Outline of Presentation

• Economic Perspective
• Data
• Metrics
• Models
  • Short Run
    • FishSet toolbox
  • Long Run
What Matters Economically

Productivity

Relative Abundance

Spatial Distribution

Market Demand

Search & Steaming Costs

Revenues

Short-Run Costs

Long-Run Costs

An Adapted Fishery
Data Example: Species, Gear, Port
New York State

### Total Landings Revenue (thousands of dollars)

<table>
<thead>
<tr>
<th>Species/Gear</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>American lobster</td>
<td>1,398</td>
</tr>
<tr>
<td>Atlantic surf clam</td>
<td>ND</td>
</tr>
<tr>
<td>Eastern oyster</td>
<td>ND</td>
</tr>
<tr>
<td>Summer flounder</td>
<td>3,715</td>
</tr>
<tr>
<td>Loligo squid</td>
<td>7,249</td>
</tr>
<tr>
<td>Quahog clam</td>
<td>ND</td>
</tr>
<tr>
<td>Scup or porgies</td>
<td>2,549</td>
</tr>
<tr>
<td>Sea scallop</td>
<td>4,961</td>
</tr>
<tr>
<td>Softshell clam</td>
<td>ND</td>
</tr>
<tr>
<td>Tilefishes</td>
<td>4,525</td>
</tr>
</tbody>
</table>

Revenue by Gear
New York 2007-2012

- **DREDGE**
- ** Gillnet**
- **Hand**
- **Longline**
- **Other**
- **Pot**
- **Pot Lobster**
- **Seine**
- **Trawl, Bottom**
Inidividual Fishing Data Informs Fleet Dynamics

• Fixed vs. Mobile
  • Olson (2011)
Economic Data Collection

- Vessel fishing cost surveys
- Crew and Owners surveys

Fishing Business Costs

- Large Vessels-Average: $251,656
- Medium Vessels-Average: $44,471
- Small Vessels-Average: $14,802
FishSET’s goal is to enable NOAA Fisheries economists and social scientists to better inform policy decisions by predicting how a variety of factors might influence fisher behavior.

Many modeling challenges exist. While predictive models are valuable tools for sustainable fisheries management and conservation, challenges to their development include preparing, integrating, updating many data sources, choosing appropriate models, and interpreting results.

FishSET provides:

1. Superior data organization, analysis, and integration for spatial models.
2. Best management practices for data, modeling, and model comparison.
3. Many models in a single toolbox for ease of model comparison and use. Combines several fisheries economics modeling approaches in one toolbox.

FishSET facilitates better and more expedient analyses to improve marine resource management.

To learn more, visit: www.st.nmfs.noaa.gov/humandimensions/fishset/index
Coupled Ecosystem and Economic Models

- Atlantis – Input/Output
LONGER TERM FLEET DYNAMICS
Long Term Dynamics: Challenges

- Current data and analyses designed to model fleet dynamics on a much shorter term time scale
  - Trips
  - Season
  - Annual
- Corresponds to time (and spatial) scale of management decisions
  - Annual or seasonal quotas
  - Area management
Short Term Fleet Dynamics

• Aggregation of Individual Decisions By Owners/Captains
Short run fixed factors that influence Individual choices

- Capital – Vessel/Gear
- Knowledge – Owner/Captain/Crew
- Market Conditions
- Stock Conditions
- Community/Family Traditions
- Port Location
- Management Regulation

Fish?

Yes

Target Species/Complex

A

Area

B

X

Y

No
In the longer run...

- Capital Replacement
  - Vessel and gear depreciates and needs replacement
    - Timing is critical
    - Heterogeneity in fleet re: where they are in the process
- New investment opportunities
- Even fishing ports come and go
- Decision to add port/expand port at state or local level
  - COE dredging and port maintenance decisions
But the ability to adapt

• Is dependent of the transition path to the new state
  • Gradual shift
  • Sudden transition
• In an ecosystem framework, some gradual shifts, some sudden
• Can’t replace capital or invest in new fishing method if you’ve been unsuccessful during the transition
Need Studies of Long Term Fleet Dynamics

• Examples exist of long term changes
  • Menhaden
  • Surf clam

• Hasn’t been a priority
  • Demand is for short term dynamics to support fishery management decisions
Study of Shifting Fleets

- Has overall landings and value changed?
  - Gradually, quickly?
- Composition of landings and value changed?
- Events
  - End of WWII
  - Foreign Fleets
  - MS-FCMA
  - Regime Shifts
  - Coastal Gentrification
  - **Climate Change**
  - Coastal Eutrophication
  - Dams
  - Dam Removal
- Long terms shifts in fleets?
Some Port Dynamics: 1920-2012

Boston, MA

Gloucester, MA

New Bedford, MA

Portland, ME

Millions of dollars

NOAA Fisheries
More Port Dynamics

Variability in Value of Landings Among All Atlantic Ports

Percentage of Total Mid-Atlantic Value Landed at the Top Three Mid-Atlantic Ports
Management and Governance Implications

• Needs Discussion Like We’re Having Here

• For Example: Catch Shares
  • Help Industry Adjust?
    • Asset value for investment financing
    • Shares can be traded to newly adapted fleet

• Hinder Industry Adjustment?
  • Tied to species, could lose value if species declines
Concluding Comments

• Significant challenge to address in a declining budget world when information demands are to support current management actions
• Different types of data and analyses are needed than is what is currently collected
• Need to determine actionable items that will make this investment in research worthwhile
Questions?