

# Flounders in the Gulf of Finland: Decline caused by the near disappearance of one species

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Over the past 40 years, there has been a dramatic decline in fishery landings of an iconic Baltic Sea fish: the flounder. In the 1980s, the landings of the flounder fishery in the Gulf of Finland dropped by 90 per cent, a trend that was later confirmed by fishery-independent surveys.

There are two cryptic (i.e. morphologically very similar) species of flounder in the Baltic Sea: the European flounder (*Platichthys flesus*), which spawn pelagic eggs in high-salinity offshore basins, and the recently described Baltic flounder (*Platichthys solemdali*), the only endemic fish of the Baltic Sea.

The latter lays demersal eggs and is well adapted to the low salinities of the coastal waters of the Gulf of Finland and northern Baltic Proper. It was long assumed that only the demersal-spawning species occurs in the Gulf of Finland, where salinity is too low for *P. flesus*'s reproduction.

Researchers from the University of Helsinki developed a simple genetic test to distinguish the two species. By analyzing the DNA from flounders' ear bones collected over the past four decades, they discovered that European flounders were in fact once the most [abundant species](#) in the Gulf of Finland. However, they have almost completely disappeared.

"We discovered that the decline in fishery landings closely mirrors in time the near-complete disappearance of the pelagic-spawning European flounder—a species that was not supposed to occur here. This species—not the Baltic flounder—dominated local assemblages until three decades ago, but has since disappeared as a result of worsening [environmental conditions](#)," says researcher Paolo Momigliano from the University of Helsinki.

European flounders cannot reproduce in the Gulf of Finland; their northernmost spawning ground is east of Gotland, in the eastern Gotland

Basin. However, larvae and juveniles can be transported to the Gulf of Finland by deep water currents.

Eutrophication and [climate change](#) have contributed to the worsening of environmental conditions in the eastern Gotland Basin. This, in turn, has likely greatly reduced the supply of larvae to the Gulf of Finland, explaining the near-complete disappearance of European flounders from the Finnish coast.

Revealing the contribution of each species to flounder stocks is essential for the appropriate management of this marine resource. The test developed by the authors also provides the means to monitor the contribution of each species to the local flounder assemblages in real-time, and for the first time will allow estimations of demographic changes, resilience to climate change and exploitation, as well as each species' response to management.

"But perhaps more importantly, our study demonstrates that cryptic [species](#) could become locally extinct before we even notice their presence," Momigliano says.

DNA was extracted from 480 otoliths (ear bones), sampled from a collection containing over 29 000 flounder otoliths. These were collected annually from 1975 to 2011 as part of the routine sampling conducted by the Finnish Natural Resources Institute and its predecessor, Finnish Game and Fisheries Research Institute.

**More information:** Paolo Momigliano et al, Cryptic temporal changes in stock composition explain the decline of a flounder (*Platichthys* spp.) assemblage, *Evolutionary Applications* (2018). [DOI: 10.1111/eva.12738](https://doi.org/10.1111/eva.12738)

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