Big data from a big fishery: Using vessel monitoring systems (VMS) to characterize trips by catcher vessels in the Bering Sea pollock fishery

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Walleye pollock (Gadus chalcogrammus)

93 trawlers (80' - 200') account for ~ 45% of the annual pollock allocation

~ $590,000,000 Annually⁴

Observer coverage has varied by year and by vessel size; vessels and trips have been fully observed since 2011.

Mean shoreside processor first wholesale values (2003 - 2013) - may include some trips from the Gulf of Alaska

The recommendations and general content presented do not necessarily represent the views or official position of the Department of Commerce, National Oceanic and Atmospheric Administration, or National Marine Fisheries Service.

We sought to identify fishing trips and to resolve trip characteristics (e.g., duration & distance traveled), which may serve as indicators of fishery changes over time.

9.3 million VMS records provide vessel locations at (mostly) regular intervals.

Observer data from 13,000 trips provide many trip start and stop times¹.

Fish tickets provide catch data, in addition to the port and landed date (most of the time).

Algorithm

Generalized Least Squares Regression
Generalized additive Models

932.4 years of at-sea days (395 years ago, the pilgrims landed at Plymouth Rock)

19,864,577 nm traveled

39.6 trips to the moon!

32,376 Fishing Trips Identified

49,140 Trips Identified

16,764 Non-Fishing

Seasonal and annual dynamics are driven by economics, biology, oceanography, management, and climate.

Additional on-going steps:

• Quantify dynamics of trip characteristics over time
• Model fishing trips to identify when vessels are fishing based on how they move.

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