



NOAA
FISHERIES

Forage and Pelagics: New England Herring

Min-Yang Lee
Northeast Fisheries Science Center
Pelagic Fisheries: U.S. and European Perspectives and
Shared Experiences
May 1, 2018

Outline

- 1 Herring in the Northeast Region
- 2 Fisheries Management in the Northeast Region
- 3 An Economic Perspective on Forage

In 2015 Fisheries Managers Wanted:

- a Harvest Control Rule that accounts for the role of Atlantic herring in the ecosystem, including its role as forage
- a HCR that stabilizes the fishery at a level that achieves optimum yield
- to minimize possible detrimental biological impacts or socioeconomic impacts on other user groups (commercial, recreational, ecotourism) who depend upon adequate local availability of Atlantic herring to support business and recreational interests both at sea and on shore.

Doing it Economically

To find the harvest control rule that produces the “greatest overall benefit to the Nation” we need to know just three things:

- How various harvest control rules affect
 - Herring fishing industry
 - Consumers of herring
 - Herring biomass
- How changes in herring biomass affect
 - Predator outcomes
 - Other forage species
- How changes in Predator outcomes affect human users, including
 - Predator Fishery outcomes (Commercial and Recreational)
 - Eco-tourism outcomes
 - Non-consumptive Uses

Doing it Economically

To find the harvest control rule that produces the “greatest overall benefit to the Nation” we need to know just three things:

- How various harvest control rules affect
 - Herring fishing industry
 - Consumers of herring
 - Herring biomass
- How changes in herring biomass affect
 - Predator outcomes
 - Other forage species
- How changes in Predator outcomes affect human users, including
 - Predator Fishery outcomes (Commercial and Recreational)
 - Eco-tourism outcomes
 - Non-consumptive Uses

Doing it Economically

To find the harvest control rule that produces the “greatest overall benefit to the Nation” we need to know just three things:

- How various harvest control rules affect
 - Herring fishing industry
 - Consumers of herring
 - Herring biomass
- How changes in herring biomass affect
 - Predator outcomes
 - Other forage species
- How changes in Predator outcomes affect human users, including
 - Predator Fishery outcomes (Commercial and Recreational)
 - Eco-tourism outcomes
 - Non-consumptive Uses

Doing it Economically

To find the harvest control rule that produces the “greatest overall benefit to the Nation” we need to know just three things:

- How various harvest control rules affect
 - Herring fishing industry
 - Consumers of herring
 - Herring biomass
- How changes in herring biomass affect
 - Predator outcomes
 - Other forage species
- How changes in Predator outcomes affect human users, including
 - Predator Fishery outcomes (Commercial and Recreational)
 - Eco-tourism outcomes
 - Non-consumptive Uses

Background: Current Herring Stock Assessment

- Moderate Retrospective pattern – Mohn's rho of 0.67
- Biomass is high, even after retrospective adjustment
- Accounts for consumption by other animals (M)

Many predators eat herring

Many of those predators are generalists

Herring: Economics and Management

- Mostly bait in lobster fishery; aquarium and pet food
- Some catch of juvenile haddock
- Some catch of river herring and shad
- Purse seine in the Gulf of Maine
- Trawl in other parts
- Large boats (by US standards)

Herring: Economics and Management

- Many trawl vessels also fish for other small pelagic fisheries:
 - Squid
 - Mackerel
- 90% of herring is landed in Maine and Massachusetts.
- Most of the rest is landed in New Hampshire, Rhode Island, and New Jersey.

Herring: Economics and Management

Management is complex:

- 4 Zones, each with a catch limit
- Gulf of Maine also has:
 - Seasonal split of catch limit
 - Days-out (No landings or possession)
 - 1 landing-per-day
 - Limits on landings-per-week
 - Time-Area Closures for Spawning
- Seasonal River Herring/Shad catch caps and closures
- Georges Bank haddock catch caps and closure areas

Herring: A Small Fishery

- Herring: 25-30 active and 40 permitted
- Mackerel: 10-15 active and 30 permitted

- LA Scallop: 350 active
- Groundfish: 270 active and 1,400 permitted
- Party/Charter: 400 Active
- HMS*: 200 active longline and 4,000 permitted GC/Angling

All approximate.

Fisheries Managers: Who are they?

New England Fishery Management Council (18 voters):

- Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut (10: 5 state officials + 5 nominated by governor)
- Seven “at-large” from these states
- One from National Marine Fisheries Service

Advised by various panels, committees, and technical groups

What do they do?

- “...conserve and manage the living marine resources of the United States of America by carrying out the business of the Council for the greatest overall benefit of the Nation.”
- “being careful to balance competing private or regional interests.”
- “ ...measures which have allocative effects should be open and transparent.”
- “...we will be judged by both the biological health of our fisheries and by how fair and equitable we are in our allocation decisions.”

Fisheries management is changing

- Historically, fisheries managed species-by-species
 - Increasingly using Ecosystem Approaches
- Historically, voting members in New England are drawn from commercial fishing industry
 - Increasingly including representatives from recreational, academic, and sectors
- Historically, advisory groups drawn from commercial fishing industry
 - Increasingly including representatives from outside this sector

In 2015 Fisheries Managers Wanted:

- a Harvest Control Rule that accounts for the role of Atlantic herring in the ecosystem, including its role as forage
- a HCR that stabilizes the fishery at a level that achieves optimum yield
- to minimize possible detrimental biological impacts or socioeconomic impacts on other user groups (commercial, recreational, ecotourism) who depend upon adequate local availability of Atlantic herring to support business and recreational interests both at sea and on shore.

Doing it Economically

To find the harvest control rule that produces the “greatest overall benefit to the Nation” we need to know just three things:

- How various harvest control rules affect
 - Herring fishing industry
 - Consumers of herring
 - Herring biomass
- How changes in herring biomass affect
 - Predator outcomes
 - Other forage species
- How changes in Predator outcomes affect human users, including
 - Predator Fishery outcomes (Commercial and Recreational)
 - Eco-tourism outcomes
 - Non-consumptive Uses

Things can quantify pretty well

How do various harvest control rules affect:

- Herring fishing industry
 - Missing entry and exit decisions
 - At the vessel or firm level. Missing crew effects.
- Consumers of herring - currently improving models of prices
- Herring biomass

How do Changes in herring biomass affect:

- Representative Predators

Things we can't quantify very well (yet)

How do changes in herring biomass affect:

- All Predators
- Other forage species

How do changes in predators affect human users:

- Predator Fisheries (Comm. and Rec.)
- Tourism
- Passive values

Things we can't quantify very well II

How do changes in predators affect Commercial Fishing:

- Higher biomass → lower costs of catching fish?
- Higher biomass → higher catch limits?
- Better body condition → higher prices?

NMFS has an routinely collects these data

Can get prices from market data

With moderate lead time (six months?), we can quantify these effects

Things we can't quantify very well III

How do changes affect Recreational Fishing and Tourism:

- Higher predator biomass → more catch?
- Bigger fish?
- Better leisure outcomes?

NMFS **does not** routinely collect these data

Can not get prices from market data

- Benefit Transfer (if lucky - 6 months)
- Develop and deploy a valuation survey (18+ months)

Some Food for Thoughts

- The shift from single-species to Ecosystem Approaches involves a change in institutions:
 - Single: Only industry is at the table
 - Ecosystem: Any stakeholder is at the table.
- The herring fishery is relatively small in size and political clout
- Valuing changes in Recreational outcomes *caused by management changes* will require substantial investment in ongoing data collection.
 - How do anglers value changes in the number of fish they can keep?
 - ~~“what is the economic contribution of recreational fishing?”~~

Acknowledgments

Thanks to:

- MSE participants
- Coauthors

Questions and pointy sticks:

`Min-Yang.Lee@noaa.gov`