NOAA FISHERIES
NEFSC

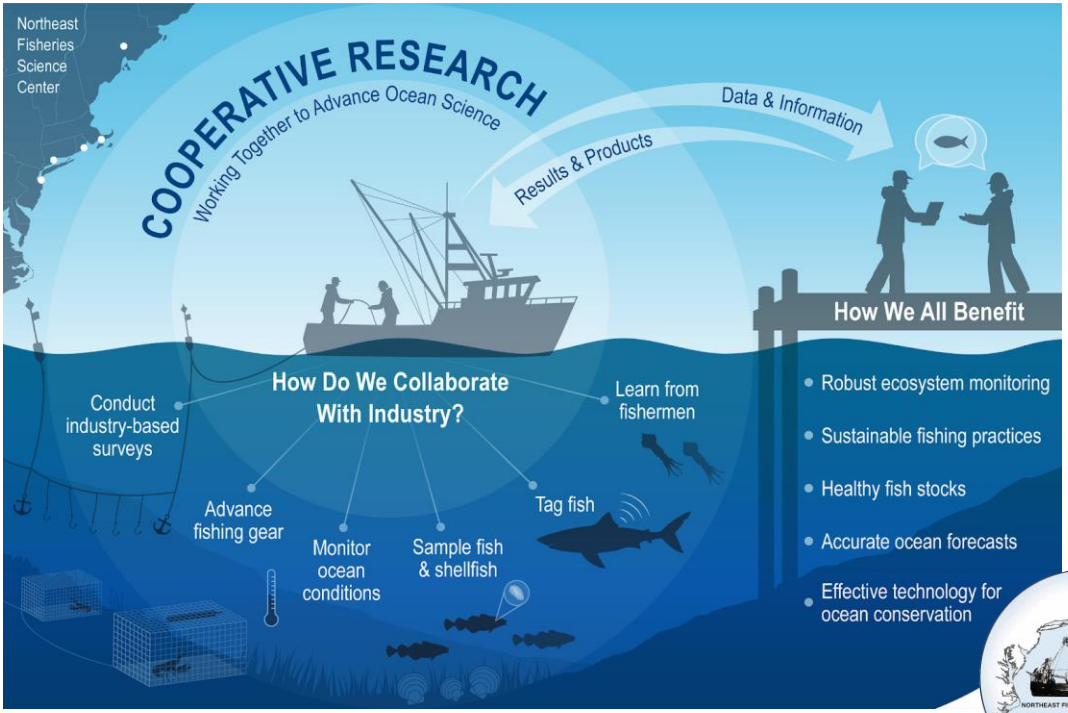
NEFSC Cooperative Research Branch Update

Anna Mercer, PhD
Chief, Cooperative Research Branch
Director, Narragansett Laboratory
Northeast Fisheries Science Center
NOAA Fisheries

In Memory: Captain Jimmy Ruhle

What is Cooperative Research?

"Cooperative research is the partnership between the fishing industry and the science community. We work together to improve our understanding of ocean ecosystems and support sustainable fisheries management. "



NEFSC Cooperative Research Branch

Long Term Programs (10+ years):

- Gulf of Maine Bottom Longline Survey
- Study Fleet
- Industry Based Biological Sampling Program (InBios)
- Environmental Monitors on Lobster Traps and Large Trawlers (eMOLT)

New Initiatives:

- Pilot Hook and Line Survey
- Offshore Wind Impacts on Fishing Operations
- Shortfin Squid Electronic Size Monitoring Project (ILXSM)
- Longfin Squid Biological Sampling Program (SQUIBS)
- Oceanographic Drivers of Shortfin Squid
- Recreational Biological Sampling Program (RecBio)
- Monitoring Scallop Disease and Reproduction (ScallApp)
- Northeast Cooperative Research Summits

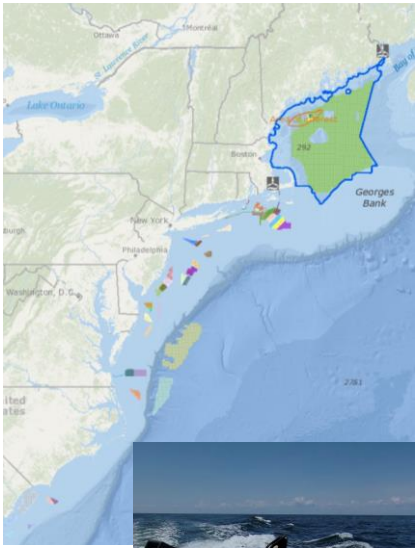
Pilot Hook and Line Survey

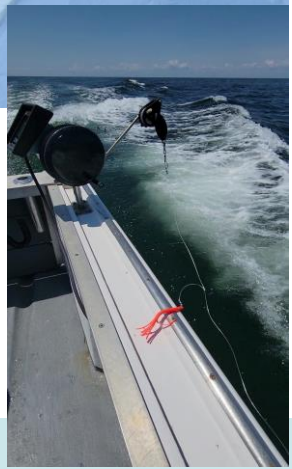
Industry Partners: 3 commercial hook/line or charter vessels

Goal: Develop and test the methodology for a new hook and line survey that can be safely deployed in any habitat type and alongside offshore wind turbines and provide data continuity for resources species in the Northeast region

Approach:

- Develop and document draft survey plan as part of the NEFSC's offshore wind survey mitigation initiative
- Refine survey design, gear, operations and protocols in partnership with fishing and science communities
  - 9 workshops in November/December 2023
  - https://www.fisheries.noaa.gov/event/pilot-hook-and-line-survey-workshop-series
- Conduct pilot hook and line survey in the Gulf of Maine, Southern New England, and Mid-Atlantic in spring 2024
- Review operational success and challenges, analyze data to assess selectivity of gear, and identify necessary modifications to achieve survey goals





Impacts of Offshore Wind Energy Development on Fishing Operations

Partners: UMass SMAST, Study Fleet captains, GARFO
Goal: Use Study Fleet data to improve the quantification of fishing footprints and impacts of offshore wind energy development

Approach:

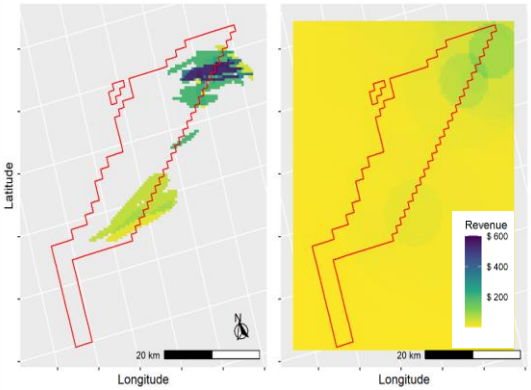
- Measure intersections of Study Fleet fishing footprints and wind farms to quantify economic exposure of longfin squid fishery
- Compare to fishing and wind farm intersections and revenue derived using coarse logbook footprints

Results:

- Study Fleet data can be used to improve economic explore estimates for the longfin squid fishery, which are underestimated by logbook data
- *Allen-Jacobson et al. 2023. Spatial analysis of fishing tows to inform offshore wind layouts. Marine & Coastal Fisheries*
- New postdoc will focus on expanding analyses to the summer flounder fishery and integrating VMS data

Study Fleet Footprint

Logbook (VTR) Footprint



Shortfin Squid Electronic Size Monitoring Pilot Project

Partners: Lunds Fisheries, Sea Freeze Shoreside, Sea Freeze LTD, The Town Dock/Norpel, Amory Seafood

Goals:

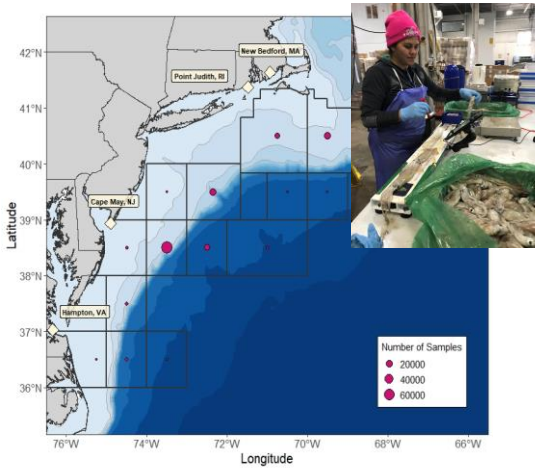
- Produce a standardized data stream of paired Illex mantle lengths and gram weights to better understand the fishery and population structure

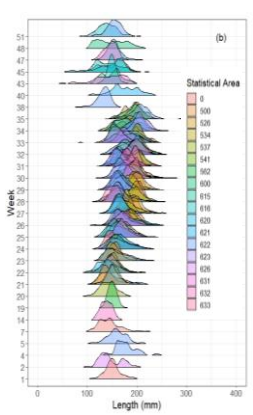
Approach:

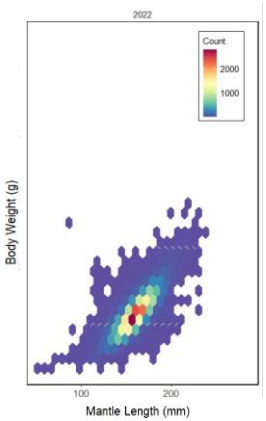
- Develop electronic size monitoring technology (BLISS app, BigFin measuring boards, Marel scales)
- Train Illex processors to use equipment
- Processor staff independently collect data throughout fishing season and submit data to NEFSC databases
- Audit and match ILXSM data to VTR data

Products:

- >33,000 Illex lengths and weights collected in 2023
- Technical Memorandum: *Mercer et al. 2023. Design, Implementation, and Results of a Collaborative Shortfin Squid (Illex illecebrosus) Electronic Size Monitoring Pilot Project.*
- Produced training and tech support videos in Spanish and English
- Developed interactive data visualization tool
- Paired ILXSM data with oceanographic data to ID environmental drivers
- Refined ILXSM technology for longfin squid and haddock sampling







Longfin Squid Biological Sampling Program (SQUIBS)

Partners: MAFMC, Over 10 F/Vs

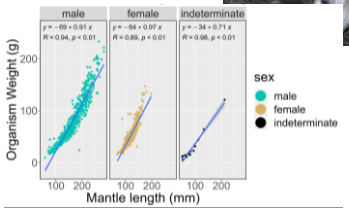
Goal: Advance understanding of longfin squid life history and provide data to support the 2026 longfin research track stock assessment.

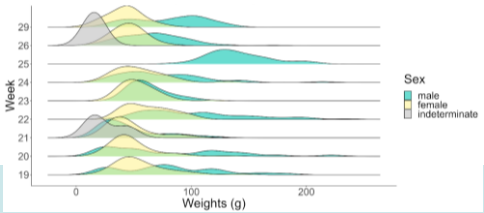
Approach:

- InBios team collects 300 longfin squid from fishing vessels at ports throughout MA, RI, and NJ every week
- Technicians collect biological data from longfin squid using an electronic data collection system
  - Mantle length, mantle width, weight, nidamental gland length, testes length, accessory gland length, spermatophore length, eggs quantity
- Technicians extract and store statoliths (squid age structures) for aging

Products:

- Modified ILXSM system for longfin squid biological sampling
- Developed detailed documentation of dissection and analysis process
- Sampled over 5,300 squid from May-September 2023
- Shipped statoliths to Spain to be aged
- Data provided for length-based assessment model for longfin squid (Collaboration with UMCES, VIMS, Lunds Fisheries, The Town Dock, Sea Fresh USA, Sea Freeze)





Oceanographic Drivers of Northern Shortfin Squid

Partners: UMass SMAST, WHOI, CFRF, F/V Dyrsten, dozens of industry members (processors, fishermen)

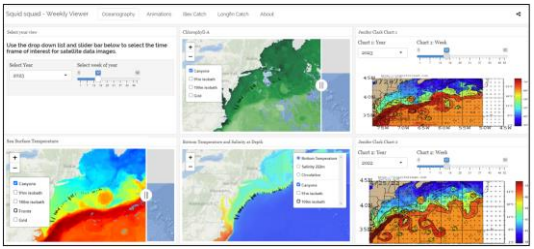
Goal: Combine industry and scientific expertise to better understand the oceanographic drivers and fishery dynamics of northern shortfin squid

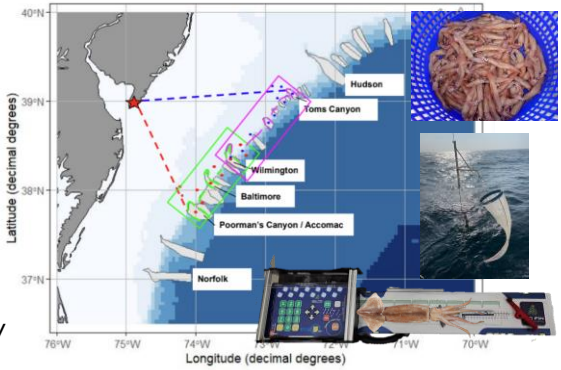
Approach:

- Weekly meetings with industry and science partners to discuss current oceanographic conditions and fishery dynamics
- Research cruise on F/V Dyrsten to map oceanographic conditions in and around squid fishing grounds
- Standardized bottom trawls, biological sampling (size, maturity, genetics), CTD casts, plankton tows, acoustics

Products:

- Website to track weekly oceanographic and fishery conditions: https://connect.fisheries.noaa.gov/content/bbd89359-6376-42cf-8d3d-6300f4c5b454/#section-oceanography
- *Salois et al. 2023. Shelf break exchange processes influence the availability of the northern shortfin squid, Illex illecebrosus, in the Northwest Atlantic. Fisheries Oceanography, 1–18*
- *Mercer et al. 2023. Bringing in the experts: application of industry knowledge to advance catch rate standardization for northern shortfin squid (Illex illecebrosus). Front Mar Sci 10:1144108*
- Data and results from research cruise F/V Dyrsten – coming soon!





Recreational Biological Sampling Program (RecBio)

Partners: Pelagic Strategies, Cabot Center for Ocean Life, Stellwagen Bank Party and Charter Boat Association, RI Party and Charter Boat Association

Goals:

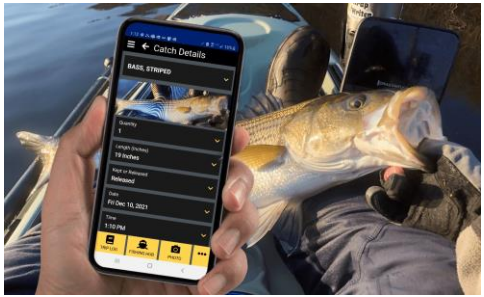
- Produce a standardized data stream of Atlantic cod lengths and ages to better characterize the catch from the recreational fishery for the stock assessment

Approach:

- Develop electronic tools to enable for-hire vessels to collect cod lengths and otoliths
- Train 10 vessels to use equipment and collect data
- Vessels independently collect length data and otoliths throughout fishing season
- Otoliths processed by NEFSC

Products:

- New software for biological data collection from recreational fisheries – modified Anglers Catch
- Data collection will begin in November 2023



Anderson Cabot Center for Ocean Life at the New England Aquarium

PELAGIC STRATEGIES

Collaborative Monitoring of Scallop Disease and Reproduction

Partners: Commercial Fisheries Research Foundation, 8 F/Vs

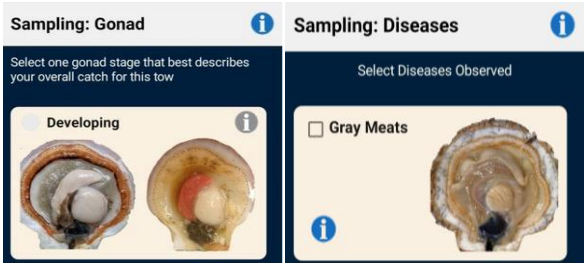
Goal: Pilot a collaborative approach to monitoring the distribution and incidence of Atlantic sea scallop disease and reproductive dynamics

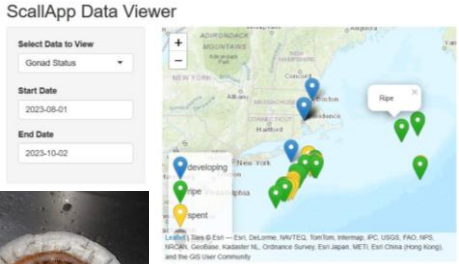
Approach:

- Develop software to enable fishermen to record observations of grey meat, nematodes, shell blister disease, and gonad state (using pictures)
- Develop relational database to receive and store data
- Beta test the app with three scallop fishermen

Results:

- New app (ScallApp) to enable fishermen to record the presence/absence of scallop disease and reproductive status
  - Available for iPhones and Android via App Store and Google Play Store
- Interactive map of distribution of grey meats, nematodes, shell disease, and reproductive status, as reported by fishermen
  - Currently only available to project team due to confidentiality of fishing locations



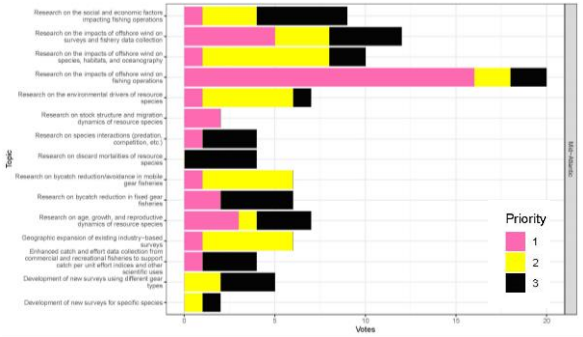


Northeast Cooperative Research Summits

- Mid-Atlantic Summit: Hampton, VA – January 31, 2023
- New England Summit: Providence, RI – February 15, 2023
- Format:
  - 10 minute research presentations
    - Industry questions/comments prioritized after each presentation
  - Topical breakout sessions with panels of industry members and scientists
    - Offshore wind/fisheries, Industry-based surveys, Conservation gear engineering, Stock assessments
  - Research prioritization exercise
  - Industry spotlights – Jimmy Ruhle, Dave Goethel
  - Poster and networking session
    - Equipment demonstrations
- Testimonials:
  - *"It was great to have a large turnout of industry, government agency staff, and researchers that allowed us to talk candidly about cooperative research."*
  - *"I was impressed by the number of commercial fishers in attendance and appreciated the input they provided."*
  - *"The breakouts were great because they provided an opportunity for attendees to share perspectives on important topics."*
  - *"There were open discussions to bridge the gap from the fishing industry to research and government"*
  - *"I appreciated the networking opportunities and the development of research opportunities to address current issues"*
- 2024 Northeast Cooperative Research Summit: New Jersey!

Northeast Cooperative Research Summits

- Mid-Atlantic Summit: Hampton, VA – January 31, 2023
- New England Summit: Providence, RI – February 15, 2023
- Format:
  - 10 minute research presentations
  - Topical breakout sessions with panels of industry members and scientists
  - Research prioritization exercise
  - Industry spotlights – Jimmy Ruhle, Dave Goethel
  - Poster and networking session
- Testimonials:
  - *"It was great to have a large turnout of industry, government agency staff, and researchers that allowed us to talk candidly about cooperative research."*
  - *"I was impressed by the number of commercial fishers in attendance and appreciated the input they provided."*
  - *"The breakouts were great because they provided an opportunity for attendees to share perspectives on important topics."*
  - *"I appreciated the networking opportunities and the development of research opportunities to address current issues"*
- Research Priorities (Mid-Atlantic)
  - Research on the impacts of offshore wind of fishing operations
  - Research on the impacts of offshore wind on surveys and fishery data collection
  - Research on the impacts of offshore wind on species, habitats, and oceanography
- 2024 Northeast Cooperative Research Summit: New Jersey!

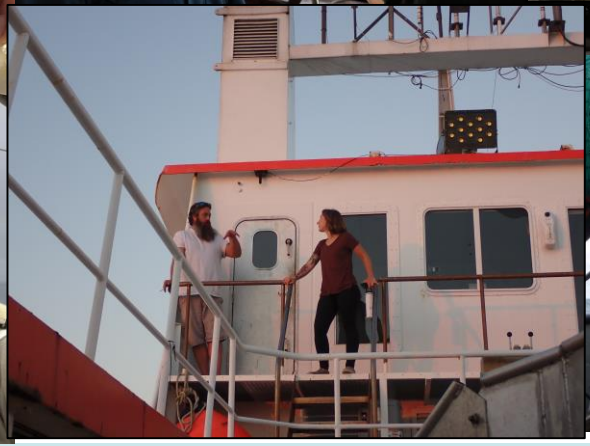


Many Partners in Cooperative Research

Questions?








Gulf of Maine Bottom Longline Survey

Industry Partners: F/V Mary Elizabeth, F/V Tenacious II

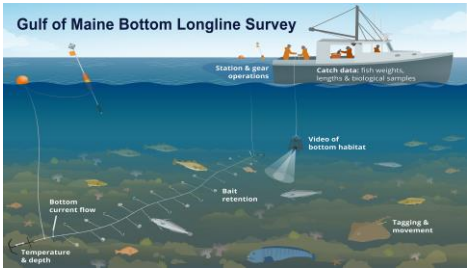
Goal: Provide data from areas/habitats not sampled by NEFSC trawl survey, focusing on data-poor species (halibut, thorny skate, cusk, wolffish) and groundfish (cod, haddock, hake, pollock)

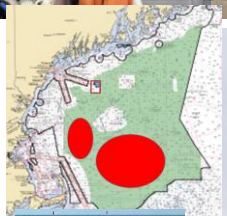
Approach: 45 random-stratified stations sampled (1000 hook tub-trawl bottom longlines) in spring & fall, coincident with trawl survey

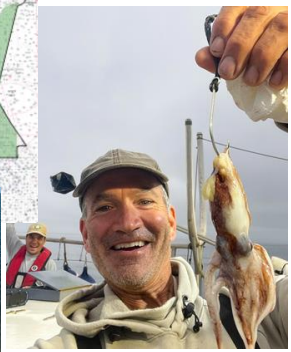
- Ecosystem Monitoring: Video survey for habitat classification, current measurements, temperature/depth

Products:

- Complete and on-time fall 2022 and spring 2023 surveys
  - New species – lamprey, sea pen, octopus
- Indices of abundance and biological data (age and maturity) for stock assessments (spiny dogfish, Atlantic cod, red hake, thorny skate, and barndoor skate in FY23)
- New electronic data collection system and database structure refined throughout 2023
- Communications – infographic, field blogs, feature stories, press (radio, print, digital)
- Survey mitigation plan for continuing operations as floating offshore wind energy is developed in the Gulf of Maine







Study Fleet

Industry Partners:

- 53 F/Vs currently involved in Study Fleet (contract/volunteer)

Goals:

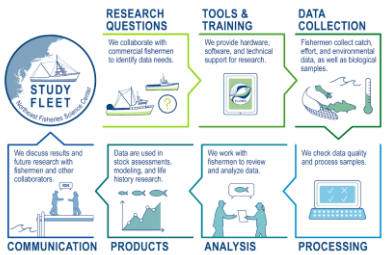
- Engage fishermen in collecting high resolution catch, effort, and environmental data to address science and management needs

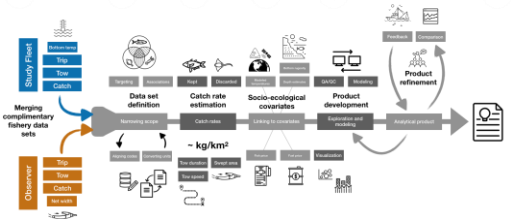
Approach:

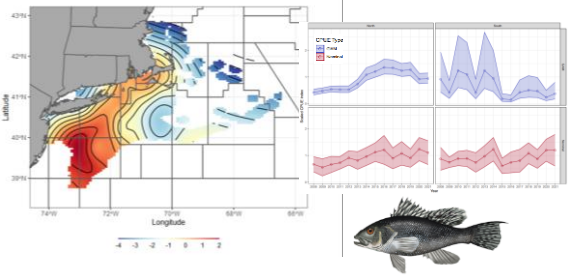
- Captains record detailed catch, effort, and environmental (temperature and depth) data during every gear haul using electronic data collection system installed by CRB staff

Products:

- Recruited 5 new vessels into Study Fleet
- Analysis of long-term Study Fleet participant data – identified changes in catch composition, fishing depth, and bottom temperature over time
- Developed standardized CPUE indices for spiny dogfish and black sea bass stock assessments
  - *Jones et al. In Prep. Combining sources of high-resolution fishery-dependent data from the northeast U.S. to develop a catch rate time series*
- Applied Study Fleet data to research on the oceanographic drivers of shortfin squid (Salois et al. 2023)
- Initiated knowledge-sharing with Norwegian Reference Fleet
- Initiated standardized testing of 3 different temperature-depth systems to inform future hardware investment.







Industry Based Biological Sampling Program (InBios)

Partners: VIMS, MADMF, Mount Holyoke, >50 F/Vs

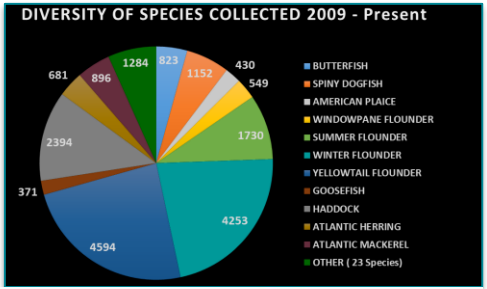
Goal: Collect fish from F/Vs for life history analysis (age, growth, maturity, reproduction, energetics) from times of year and areas not otherwise sampled

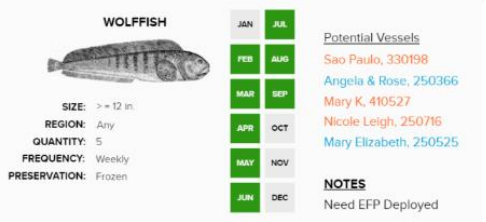
Approach:

- Identify sample needs from NEFSC/academic partners
- Coordinate collection of samples with F/Vs harvesting target species from the desired area and time of year
  - Dealer permit, EFP (for sub-legal specimens)
- 2023 Species: haddock, winter flounder, yellowtail flounder, American plaice, little skate, winter skate, spiny dogfish, Atlantic herring, shortfin squid, longfin squid, wolffish, porbeagle shark.

Results:

- Over 5,500 specimens collected in FY22 (quadruple the amount of samples collected in previous years!)
- Contributed to research on wolffish osteology and systematics, haddock fecundity and energetics, herring genetics and spawning patterns, shark age, growth, and trophic ecology, winter and yellowtail flounder reproduction and energetics, American plaice stock structure and reproduction, skate and dogfish clasper morphology, and squid life history and trophic ecology





Environmental Monitors on Lobster Traps and Large Trawlers

Goal:

- Work with fishermen to collect in situ bottom water temperature data to inform oceanographic models

Industry Partners:

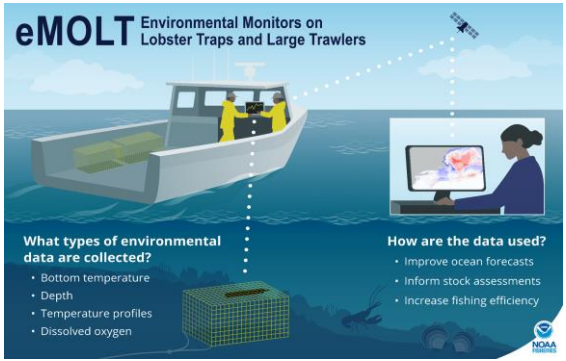
- 96 F/Vs deploy temperature probes on fishing gear

Approach:

- Data collection systems installed on eMOLT F/Vs
  - Temperature probe (Vemco, Lowell, Moana)
  - Deck box that enables fishermen to view bottom temperatures in real time
- Data transmitted to NEFSC via satellite, WIFI, or cellular

Products:

- Expansion of eMOLT by 15 vessels in the Gulf of Maine
- New sensors that enable profiling of water column (Moana)
- New remote access to eMOLT systems on F/Vs for efficient technical support
- New standardized deck boxes with enhanced visualizations
- New initiative to monitor dissolved oxygen in Cape Cod Bay using eMOLT approach (MA DMF collaboration)
- Input to oceanographic models (FVCOM, GoMOFS)
- International collaboration through the Fishing Vessel Ocean Observing Network to standardize data QA/QC, database infrastructure, and instrument testing



2023-09-15 12:01