

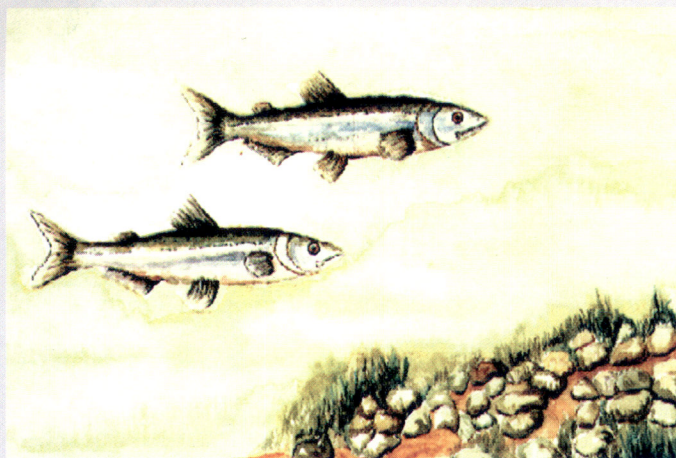


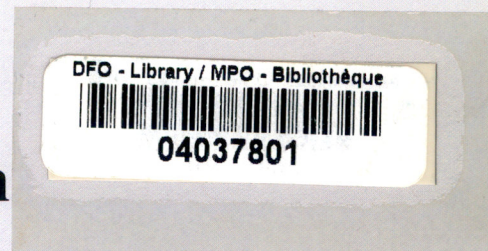
Illustration by Robert Perry

Coastal Zone

Species Profile Series

No. 12

Capelin



Common names of capelin (*Mallotus villosus*) include caplin (Newfoundland), lodde, and whitefish.

Physical Characteristics

- Capelin are slender, elongate fish, generally 13 to 20 cm long. They are translucently coloured, olive to bottle green above the lateral line with silvery sides below and a white belly.
- Males are larger than females at sexual maturity. During the spawning season males develop two pairs of ridges (formed by an elongation of scales) which extend along the length of the body, above and below the lateral line. In addition to the ridges, males also have larger fins which extend from the body at this time.

Distribution

- On the east coast of North America capelin are found from Hudson Bay to Nova Scotia, rarely extending as far south as Cape Cod. Large quantities of capelin occur off the shores of Newfoundland and Labrador.
- Capelin are pelagic (mid and upper water column) marine fish of cold, deep waters. They can be found in the Atlantic Ocean on the offshore banks and in coastal areas, occasionally spending the winter and early spring months in the deep bays off eastern Newfoundland. An intensive inshore migration towards spawning beaches begins in May.

Natural History

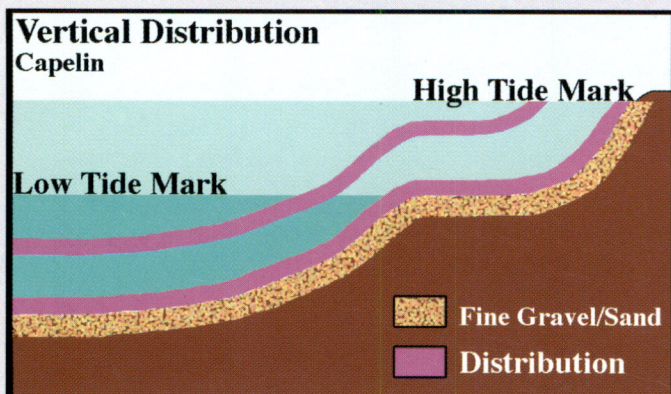
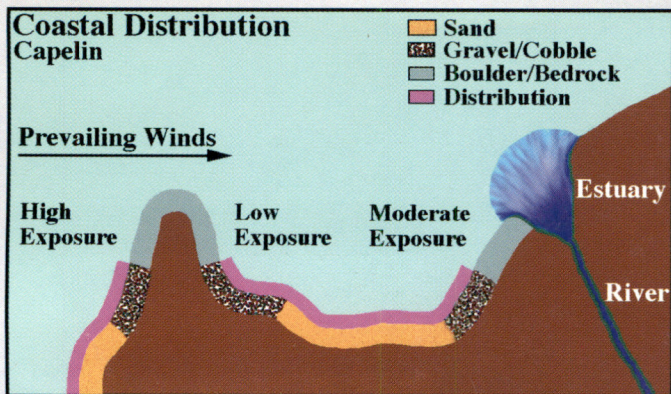
* Life Cycle/Habitat Requirements

- Mass spawning of capelin occurs at 3 to 4 years of age. On the south and east coasts of Newfoundland and Labrador spawning usually begins around late May and, depending on tides, winds, and water temperature, may continue until late July (Newfoundland) or August (Labrador).

- Beach spawning of capelin occurs on coarse sand or fine gravel substrates (5 to 25 mm) and in water temperatures of 5 to 11°C. Capelin also spawn in shallow depths of 2 to 3 m in coastal areas to depths of 80 m on the offshore banks.
- Beach spawning is most intensive during periods of intermediate tide, usually occurring at night or during heavy overcast and/or foggy conditions ('capelin weather'). Adults roll/swim on the crests of waves to reach the beach where eggs are deposited and fertilized on the substrate. Eggs are spherical (0.3 to 1.0 mm), adhesive, and can be buried 15 cm or more beneath the surface. The number of eggs increases with the size of the female, with a large female producing more than 50,000 eggs. After spawning, 90% of males and 80% of females die.
- Spawning capelin tend to congregate on beaches with the appropriate substrate. This specificity in terms of beach spawning sites can result in egg concentrations of >800/cm² in beach sediments. Egg mortality rates are highly variable and may be caused by a lack of oxygen (due to high egg densities), water and air temperature effects, or unsuitable substrates. Hatching usually occurs in 9 to 24 days.
- The emergence of larvae, and their rapid removal from coastal areas is linked to onshore winds and the associated warmer surface waters. Larval growth rates average 2.5 mm per day.

* Feeding and Predation

- Capelin feed on planktonic organisms with euphausiids (shrimp) being the dominant food type. Copepods, amphipods, and other planktonic invertebrates are consumed to a lesser extent. Feeding begins in the spring, is heaviest in fall to early winter, with little or no feeding occurring in mid-winter (January to March).



- The largest (quantity consumed) single predator on capelin is Atlantic cod. Other predators include haddock, Atlantic salmon, flounders, turbot, whales (minke, fin, and humpback), seals (harp and ringed), and seabirds (murre, gulls, gannets, puffins, etc.).

Potential Impacts of Nearshore/Coastal Development

* Larvae

- Capelin are most susceptible to negative habitat impacts during the inshore phase of their life cycle, when eggs and larvae are in the sediment. Disruption/destruction of beach and shallow water spawning habitat can be detrimental. Examples of potential impacts include:
 - cooling effluent from industrial plants (e.g. power plants) can alter water temperature and salinity to which eggs and larvae are very sensitive. Industrial effluent may contain toxic substances such as petroleum products, heavy metals, or other chemicals.
 - poor agricultural, forestry, or construction practices adjacent to a river system that flows directly to the ocean can lead to increased turbidity and siltation in coastal areas.

- the introduction of raw sewage (usually containing detergents and other chemicals) into beach and shallow water spawning habitats may have negative impacts.
- oiled beaches can result from tanker spills and/or bilge flushing at sea. A large spill affecting a high proportion of spawning beaches could be catastrophic for inshore reproduction.
- physical obstructions, such as breakwaters and causeways, can interfere with larval dispersal.
- dredging operations and construction (wharves, breakwaters, etc.) can physically remove habitat and cause excessive siltation.

* Juveniles and Adults

- Juvenile and adult capelin, due to their predominantly pelagic and offshore existence, are less susceptible to coastal zone influences than eggs and larvae. When they migrate to the nearshore environment for feeding and/or spawning, they may be negatively impacted by many of the same factors.

Fishery

- An important capelin fishery is conducted in Newfoundland during the spawning season (June to July) using both capelin traps and seines (beach and purse). The fishery occurs throughout the capelin's range around coastal insular Newfoundland. The mature females are marketed primarily in Japan (for the roe), while the males are marketed as fish silage, animal feed, and fertilizers.

Selected References and Further Reading

- Jangaard, P. M. 1974. The capelin (*Mallotus villosus*): biology, distribution, exploitation, utilization, and composition. Bull. Fish. Res. Board Can. 186: 70 p.
- Nakashima, B. S. 1994. The relationship between oceanographic conditions in the 1990's and changes in spawning behaviour, growth and early life history of capelin (*Mallotus villosus*). NAFO SCR Doc. 94/74: 18 p.
- Scott, W. B., and M. G. Scott. 1988. Atlantic Fishes of Canada. Can. Bull. Fish. Aquat. Sci. 219: 731 p.

For further information, please contact your local office of the Department of Fisheries and Oceans.