

Blue mussel habitat is decreasing

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During the last 10 to 15 years, blue mussels in shallow waters on Sweden's west coast have largely disappeared. Observations and reviews of studies and reports indicate that climate change may be behind the change.

"Today children no longer find [mussels](#) on the beaches to use as bait for their crab fishing. And on islets and skerries oyster shells have replaced mussel shells. We wanted to investigate what happened," says Susanne Baden, a researcher in marine ecology at the University of Gothenburg, Kristineberg Center for Marine Research and Innovation.

Together with research colleagues, she has reviewed the [scientific literature](#) and reports by public agencies to analyze various explanations for the disappearance of blue mussels.

"We have also asked whether the disappearance of the blue mussel is unique to the Swedish west coast."

Climate changes involved

The researchers' studies show that blue mussel habitats in the North Atlantic have decreased. The overall explanation is overfishing of mussel banks combined with direct and indirect effects of [climate change](#). But there are local variations.

"On the Swedish west coast, fishing for wild mussels has never been particularly widespread. So that probably has not been a decisive factor in disappearance of blue mussels in the shallow coastal zone."

The researchers have also noted an important contradiction in Bohuslän's inner archipelago. While dense populations of blue mussels do not exist where they previously grew naturally, they can be found in the same area on the underside of jetties, buoys, boat hulls, and especially in mussel farms.

"On the other hand, in some places in the outer archipelago, healthy mussel banks can be seen, while they have disappeared in other places of the outer archipelago. In our [research article](#), we have highlighted

various factors that could explain these differences."

Climate change is driving the decrease

Many stressors can affect mussel health, reproduction and ultimately survival.

"Yet we can present some factors that are probably more involved than others in the decline of the mussel. Virtually all of them are associated with [climate](#) change. For example, the amount of rain along the west coast has increased by about a third in the last 30 years."

The rain contributes to an increased outflow of nutrients and fresh water. This, in turn, affects the substrates to which the mussels settle. Many substrates have now become overgrown with filamentous algae.

Sensitive to lower salt content

Mussel larvae and young mussels are also sensitive to fresher water.

"In the wake of climate change, extreme weather conditions result in several unusually long periods of rain, heat or cold, possibly combined with drying up of shallow coastal areas. This can increase the mortality of bottom-dwelling mussels compared to those that grow on floating substrates."

Seabirds, crabs and Japanese oysters threaten the blue mussel

Another explanation is the prevalence of many more seabirds, such as eider ducks, that now spend the winter here on the west coast of Sweden instead of migrating to e.g. the Wadden Sea because of warmer

temperatures.

"An eider eats about 2.5 kilograms of mussels a day, which can amount to significant quantities in a single winter. As a result, we cannot rule out the possibility that they have had a major impact on the mussels in shallow areas, where [blue mussels](#) have been more easily accessible."

In addition, the population of shore crabs along the west coast has tripled, probably due to declining cod stocks. Shore crabs are predators that eat mussels.

Another factor that may have affected the mussels' ability to attach to natural substrates near the shore may be the invasive Japanese oysters occupying the same area. In other countries we have seen that it can take a while before they coexist in a mixed mussel-oyster bank. Such a balance does not appear to have been achieved on the Swedish west coast.

"We believe that the direct and indirect effects of climate change can chiefly explain the large decline in mussels along the Swedish west [coast](#). However, more research is needed to map the remaining mussel banks and experimentally test the various explanatory models," says Baden.

The new studies are published in the *Journal of Shellfish Research*.

More information: Susanne Baden et al, Declining Populations of *Mytilus* spp. in North Atlantic Coastal Waters—A Swedish Perspective, *Journal of Shellfish Research* (2021). [DOI: 10.2983/035.040.0207](https://doi.org/10.2983/035.040.0207)

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