The human predator: influence of target species on catch in the Georges Bank Trawl Fishery

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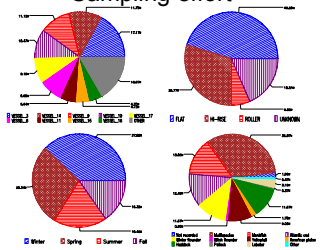
Abstract

We collaborated with the New Bedford trawl fleet to collect catch from the Georges Bank groundfish fishery between November 2000 and August 2004. A major incentive for the project was to recognize the desire of the commercial fishing community to participate more directly in the management of the resource. Catch data were recorded from 7,911 trawl tows from 209 trips. A total sampling effort of 1,552 days at sea and 23,247 hours of trawling resulted in the capture of over 12 million lbs of fish, of which 8.7 million lbs were kept and 3.8 million lbs were discarded. The catch composition consisted of 51 species/species groups, with skates, monkfish, Atlantic cod, haddock and winter flounder predominant. Skate constitute the dominant discard species (80%) followed by spiny dogfish, barndoor skate, sea raven, and monkfish. Fourteen species or species groups were targeted by the fishermen, with multispecies groundfish, monkfish, Atlantic cod, winter flounder, monkfish, haddock and yellowtail accounting for 95% of the effort. The influence of target species on trawl catch is complex. Catch was typically dominated by the target species, except for several cases where the target was second to skate. Total combined species catch was greatest when targeting skates, and least when targeting redfish, witch flounder and American plaice. However, discard was greatest when targeting winter flounder, yellowtail and scallop. The greatest percent catch discard occurred when winter flounder, scallop, yellowtail and lobster were targeted, and least when monkfish, redfish, hake mix, or skate were targeted. Target species had a strong influence on catch per unit effort (catch/tow duration). Often catch of target species tended to be unrelated to tow duration, while non-targeted species could exhibit positive, negative, or no relation to duration. These patterns were used to infer seasonal changes in distribution types of target species.

Collaboration with the New Bedford trawler fleet is a vital component of the program

- **20 vessels participated**
- **62-82 ft, 65-198 tons, 365-850 hp**
- **Gear – Otter trawls or various types 6-6 ½ in mesh**
  - **78 (25-150) ft wide**
  - **14 (5-26) ft high**
- **221 trips >1552 DAS**
- **Tow speed ave. 2.9 knots**
- **Depth ave. 68 fm (7-162 fm)**

Sampling effort

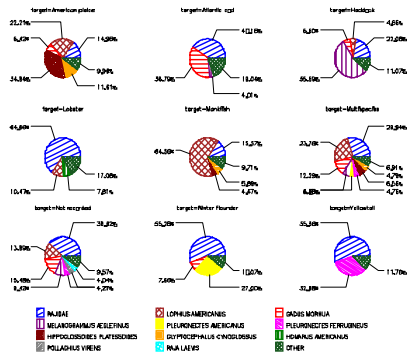


- 221 fishing trips with 8,421 trawl tows
- However, only 7,359 tows from 203 trips produced useful catch data
- 1,552 Days at sea
- 23,247 trawling hours
- Total of 12,033,801 lbs caught, 8,702,167 lbs kept, and 3,890,330 lbs discarded
- Average 27% of catch was discarded by weight per tow

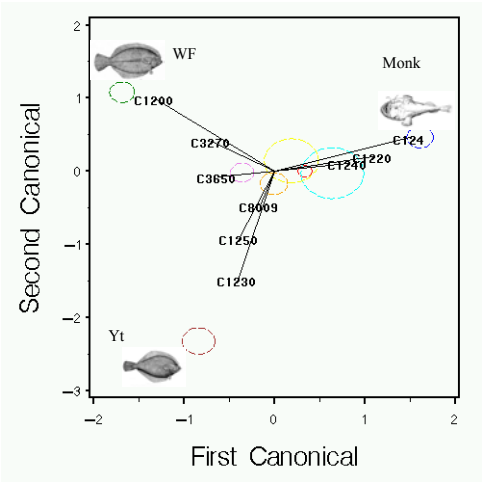
Dominant catch by weight

Species/species group	Mean Weight/tow-hr	SE
Rajidae	240	9.9
Gadus morhua	90	6.2
Lophius americanus	80	2.0
Melanogrammus aeglefinus	56	4.8
Pleuronectes americanus	53	2.4
Pleuronectes ferrugineus	25	1.2
Hippoglossoides platessoides	16	0.5
Glyptocephalus cynoglossus	15	0.4
Homarus americanus	11	0.4
Pollachius virens	9	0.8
Squalus acanthias	8	1.5
Raja laevis	7	1.0
Hemitripterus americanus	6	0.3
Cottidae	5	0.4

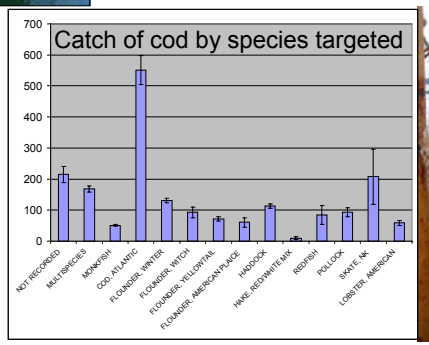
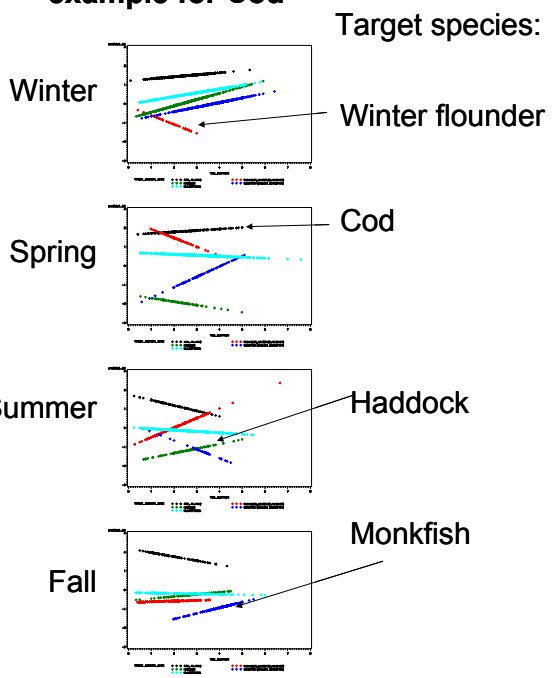
Catch composition by target species



Strong discrimination of catch composition among tows targeting different species



Strong evidence that fishermen can effectively target fish



Complex relationship among tow-duration, season, and targeted species on catch: example for Cod