

Project information

Keywords

Atlantic salmon, fisheries management, mixed-stock fisheries

Project title

Region- and stock-specific catch and migration models of Barents Sea salmon

Year

2015

Project leader

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Participants

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Other partner institutes: Norwegian University of Life Sciences, Natural Resources Institute Finland, University of Turku, University of Waterloo, Department of Fisheries and Ocean Canada

Flagship

Fjord and Coast

Funding Source

Fram Centre and Norwegian Research Council

Summary of Results

This is the first year of a three-year project funded by the Norwegian Research Council (NRC). The project funding from NRC was cut by 18 %, and the Fram Centre funding has allowed the project to continue, so far, with its original intended scope.

The main work in 2015 has been focused on a dataset sampled by coastal fishermen along the coast of northern Norway in 2011 and 2012. Over 16000 adult salmon were sampled and stock identified using microsatellite genetic markers. With this basis, we have developed stock-specific migration and exploitation models of salmon moving along the coast and fjords of northern Norway.

The key element in the life history of Atlantic salmon is the accurate return migration from feeding areas at sea to the natal river to reproduce. Because of this accurate natal homing, individuals from the river interbreed, but are to a large extent reproductively isolated from salmon in other rivers. As a result of this reproductive isolation and divergent selection, salmon inhabiting different rivers have accumulated significant inter-population genetic variation which can be used to identify the river origin of catch samples from the coastal mixed-stock fishery of northern Norway.

The coastal salmon fishery in Norway is divided into a number of management regions. These regions are defined either as outer coastal regions or inner (fjord) regions. The stock diversity was much higher in outer regions than in inner regions, while the percentage of the catch belonging to local stocks was much higher in inner than in outer regions. The salmon catch in the outer coastal regions was dominated by a combination of local stocks and salmon from neighbouring regions. This indicates that the salmon spawning migration from the open ocean is reasonably accurate, bringing the adult salmon to coastal waters relatively close to their home regions.

A stock-specific migratory model was developed for four large salmon stocks in northern Norway, Finland and north-western Russia, i.e. Målselv salmon in Troms county, Alta and Tana salmon in Finnmark county and the Kola salmon (Kola peninsula, Russia). Adult salmon from all these stocks were exploited along the North-Norwegian coastline, mainly in June-July, while multi-sea-winter salmon (MSW) in general arrived the coast earlier than one-sea-winter salmon (1SW). The two westernmost stocks (Målselv and Alta), both seemed to approach the western coast of northern Troms and western Finnmark, more or less directly from the open sea. In contrast, Tana salmon was recorded in the coastal catches from all fishing regions in the study area, and approximately in the same periods, strongly suggesting that Tana salmon reach the coastal areas both from southwest, west, north and east. Kola salmon, both 1SW and MSW, was most frequently recorded in catches in Eastern Finnmark, especially in the Varangerfjord. Some Kola salmon were also caught in western Finnmark very early in the summer. This may indicate that most Kola salmon approached the coast in Eastern Finnmark, whereas some fishes migrated from the west, but fairly far from the North-Norwegian coastal areas.

For the Management

The results provide an invaluable management tool. The data, standardized to catch per unit effort, enables the estimation of the effect, both on a region- and stock-specific basis, of proposed fisheries regulations. The models can be further used to estimate pre-fishery abundances and the relative stock-specific exploitation rates in the coastal mixed-stock fisheries. All this will simplify the selection of regulatory measures and clarify communication between managers and interest groups. The importance of this cannot be overstated.

Published Results/Planned Publications

Two publications are currently in prep.:

- 1) Using genetics to infer stock-specific migration patterns of four of the largest Barents Sea Atlantic salmon stocks.
- 2) Genetic evidence of mixed-stock migration patterns and exploitation of Atlantic salmon along the north Norwegian coast.

Communicated Results

Svenning, Falkegård, Fauchald, Yoccoz, Niemelä, Vähä, Wennevik & Prusov (2015). Use of genetics to develop stock-specific migration models for Barents Sea salmon. ICES CM 2015/T14

Other use: The results have so far been used extensively in ongoing regulatory processes concerning the coastal salmon fisheries in northern Norway. The results will also form the main basis for a new MOU concerning salmon fisheries regulations between Norway and Russia. Furthermore, the results have been important in the negotiation process between Norway and Finland when it comes to reaching a new agreement regulating the salmon fishery of the large Tana river system in Finnmark (these documents are currently not available for public access.)

Budget in accordance to results

The funding awarded for 2015 has been used in accordance with the proposal.

Could results from the project be subject for any commercial utilization

No

Conclusions

So far, the project results have demonstrated that it is possible, by use of a comprehensive set of genetic markers, to analyze and model stock-specific effects of a complex and large-scale mixed-stock fishery. The resulting migration and exploitation models will allow for a stock-specific regulation of coastal salmon fisheries in the future.