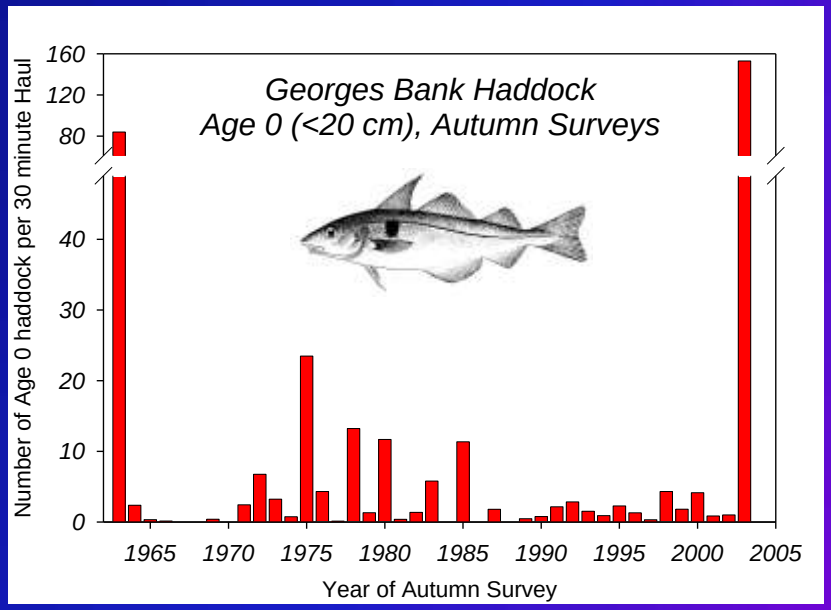
NOAA Fisheries – NEFSC
Fishery Independent Surveys



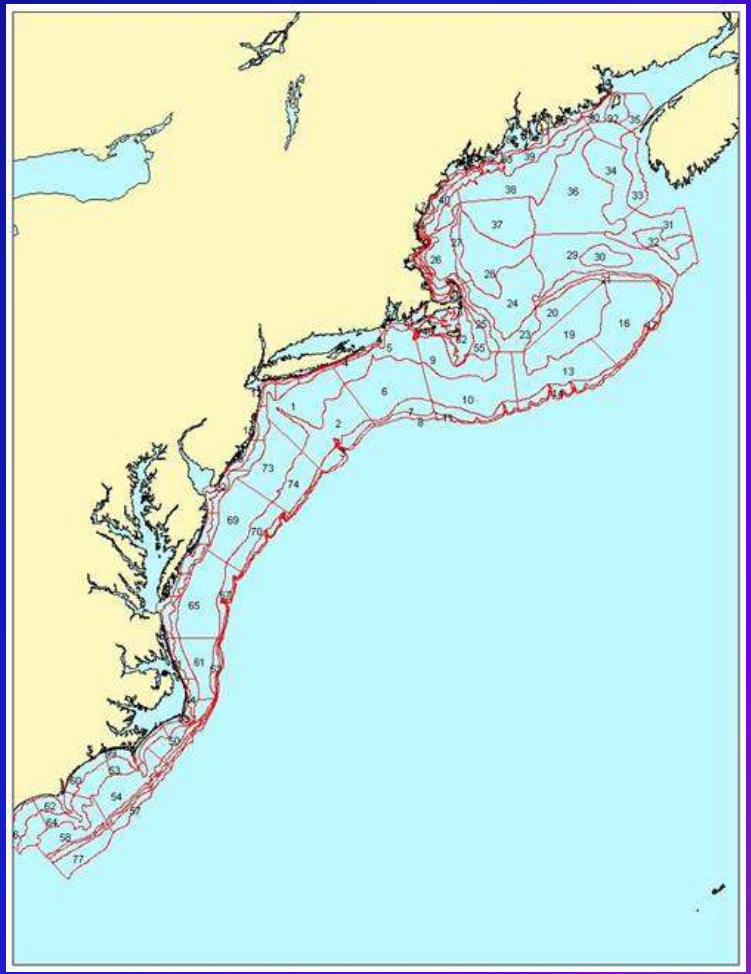
Ecosystem Surveys Branch
Northeast Fisheries Science Center
Woods Hole, Massachusetts

NOAA Fisheries Survey Objectives

1. Monitor trends in abundance, biomass and recruitment
2. Monitor the geographic distribution of species
3. Monitor ecosystem changes
4. Monitor trends in biological parameters (growth, mortality and maturation rates) of the stocks
5. Collect environmental data (Oceanography, Habitat, Acoustics – bottom and midwater)

NEFSC Multispecies Bottom Trawl Surveys

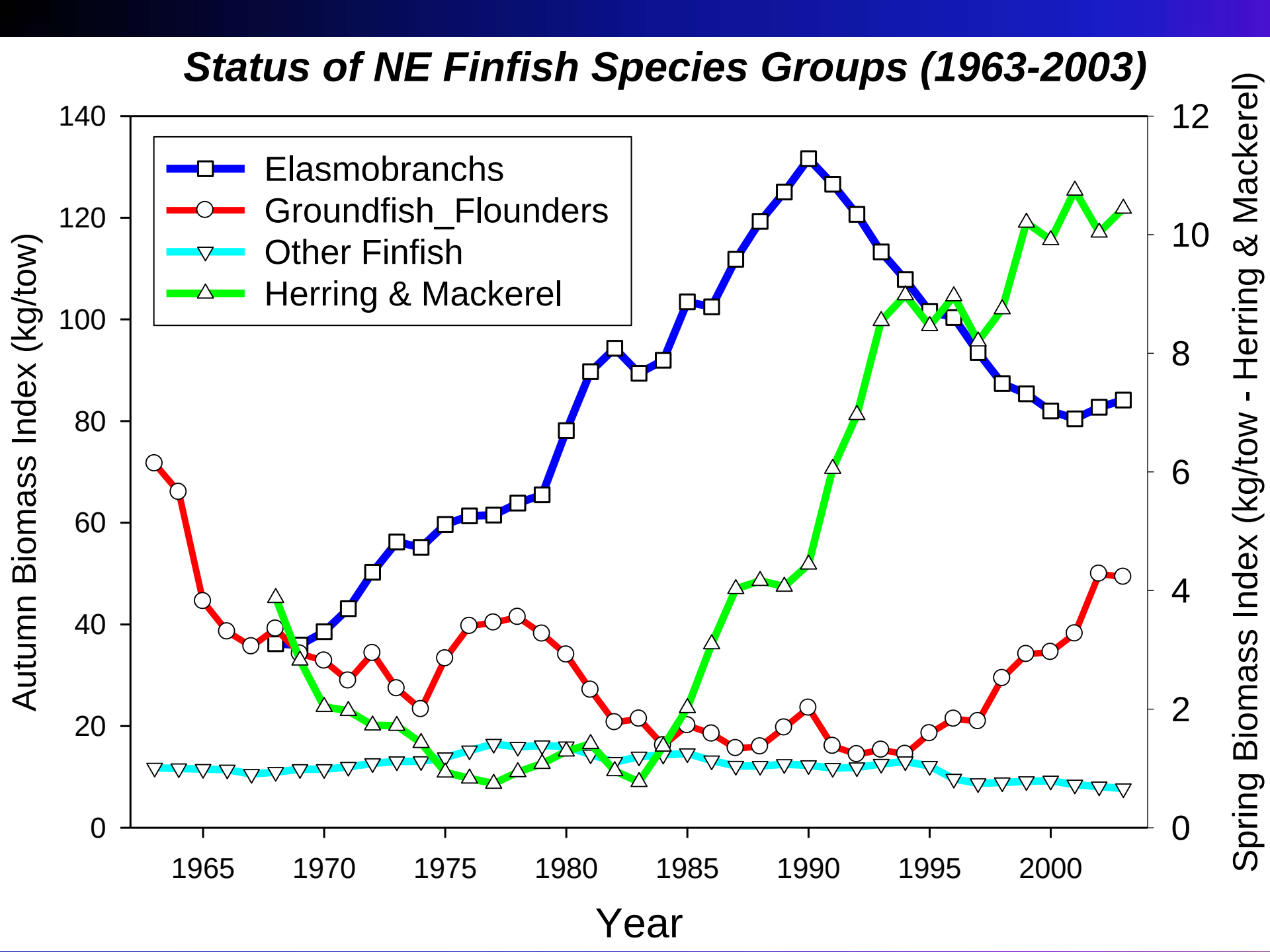
- **Overview**
  - Spring
    - 1963 – Present (48 years)
    - March – early May
  - Autumn
    - 1968 – Present (43 years)
    - September – early Novement
  - Cape Lookout to Scotian Shelf
  - Stratified random survey design
  - 380 stations (60 sea days)
  - 14-15 scientists, 24 hour operations
  - FSV Henry Bigelow
    - Historically, Albatross IV, Delaware II and Atlantic Twin



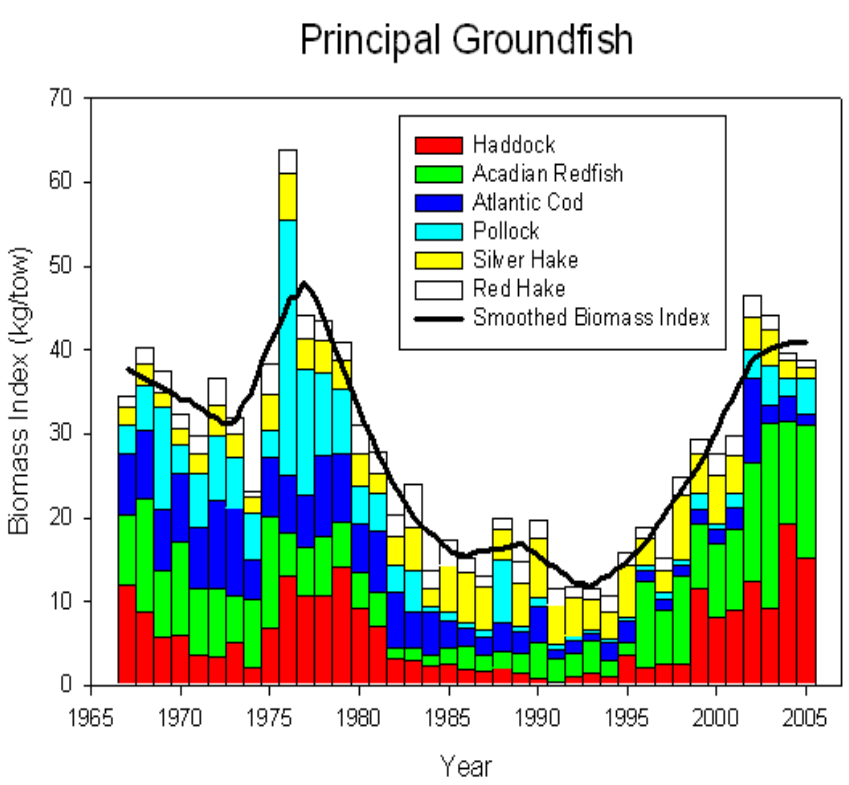
NEFSC Multispecies Bottom Trawl Surveys

- **Unique Points**
  - Input data to 45 single species and several ecosystem assessments
  - Key transition between 2008 & 2009
    - New Vessel (FSV Henry Bigelow)
    - New Trawling System (net, doors, warps)
    - Revised operational procedures
  - Autotrawl Operations
  - Full mensuration on every tow
  - Electronic data acquisition – station, tow and biological data (FSCS)

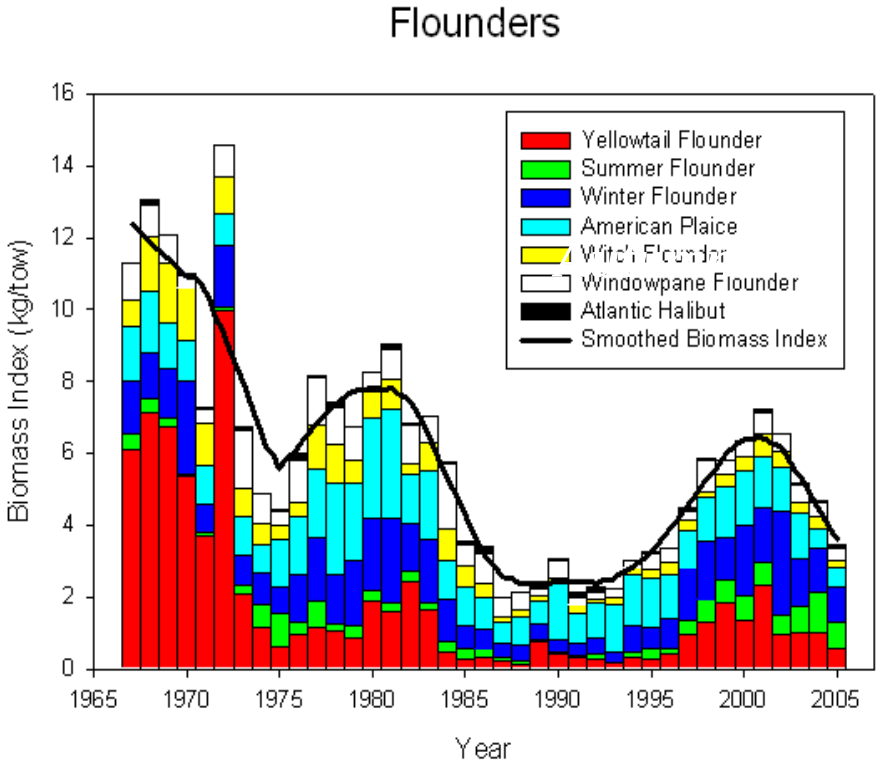
- **Current Challenges**
  - Vessel reliability (FSV Henry Bigelow)
  - Autotrawl calibration
  - New data acquisition system implementation (FSCS 2.0)


Status of NE Finfish Species Groups (1963-2003)
Elasmobranchs
Groundfish_Flounders
Other Finfish
Herring & Mackerel
Autumn Biomass Index (kg/tow)
Spring Biomass Index (kg/tow - Herring & Mackerel)
Year
0
20
40
60
80
100
120
140
0
2
4
6
8
10
12
1965
1970
1975
1980
1985
1990
1995
2000

Broad Scale Trends in Resource Abundance



Relative biomass index of principal groundfish (Atlantic cod, haddock, pollock, silver hake, red hake, and Acadian redfish) in the NEFSC autumn survey, 1967-2005. The solid line represents a smoothed index.



'. Relative biomass index of flounders (yellowtail flounder, summer flounder, winter flounder, American plaice, witch flounder, windowpane flounder, and Atlantic halibut) in the NEFSC autumn survey, 1967-2005. The solid line represents a smoothed index.

Northern Shrimp Bottom Trawl Survey

- **Overview**
  - 1985 – Present (28 years)
  - July - August
  - Gulf of Maine
  - Stratified random survey design
    - Some fixed stations
  - 70-80 stations (22 sea days)
  - R/V Gloria Michelle
  - 6 scientists, day time operations

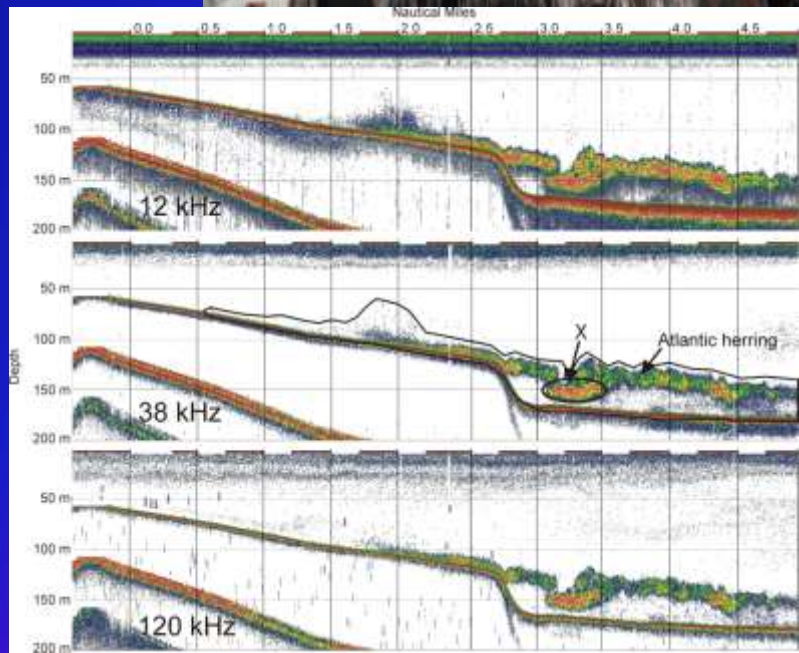
- **Unique Points**
  - Survey conducted with the Atlantic States Marine Fisheries Commission
  - Bycatch used as indices in other assessments (redfish, white hake)
  - Full net mensuration on every tow
  - Electronic data acquisition (FSCS)

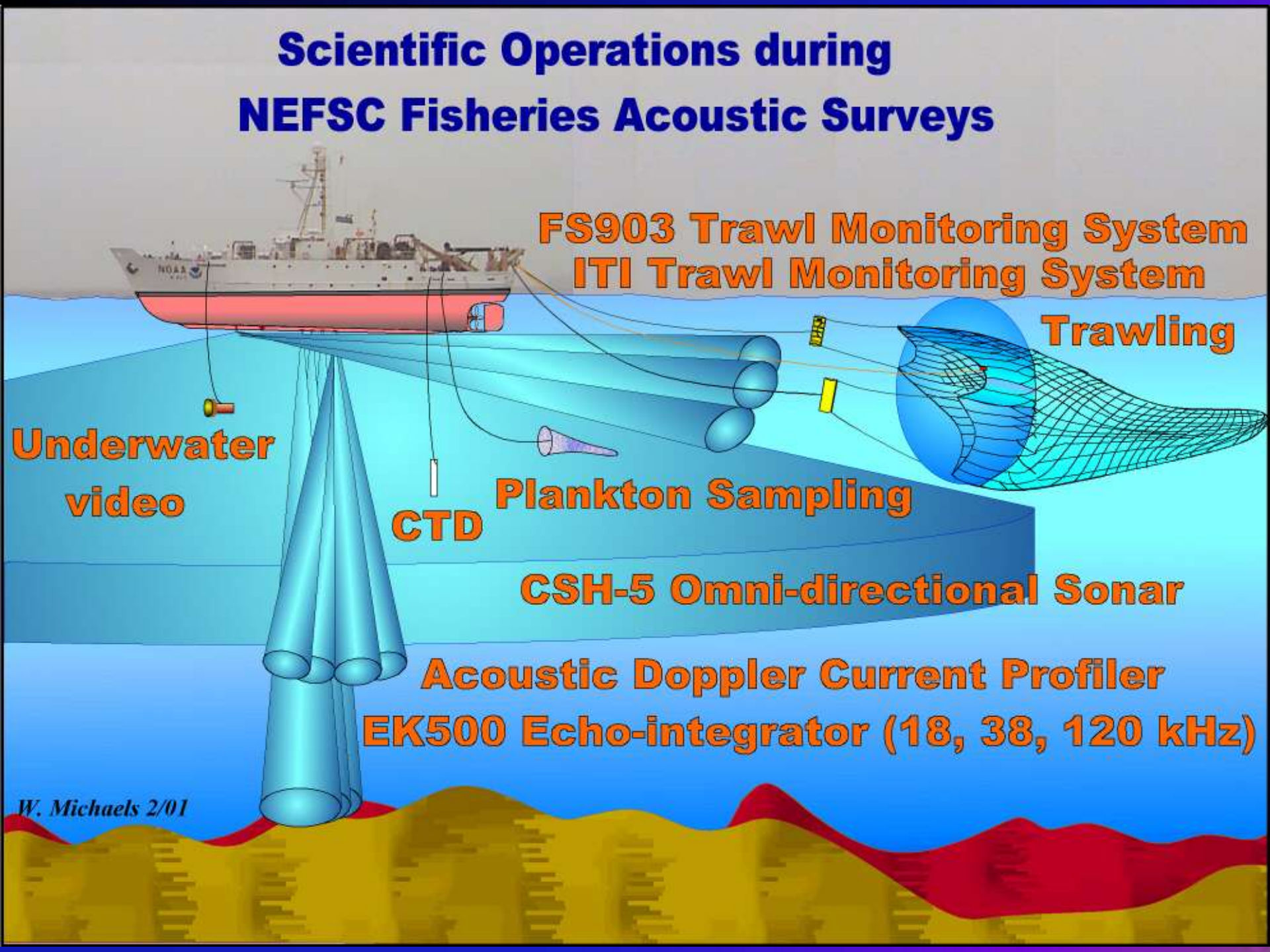
- **Key Challenges**
  - Vessel reliability
  - Gear transitions (trawl doors)

Atlantic Herring Acoustics Survey

- **Overview**
  - 1999 – present (13 years)
  - September – October
  - Acoustics & Midwater Trawling
  - Georges Bank, Southern Gulf of Maine
  - Transect survey (35 sea days)
  - FSV Delaware II
  - 6-8 scientists, 24 hour operations
  - Full net mensuration & electronic data capture

- **Key Challenges**
  - Survey results excluded from last stock assessment
  - Funding support
  - Transition to an FSV




Scientific Operations during
NEFSC Fisheries Acoustic Surveys
FS903 Trawl Monitoring System
ITI Trawl Monitoring System
Trawling
Underwater video
CTD
Plankton Sampling
CSH-5 Omni-directional Sonar
Acoustic Doppler Current Profiler
EK500 Echo-integrator (18, 38, 120 kHz)
W. Michaels 2/01

NEFSC Shellfish Surveys

- **Sea Scallop Dredge Survey**
  - 1982 – Present (29 years)
  - May – early July
  - 8-foot New Bedford Scallop Dredge
  - Virginia to Georges Bank
  - 500 stations (36 sea days)
  - R/V Hugh R. Sharp
    - Historically R/V Albatross IV

- **Key Points**
  - $350 - $450 million dollar fishery
  - Low CV on survey (0.09 – 0.12)
    - Single species survey of relatively sessile organism
    - Adaptive allocation of station density to strata based on previous survey results

- Key Challenges
  - Transition to optical survey technology (HabCam system)

Surfclam & Ocean Quahog Dredge Survey

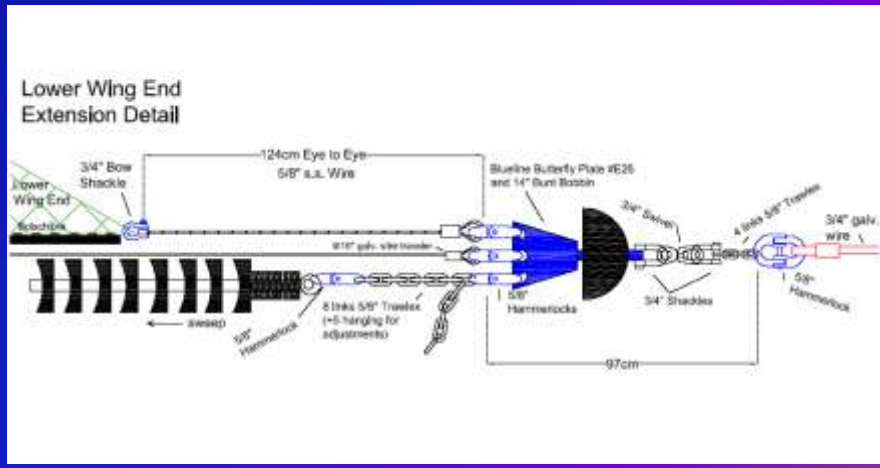
- **Overview**
  - 1975 – 2011 (triennial survey)
  - July - August
  - Hydraulic clam dredge
  - Virginia to Georges Bank
  - Stratified random sampling design
  - 600 stations (35 sea days)
  - FSV Delaware II
  - Specialized Survey Sensor Package

- Key Challenges
  - Effort standardization
  - Transition to an industry vessel platform (planned 2012)

Collaborative Research Surveys

- **Overview**
  - Conducted in conjunction with industry stakeholders to address specific issues
  - Utilize simplified electronic data acquisition systems

- **Examples**
  - Sweep Efficiency Study (2009-2010)
  - Cooperative Monkfish Survey (2001, 2004, 2009)
  - Clam Survey Depletion Studies (2005, 2008, 2011)
  - IBS Cod and Yellowtail Flounder Surveys



- **Key Challenges**
  - Standardization
  - Adapting electronic data acquisition systems to specific missions

Summary

- Long term, broad scale independent surveys provide valuable data for stock assessment and management

- Common Themes:
  - Efficiency in the use of vessel time
    - Balancing staffing with available vessel time and berths
    - Electronic data acquisition and real time data quality checks

- Key challenges related to long term funding
  - Multidisciplinary/Ecosystem focus rather than single species or fisheries management focus

FRV Henry B. Bigelow