Reducing Bycatch in New England’s Groundfish Sectors: Development of a Fishing Area Selectivity Tool

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Fisheries Bycatch Global Issues and Creative Solutions
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Overview

• Background of Problem
• Identification of Solution
• The Process
• The Results
  – Challenges
  – Successes
  – Lessons Learned
• Next Steps
Background: Management Shift

Allocation of days to fish

Allocation of fish

Days At Sea
Background: Sectors

New England Groundfish Sectors 2013
WITH PRIMARY VESSEL HOME PORTS

FGS  GB Cod Fixed Gear Sector (MA)
MCCGS Maine Coast Community Groundfish Sector (ME)
NEFS2 Northeast Fishery Sector (MA)
NEFS3 Northeast Fishery Sector (MA)
NEFS5 Northeast Fishery Sector (CT, RI)
NEFS6 Northeast Fishery Sector (MA)
NEFS7 Northeast Fishery Sector (MA)
NEFS8 Northeast Fishery Sector (MA)
NEFS9 Northeast Fishery Sector (MA)
NEFS10 Northeast Fishery Sector (MA)
NEFS11 Northeast Fishery Sector (NH)
NEFS12 Northeast Fishery Sector (NH)
NEFS13 Northeast Fishery Sector (MA)
NCCS Northeast Coastal Communities Sector (MA, ME)
SHS1 Sustainable Harvest Sector (MA, ME, NH, RI)

LEASE ONLY SECTORS*
NEFS4 Northeast Fishery Sector (MA)
MEPB Maine Permit Bank (ME)
SHS3 Sustainable Harvest Sector 3

* Not displayed on map
Project Assumptions

• Data Poor
  – Limited access to data, fishermen can only see their own information, takes a while to get into system

• Follow “Big Data” Paradigm
  – Share catch data regionally aggregated and integrated with data could provide insight into trends and patterns that could help avoid bycatch

• Goal: sectors fish to full quota
Proposed Solution

Develop industry led bycatch avoidance tool that would map hotspots of choke species

Encourage/enable the fleet to share data, and target their full allocation
Leveraging success stories

• Others dealing with choke species that can shut down fishery:
  – SeaState – Walleye pollock fishery/Alaskan salmon bycatch
  – SMAST Georges Bank scallop fishery/yellowtail Flounder
Sector fishermen should work together, right?

Just had a nice set of haddock on Jeffery’s.

Platt’s is loaded with cod!

I’m straining water on the Northwest corner.
Full Harvest of Sector Allocations

![Bar chart showing percentage of ACE harvested for various species. Each species is represented by a bar, with the x-axis labeled with species names such as SNE/MA Yellowtail Flounder, GB Yellowtail Flounder, and so on. The y-axis is labeled Percentage of ACE Harvested. A legend indicates 'Full Utilization' and 'Percent of ACE Caught.' The chart visually compares the full harvest percentages across different species.]
Reality Bites

• Perceived Problem:
  – Under low annual catch limits (ACLs), there would be Choke stocks
    • Low allocations of one species would constrain the industry’s ability to harvest other species.

• Challenges to our assumptions
  – No “choke” stocks
    • Fluid lease market
  – One person’s choke stock is another’s target
  – Fishermen are not interested in sharing catch data for target species
  – Fishing locations are private information
2012 Groundfish Harvest

Percentage of ACE Harvested

- Full Utilization
- Percent of ACE Caught

Species: SNE/MA Yellowtail Flounder, GB Yellowtail Flounder, GOM Winter Flounder, GB Cod East, GOM Haddock East, GB Haddock East, CC/GOM Yellowtail Flounder, Witch Flounder, Plaice, GOM Cod, GB Haddock, White Hake, GB Cod, GB Winter Flounder, Redfish, Pollock.
Confidentiality

...few flats here and there...

...marked a few fish...see what comes up in the bag...

Gulf of Maine

Cape Cod Bay

Boston

Providence
Course Correction

• Engage sectors
  – networked project: 400+/- individual businesses

• Can we find common problem?
  – changes depending on who is in the room

• What are the emerging issues in the nascent Sector program?
Maine Voices: 'Overfishing' or 'mismanagement'?

Groundfishermen are taking the blame for the fishery crisis, while those who create policy are exempt from scrutiny.

No easy answers to New England cod crisis

Cod fishery's catch limit cut by 77%, 'the game is over'

A fishing way of life is threatened

By David Ariosto, CNN
updated 10:37 PM EST, Tue February 28, 2012

Cod crisis prevented this from moving forward.

NOAA sees 'status quo' on closed fish areas

By Sean Horgan
Staff Writer
Porpoise problems have fishermen facing shutdown

September 12, 2012 11:05PM

NH fishermen say new rule sounds death knell for industry

By GRETYL MACALASTER
Union Leader Correspondent

Feds turn down request for porpoise closure relief
Harbor Porpoise Consequence Closure in the Gulf of Maine
Industry was willing to admit they had a problem

• Industry only seeing aggregate take data after the fishing season had ended – no way to proactively address a FLEET WIDE issue.
  – Could we share take information across the fleet during the fishing year, modify fishing behavior in season to minimize takes?

• Industry led process with goal of reducing takes in sink gillnet fishery.
  – Marine mammal focus – legal mandate to report interactions (MMPA)
  – Fixed gear fishery in small communities – No secrets about where and when fishermen fish.
  – Allocations and catch info is not shared
Web-based Reporting and Mapping Species of Interest/Hot Spots in Near Real-time for Groundfish Sectors

Data Entry
- Date:
- Location (lat/long):
- Species:
-#/Lbs:

Layers
- ocean conditions
- historical maps
- observer data (own)
- study fleet (?)

View by
- day
- week
- month

Advisory/Alert
- Shared:
  - within sector
  - several sectors
  - fishery

Fisherman
Login
Sector Manager
Database
Industry Designed Data Sharing

Information entered into FAST portal

Portal: Visualization of data (sector) Update of Count (project participants)

Alerts – E-mail, text message

Fisherman and Sector Manager:
• Lat/Lon with vessel name (visualized in portal)
• Count of Sector takes
• Update of total takes

Other fishermen in the Sector:
• Lat/Lon (visualized in portal),
• Count of Sector Takes,
• Update of total takes

Other Project Participants:
• Management Area Take Occurred in
• Update of total takes recorded (point location not shared)
FAST: Web-Based Portal
Layers: Historic harbor porpoise take data

Location and number of sightings plotted on map by gear type

Species: Harbor Porpoise
Date: 2009-10-01 00:00:00-04
Gear: GNS
Statistical Area: 513

Species: Harbor Porpoise
Date: 2010-10-01 00:00:00-04
Gear: GNS
Statistical Area: 513
Filter by month, year, resolution (1, 5, 10 minute square)
Toggle layers on and off for stat areas, closures, and more.
Historical observer data
Reporting interactions

FAST Fishing Area Selectivity Tool

REPORT SPECIES ENCOUNTER

Fast Species Encounter
Species: Harbor Porpoise
What species?

Encounter Type: Sighting
What kind of encounter?

Number of sightings: 0
How many of this species sighted?

Latitude: 43.000
Longitude: -70.000

Encounter Date:
2012-10-16 14:45:45
E.g., 2012-10-16 14:45:45

SAVE

Powered by Drupal
Data Sharing - Alerts

FAST Species Encounter Report

iogilvie@gmri.org
Sent: Tuesday, November 27, 2012 4:31 PM
To: Jonathon Peros

jperos, A sighting of has been reported.

Species: Harbor Porpoise
Date: 2012-11-27 16:30:00-05
Sector: Maine Permit Bank Sector
Sightings this encounter: 1
Total Sightings for Maine Permit Bank Sector 1
Lat: 42 18 00.0
Lon: -70 24 00.0
The moon was 14.1 days old, and waxing
Communication

• Many challenges in reporting real or near-real time information at sea

• Web-based tool that can be used anywhere there is internet access

• Reporting can even be done on smart phones over 3G network
FAST: Enabling an Industry Led Process

- FAST is a *tool* that can be used in an industry led process *outside of the regulatory process (voluntary)*

- Aligning oceanographic and modeling information with historic and near real-time data through a web-based portal

- Information sharing arrangement designed by industry
  - Alert system

- Industry designed protocols in response to near real-time information
  - Voluntary response to information
Extending Project Focus
Fall Trawl Survey vs. Observer
Hot Spots
Sector data

FAST Fishing Area Selectivity Tool

Home
Fast Species Encounter
Upload Data
Choose File  No file chosen
Data file (.csv)

Upload DATA FILE

You may upload your list of data as a .csv file. Please make sure your data is stored as .csv and that your headers match the headers shown in the example below:

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</table>

To upload your data, select "Choose File" button above, browse to the appropriate .csv file and click "upload Data File".

If your file is processed correctly, the data will be automatically added to the database and will be available to view on the FAST map.
Challenges

• Sectors were very new
  – lots of concern about new system
  – little capacity to get engaged
  – problems had not materialized yet

• When crisis and threat is off the table, interest wanes

• RT or even near-RT data access is really challenging
  – technologically feasible, hurdles around access b/c of confidentiality, release of data, etc.
Successes

• Developed robust tool that doesn’t really care what species is being monitored

• Flexible design, easy to extend to respond to new issues in fishery

• It’s GIS – mapping platform to distribute data from other sources (NEFMC) that would be of interest/value to users
Lessons Learned

• What is the secret sauce?
  – **Trust** – prove that data stewarded and protected, sharing levels are set and understood by all participants
  – **Value** – show that program is actually helping reduce bycatch and avoid management actions
  – **Ease of use** – lower barrier to participation, no redundancy in reporting info (VTR integration)
Next Steps

• Non-allocated species – windowpane
  – Accountability measures for non-marketable species (windowpane) have been triggered – gear modifications required, potential for time area closures. Fleet could address this proactively during the fishing year, not be subject to time lags in management. Paying for catches that happened 2 years ago.

• Heatmap/hot spot for low resolution data

• Integrate eVTR data to reduce redundancy and give fishermen/sectors a way to visualize data geospatially/temporally

• Harness engaged group of sectors who have seen the value through the pilot and want to continue to grow program.
If the service provided is valuable, easy, reliable, it is indispensable.

They will come.

We know we can communicate in real time with each other.
Thank you!

The FAST tool is a web-delivered software application. It is written in the Drupal content management system, leveraging an open-sourced technology stack that includes:

- Operating system: Amazon Linux 64-bit Ubuntu 10.04 LTS (Lucid Lynx) Server
- 2 Disk Elastic Block Storage (32 GB - software, 200 GB – data)
- Apache PHP 5.3.6
- PostgreSQL with PostGIS for spatial data
- Drupal CMS – Omega responsive theme for mobile access
- Open Layers/ Ext JS JavaScript library for mapping interface
- GeoServer for integration of shape (.shp) and r-based output files
- Web service integration for oceanographic data through
- Python scripting for data acquisition and integration
- PHP-based alert system for email notifications