

*Science, Service, Stewardship*



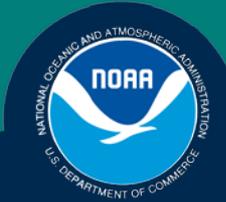
# New Data Integration: Atlantic Herring Stock Assessment Case Study

Jonathan J. Deroba,  
Fishery Research Biologist  
[Jonathan.Deroba@noaa.gov](mailto:Jonathan.Deroba@noaa.gov)

August 2, 2013

**NOAA  
FISHERIES  
SERVICE**

NOAA



## Outline

- I. Introduction
- II. Fishery independent survey data (TOR 1-3)
  - i. Bottom trawls
  - ii. Acoustics
  - iii. Fish diet / consumption
- III. Fishery dependent data (TOR 4-6)
  - I. Catch data
- IV. Recommendations (TOR 7)



## Atlantic herring: Introduction

Long and variable history of exploitation

Complex stock structure

Main prey item for “everything”



## Outline

- I. Introduction
- II. Fishery independent survey data (TOR 1-3)
  - i. Bottom trawls
  - ii. Acoustics
  - iii. Fish diet / consumption
- III. Fishery dependent data (TOR 4-6)
  - I. Catch data
- IV. Recommendations (TOR 7)



## Fishery Independent: Bottom Trawls TOR 1

Several state surveys

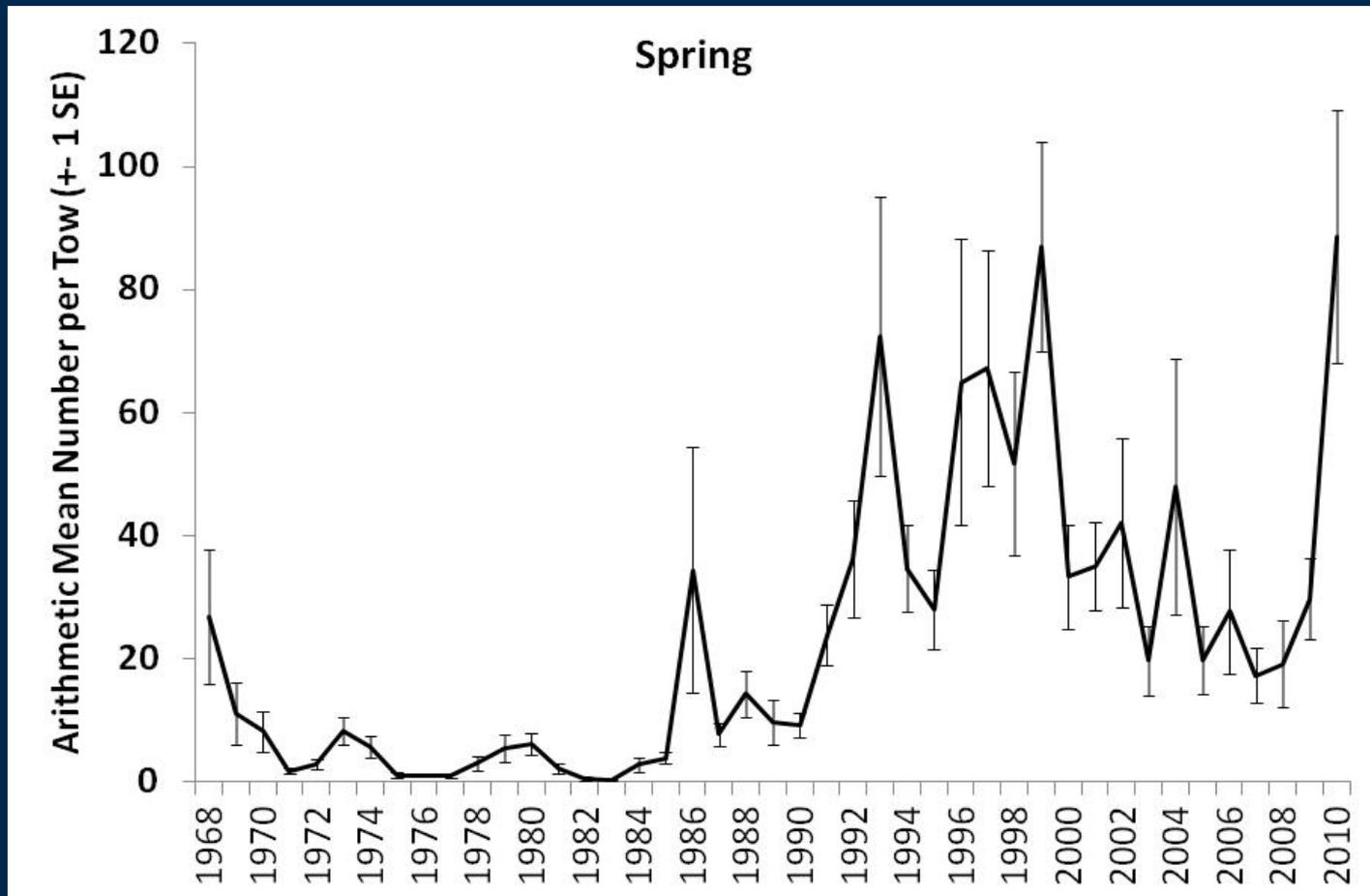
NMFS surveys (spring, fall, shrimp)

quality and timeliness relatively good

within and among year precision poor and directly  
translates to the assessment



# Fishery Independent: Bottom Trawls





## Fishery Independent: Bottom Trawls TOR 1-3

### Strengths:

- long time series
- covers stock range

### Challenges:

- bottom trawl for pelagic species = imprecise (bias?)
- survey gear/design changes at worst times

### Proposed Solutions:

- keep conducting broad multi-species surveys
- studies of behavior (e.g., depth preferences)
- direct studies of catchability
- calibration studies as needed



## Outline

- I. Introduction
- II. Fishery independent survey data (TOR 1-3)
  - i. Bottom trawls
  - ii. Acoustics
  - iii. Fish diet / consumption
- III. Fishery dependent data (TOR 4-6)
  - I. Catch data
- IV. Recommendations (TOR 7)



## Fishery Independent: Acoustics TOR 1

MIT OAWRS survey

To be determined

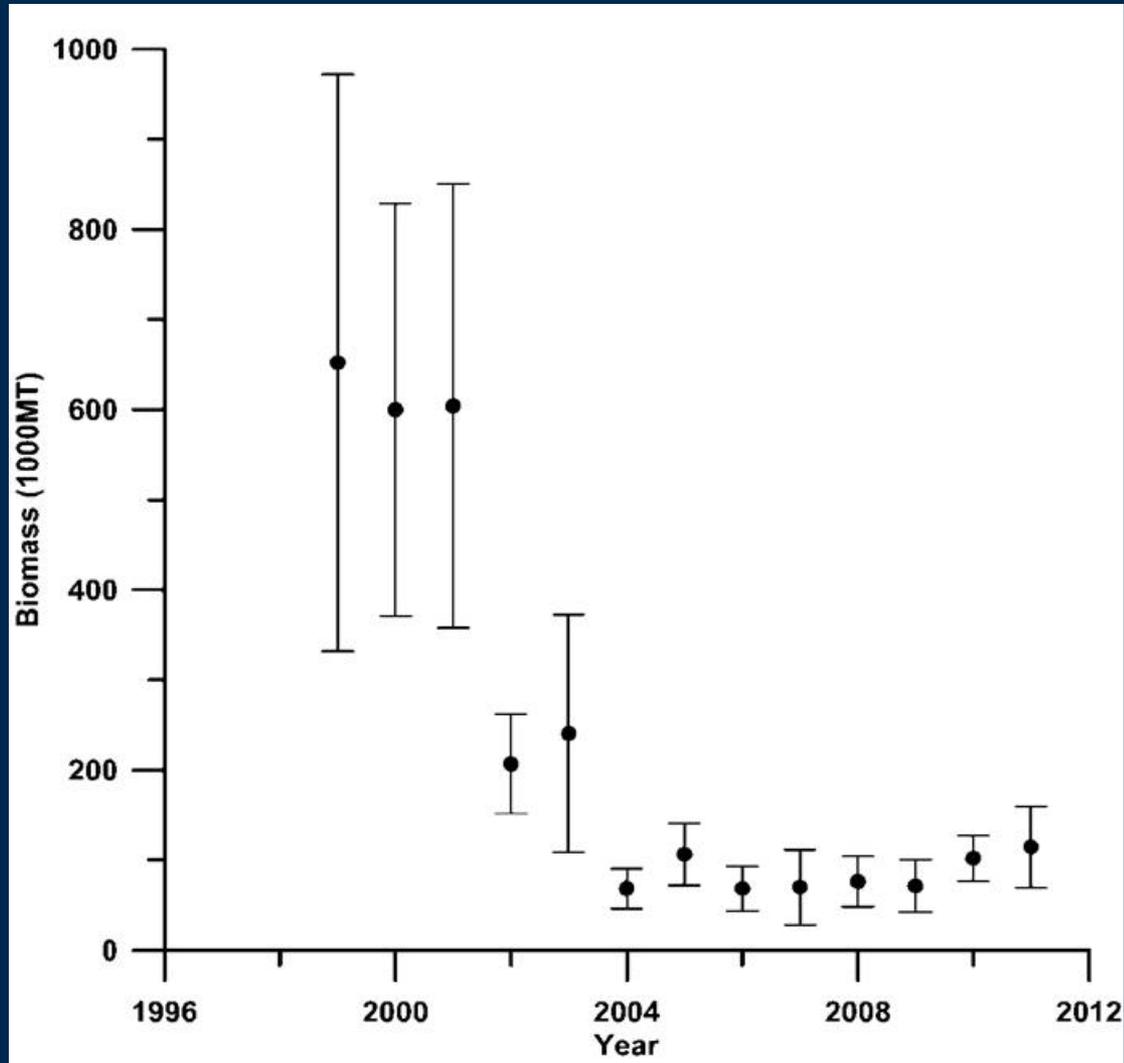
NMFS acoustic survey on George's Bank

Precision and timeliness relatively good, but not automated

Quality of work good but data are undetermined



# Fishery Independent: Acoustics



# Fishery Independent: Acoustics

## TOR 1-3

### Strengths:

- better gear for pelagics
- precise
- consistent with OAWRS method

### Challenges:

- inexplicable pattern
- does not cover stock range

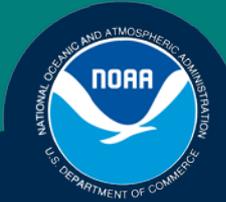
### Proposed Solutions:

- resolve odd pattern, or
- independently confirm recent values (e.g., OAWRS)
- expand spatial coverage
- automate as other surveys



## Outline

- I. Introduction
- II. Fishery independent survey data (TOR 1-3)
  - i. Bottom trawls
  - ii. Acoustics
  - iii. Fish diet / consumption
- III. Fishery dependent data (TOR 4-6)
  - I. Catch data
- IV. Recommendations (TOR 7)



## Fishery Independent: Consumption TOR 1

Timeliness good and improving (FEAST)

Accuracy unknown, but likely biased

- biased low by design

- sampling in time limited to spring and fall

- sampling in space relies on trawl as effective predator gear

- diet subsample may not reflect population (in progress)

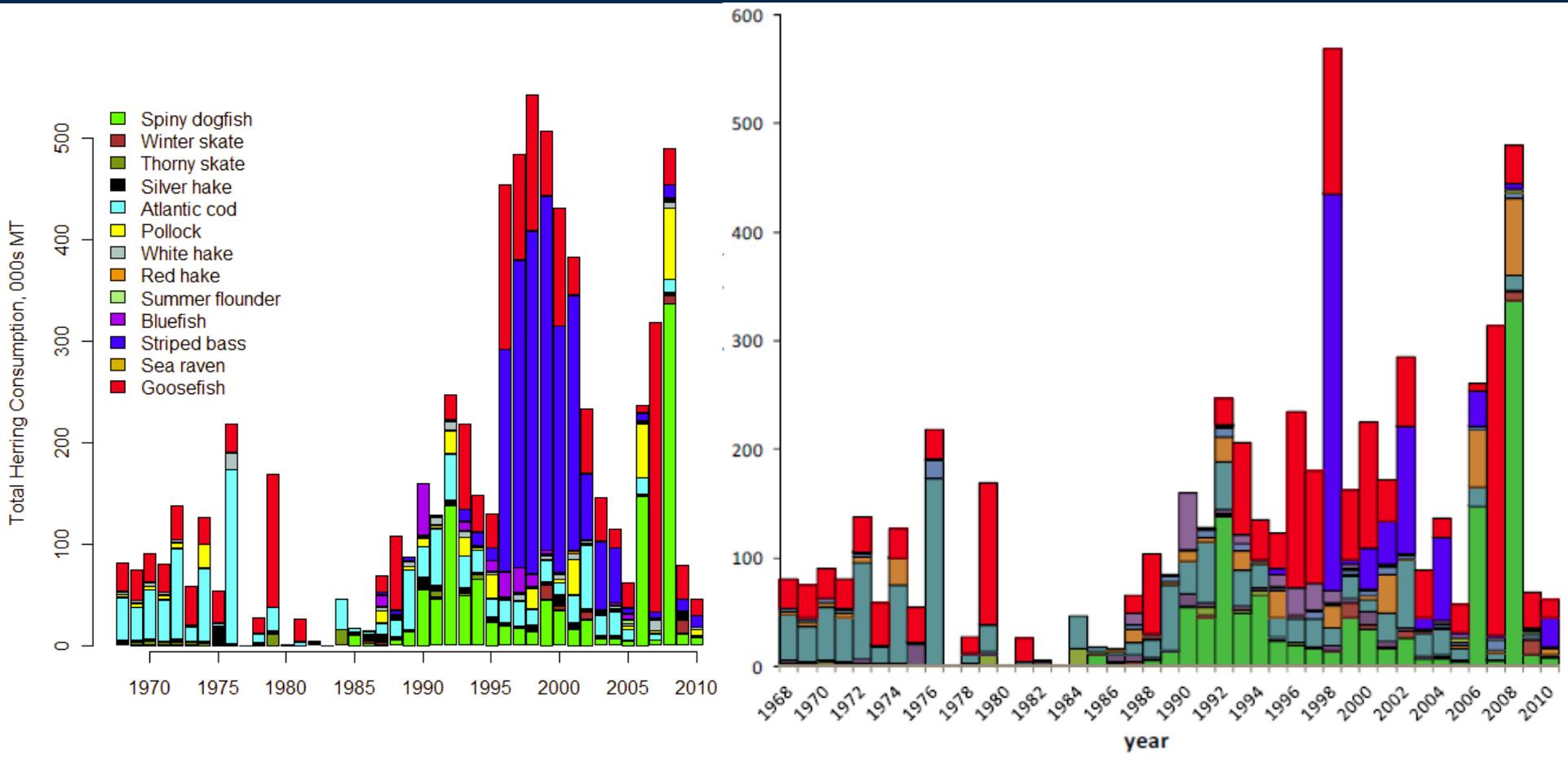
- reliant on stock assessment estimates of predators

Precision

- poor



# Fishery Independent: Consumption





## Fishery Independent: Consumption TOR 1-3

### Strengths:

- Long time series

- Inform natural mortality

### Challenges :

- imprecision and bias

- long way from “data”

### Proposed Solutions:

- consider other ways of utilization

- more stomachs but sampling takes time

- expand sampling seasonally



## Outline

- I. Introduction
- II. Fishery independent survey data (TOR 1-3)
  - i. Bottom trawls
  - ii. Acoustics
  - iii. Fish diet / consumption
- III. Fishery dependent data (TOR 4-6)
  - I. Catch data
- IV. Recommendations (TOR 7)



## Fishery Dependent: Catch TOR 4

Timeliness good

Accuracy unknown:

VTR correlated with independent observer estimates

Slippage unknown, but likely minor

Precision unknown



## Fishery Dependent: Catch TOR 4-6

### Strengths:

- well sampled
- long time series

### Challenges:

- Biological data not housed internally
- Reliant on self-reporting

### Proposed Solutions:

- Automate data sharing among Maine and NMFS



## Outline

- I. Introduction
- II. Fishery independent survey data (TOR 1-3)
  - i. Bottom trawls
  - ii. Acoustics
  - iii. Fish diet / consumption
- III. Fishery dependent data (TOR 4-6)
  - I. Catch data
- IV. Recommendations (TOR 7)

# Proposed Solutions

## TOR 7

### I. Fishery independent survey data

#### i. Bottom trawls

- Directed studies as needed (high priority)

#### ii. Acoustics

- Great potential
- Explore odd pattern and expand (high priority)

#### iii. Fish diet / consumption

- Several potential uses in assessment
- Explore sensitivity, bias, and imprecision (high priority)
- Expand stomach sampling (medium priority)

### II. Fishery dependent data

#### I. Catch

- Automate data sharing (low priority)

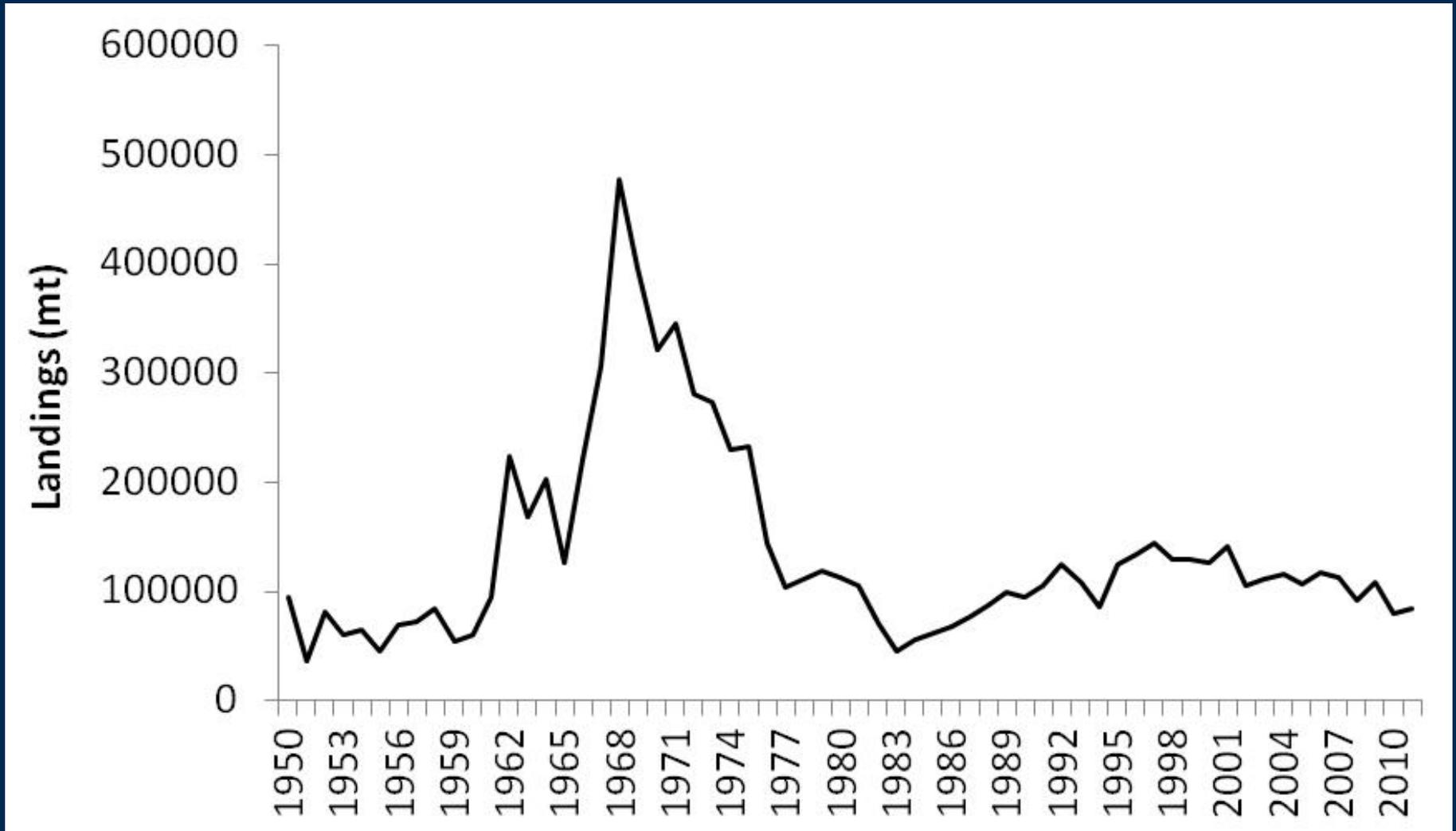
**NOAA  
FISHERIES  
SERVICE**



Thanks!

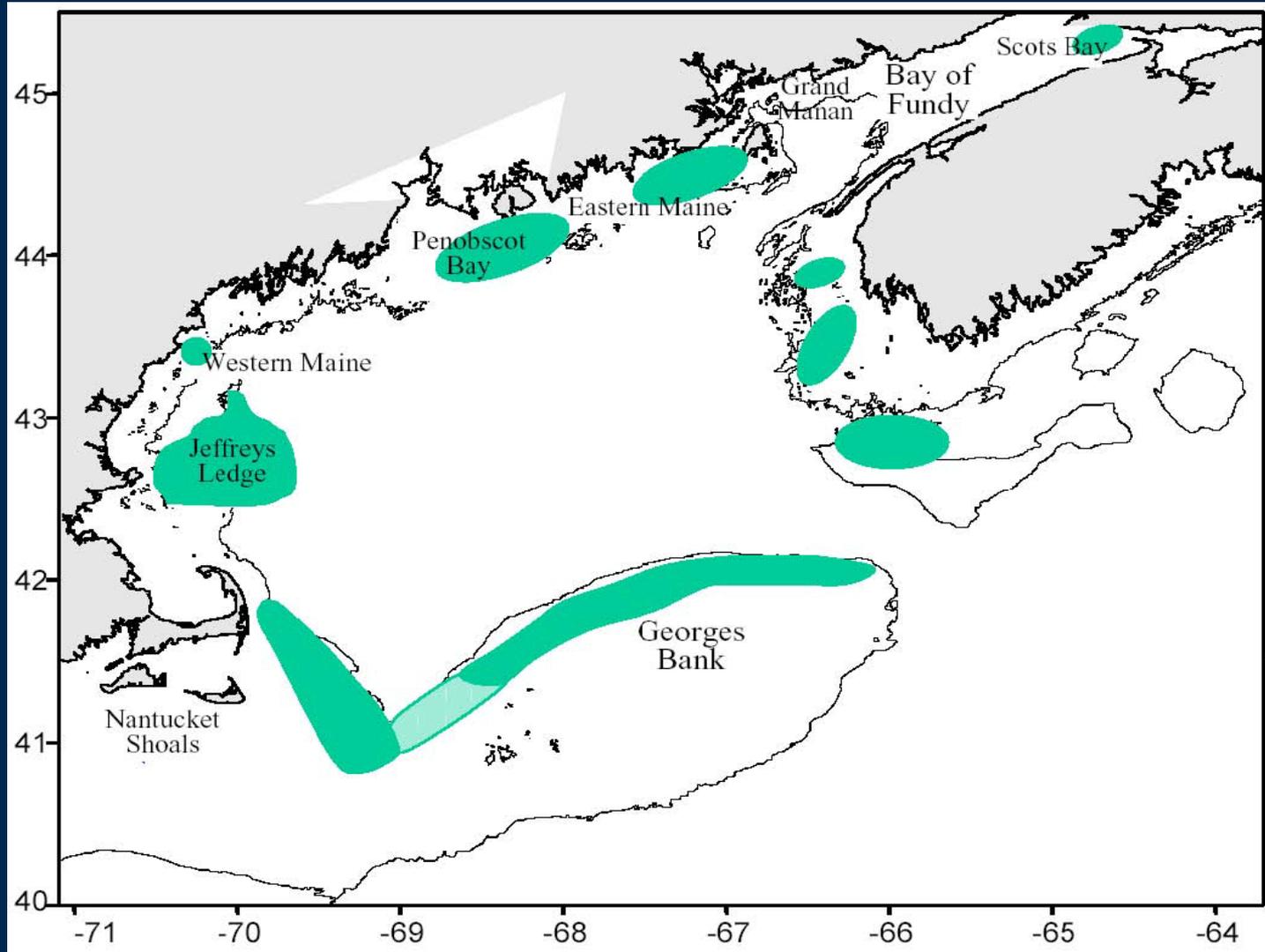
# Atlantic Herring Introduction

Long and variable history of exploitation



# Atlantic Herring Introduction

Complex stock structure and migratory



# Atlantic Herring Introduction

Main prey item for “everything”

