

Pilot studies and methodology  
development to evaluate fishing  
induced effects on fish communi-  
ties in the outer Stockholm  
archipelago

**Länsstyrelsen i Stockholms Län**

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## Executive summary of the project

To test whether herring abundance and recruitment has changed over time, as well as to complement the Swedish offshore acoustic surveys, we used assessed recruitment success as a proxy for herring abundance in previously studied (Himmerfjärden-Landsort, 2002-2004) as well as unstudied areas (Närndö archipelago) in the southeast Stockholm Archipelago. Hydroacoustic surveys, supported by midwater trawling, were carried out in August 2021 partly at previously surveyed herring spawning and nursery areas. Results regarding the composition of the fish community, the abundance of different species, and annual herring fry were compared with results from the previous investigations (hydroacoustic and gillnet test fishing 1985-2000, and monitoring midwater trawling 2002-2004).

We found that the composition of the fish community in the surveyed areas had undergone significant changes since 2002-2004. Young-of-the-year (YOY) herring, previously being dominant, declined from 55 per cent to 4 per cent in numbers, whereas three-spined stickleback increased from no representation to 76 per cent. This result support the statements from coastal fishermen and local residents about a dramatic decrease in the herring abundance - and hence decreased recruitment of the stocks - during a period of intensified industrial and largescale fishing in adjacent sea.

The density of yearlings of herring was highest in the southern Askö area, followed by the northern part of the same area and the eastern offshore area at Närndö, suggested that these areas are important as reproduction areas for the species. This has also been used as a factor when setting the geographical borders for a National Park which is in a late planning phase for the archipelago east of Närndö.

A Nordic coastal nets survey was undertaken during august in 2021. Altogether 19 fish species were caught, and the area showed a higher biodiversity compared with adjacent fish survey areas. The contribution om marine fishes were significant.

An underwater small detonation survey was undertaken in the area in the archipelago East of Närndö during September 2021. Overall only moderate or low abundances of fish fry were found.