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## The history of cod in Greenland: A major fishery collapse explained by archived DNA

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**The history of cod in Greenland: A major fishery collapse explained by archived DNA.**

**Einar Eg Nielsen**, Sara Bonanomi, Loïc Pellissier, Nina Overgaard Therkildsen, Rasmus Berg Hedeholm, Anja Retzel, Steffen Malskær Olsen, Anders Nielsen, Christophe Pampoulie, Jakob Hemmer-Hansen, Mary Susanne Wisz, Peter Grønkjær

Fishing and climate variability are known as important factors impacting the demography of marine fish species. However, it has been generally ignored that species, and in many cases the management units “the fish stocks”, are made up of genetically distinct locally adapted populations that may show idiosyncratic responses to environmental and anthropogenic pressures. Employing long term archived DNA based fisheries monitoring (1932 –2012) and high-resolution SNP analysis, we demonstrate that the proportions of different genetic populations in the historical cod fishery in west Greenland underwent dramatic spatiotemporal changes, which can be linked to intensive fishing and climate change. We show how these historical insights have already been used for improvement of cod fisheries management in Greenland through allocating population targeted quotas. Likewise, we demonstrate how high throughput genetic tools can be used in the future to monitor and manage the contribution of different cod populations to the fishery in Greenland and elsewhere.