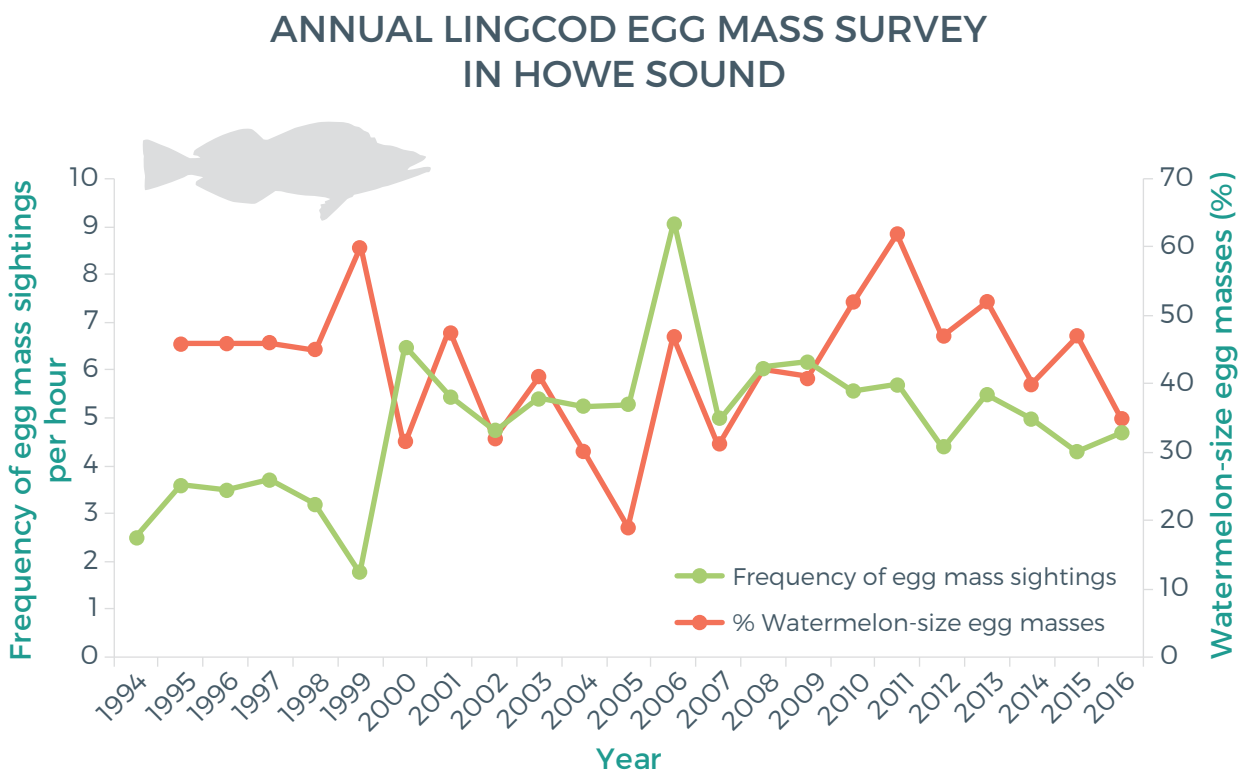


Figure 1. Frequency of egg mass sightings per hour and percentage of watermelon size egg masses (females at least five years old) in Howe Sound 1994–2015.

What is being done?

Commercial fishing for lingcod in Howe Sound has been closed since 1990. Recreational fishing for lingcod is prohibited throughout the Sound and has been since 2002. As a further measure, and due to the extremely low abundance of lingcod in Howe Sound and Burrard Inlet, all hook-and-line fishing for groundfish (lingcod and rockfish) was banned beginning in the summer of 2007.

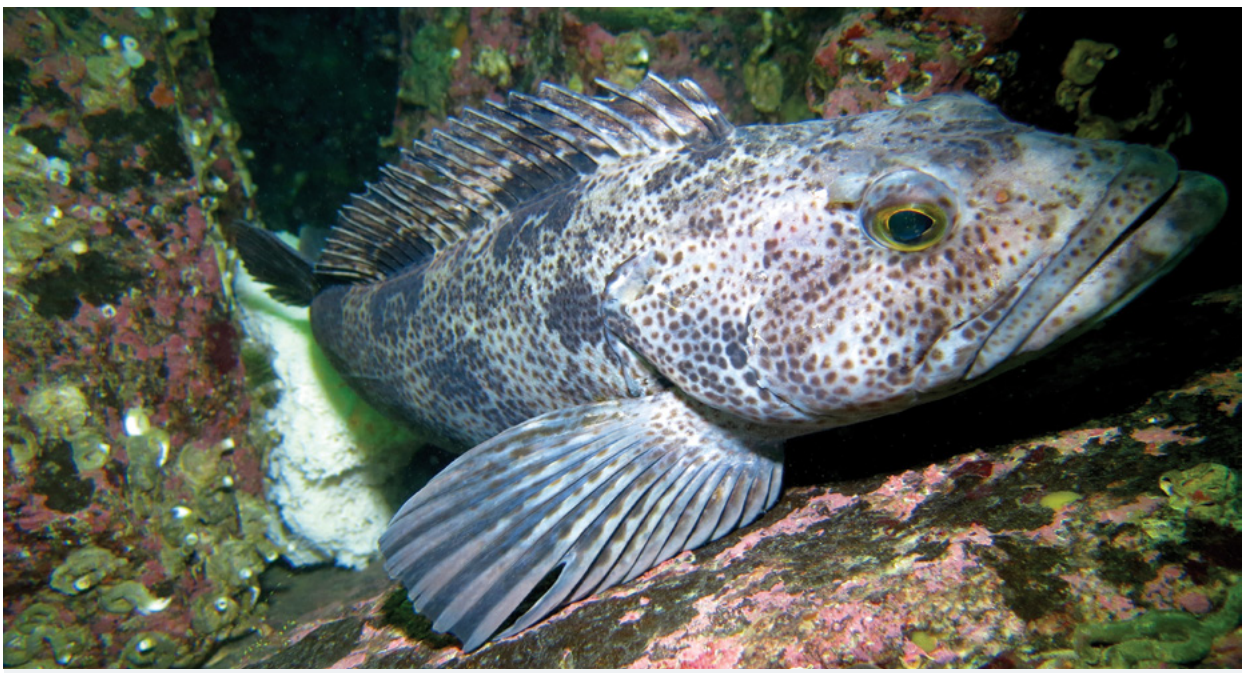
What can you do?

Individual and Organization Actions:

- Follow fishing closures for the recreational fishery and report any illegal fishing to 604-666-3500 (1-800-465-4336). Even if not involved in fishing, educate yourself on fishing practices so you are able to report poaching.
- Support the annual Lingcod Egg Mass Survey in February and March by spreading awareness and contributing dive surveys to the Vancouver Aquarium (www.vanaqua.org/lingcod-survey).

Government Actions and Policy:

- Increase public education and awareness surrounding the closures of commercial and recreational fisheries, and the status of Lingcod populations.
- Work with the Vancouver Aquarium to help encourage awareness of and participation in the annual Lingcod Egg Mass Survey.
- Designate more resources to effective monitoring and enforcement of fishing closures.
- Continue to include area 28 and 29 in ongoing assessments of lingcod stocks.



Lingcod with egg mass. (Photo: Jenn Burt)

Resources

2015 Lingcod egg mass survey report including more information on lingcod biology and comparative survey results for other areas in British Columbia.
www.vanaqua.org/files/7514/4857/6020/2015_LEMS_report.pdf

DFO. 2015. Stock assessment for Lingcod (Ophiodon elongatus) for the Strait of Georgia, British Columbia in 2014.
www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2015/2015_014-eng.pdf

Details on the Lingcod Egg Mass Survey
www.vanaqua.org/lingcod-survey

Footnotes

[1] Martell, S.J.D. and S. S. Wallace. 1998. Estimating historical lingcod abundance in the Strait of Georgia. Pages 45–47 in D. Pauly and D. Preikshot, eds. Back to the future: reconstructing the Strait of Georgia ecosystem. Fisheries Centre, Univ. British Columbia, Vancouver. 211 p.

[2] Martell, S.J.D. 1997. Reconstructing lingcod biomass in Georgia Strait and the effect of marine reserves on lingcod populations in Howe Sound. MSc Thesis University of British Columbia.

[3] Frid, A., B. Connors, A.B. Cooper, and J. Marliave. 2013. Size-structured abundance relationships between upper- and mid-trophic level predators on temperate rocky reefs. Ethology, Ecology & Evolution 25(3): 253-268. DOI:10.1080/03949370.2013.798350

[4] Wallace, S.S. 1999. Fisheries impacts on marine ecosystems and biological diversity: the role for marine protected areas in British Columbia. PhD Dissertation University of British Columbia.

[5] Holt, K., J.R. King, and B.A. Krishka. 2016. Stock Assessment for Lingcod (Ophiodon elongatus) in the Strait of Georgia, British Columbia in 2014. DFO Can. Sci. Advis. Sec. Res. Doc. 2016/013. xi + 186 p. Accessed Sept 14, 2016. http://www.dfo-mpo.gc.ca/csas-sccs/Publications/ResDocs-DocRech/2016/2016_013-eng.pdf