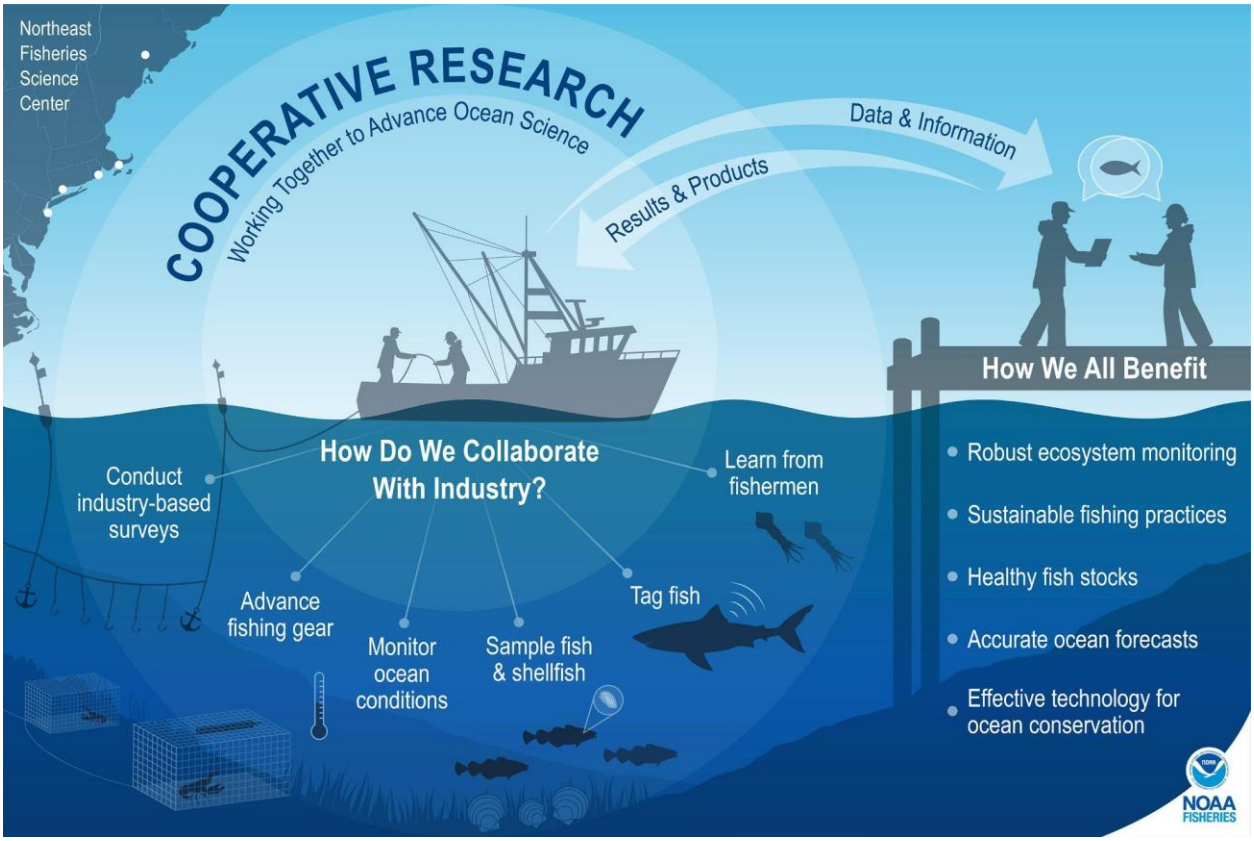
Summary and Proceedings of the 2023 Northeast Cooperative Research Summits



NOAA FISHERIES

National Marine Fisheries Service

Northeast Fisheries Science Center

Table of Contents

EXECUTIVE SUMMARY

The Northeast Fisheries Science Center's (NEFSC) Cooperative Research Branch developed the Northeast Cooperative Research Summits to foster regional coordination of cooperative research and develop new partnerships between the science and fishing communities. The 2023 Northeast Cooperative Research Summits were held in Newport News, Virginia and Providence, Rhode Island in winter 2023. An additional session was held at the Maine Fishermen's Forum in Rockland, Maine.

The goals of the Northeast Cooperative Research Summits were to share ongoing cooperative research efforts, discuss lessons learned, identify research priorities, and develop new relationships between the fishing and science communities. Agenda items included industry highlights, research presentations, breakout discussions, a research prioritization exercise, and a networking and poster session. Breakout discussions focused on 1) integrating cooperative research in stock assessments, 2) the past, present, and future of industry-based surveys, 3) the

role of cooperative research in offshore wind energy development, and 4) engaging industry in conservation gear engineering.

Over 250 industry members, scientists, managers, and other stakeholders attended the 2023 Northeast Cooperative Research Summits. Of these participants, approximately 30% were industry members, 30% were researchers, 25% were government scientists or managers, and 15% were other interested parties, including representatives from non-governmental organizations and offshore wind companies.

Through the research prioritization exercise, participants in the Northeast Cooperative Research Summits consistently identified understanding the impacts of offshore wind energy development on the marine environment and fishing community as the top research priorities. These results highlight the pressing need for more research on the interaction between offshore wind and fisheries, given the fast pace and large scale of offshore wind energy development in the Northeast region. There was also region-wide consistency in prioritization of ecosystem research and biological research that leverages the expertise of the science and fishing communities. Other research priorities varied between the Mid-Atlantic, New England, and northern New England regions and were reflective of the unique scientific questions and challenges facing each area.

Feedback from participants indicates that the 2023 Northeast Cooperative Research Summits were successful at facilitating knowledge-sharing and relationship-building for scientists and fishermen in the northeast. Participants were particularly complementary of the level of industry engagement, diversity of research shared, opportunity to contribute to research prioritization, and opportunities for small group discussions about urgent research topics.

Given the success of the 2023 Northeast Cooperative Research Summits, the NEFSC Cooperative Research Branch will annually host one Northeast Cooperative Research Summit, with the location rotating among states. The 2024 Northeast Cooperative Research Summit will be held in Cape May, New Jersey.

BACKGROUND AND PURPOSE

The Northeast Cooperative Research Summits are a direct result of the input and recommendations gathered during a series of Stakeholder Engagement Sessions in 2019. These Stakeholder Engagement Sessions, hosted by the NEFSC's Cooperative Research Branch (CRB), brought together the fishing and science communities to discuss research ideas and priorities for future projects, and to share past research successes and lessons learned. One priority that emerged from the Stakeholder Engagement Sessions was a need to facilitate regional coordination of cooperative research and the development of new partnerships. The NEFSC CRB developed the Northeast Cooperative Research Summits (hereafter 'the Summits') in response to this demand, and to serve as a step toward a cohesive vision and path for cooperative research in the northeast region.

The goal of the 2023 Summits was to enhance communication, collaboration, and connection between the fishing and science communities. Specifically, the Summits sought to bring together scientists, managers, and members of the fishing community to communicate and coordinate the variety of cooperative fisheries research being conducted in the northeast region, identify opportunities for enhanced industry involvement, and outline best practices for applying cooperative research results to science and management. Agenda items for the 2023 Northeast Cooperative Research Summits included presentations from researchers and members of the fishing community, breakout group discussions, and a poster and networking session. Active participation by the fishing industry was prioritized throughout the Summits, including during question and answer sessions following research presentations, as panelists and participants in breakout discussions, and through presentations from fishermen who have contributed significantly to cooperative research throughout their careers.

Figure 1. Group photo of Mid-Atlantic Cooperative Research Summit participants.

Figure 2. Group photo of New England Cooperative Research Summit participants.

SUMMIT PROCEEDINGS

The Northeast Cooperative Research Summits were designed to share ongoing cooperative research efforts, discuss lessons learned, identify research priorities, and develop new relationships between the fishing and science communities. The northeast US is a large region with diverse fisheries and stakeholders. To effectively reach stakeholders across this broad region, two in-person Summits were held: one in the Mid-Atlantic (Virginia) and one in New England (Rhode Island). Both the Mid-Atlantic Cooperative Research Summit and New England Cooperative Research Summit followed the same format, described below. The session at the Maine Fishermen's Forum focused on discussion of research priorities.

- Research Presentations and Discussions
- Breakout Discussions
- Research Prioritization Exercise
- Networking and Poster Session

A primary goal of the Summits was to elevate the role of fishermen in the scientific process and to open lines of communication between the science and fishing communities. To support this goal, comments, perspectives, and questions from fishing industry members were prioritized following each research presentation and throughout breakout discussions. Furthermore, all breakout session panels included members of the fishing industry. Each Summit had opening and closing remarks from leadership in the Northeast Fisheries Science Center's Cooperative Research Branch (Dr. Anna Mercer) and the fishing industry (Captain Jimmy Ruhle, F/V Darana R, Wanchese, NC; and Captain David Goethel, F/V Ellen Diane, Hampton, NH).

Oral presentation abstracts from the Mid-Atlantic Cooperative Research Summit are available in Appendix I. Poster presentation abstracts from the Mid-Atlantic Cooperative Research Summit

are available in Appendix II. Oral presentation abstracts from the New England Cooperative Research Summit are available in Appendix III. Poster presentation abstracts from the New England Cooperative Research Summit are available in Appendix IV.

Figure 3. Jimmy Ruhle (F/V Darana R, Wanchese, NC) providing a history on his involvement in cooperative research for the "Industry Highlight" at the Mid-Atlantic Cooperative Research Summit.

Figure 4. Poster and networking session at the New England Cooperative Research Summit.

BREAKOUT DISCUSSIONS

The Role of Cooperative Research in Offshore Wind Energy Development

Offshore wind energy development is advancing rapidly in the Northeast region, with over 18 million acres planned for development. Diverse research is needed to understand the impact of offshore wind energy development on the marine ecosystem, resources, species, and the fishing industry. This breakout session focused on discussing the role of cooperative research in addressing the science needs surrounding offshore wind energy development.

Mid-Atlantic Cooperative Research Summit Panelists:

- Andy Lipsky, Offshore Wind Ecology Branch, Northeast Fisheries Science Center
- Daphne Monroe, Rutgers University
- Kevin Wark, F/V Dana Christine II, Barnegat Light, NJ
- Rick Bellavance, Priority Charters, Point Judith, RI
- Robert Ruhle, F/V Darana R, Wanchese, NC

New England Cooperative Research Summit Panelists:

- Andy Lipsky, Offshore Wind Ecology Branch, Northeast Fisheries Science Center
- David Bethoney, Commercial Fisheries Research Foundation
- Fiona Hogan, Responsible Offshore Development Alliance
- Meghan Lapp, Sea Freeze Ltd.

Discussion Summary:
Panelists and participants identified the following top priorities for offshore wind and fisheries science: engaging with the fishing community on research early and often; prioritizing collection of baseline data (more than three years before construction) to enable quantification of environmental change in lease areas; developing and implementing sound, repeatable survey designs; practicing active listening across sectors; identifying actionable solutions; coordinating and standardizing data collection across the region (monitoring is important but there is a need for coordination across projects and states); developing tools for survey standardization such as a bottom-trawl restrictor rope; ensuring open sharing of data; engaging fishermen to fill data gaps introduced by offshore wind; and striving for coherent standards and methodologies for offshore wind surveys and research.

Panlists and participants identified opportunities for fishermen to get involved in research related to offshore wind and fisheries including surveys, cable burial projects, fishing gear technology advancements to safely fish in wind areas, protected species monitoring, and sharing of ecological knowledge about the environment.

Panelists and participants noted the following key concerns and challenges related to offshore wind energy development: the pace of development not allowing time for sound science; slow and onerous permitting process for research due to potential protected species interactions; burdensome safety regulations required by developers; inconsistencies between surveys occurring in different lease areas; limited data sharing; high uncertainty surrounding impact of offshore wind on survey and fishery data that inform stock assessments; lack of implementable solutions for survey mitigation and compensatory mitigation; boulder relocation; inefficient gear loss claim processes; and lack of lower trophic level monitoring (phytoplankton, zooplankton, and larval fish).

"There's no time, we don't have it – we're not getting baseline data and are many years behind. Projects are starting soon and we need to move faster and we need standardization across the board." - Robert Ruhle, F/V Darana R

"I know offshore wind is here to stay. But we need to do it with good, sound science and with all the players involved." - Fred Mattera, Commercial Fisheries Center of Rhode Island

Figure 5. From left to right, Giovanni Gianesin (NEFSC - moderator), Andy Lipsky (NEFSC), Rick Bellevance (Priority Charters), Robert Ruhle (F/V Darana R), Daphne Monroe (Rutgers University), Kevin Wark (F/V Dana Christine) participating in the "The Role of Cooperative Research in Offshore Wind Energy Development" breakout discussion at the Mid-Atlantic Cooperative Research Summit.

The Past, Present and Future of Industry-Based Surveys in the Northeast Region

This breakout session focused on the opportunities for industry-based surveys to meet the expanding scientific data needs in the Northeast region. Industry-based surveys are a valuable tool for understanding long-term trends in the distribution, abundance, and biomass of resource species. Fishermen offer expertise in operating survey gear and navigating the challenges of working on the water, which is extremely beneficial to survey operations. Furthermore, involving fishermen in collecting survey data, which are an important component of many stock assessments, builds confidence in the quality of both data inputs and greater trust in the resulting assessment outputs.

Mid-Atlantic Cooperative Research Summit Panelists:

- Jim Gartland, Virginia Institute of Marine Science
- Jimmy Ruhle, F/V Darana R, Wanchese, NC
- Sally Roman, Virginia Institute of Marine Science
- Dave McElroy, Cooperative Research Branch, Northeast Fisheries Science Center
- Mike Cox, F/V Miss Madeline, Cape May, NJ
- Rob Jarmol, F/V Christy, Atlantic City, NJ

New England Cooperative Research Summit Panelists:

- Dave McElroy, Cooperative Research Branch, Northeast Fisheries Science Center
- Eric Hesse, F/V Tenacious II, Barnstable, MA
- Paul McCluskey, Cooperative Research Program, Alaska Fisheries Science Center
- Rebecca Peters, Maine Department of Marine Resources

Discussion Summary:

Panelists and participants highlighted successful industry based surveys in the northeast, including the Northeast Monitoring and Assessment Program Inshore Trawl Survey, the Gulf of Maine Bottom Longline Survey, RSA supported scallop dredge and drop camera surveys (VIMS, SMAST, CFF), the Maine-New Hampshire Trawl Survey, and the Eastern Gulf of Maine Sentinel Survey. All of these surveys are unique in their design and geographic footprint, but share a cornerstone of industry partnership. It was noted that all fishery surveys in Alaska are conducted in collaboration with commercial fishing vessels, including trawl and longline surveys. Industry-based surveys in Alaska were critical in documenting the Pacific cod collapse, with industry partners trusting the data and trends from the survey, even providing observations from fishing saying “Your data matches what we are seeing. We are not seeing cod”. The Alaskan and Northeast region examples highlighted the many benefits to industry based surveys, including increased understanding of the scientific process, trust in the data and the stock assessments they support, and financial recognition of the industry’s contributions to science.

The critical components of industry based surveys that were highlighted during this breakout session included involvement of industry partners early in the process (as early as survey design); development of two-way trust between the industry and science teams; sharing of data with industry partners, stock assessors, and the public; and communication of data applications and impacts. Reliable funding for industry-based surveys was also highlighted as critical, with the scallop Research Set Aside (RSA) program providing an example of consistent funding for industry based surveys conducted by a wide variety of groups.

Participants suggested new industry-based surveys for areas and species that are poorly sampled by existing surveys, including a longline survey for Atlantic halibut, a longline survey for golden tilefish, and a trawl survey in the Nantucket shoals region to serve as a bridge between Mid-Atlantic and New England species. The idea that survey footprints may need to be modified as climate impacts species distributions, especially as southern species shift or extend their range northward, was also discussed. Participants also suggested that piloting survey gear types, such as fish pots and hook and line, would be valuable within and around offshore wind energy areas. Coordinating and standardizing between surveys was noted as an ongoing challenge, especially as new surveys are developed for specific offshore wind areas.

"The motivation for industry to participate in surveys isn't just the money. It helps improve understanding of the science, trust in it, and see the long term value of participating in it." - *Eric Hesse, F/V Tenacious II*

"In order to be successful, industry involvement needs to be included at the onset. Pilot years are necessary to get the input and involvement." - *Jim Gartland, Virginia Institute of Marine Science*

"Everyone has to prove themselves. Finding the right people that bring expertise, open minds, and respect to a survey will ultimately yield a better product. Resistance between the industry and scientists can be aided by finding the right people." - *Jimmy Ruhle, F/V Darana R*

Figure 6. From left to right, Kathryn Ford (NEFSC - moderator), Rebecca Peters (ME DMR), Paul McClusky (AFSC), Dave McElroy (NEFSC), and Eric Hesse (F/V Tenacious II) participating in "The Past, Present and Future of Industry-Based Surveys in the Northeast Region" breakout discussion at the New England Cooperative Research Summit.

Integrating Cooperative Research in Stock Assessments

Stock assessments integrate fishery, survey, and biological data to track and predict changes in the abundance of resource species over time. Some of the data required for stock assessments can be contributed through cooperative research, which includes but is not limited to data from industry-based surveys, high resolution fishery data, and discard mortality estimates. This breakout session focused on opportunities and challenges commonly encountered when applying cooperative research data to stock assessments. Specific examples of cooperative research applications in stock assessments were shared, and best practices were discussed.

New England Cooperative Research Summit Panelists:

- Alan Eagles, F/V Catherine Ann, Newport, RI
- Conor McManus, Rhode Island Department of Environmental Management
- David Goethel, F/V Ellen Diane, Hampton, NH
- Larry Alade, Population Dynamics Branch, Northeast Fisheries Science Center
- Steve Cadrin, University of Massachusetts Dartmouth, School for Marine Science and Technology

Discussion Summary:
Panelists provided examples that highlight how cooperative research can and has been used to improve stock assessments including: Using cooperative cod tagging data to define new stock boundaries for Atlantic cod; using cooperative research data to justify differences in the fishery and survey selectivity of Atlantic mackerel in the stock assessment; and using industry-based

survey data as indices of abundance in stock assessments (e.g., NEAMAP, scallop dredge and dropcam surveys, Gulf of Maine Bottom Bottom Longline Survey, ME-NH trawl survey). The discussion highlighted that cooperative research plays a unique role in filling data gaps in space and time. For example, fishermen participating in the Lobster and Jonah Crab Research Fleet provide biological data on lobsters from areas that are otherwise unsampled. The discussion also emphasized the role of cooperative research in advancing ecosystem inputs for assessments, including industry-based monitoring of oceanographic conditions and species distribution and biology. It was noted that the Northeast Trawl Advisory Panel is actively working to evaluate existing surveys and develop novel survey designs to meet emerging needs as climate and ocean uses change.

This breakout session also included a robust discussion of the role that recreational fishing data play in stock assessments, and what can be done to increase its use in stock assessments. It was recognized that recreational fishermen are a large and diverse group that could have greater involvement in cooperative research. Suggestions for increasing industry participation in cooperative research included training recreational fishermen to collect biological data from their catch and discards, and developing standardized electronic tools for recreational fishermen to collect data and report catch. Specifically, it was suggested that new tools that enable recreational fishermen to record data while fishing could provide a way to be responsive to their perspectives. The discussion highlighted critical information recreational fisherman or charter boat captains could collect that would be useful for stock assessments including length, age, catch, and discard data. Specifically, more length and age data from fish that are retained and discarded in the recreational fishery are critically needed for many stock assessments. It was noted that new sources of length and age data are readily integrated into management track stock assessments.

Finally, the challenges related to applying cooperative research data and results to stock assessments were discussed. The discussion highlighted that there is cultural resistance to novel data, but that considering diverse data sets is critical to producing the best available science. Participants noted that there are ongoing challenges related to perceptions of the quality and representativeness of data collected through cooperative research projects. Specifically, data that is collected opportunistically (versus using a scientific design) is more challenging to use in stock assessments due to concerns about consistency and potential bias. It was specifically noted that the spatial scope of the data collected by cooperative research needs to be appropriate to the scale of the stock so that the data will not bias the assessment. One note from the discussion was that high-resolution cooperative research data, such as that produced by Study Fleets and Research Fleets, is helpful for assessing representativeness and potential for bias. Thoughtful sampling design, efficient data collection, rigorous data auditing, and prompt data access are critical for getting cooperative research data and results used in stock assessments. Understanding what data is needed for stock assessments prior to collecting it is essential, as is standardizing data as much as possible. Including all necessary people and expertise in the initial study design and setting reasonable expectations are also key to cooperative research success and use in stock assessments. The discussion concluded with a recognition of the importance of two-

way communication and data sharing between fishermen and scientists in all research partnerships.

"We must understand what data are needed prior to collecting it; a standardized data form should be used so that collected data is usable." - David Goethel, F/V Ellen Diane

"Cooperative research helps fill in critical data gaps that agencies are not able to." - Conor McManus, Rhode Island Department of Environmental Management

"Fishermen can provide information on a species that scientists do not have access to, such as reproductive condition and shell disease progression in lobsters." - Alan Eagles, F/V Catherine Ann

"The spatial scope of the data needs to be appropriate so that the data will not bias the assessment." - Larry Alade, Stock Assessment Scientist, Northeast Fisheries Science Center

Figure 7. From left to right, Alan Eagles (F/V Catherine Ann), Conor McManus (RI DEM), Steve Cadrin (UMassD SMAST), Larry Alade (NEFSC), and David Goethel (F/V Ellen Diane) participating in the "Integrating Cooperative Research in Stock Assessments" breakout discussion at the New England Cooperative Research Summit.

Fishing Smarter Not Harder: Engaging Industry in Conservation Gear Engineering

Over the years, scientists and fishermen have developed a unique partnership to develop

modifications to fishing gear that increase harvest efficiency, reduce unwanted bycatch, avoid choke species, and minimize habitat disturbance. Bycatch hotspot mapping initiatives have also leveraged fishermen's on-the-water observations to minimize interactions with species of concern. This breakout session discussed the current priorities for conservation gear engineering as well as best practices for the development and adoption of modified fishing gear.

New England Cooperative Research Summit Panelists:

- David Chosid, Massachusetts Division of Marine Fisheries
- Emerson Hasbrouck, Cornell Cooperative Extension
- Eric Matzen, Protected Species Branch, Northeast Fisheries Science Center
- Jon Knight, Superior Trawl
- Mike Marchetti, F/V Mister G, Point Judith, RI

Discussion Summary:
The breakout session kicked off with panelists identifying examples of conservation gear engineering research that was deemed successful, with focus on adoption by the commercial fishing fleet. One example discussed was research on large mesh belly panels, which have been effective at reducing the number of non-targeted species. The large mesh belly panel is now an approved gear type by the National Marine Fisheries Service (NMFS) and there are voucher programs that have allowed fishermen to install large mesh belly panels at no cost. Similarly, the Eliminator Net was developed by a team of scientists and fishermen to reduce the bycatch of cod in the haddock fishery, and achieved NMFS approval. It was noted that many scallop gear modifications have been developed and tested through the scallop RSA program, including but not limited to turtle deflector dredges, lower profile dredges, and dredges with modified ring sizes. In the whelk fishery, research on modifications of vent sizes have demonstrated effective techniques for allowing undersized whelks to escape from whelk traps. Across the examples provided, a common challenge was voluntary adoption of the modified gear by the fishing fleet. Gear modifications that are initiated by fishermen have been the most widely adopted after their development. Regulatory actions to require the use of specific gear modifications (e.g. turtle excluder devices) have resulted in the greatest adoption of conservation gear engineering.

The process of developing modified gears was discussed at length. Participants highlighted the value of informal tinkering with gear to develop and refine ideas before submitting proposals for funding. Once ideas are well formed, pilot studies of lower scale and cost are often conducted. If warranted, full scale proposals and testing are then pursued. Due to the lengthy and costly nature of this process, a small portion of gear modifications are fully vetted and made available to the industry. It was noted that it is important to track conservation engineering gear when and how it is used in the fishery for the purpose of identifying opportunities for further improvement.

The discussion concluded with participants highlighting new needs for conservation gear engineering. Emphasis was placed on the value of fishermen's ideas as the seeds that initiate successful conservation gear engineering projects. It was also noted that the development of offshore wind energy is going to exclude many traditional gear types and elevates the need for

development of novel gear designs. It will require creative thinking and research to develop techniques for fishing within wind energy areas that are safe and effective.

"I originally built nets to catch fish, now I surgically remove pieces of nets to not catch fish." - Jon Knight, Superior Trawl

"You need to have industry support to get buy-in to a new gear." - Mike Marchetti, F/V Mister G

Figure 8. From left to right, Eric Matzen (NESFC), David Chosid (MA DMF), Jon Knight (Superior Trawl), Emerson Hasbrouck (Cornell Cooperative Extension), and Mike Marchetti (F/V Mister G) participating in the "Fishing Smarter Not Harder: Engaging Industry in Conservation Gear Engineering" breakout discussion at the New England Cooperative Research Summit.

RESEARCH PRIORITIES

Description:
A research prioritization exercise was conducted during the 2023 Cooperative Research Summits to identify the top research priorities for cooperative research in the Mid-Atlantic and New England regions. A similar exercise was conducted during the Maine Fishermen's Forum, which characterized the research priorities for northern New England. During this exercise, each participant was asked to place color-coded stickers next to research topics that they identified as their first, second, and third priorities. Participants used different shape stickers to indicate whether they were industry members, scientists, or other stakeholders. The 15 research topics that participants selected their top three priorities from were as follows:

Fishery Dynamics

- Enhanced catch and effort data collection from commercial and recreational fisheries to support catch per unit effort indices and other scientific uses
- Research on the social and economic factors impacting fishing operations
- Research on discard mortalities of resource species

Conservation Gear Engineering

- Research on bycatch reduction/avoidance in mobile gear fisheries
- Research on bycatch reduction in fixed gear fisheries

Fishery Independent Surveys

- Geographic expansion of existing industry-based surveys
- Development of new surveys for specific species
- Development of new surveys using different gear types

Biological Research

- Research on age, growth, and reproductive dynamics of resource species
- Research on stock structure and migration dynamics of resource species

Offshore Wind and Fisheries Research

- Research on the impacts of offshore wind on fishing operations
- Research on the impacts of offshore wind on species, habitats, and oceanography
- Research on the impacts of offshore wind on surveys and fishery data collection

Ecosystem Research

- Research on the environmental drivers of resource species
- Research on species interactions (predation, competition, etc.)

Figure 9. Participants in the New England Cooperative Research Summit (left) and the Mid-Atlantic Cooperative Research Summit (right) cast their votes during the research prioritization exercise.

Results:

Across the northeast region, the top research priorities revolved around understanding the

impacts of offshore wind energy development on the marine environment and fishing community. These results highlight the need for more research in this area, given the fast pace and large scale of offshore wind energy development. There was also consistency in prioritization of ecosystem research and biological research across the northeast. Other research priorities varied between the Mid-Atlantic, New England, and northern New England regions.

Members of the fishing industry, members of the science community, and other stakeholders identified consistent research priorities in both the Mid-Atlantic and New England, but the specific rank prioritization varied slightly by group. In the Mid-Atlantic, the fishing industry clearly identified research on the impacts of offshore wind on fishing operations as the top priority, whereas scientists and other stakeholders identified a wider variety of research priorities. In New England, scientists and other stakeholders identified research on the environmental drivers of resource species as a higher priority, whereas the fishing industry identified research related to the impacts of offshore wind as a higher priority. There was general coherence, however, on which research topics are priorities within each region, as described below.

Mid-Atlantic:

Participants at the Mid-Atlantic Cooperative Research Summit clearly identified "research on the impacts of offshore wind on fishing operations" as the top priority (Figure 10). Other research topics that were identified as high priority included "research on the impact of offshore wind on survey and fishery data collection", "research on age, growth, and reproductive dynamics of resource species", "research on bycatch reduction in fixed gear fisheries", and "research on stock structure and migration dynamics of resources species". Themes that were consistently identified as second or third priority included "research on the impacts of offshore wind on species, habitats, and oceanography", "research on the social and economic factors impacting fishing operations", and "research on the environmental drivers of resource species" (Figure 10).

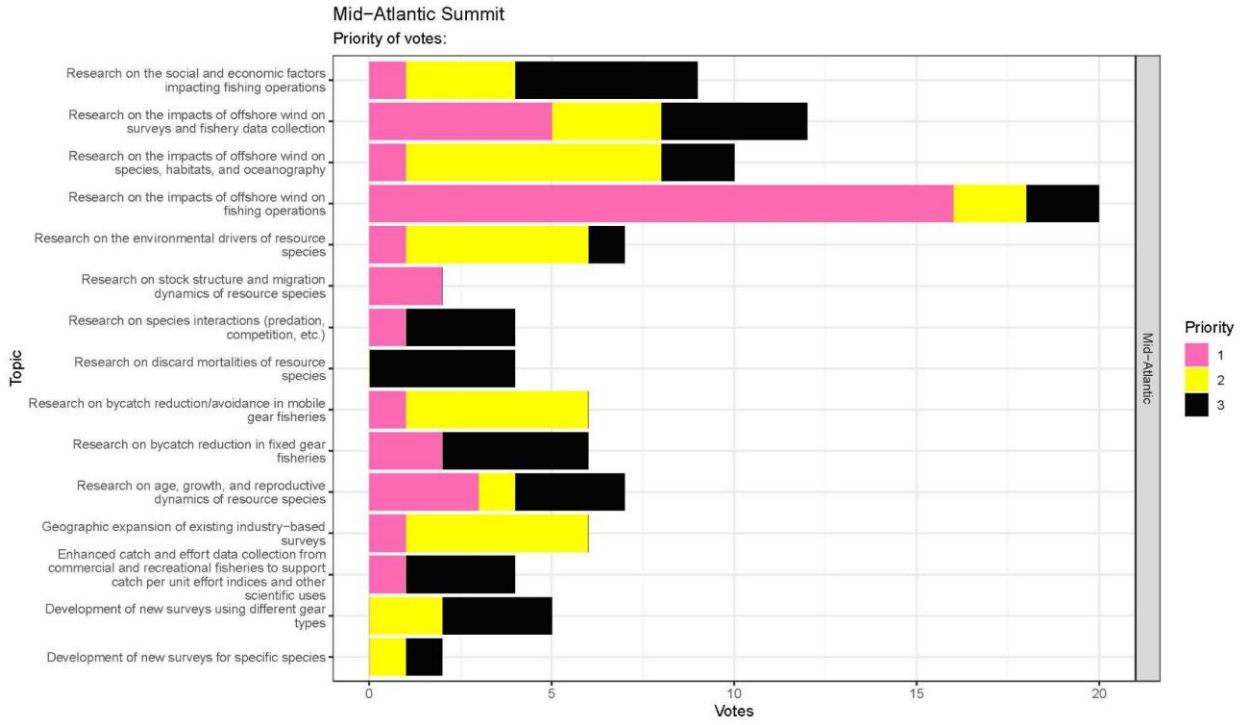


Figure 10. Tally of research prioritization votes at the 2023 Mid-Atlantic Cooperative Research Summit. Pink bars indicate the number of first priority votes for a given research topic. Yellow bars indicate the number of second priority votes for a given research topic. Black bars indicate the number of third priority votes for a given research topic.

New England:

Participants at the New England Cooperative Research Summit clearly identified "research on the impacts of offshore wind on species, habitat, and oceanography" as the top priority (Figure 11). Other research themes that were identified as high priority included "enhanced catch and effort data collection from commercial and recreational fisheries to support catch per unit effort indices and other scientific uses", "research on the environmental drivers of resource species", and "research on the impact of offshore wind on fishing operations". Themes that were consistently identified as second or third priority included "research on age, growth, and reproductive dynamics of resource species", "research on bycatch reduction/avoidance in mobile gear fisheries", "research on the social and economic factors impacting fishing operations", "research on the impacts of offshore wind on surveys and other fishery data collection", and "development of new surveys for specific species" (Figure 11)

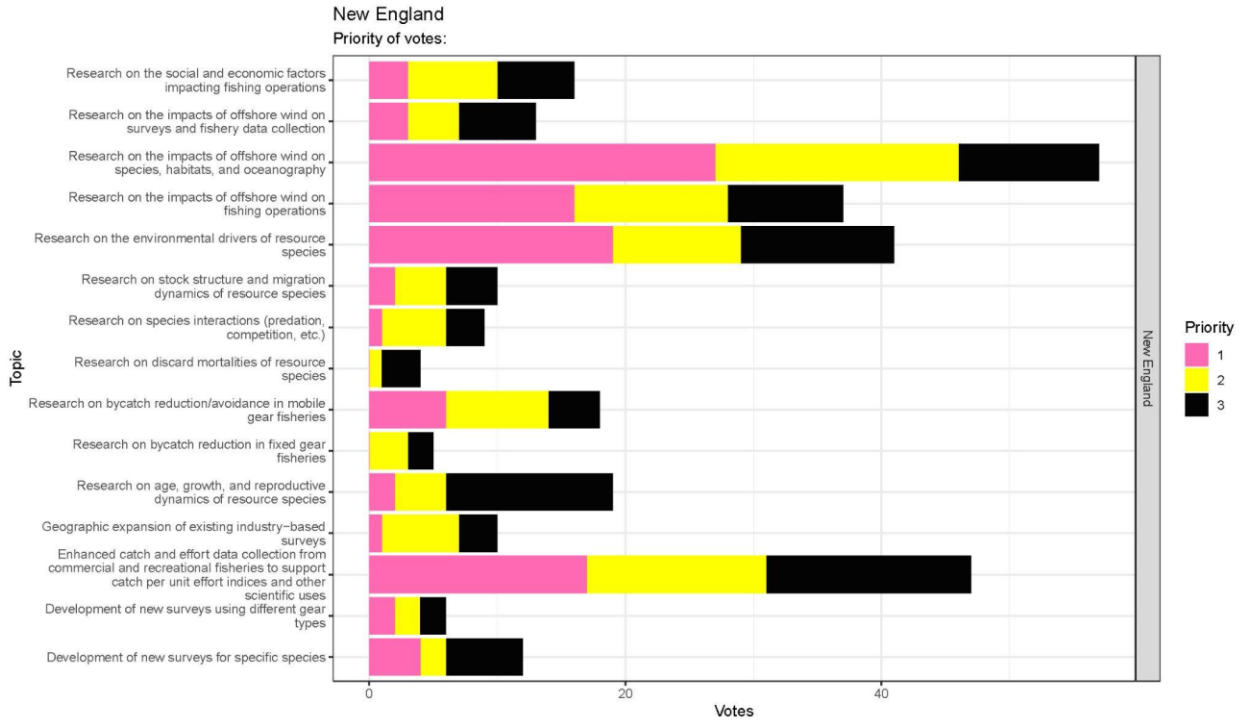


Figure 11. Tally of research prioritization votes at the 2023 New England Cooperative Research Summit. Pink bars indicate the number of first priority votes for a given research topic. Yellow bars indicate the number of second priority votes for a given research topic. Black bars indicate the number of third priority votes for a given research topic.

Northern New England:

Participants at the Maine Fishermen's Forum clearly identified "research on the social and economic factors impacting fishing operations" as the top priority (Figure 12). Other research themes that were identified as high priority included "research on the environmental drivers of resource species", "enhanced catch and effort data collection from commercial and recreational fisheries to support catch per unit effort indices and other scientific uses", "research on the impact of offshore wind on species, habitats, and oceanography", and "research on the impact of offshore wind on surveys and other fishery data collection". Themes that were consistently identified as second or third priority included "research on stock structure and migration dynamics of resource species", "geographic expansion of existing industry-based surveys", and "development of new surveys using different gear types" (Figure 12).

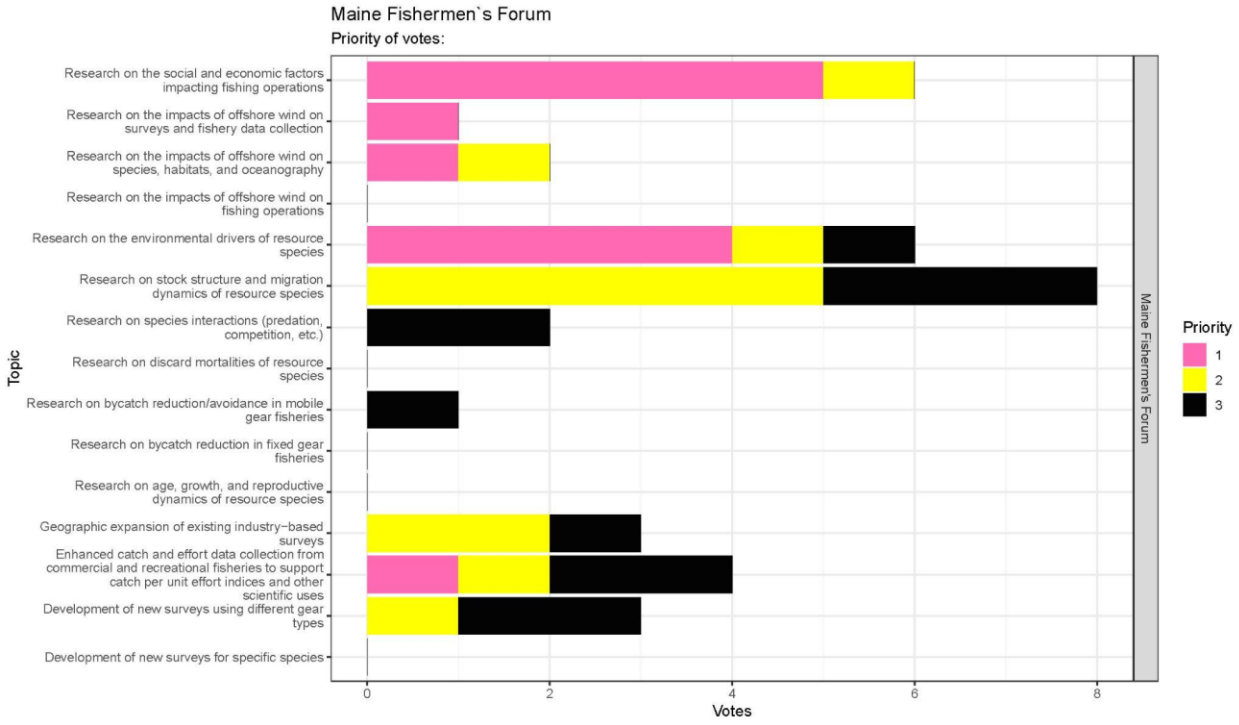


Figure 12. Tally of research prioritization votes at the 2023 Maine Fishermen's Forum. Pink bars indicate the number of first priority votes for a given research topic. Yellow bars indicate the number of second priority votes for a given research topic. Black bars indicate the number of third priority votes for a given research topic.

PARTICIPATION AND FEEDBACK

Collectively, over 250 stakeholders attended the Northeast Cooperative Research Summits in Providence, RI and Newport News, VA. Of these participants, approximately 30% were industry members, 30% were researchers, 25% were government scientists or managers, and 15% were other interested parties, including representatives from non-profit organizations and offshore wind companies.

Feedback provided by participants indicates that the 2023 Northeast Cooperative Research Summits were largely successful in achieving the goal of enhancing communication and coordination of cooperative research in the northeast region. When asked to rate the overall success of the Summits on a scale of 1 (poor/not successful) to 5 (excellent/very successful), 65% of participants ranked the Summits at a 5, 30% of participants ranked the Summits at a 4, 5% of participants ranked the Summits at a 3, and no one ranked the Summits at a 1 or 2.

When participants were asked how their knowledge/experience of cooperative research in the northeast changed due to their participation in the 2023 Northeast Cooperative Research Summits, 21% indicated a substantial increase, 46% indicated a moderate increase, 26% indicated a slight increase, and 8% indicated no increase.

Participants also expressed appreciation for the diversity of roles represented at the Summits, opportunities for informal interaction with industry members and researchers, the high level engagement of industry and all participants, the engaging format of the breakout discussions, and the focus on sharing comments and questions from members of the fishing industry. As one participant put it, the Summits gave them "a sense of hope".

A selection of testimonials from participants are provided below.

"The summits were super well organized, felt very inclusive and were extremely educational! I learned so much, felt comfortable approaching others and overall felt so inspired. It was such a great experience, I made some great connections and am excited for the next one!"

"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."

NEXT STEPS

Given the success of the 2023 Northeast Cooperative Research Summits, the NEFSC Cooperative Research Branch will annually host one Northeast Cooperative Research Summit, with the location rotating among states in the Northeast. The 2024 Northeast Cooperative Research Summit will be held in Cape May, New Jersey. Focusing on a single summit that rotates location each year will support continued coordination and communication across the northeast region.

APPENDIX I - MID-ATLANTIC COOPERATIVE RESEARCH SUMMIT ORAL PRESENTATION ABSTRACTS

Abstract #1
Title: Review of the VIMS Industry-Based Sea Scallop Dredge Surveys
Authors: Sally Roman and David Rudders
Affiliation: Virginia Institute of Marine Science
Contact: saroman@vims.edu
Abstract:
The Virginia Institute of Marine Science has been conducting cooperative industry-based sea scallop dredge surveys since the earAly 2000s, through funding provided by NOAA's Sea Scallop Research Set-Aside Program. Surveys are conducted onboard commercial sea scallop fishing vessels chartered as research platforms. Commercial crews are involved in all aspects of catch and biological sampling conducted during these surveys. The spatial scale of surveys has varied over the time period, depending on resource conditions and management measures. Since 2014, VIMS has surveyed the Mid-Atlantic Bight from the Virginia/North Carolina border to south of Block Island on an annual basis. The Nantucket Lightship and portions of Closed Area II have been surveyed annually since 2016, and beginning in 2018 an annual survey was also conducted in Closed Area I. Results from these surveys have been used for assessment and management of the resource. Annual data are combined with other sea scallop surveys to set annual specifications for the fishery, including total allowable catch limits, access to rotational access areas, and days-at-sea determination. Catch and biological data have also been included in sea scallop stock assessments as well as for other species of interest.

Abstract #2
Title: Using a collaborative framework to identify oceanographic indicators of *Illex illecebrosus*: Origination of the Squid Squad
Authors: Sarah Salois and Kim Hyde
Affiliation: Northeast Fisheries Science Center
Contact: sarah.salois@noaa.gov
Abstract:
Climate-driven variations in oceanic conditions can impact population dynamics of commercially important species, including *Illex illecebrosus*, a highly migratory species whose migration patterns are largely influenced by regional oceanography. The U.S. Illex fishery has high spatial and interannual variability, posing a particular set of challenges to the management and assessment of the species. Through interdisciplinary collaboration we developed conceptual and statistical models that identified important environmental variables to serve as oceanographic indicators of Illex availability. This team, affectionately referred to as the "Squid Squad" continues to work together sharing knowledge and developing lines of research. Our highly collaborative research team includes federal (NEFSC; GARFO), academic (Woods Hole Oceanographic Institute; University of Massachusetts), industry (fishing captains; processors), and management (MAFMC) partners. Together we are improving data collection and

visualization, analyzing biological and oceanographic data, developing models, creating platforms for tracking oceanographic conditions, and coordinating field sampling efforts between commercial fishing and research vessels. Recent successes include development of a collaborative framework for the identification of fine-scale oceanographic indicators for Illex, which can also be applied to other commercially important species. The U.S. Illex fishery serves as an example of the insights and understanding of a data-limited stock that is achievable through open collaboration and cooperative research.

Abstract #3
Title: Modeling Interactions Among Commercial Shellfish Fishing and Wind Energy - The Value of Co-Production and Fishery Data
Authors: Sarah Borsetti, Andrew S. Scheld, David Rudders, Daphne M. Munroe, Eric N. Powell, Molly Spencer, Stephanie Strom, Eileen E. Hofman, John M. Klinc
Affiliations: Virginia Institute of Marine Science; Rutgers University; University of Southern Mississippi; Old Dominion University
Contact: seborsetti@vims.edu
Abstract:
The lucrative shellfish fisheries operating on the Northeast U.S. continental shelf are highly vulnerable to impacts from offshore wind energy development because of the overlap of large areas proposed for wind energy and fishing grounds, limitations to access for bottom-tending gear towed by large vessels, and the high value of the landed product. The economic impacts of future offshore wind farms on these fisheries are evaluated using a modeling framework that integrates spatial dynamics in stock biology, fishery captain and fleet behavior, federal management decisions, and fishery economics. The simulations implemented with the model consider the impacts of proposed wind array configurations on the fisheries that result from anticipated vessel responses to array and turbine locations and responses of stock population dynamics to changing environmental conditions. Stock assessment data and detailed input from industry advisory teams about fleet and captain behavior constrain the simulations. Throughout model development, an industry advisory team provided advice and suggestions which informed model choices about how the captains and fleet managers will respond to turbine arrays, how the fishery may change in the future, and how those decisions translate to the economics of the fishery. The simulation results provide an understanding and identification of the costs to these shellfish fisheries produced by displacement or changes in fishing activity due to wind energy and a warming climate. This information is critical for industry and fishery managers to assess approaches for mitigating interactions between commercial fisheries, the growing offshore wind industry, and changing environmental conditions.

Abstract #4
Title: Virginia Game Fish Tagging Program
Author: Susanna Musick
Affiliation: Virginia Institute of Marine Science
Contact: susanna@vims.edu
Abstract:

For 28 years, the Virginia Game Fish Tagging Program (VGFTP) has collected data for recreationally-important marine fishes in cooperation with skilled volunteers. These experienced and highly-trained anglers have tagged more than 394,000 fishes since 1995 and contributed data regarding fish movement and site-fidelity in Chesapeake Bay and Atlantic Coastal waters. Best practices for cooperative research with anglers will be shared.

Abstract #5
Title: Northeast Trawl Advisory Panel Achievements and Priorities
Authors: Kathryn H. Ford, Wes Townsend, and Daniel Salerno
Affiliations: Northeast Fisheries Science Center, Mid-Atlantic Fishery Management Council, New England Fishery Management Council
Contact: kathryn.ford@noaa.gov
Abstract:
The Northeast Trawl Advisory Panel (NTAP) is a joint NEFMC and MAFMC advisory panel established to bring commercial fishing, fisheries science, and fishery management professionals together to identify concerns about regional research survey performance and data, to identify methods to address or mitigate these concerns, and to promote mutual understanding and acceptance of the results of this work among their peers and in the broader community. The panel was originally formed in 2002 and has had two main periods of activity. From 2003-2008 the panel addressed the transition from the Albatross to the Bigelow, and the resulting need to redesign the Northeast Fisheries Science Center's multispecies bottom trawl survey gear to be used on the new ship. From 2015-present the panel has focused attention on understanding differences between commercial gear and survey gear and improving catch efficiency factors for the bottom trawl survey. The panel is expecting to be active in the coming decade determining how best to adapt the current survey to the new landscape and research needs introduced by offshore wind development. This presentation will review past NTAP achievements, current projects, and consider priorities for the future.

Abstract #6
Title: Recent applications of the high-resolution catch and effort information collected by the Northeast Fisheries Science Center's Study Fleet
Authors: Andrew Jones, Katie Burchard, Giovanni Gianesin, Mike Morin, Emma Fowler, Jacob Wilson, Ben Church, and Anna Mercer
Affiliation: Northeast Fisheries Science Center
Contact: andrew.jones@noaa.gov
Abstract:
The Northeast Fisheries Science Center's Study Fleet is an extensive collection of high-resolution catch and effort data collected by participating captains via an electronic logbook system. This self-reported dataset stretches back over 15 years and is a valuable resource for scientists and managers in the region. We provide an overview of the program's key elements, a summary of its progress to date, and details on current applications of the data, such as using the program's fine-scale fishing footprint information to assess conflicts between the longfin squid fishery and wind energy areas and developing standardized catch per unit fishing effort indices

for research on stock assessments of black sea bass (*Centropristis striata*), American plaice (*Hippoglossoides platessoides*), and spiny dogfish (*Squalus acanthias*). We also discuss the strengths and weaknesses of the dataset and ongoing efforts to improve data quality and future plans for the program.

Abstract #7
Title: Collaborative Identification of Research Needs: Fishermen, scientists, and government worked together to develop the Synthesis of the Science for Fisheries and Offshore Wind Energy
Authors: Elizabeth Methratta, Andrew Lipsky, Angela Silva, Fiona Hogan, Annie Hawkins, Brandon Jensen, and Brian Hooker
Affiliations: Northeast Fisheries Science Center; Responsible Offshore Development Alliance; Bureau of Ocean Energy Management
Contact: elizabeth.methratta@noaa.gov
Abstract:
The Responsible Offshore Development Alliance (RODA), in collaboration with NOAA Fisheries and the Bureau of Ocean Energy Management (BOEM), led the development of a project entitled The Synthesis of the Science: Fisheries and Offshore Wind Energy. Fishing industry members collaborated on each component of this project including the initial kick-off workshop where the content and focus of the effort was initially discussed, and subsequently in writing, reviewing, and editing the final written report. The final report synthesizes the existing body of knowledge on the interactions between offshore wind development, fisheries, and the marine ecosystem. Using this synthesized information as a basis, the report identifies gaps in knowledge and makes recommendations for future scientific research to fill these gaps. The Synthesis of the Science is composed of five main chapters: 1. ecosystem effects; 2. fisheries human dimensions; 3. fisheries management and data collection; 4. methods and approaches; and 5. regional science planning. Each section was developed collaboratively by federal and state agencies, fishing community representatives, academic scientists, offshore wind developers, and other experts. Although the geographic focus of the report is the Northeastern U.S. as this is the vanguard of domestic offshore wind development, knowledge and expertise from Europe were incorporated into the report because the majority of empirical research studies have been conducted there. As this project developed during the Covid pandemic, collaborators had to rise to unexpected challenges by conducting the initial workshop virtually rather than in-person and through the regular use of virtual meeting tools to develop individual components of the report. The Synthesis of the Science is a valuable resource that provides both a comprehensive understanding of existing research and a roadmap for future studies. This information is urgently needed by agencies, fishing communities, and developers as offshore wind development is moving forward rapidly in the U.S.

Abstract #8
Title: Refinement and Testing of a Microprocessor-Based Shark Bycatch Reduction Device (M-B BRD) Using an Academic-Industry Partnership
Authors: Sara Mirabilio, Richard Brill, Peter Bushnel, Amanda Wilson

Affiliations: NCSU North Carolina Sea Grant College Program, Virginia Institute of Marine Science, Indiana University South Bend, Ocean Guardian
Contact: semirabi@ncsu.edu
Abstract:
Reducing shark bycatch in U.S. pelagic longline fisheries is a NOAA Fisheries management priority as multiple coastal-pelagic species are overfished and/or experiencing overfishing. We contend shark bycatch can be reduced by taking advantage of the unique sensory biology of elasmobranch fishes, specifically their ability to perceive electric fields of less than five nanovolt per centimeter. Such signals are, however, undetectable by targeted teleost fishes which lack the electrosensory system (Ampullae of Lorenzini) of elasmobranch fishes. A National Sea Grant Office award (NA19OAR4170413) funded development of an industry-deployable, microprocessor-based, shark bycatch reduction device (M-B BRD). We evaluated its performance using a 150-hook, three-mile, bottom longline deployed from a commercial fishing vessel operating in coastal waters from Oregon to Hatteras inlets (North Carolina). Over the course of 15 fishing days (Aug. 2 – Oct. 1, 2021), a total of 141 sharks (across nine species) were captured with all but 34 on hooks near M-B BRDs that emitted no electric pulse (controls). This ratio is significantly different from the expected 1:1 ratio (p=0.0000000007). Although effectiveness was species-specific, in aggregate the presence of an active M-B BRD reduced shark catch by greater than 50%. These data support the hypothesis that weak electric stimuli generated by a M-B BRD can reduce shark bycatch in longline fisheries. Further, with a M-B BRD shark bycatch could be reduced without imposition of time-area closures, significant gear modifications, or mandated hook types, and with little or no effect on catches of non-electrosensitive target teleost fishes (e.g., swordfish and tunas).

Abstract #9
Title: Homegrown, Commercial R&D - Challenge and Opportunity
Authors: Samantha Glover*, Michael Congrove, Standish K. Allen, Jr.
Affiliation: Oyster Seed Holdings
Contact: sam@oshoyster.com
Abstract:
Oyster Seed Holdings, Inc (OSH) is a commercial oyster hatchery based on Gwynn’s Island, Virginia that embraces a “tech-forward” approach to hatchery technology in an effort to ensure steady supply of premier quality oyster larvae and seed to the industry. OSH has embarked on numerous small scale research projects in the past, and recently, has committed to establishing a permanent R&D presence to ensure continued innovation. There are essentially two “flavors” of research ongoing at OSH. The first type is internal R&D questions relating to improving commercial production and product quality. Some is funded, some is internally supported. Examples include testing algal nutrients, elimination of epibiont pests, developing boutique brood stock for remotely located oyster farms (e.d., Florida), and larval feeding trials. The second type of research is hatchery innovation. These are typically grant funded because of their extensive and risky nature. Also in this category are collaborations with academic institutions. Examples of innovation research are recirculating aquaculture systems for larval culture, examining the potential for deploying mobile oyster hatcheries, and feasibility of soft-shell clam

seed production. OSH believes that by being a leader in improved hatchery technology, it can assure its place as an independent supplier of high quality oyster seed serving the entire shellfish aquaculture industry.

Abstract #10
Title: Counting your fishes before they hatch: contributions of Study Fleet samples to estimate flatfish annual egg production for 10 years
Authors: Mark J. Wuenschel, Emilee Tholke, Yvonna Press, W. David McElroy*, and Richard S. McBride
Affiliation: Northeast Fisheries Science Center
Contact: dave.mcelroy@noaa.gov
Abstract:
Presumably egg production by marine fishes varies from year to year based on environment conditions and the condition of the fish themselves, and these variations lead to recruitment variability observed by the fishery. If so, then it may be possible to predict fish recruitment variability by counting eggs within the ovary itself (yes, before they 'hatch,' or are even spawned). However, measuring this 'potential annual fecundity' requires sampling females within a narrow seasonal period, just before the spawning season begins, and once these fish are delivered to the laboratory, counting eggs by traditional methods is laborious. We resolved the first problem by getting fish from the Northeast Fisheries Science Center Study Fleet, which fishes broadly both geographically and seasonally. We resolved the second problem by adopting an innovative method that automates the counting process using image analysis. We present results for different stocks of winter and yellowtail flounder (Gulf of Maine, Georges Bank, and Southern New England/Mid-Atlantic). We focus here on 'hyper' fecundity among older females, as well as the patterns of potential annual fecundity from 2010 to 2019. Winter flounder showed a decadal pattern of rising and falling fecundity across stocks, suggesting common drivers may affect fecundity across a broad spatial scale. Yellowtail flounder showed a similar decadal pattern, but with greater within year stock variation, suggesting their reproductive strategy allows them to 'fine tune' fecundity to environmental conditions over smaller scales (time and space). In addition to continuing to monitor fecundity, future plans are to evaluate initial regulation of fecundity by environmental drivers — such as temperature and primary or secondary productivity — and to look for subsequent effects on population replenishment and recruitment.

Abstract #11
Title: Working Together to Address Offshore Wind and Fisheries Science Needs
Authors: Andrew Lipsky
Affiliation: Northeast Fisheries Science Center
Contact: andrew.lipsky@noaa.gov
Abstract:
To meet state and federal renewable energy targets offshore wind development is rapidly expanding in the Atlantic, Gulf Of Mexico, and Pacific regions of the United States. By 2030 the Northeast large marine ecosystem will be occupied by over 2.4 million acres of leases, 3400

turbines, and 10,000 miles of submarine cables and an additional 5.7 million acres is also under consideration for further development. Further, over 22.37 million acres of the U.S. NES have been designated by the Bureau of Ocean Energy Management as offshore wind leases, wind energy areas, or wind planning areas (BOEM, 2022a, BOEM, 2022b). The pace, scale, and scope of this development creates scientific demands for NOAA Fisheries regulatory and scientific missions. Addressing the interaction of wind on fisheries, fishing communities, protected species, and marine habitats requires deepening our collaborations with industry and advancing ecosystem based approaches to successfully meet NOAA Fisheries mandates. This presentation will provide an overview of these scientific needs and identify how fishing communities and scientists can work together to meet them.

APPENDIX II – NEW ENGLAND COOPERATIVE RESEARCH SUMMIT ORAL PRESENTATION ABSTRACTS

Abstract #1
Title: The Commercial Fisheries Research Foundation: Engaging Fishermen to Support Science
Authors: David Bethoney
Affiliation: Commercial Fisheries Research Foundation
Contact: dbethoney@cfrfoundation.org
Abstract:
The Commercial Fisheries Research Foundation (CFRF) was established in 2004 to provide fishermen with opportunities to contribute to the science and management of key fisheries resources. Founded and led by members of Rhode Island's fishing community, the CFRF has developed practical solutions to scientific and supply chain challenges. While doing so, the CFRF has engaged over 150 fishermen and over 300 scientists and seafood professionals across the East Coast in its work. Since inception, the CFRF has focused on building a community of collaboration among fishermen, scientists, managers and food professionals that promotes sound science, sustainable seafood and vibrant fishing communities in Southern New England. This presentation will provide an overview of CFRF's active projects including how they fit into collaborative strategy that has enabled the CFRF to address the concerns of the fishing community as well as the needs of scientists and fisheries managers.

Abstract #2
Title: Creation of a "Data Trust" for Effective Inclusion of Fishermen's Knowledge in Offshore Wind Energy Decision Making
Authors: Fiona Hogan, Steven Jacobs, and Annie Hawkins
Affiliation: Responsible Offshore Development Alliance, SquareThread
Contact: fiona@rodafisheries.org
Abstract:

Regulators rely on access to accurate and reliable data when making informed and equitable decisions, particularly across users of the same resource. The fishing industry currently faces the potential to lose some of their historic fishing grounds to offshore development projects. Access to, and the quality of, available data to describe historic fishing patterns is a persistent issue when analyzing impacts of one industry on the other. Fishing industry members have consistently identified the gap in understanding of fisheries scientists and managers of the current status and dynamics of fisheries as a major problem. This gap exists because of the cultural natures found in both the fishing industry and in fisheries science and management. Independent fishing businesses collect detailed data on the water and shoreside to increase business efficiencies, but that data is often recorded in personalized, unstandardized, non-digital formats. Fishing is a competitive industry making knowledge and data sharing within the industry extremely difficult. Government-run fisheries data collection systems are used simultaneously by fisheries and ecosystem science, policy making, and fisheries enforcement. The threat of heavy financial penalties by enforcement produces strong disincentives to accurately report on all government data collection systems. Government fishery data collection systems also do not collect position, time and catch economic data at the high resolutions necessary to sufficiently represent the realities of fishing in assessments of impacts and tradeoffs related to ecosystem management. Individuals in the fishing industry have in depth empirical knowledge of the ecology and human social dimensions of the ecosystems in which they operate daily. This expert knowledge is infrequently utilized in management systems where decisions are made because the knowledge is rarely presented by the industry as consensus with evidentiary support.

The creation of the Fisheries Knowledge Trust (the "Trust") provides a solution in a standardized and industry-owned data platform that allows fishermen to own, use, and market their data while retaining granular control over who has access to it. The Trust manages the governance processes required to securely share proprietary information, provides the technical infrastructure, and processes required to aggregate this information for analysis, and produces the needed evidence to demonstrate the provenance of both the data and analysis needed to build trust with regulators. Through pilot projects, which to date have focused on the Atlantic herring and surfclam fisheries, a proof of concept for this approach has been shown, which we hope to expand to include multiple fisheries and data sources. Incorporation of new fishery dependent data into management and offshore wind siting or impact analyses will improve these processes through the incorporation of generations of knowledge.

Abstract #3
Title: Recent Applications of the High-Resolution Catch and Effort Information Collected by the Northeast Fisheries Science Center's Study Fleet
Authors: Andrew Jones, Katie Burchard, Giovanni Gianesin, Mike Morin, Emma Fowler, Jacob Wilson, Ben Church, and Anna Mercer
Affiliation: Northeast Fisheries Science Center, Cooperative Research Branch
Contact: andrew.jones@noaa.gov
Abstract:

The Northeast Fisheries Science Center's Study Fleet is an extensive collection of high-resolution catch and effort data collected by participating captains via an electronic logbook system. This self-reported dataset stretches back over 15 years and is a valuable resource for scientists and managers in the region. We provide an overview of the program's key elements, a summary of its progress to date, and details on current applications of the data, such as using the program's fine-scale fishing footprint information to assess conflicts between the longfin squid fishery and wind energy areas, and developing standardized catch per unit fishing effort indices for research on stock assessments of black sea bass (*Centropristis striata*), American plaice (*Hippoglossoides platessoides*), and spiny dogfish (*Squalus acanthias*). We also discuss the strengths and weaknesses of the dataset and ongoing efforts to improve data quality and future plans for the program.

Abstract #4
Title: Utilizing Collaborative Scientist-Industry Partnerships to Monitor a Windfarm Off New Jersey
Authors: Douglas Zemeckis, Jason Morson, Daphne Munroe, Anthony Vastano, Kaycee Coleman, Gregory DeCelles, and Thomas Grothues
Affiliation: Rutgers University
Contact: zemeckis@njaes.rutgers.edu
Abstract:
The offshore wind energy industry is rapidly developing in the United States, particularly in the northeast. It is critical that monitoring programs evaluate impacts of offshore wind development on fisheries resources. These monitoring programs ideally include fishing industry partners on the research teams and to conduct fieldwork aboard their vessels to incorporate their local ecological knowledge and fisheries expertise. Such scientist-industry collaborations will improve the quality and relevance of monitoring programs of offshore windfarms, as well as increase the transparency of project results. Our research team has been working collaboratively with commercial fishing industry partners to design, coordinate, and execute multiple surveys at Ørsted's Ocean Wind 1 offshore windfarm off New Jersey, including a bottom trawl survey, structured habitat survey (Chevron traps, rod-and-reel, baited remote underwater video), and surfclam dredge survey. The collaborative scientist-industry partnerships for these projects have been confronted with several challenges which have become common for offshore wind monitoring but differ from those experienced with other fisheries research in the northeast, including the politics associated with offshore wind energy, health and safety standards for crews and vessels, and permitting field-based surveys during a period with several protected species issues in the region. This presentation will communicate the lessons learned and recommended practices for utilizing collaborative scientist-industry partnerships for monitoring fisheries resources within offshore windfarms; recommendations that are also of value for similar partnerships addressing issues in other areas of fisheries science.

Abstract #5
Title: Strategies for Successful Cooperative Research

Authors: Emerson C. Hasbrouck, Jr, Scott Curatolo-Wagemann, Tara McClintock, Kristin Gerbino, Alex Mercado, Amanda Dauman, Tyler Guteres, and Mike Bowen
Affiliation: Cornell University Cooperative Extension
Contact: ech12@cornell.edu
Abstract:
Cornell University Cooperative Extension (CCE) has a long history of working collaboratively with the fishing industry in Southern New England and the Mid-Atlantic. We have conducted numerous successful cooperative research projects over the years that involve the fishing industry in developing bycatch reduction solutions as well as improved science to help address specific fishery management issues. We will offer some strategies for researchers and fishermen to develop and implement successful projects. This talk will discuss: involving the fishing industry in research; effective collaboration; our experiences over the years; lessons learned and what works.

Abstract #6
Title: Transitioning Acoustical and Biological Surveys of Offshore Wind Areas to Commercial Platforms
Authors: Michael Jech, Andrew Lipsky, Guillaume Matte, Hugo Bitard, Tehei Gauthier, Patrick Moran, and Gabriel Diaz
Affiliation: Northeast Fisheries Science Center
Contact: michael.jech@noaa.gov
Abstract:
Offshore wind development is projected to rapidly expand along the east coast of the United States with more than 2.4 million acres proposed within the next ten years in the northeast region. Fixed and floating turbines will be prominent in the seascape and will affect the ecology and biology of the flora and fauna, as well as commercial and recreational fishing and scientific monitoring in these areas. We conducted a 4-day acoustic and biological survey of the Block Island Wind Farm (BIWF), a five-turbine, 30 MW wind farm located about 6 km off the coast of Rhode Island, in August 2021 on the NEFSC's R/V Gloria Michelle to gain insight into the spatial distribution of fish species in and around the turbines. We utilized a hull-mounted, downward-looking Simrad 38/200 kHz ES70 and a pole mounted iXblue Seapix steerable mills cross, 150kHz, 1.6-degree resolution multibeam echosounder (MBES) oriented either downward or sideways to map the 2D and 3D distributions using spiral and straight-line transect patterns. Black sea bass (*Centropristis striata*) were the most commonly caught species by hook-and-line, and appeared to be the primary constituents of the fish aggregations mapped by the acoustic systems. Resource surveys in offshore wind areas using NOAA vessels and standard gear may be limited to impossible. We apply the experiences and knowledge gained during this project to address monitoring living marine resources in offshore wind areas using commercial platforms.

Abstract #7
Title: Using a Collaborative Framework to Identify Oceanographic Indicators of *Illex illecebrosus*: Origination of the Squid Squad
Authors: Sarah Salois and Kim Hyde

Affiliation: Northeast Fisheries Science Center, University of Massachusetts Dartmouth School for Marine Science and Technology
Contact: sarah.salois@noaa.gov
Abstract:
Climate-driven variations in oceanic conditions can impact population dynamics of commercially important species, including *Illex illecebrosus*, a highly migratory species whose migration patterns are largely influenced by regional oceanography. The U.S. Illex fishery has high spatial and interannual variability, posing a particular set of challenges to the management and assessment of the species. Through interdisciplinary collaboration we developed conceptual and statistical models that identified important environmental variables to serve as oceanographic indicators of Illex availability. This team, affectionately referred to as the "Squid Squad", continues to work together sharing knowledge and developing lines of research. Our highly collaborative research team includes federal (NEFSC; GARFO), academic (Woods Hole Oceanographic Institute; University of Massachusetts), industry (fishing captains; processors), and management (MAFMC) partners. Together we are improving data collection and visualization, analyzing biological and oceanographic data, developing models, creating platforms for tracking oceanographic conditions, and coordinating field sampling efforts between commercial fishing and research vessels. Recent successes include development of a collaborative framework for the identification of fine-scale oceanographic indicators for Illex, which can also be applied to other commercially important species. The U.S. Illex fishery serves as an example of the insights and understanding of a data-limited stock that is achievable through open collaboration and cooperative research.

Abstract #8
Title: Northeast Trawl Advisory Panel Achievements and Priorities
Authors: Kathryn Ford, Wes Townsend, and Daniel Salerno
Affiliation: Northeast Fisheries Science Center, Mid-Atlantic Fishery Management Council, New England Fishery Management Council
Contact: kathryn.ford@noaa.gov
Abstract:
The Northeast Trawl Advisory Panel (NTAP) is a joint NEFMC and MAFMC advisory panel established to bring commercial fishing, fisheries science, and fishery management professionals together to identify concerns about regional research survey performance and data, to identify methods to address or mitigate these concerns, and to promote mutual understanding and acceptance of the results of this work among their peers and in the broader community. The panel was originally formed in 2002 and has had two main periods of activity. From 2003-2008 the panel addressed the transition from the Albatross to the Bigelow, and the resulting need to redesign the Northeast Fisheries Science Center's multispecies bottom trawl survey gear to be used on the new ship. From 2015-present the panel has focused attention on understanding differences between commercial gear and survey gear and improving catch efficiency factors for the bottom trawl survey. The panel is expecting to be active in the coming decade determining how best to adapt the current survey to the new landscape and research needs introduced by

offshore wind development. This presentation will review past NTAP achievements, current projects, and consider priorities for the future.

Abstract #9
Title: Improving Application of Cooperative Research for New England Groundfish
Authors: Gareth Lawson and Steven Cadrin
Affiliation: Conservation Law Foundation, University of Massachusetts Dartmouth School for Marine Science and Technology
Contact: glawson@clf.org
Abstract:
The New England groundfish fishery has a long history of cooperative research, with many successes as well as challenges in attaining the benefits that cooperative research can offer. In January 2023 we convened a workshop with broad representation from commercial and recreational fisheries, federal and state fisheries agencies, academia, and environmental organizations. The goal was to propose opportunities and an implementation strategy to increase and improve cooperative research and its application to groundfish assessment and management. Discussions among this diverse group were generally positive and converged on clear top priorities. These included creation of a regional coordinating body to identify and prioritize research needs, ideally providing or securing funding, with a focus on meeting assessment and management needs and taking advantage of the research track assessment process. Two specific research priorities arising from the workshop were: (1) Commercial and recreational industry collection of biological samples, particularly age and length, in a manner that enables use within assessment models and (2) Studies of changes in species, seasonality, and locations, particularly climate-related. Best practices identified in the discussions confirmed previous reviews, and included clear communication and goals, answerable questions, adequate incentives and compensation, as well as fully including industry collaborators in all phases of the research and including end users from the start. We hope to gain input from this summit on the workshop's recommendations, with the goal of developing a holistic and inclusive roadmap that is more likely to achieve the wide range of benefits that collaborative research can offer for some of the region's most challenging stocks.

Abstract #10
Title: Counting Your Fishes Before They Hatch: Contributions of Study Fleet Samples to Estimate Flatfish Annual Egg Production for 10 Years
Authors: Mark J. Wuenschel, Emilee Tholke, Yvonna Press, David McElroy, and Richard S. McBride
Affiliation: Northeast Fisheries Science Center
Contact: dave.mcelroy@noaa.gov
Abstract:
Presumably egg production by marine fishes varies from year to year based on environment conditions and the condition of the fish themselves, and these variations lead to recruitment variability observed by the fishery. If so, then it may be possible to predict fish recruitment variability by counting eggs within the ovary itself (yes, before they 'hatch,' or are even

spawned). However, measuring this 'potential annual fecundity' requires sampling females within a narrow seasonal period, just before the spawning season begins, and once these fish are delivered to the laboratory, counting eggs by traditional methods is laborious. We resolved the first problem by getting fish from the Northeast Fisheries Science Center Study Fleet, which fishes broadly both geographically and seasonally. We resolved the second problem by adopting an innovative method that automates the counting process using image analysis. We present results for different stocks of winter and yellowtail flounder (Gulf of Maine, Georges Bank, and Southern New England/Mid-Atlantic). We focus here on 'hyper' fecundity among older females, as well as the patterns of potential annual fecundity from 2010 to 2019. Winter flounder showed a decadal pattern of rising and falling fecundity across stocks, suggesting common drivers may affect fecundity across a broad spatial scale. Yellowtail flounder showed a similar decadal pattern, but with greater within year stock variation, suggesting their reproductive strategy allows them to 'fine tune' fecundity to environmental conditions over smaller scales (time and space). In addition to continuing to monitor fecundity, future plans are to evaluate initial regulation of fecundity by environmental drivers — such as temperature and primary or secondary productivity — and to look for subsequent effects on population replenishment and recruitment.

Abstract #11
Title: Review of the VIMS Industry-Based Sea Scallop Dredge Surveys
Authors: Sally Roman and David Rudders
Affiliation: Virginia Institute of Marine Science
Contact: saroman@vims.edu
Abstract:
The Virginia Institute of Marine Science has been conducting cooperative industry-based sea scallop dredge surveys since the early 2000s, through funding provided by NOAA's Sea Scallop Research Set-Aside Program. Surveys are conducted onboard commercial sea scallop fishing vessels chartered as research platforms. Commercial crews are involved in all aspects of catch and biological sampling conducted during these surveys. The spatial scale of surveys has varied over the time period, depending on resource conditions and management measures. Since 2014, VIMS has surveyed the Mid-Atlantic Bight from the Virginia/North Carolina border to south of Block Island on an annual basis. The Nantucket Lightship and portions of Closed Area II have been surveyed annually since 2016, and beginning in 2018 an annual survey was also conducted in Closed Area I. Results from these surveys have been used for assessment and management of the resource. Annual data are combined with other sea scallop surveys to set annual specifications for the fishery, including total allowable catch limits, access to rotational access areas, and days-at-sea determination. Catch and biological data have also been included in sea scallop stock assessments as well as for other species of interest.

Abstract #12
Title: Cooperative Research by NOAA's Atlantic Oceanographic and Meteorological Laboratories and Commercial Fishers and Industry Partners Investigating Changing Oceanographic Conditions
Authors: Kelly Montenero

Affiliation: NOAA Atlantic Oceanographic and Meteorological Laboratory
Contact: kelly.montenero@noaa.gov
Abstract:
NOAA's Atlantic Oceanographic and Meteorological Lab (NOAA AOML) consists of hurricane research, physical oceanography and ocean chemistry and ecosystem science, focusing on the Atlantic. NOAA AOML has a number of cooperative research studies, ranging from ships of opportunity deploying oceanographic instruments, to cargo ships providing a platform for continuous ocean observations, to stakeholder input on habitat changes and citizen science by commercial fishers. Commercial mariners play a crucial role in providing data that NOAA uses to produce maritime forecasts by collaborating with scientists to outfit their ships (at no cost to the vessel or vessel owner) with small instruments that measure atmospheric and oceanic data. NOAA AOML has also partnered with the Florida Commercial Waterman's Conservation to expand water quality monitoring by fishers as well as NOAA and state scientists. The Florida Commercial Watermen’s Conservation plan established a fishermen water quality monitoring program on the southwest Florida shelf. The goal of the program is to quantify the environmental and oceanographic conditions before, during, and after red tide blooms to inform models, better understand ocean dynamics and provide timely decision-support to increase the resilience of fishermen and fishing communities on the west coast of Florida to red tide events.

Abstract #13
Title: Fishermen's Role In The Design, Implementation, and Interpretation of Results in Collaborative Research
Authors: Carla Guenther
Affiliation: Maine Center for Coastal Fisheries
Contact: cguenther@coastalfisheries.org
Abstract:
Fishermen’s ecological knowledge has been the foundation of Maine Center for Coastal Fisheries’ work for 20 years. Fishermen’s knowledge has initiated fisheries management measures, marine policy, and ecosystem research. In 2010, we began the Sentinel Survey of groundfish species in the eastern Gulf of Maine. This research aimed to test Ted Ames’ hypothesis that codfish recovery would be facilitated by restored river herring populations brought about by dam removal in eastern Maine’s watersheds. A former groundfisherman himself, Ames formed this hypothesis while mapping 40+ years of fishermen’s ecological knowledge of spawning grounds. In 2022, we began investigating scallop fishermen’s questions about scallop larval supply and population connectivity. Resolving the spatial and temporal variability of scallop larvae could have huge implications for Maine’s inshore sea scallop fishery, which has used spatial and rotational management strategies for the past 10 years. In both projects, fishermen are integral in asking the principal research questions, site selection, and data collection. In our talk we reflect on what has worked well and what has challenged our approach to collaborative research. We also provide some learned best practices for moving forward.

APPENDIX III - MID-ATLANTIC COOPERATIVE RESEARCH SUMMIT POSTER PRESENTATION ABSTRACTS

Abstract #1
Title: Shortfin Squid Electronic Size Monitoring Project (ILXSM)
Authors: Anna Mercer, Thomas Swiader, Josh Moser
Affiliation: Northeast Fisheries Science Center
Contact: anna.mercer@noaa.gov
Abstract:
The life history and population dynamics of the northern shortfin squid (*Illex illecebrosus*) are poorly understood due to a paucity of data, yet the species supports a productive fishery on the northwest Atlantic continental shelf. The Shortfin Squid Electronic Size Monitoring Project (ILXSM) was developed in 2021 to address the need for individual shortfin squid size and weights throughout the fishing season, which are key for understanding the ingress, egress, growth, and reproduction of this semelparous species. To achieve this goal, the ILXSM team developed an electronic data collection system that can be used by the region's shortfin squid processors to collect biological data during the vessel offload process. Six shortfin squid processors were provided with Big Fin Scientific electronic fish measuring boards, Marel digital Bluetooth scales, and a ruggedized Samsung tablets running the BioLogical Information System Software (BLISS) to efficiently collect paired mantle lengths and gram weights for a subsample of squid from each vessel offload. These data are uploaded to NEFSC databases for scientific analysis and downloaded by processors for use in sales and marketing. In 2021 and 2022, processors collected over 60,000 shortfin squid mantle lengths and weights. This project plays a critical role in documenting rapidly changing dynamics of the shortfin squid population and promotes long-term conservation of this valuable fishery resource.

Abstract #2
Title: Virginia's Young Fishermen's Initiative
Authors: Shelby B. White and Sarah Borsetti
Affiliation: Virginia Institute of Marine Science
Contact: sbwhite@vims.edu
Abstract:
Virginia's small-scale commercial fisheries are experiencing a "graying of the fleet" as the average age of commercial fishermen increases. Lack of succession in the commercial fishing industry has become a problem in coastal communities throughout the United States, threatening the sustainability and resiliency of the industry and resource-dependent fishing communities. Generational gaps inhibit the ability of older fishermen to transfer knowledge and social memory to younger generations, thus decreasing the ability of younger fishermen to respond to adverse events. In the past two decades, the number of commercial fishing licenses sold in Virginia has declined while the number of licenses assigned to older fishermen has increased. This indicates a potentially problematic shift in resource dependence for fishermen and fishing communities that

derive economic, social, and cultural value from commercial fishing as a livelihood. Furthermore, labor shortages have been identified as a threat to commercial fishing-related industries (e.g., aquaculture, seafood sales and processing) in recent years and were further compounded with the COVID-19 pandemic. Virginia's Young Fishermen's Initiative (VYFI) was created as the first formal workforce development opportunity for individuals interested in commercial fishing in Virginia. This newly established program allows novice and newly established entrants to learn from experienced fishermen, as well as develop specific training, education, and technical assistance. The goal of the VYFI is to expand in collaboration with community partners, including the commercial fishing industry, Virginia Marine Resources Commission, and Virginia Sea Grant to address challenges of entry by young fishermen and hone skills essential to success in the industry.

Abstract #3
Title: Cooperative research to determine the effect of density on growth, yield, and reproduction in Atlantic sea scallops (Placopecten magellanicus)
Author: Kaitlyn Clark
Affiliation: Virginia Institute of Marine Science
Contact: krclark@vims.edu
Abstract:
The Atlantic sea scallop fishery employs a rotational closed area strategy designed to increase yield-per-recruit and allow scallops to spawn multiple times before they are susceptible to the fishery. Though generally successful, this strategy was recently challenged by two high-density recruitment events that occurred in the Nantucket Lightship Closed Area in 2012 and the Elephant Trunk Flex Area in 2013. The scallops at these sites persisted at high densities and initially exhibited varying degrees of impacted performance, raising questions about how to best manage these two areas. The effect of sea scallop density on growth, yield, and reproduction was investigated in a study funded through the NOAA Fisheries Sea Scallop Research Set Aside, in which scallop pounds are "set aside" to fund cooperative research. Researchers and fishing vessels partner to conduct the research and harvest the allocated pounds, with proceeds funding the research and compensation for fishing industry partners. Eight Limited Access sea scallop vessels participated in sampling for this project, with quarterly sampling trips conducted over two years from 2018–2020. Overall, scallops in the Elephant Trunk largely returned to growth and yield near expectations, while scallops in the high-density areas of the Nantucket Lightship exhibited declines in growth, yield, and reproductive activity compared to low- and medium-density areas. Results from this study were presented to the New England Fishery Management Council Scallop Plan Development Team and the Scallop Advisory Panel, and a modified shell height to meat weight relationship was developed for the high-density portion of the Nantucket Lightship to better represent the lower yields from this region in forward projections of biomass.

Abstract #4
Title: Industry-Based Biological Sampling Program
Author: Katie Burchard
Affiliation: Northeast Fisheries Science Center

Contact: katie.burchard@noaa.gov
Abstract:
The Industry-based Biological Sampling (InBioS) program engages fishermen in collecting fish, shellfish, and cephalopod samples for analysis of age, growth, reproductive and energetic dynamics, and genetic structure. InBios focuses on collecting whole fish from areas and times of year that are otherwise inaccessible (e.g., due to limited temporal and spatial coverage standard surveys), but are key to understanding biological and ecological dynamics. Since its inception in 2009, InBios has supported the collection of over 18,500 specimens from 34 different species. This collaborative research program has led to insights into the reproductive dynamics of groundfish, herring, mackerel, and redfish, including annual variation, variation between stocks, fecundity regulation, and the effects of female condition. Ongoing work aims to better understand the environmental and energetic factors that influence the reproductive dynamics of resource species.

Abstract #5
Title: Study Fleet: Advancing Scientific Data Collection Through Partnerships with the Northeast Fishing Fleet
Authors: Emma Fowler, Michael Morin
Affiliation: Northeast Fisheries Science Center
Contact: emma.fowler@noaa.gov
Abstract:
The Study Fleet program was developed in 2006 to engage commercial fishing vessels in electronically collecting high-resolution catch, effort, and environmental data to address scientific data needs. Detailed information about fishing activity, including effort locations and catch and discard estimates, are logged by captains using a computer program called the Fisheries Logbook Data Recording Software (FLDRS). Study Fleet captains also collect bottom water temperature and depth data using a bluetooth temperature logger and are able to view these data in near real time on a laptop in the wheelhouse. Since 2020, a total of 66 vessels from Maine to Virginia have participated in the Study Fleet. The data collected by the Study Fleet are being used to create fishery footprints to better understand the economic and operational impacts of offshore wind energy development on the longfin squid fishery. Study Fleet data have also recently been used to develop standardized catch per unit effort indices for the haddock, American plaice, spiny dogfish, and black sea bass stock assessments. The Study Fleet program also provides a means to collect fish samples for life history research in coordination with the Industry Based Biological Sampling Program. Moving forward, the Study Fleet program will continue to advance the development of electronic data collection tools and application of fishery dependent data to stock assessments, while also expanding contributions to ecosystem-based fisheries science.

Abstract #6
Title: NEFSC Gulf of Maine Bottom Longline Survey
Authors: Julie Nieland, Ben Church, Dave McElroy
Affiliation: Northeast Fisheries Science Center

Contact: dave.mcelroy@noaa.gov
Abstract:
The Northeast Fisheries Science Center (NEFSC) Gulf of Maine Bottom Longline Survey (BLLS) began in 2014 and was designed to increase sampling of fish stocks associated with complex habitats that are inaccessible to bottom trawl surveys. The BLLS uses a stratified random design (by depth and area), similar to the NEFSC Bottom Trawl Survey, and is further sub-stratified into “rough” and “smooth” bottom types. The BLLS samples 45 stations each spring and fall in the Gulf of Maine and is conducted collaboratively with two commercial fishing vessels (F/V Mary Elizabeth, F/V Tenacious II) simultaneously. The BLLS gear is a 1 nautical mile groundline baited with frozen squid (Illex spp.) on each of 1,000 #12 semi-circle, easy-baiter hooks. The gear is set across slack tide for a 2-hour soak time. Data collection at each station includes length and aggregate weight measurements for each species; additional biological samples such as sex, age, and maturity; temperature, depth, current direction and velocity measurements; bottom habitat characterization using a drop camera; and hook disposition using electronic monitoring camera systems. A total of 48 unique species have been caught, including 29 fish species, 10 invertebrate species, and 9 elasmobranch species (4 shark and 5 skate species). Collaboration with industry partners is critical to the operational and scientific success of the BLLS, which provides information on species abundance, biomass, and distribution to support stock assessments, management actions, habitat studies, life history studies, and survey-comparison analyses.

Abstract #7
Title: Exploration of high-resolution long-term catch and effort series from the NEFSC Study Fleet
Authors: Andrew Jones, Jack Wilson, Dave Goethel, and Jim Ford
Affiliations: Northeast Fisheries Science Center; F/V Ellen Diane, F/V Lisa Ann III
Contact: andrew.jones@noaa.gov
Abstract:
Fishery catch and effort change through time as stocks change in abundance and distribution. Often these trends are observed at a coarse resolution because fine scale data are not available. In the northeast U.S. industry members have participated in a long-running research effort to collect high-resolution catch-and-effort data via an electronic logbook system. These collections now represent valuable windows into how catch and effort have changed over a dynamic period. Here we highlight two fishermen’s records that span more than 15 years. Captains Dave Goethel and Jim Ford participated in voluntary high-resolution data collection in a similar region of the Gulf of Maine. Despite differences in their fishing practices and business operations, similar patterns in catch can be seen in both. Specifically, both vessels trended away from harvesting Atlantic cod to other commercially important species, and the depth at which most species were caught trended deeper across years. These examples point to the potential value of these long running records generated by fishermen.

Abstract #8
Title: Environmental Monitors on Lobster Traps and Large Trawlers Program (eMOLT)

Author: George Maynard, James Manning, Erin Pelletier, Huanxin Xu
Affiliation: Northeast Fisheries Science Center, Gulf of Maine Lobster Foundation
Contact: george.maynard@noaa.gov
Abstract:
The environmental Monitors on Lobster Traps and Large Trawlers (eMOLT) program is a collaborative effort between the Northeast Fisheries Science Center and the Gulf of Maine Lobster Foundation with support from commercial fishermen, the tech industry, and regional non-profit organizations. Fishermen who participate in the program use a range of sensors attached to their gear to collect environmental observations during the course of their normal fishing operations. The measurements are immediately visible to the captains on a computer in their wheelhouse and are wirelessly transmitted back to a server via satellite or cellular network in near real time. From there, the real time observations are used to fine tune ocean forecast models and the historic data are put to use in a range of data products at the Northeast Fisheries Science Center. The eMOLT program currently has nearly 100 participating vessels between New Jersey and Canada and over 12 million individual data points collected between 1996 and the present.

Abstract #9
Title: Environmental Drivers of the Hook Availability for the Gulf of Maine Bottom Longline Survey
Authors: Lindsey Nelson, W. David McElroy, Anna Mercer, Andrew Jones, George Maynard, Chris Tholke
Affiliation: Northeast Fisheries Science Center
Contact: lindsey.nelson@noaa.gov
Abstract:
It is hypothesized that the catch rates of longline surveys are dependent on the availability of baited hooks to fish. Each hook is baited upon deployment, but bait can be lost or can be consumed by fish and invertebrates at any time during the set, thereby affecting catch rates. We sought to characterize the percent of retained baits and other hook dispositions of the Northeast Fisheries Science Center's Gulf of Maine Bottom Longline Survey sets in relation to habitat and survey station variables. As a novel approach to collect these data, electronic monitoring camera systems were deployed on partner vessels to record video of the gear retrieval. Video was collected from two fall (2020 and 2021) and two spring (2021 and 2022) surveys and subsequently reviewed and annotated. Individual hook dispositions were recorded into one of four main categories (bait, empty hook, fish, and invertebrate), summarized, and examined across categorical variables (season, day or night, and bottom substrata) and continuous variables (bottom temperature, bottom depth, and substrate rugosity). Bait was the third most common disposition by mean value. Overall, high percentages of retained bait were correlated with low temperatures, rough bottom substrata, daytime hauls, increased bottom rugosity, and shallow depth. The resulting hook disposition data will be incorporated into catch rate models to develop standardized indices of abundance for stock assessments. This study serves as an example of the utility of electronic monitoring cameras to supplement on board data collection during cooperative fishery surveys.

Abstract #10
Title: Mid-Atlantic/Southern New England NEAMAP: Cooperative Research in Support of Fisheries Investigations, Stock Assessments, and Management
Author: Dustin Gregg
Affiliation: Virginia Institute of Marine Science
Contact: dgregg@vims.edu
Abstract:
The Northeast Area Monitoring and Assessment Program (NEAMAP) began the Mid-Atlantic/Southern New England trawl survey in 2007 in response to fishery-independent data gaps identified by fisheries management and stock assessment activities in the northeastern United States. Since the survey's inception, industry stakeholder input and confidence have been key pillars supporting the survey's mission. As such, NEAMAP MA/SNE has effectively collaborated with industry partner the F/V Darana R for 17 years and counting. The survey monitors the biological and ecological attributes of recreationally, commercially, and ecologically important species. Data collected from NEAMAP MA/SNE are then disseminated through public outreach products, various collaborative research investigations, and/or submitted for inclusion in regional stock assessments and management activities.

Abstract #11
Title: Pairing high-resolution environmental data to high-resolution fishery-dependent catch data to understand the influence of oceanographic conditions on Northern shortfin squid availability
Authors: Sarah L. Salois, Kimberly J. W. Hyde, Adrienne M. Silver, Avijit Gangopadhyay, Glen Gawarkiewicz, Anna Mercer, Brooke Lowman, John Manderson, Sarah Gaichas, Daniel Hocking, Benjamin Galuardi, Andrew Jones, Jeff Kaelin, Greg DiDomenico, Katie Almeida, Bill Bright, Meghan Lapp
Affiliations: Northeast Fisheries Science Center, University of Massachusetts School for Marine Science and Technology, Woods Hole Oceanographic Institute, Virginia Marine Resource Commission, Open Ocean Research, Greater Atlantic Regional Fisheries Office, Lund's Fisheries, The Town Dock, F/V Retriever, SeaFreeze Shoreside
Contact: sarah.salois@noaa.gov
Abstract:
Oceanographic satellite imagery is a powerful tool for assessing dynamic marine systems in a changing world. Remotely sensed data are well suited for environmental analyses and ecological forecasting as they provide long-term synoptic, near real-time coverage of oceanographic conditions at high spatial (1-4 km) and temporal (daily) resolutions. This study utilizes these long term time series, as well as global ocean reanalysis physical data to generate high resolution metrics which are then paired with high resolution fishery dependent catch data to serve as indicators for understanding the distribution of the commercially important Northern shortfin squid, *Illex illecebrosus*. Illex are a data poor species due to their sub-annual lifespan and offshore migrations. Recent years have seen above average availability to the U.S. fishery, yet the drivers associated with the high abundance years are unknown. The variable population dynamics exhibited by Illex in the U.S. Mid-Atlantic fishery are largely thought to be influenced

by oceanographic conditions of the Northwest Atlantic, which have documented significant changes over the past decade. Using generalized additive models to examine the relationships between Illex catch and environmental covariates, we identified a suite of oceanographic indicators of habitat condition and primary productivity that may influence Illex availability throughout the fishery footprint. In particular, we found that cooler bottom temperatures, higher instances of warm core ring (WCR) occupancy in the winter and early spring months (ahead of the summer fishery), as well as physical processes that promote upwelling (e.g.: frontal dynamics and interactions between WCRs and subsurface features) are associated with greater CPUE. Understanding relationships between the spatiotemporal distribution of Illex catch and specific properties of oceanographic features (e.g.: mesoscale eddies, fronts) has great utility for advancing our understanding of the mechanistic processes influencing the availability of this species.

Abstract #12
Title: Potential impacts of offshore wind development on fishing operations: comparing fine- and coarse-scale fishery dependent data
Authors: Lianne Allen-Jacobson, Andrew Jones, Anna Mercer, Steven Cadrin, Benjamin Galuardi, Douglas Christel, Angela Silva, Andrew Lipsky, Janne Haugen
Affiliations: Northeast Fisheries Science Center, University of Massachusetts Dartmouth School for Marine Science and Technology, Greater Atlantic Regional Fisheries Office
Contact: andrew.jones@noaa.gov
Abstract:
Climate change will disrupt many aspects of the marine environment, with anticipated effects for half of Northeast U.S. fisheries. To mitigate effects of climate change, the United States has designated 35,000 square miles of ocean for offshore wind energy development, but this growing industry could impact fisheries in the region. Hence, there is a need to measure the spatial distribution of fishing operations to support multiple goals, including spatial planning and compensatory mitigation. In the U.S. Northeast, National Oceanic and Atmospheric Administration Fisheries developed fishing footprints previously by using logbooks. However, logbook footprints rely on coarse data: a single location, the center point of fishing trips reported in logbooks. Therefore, we evaluated bias in these logbook footprints by restricting the size of logbook footprints and by generating active-fishing footprints from fine-scale location data collected by a reference fleet operating in the same region. Active-fishing footprints act as a benchmark approximating the “true” fishing footprint and exposure to wind farms. We focused on the longfin inshore squid, *Doryteuthis pealeii*, fishery, including 336 trips from 2016 to 2019, and 38 wind farms in southern New England and the Middle Atlantic Bight. Compared to the benchmark active-fishing footprints, unrestricted logbook footprints detected all exposed trips. As we restricted the logbook footprints, the logbook analysis failed to detect exposed trips but better approximated the amount of exposed revenue. Finally, unrestricted logbook footprints underestimated the exposed revenue for high-impact wind farms and overestimated the exposed revenue for low-impact wind farms, and this bias declined with logbook footprint restriction. We show how restricting logbook footprints could improve exposure analysis that depends on coarse-scale data when fine-scale data are unavailable. Furthermore, our analysis highlights the

limits of coarse-scale data (i.e., logbook footprints). Therefore, we recommend additional incentives for voluntary participation in programs collecting fine-scale data. These incentives should be prioritized because informed, time-sensitive decisions depend on data collected prior to construction of offshore wind farms.

Abstract #13
Title: Research Set-Aside Programs: Investing in Our Fisheries Through Cooperative Research
Author: Ryan Silva, Laura Deighan
Affiliation: Greater Atlantic Regional Fisheries Office
Contact: ryan.silva@noaa.gov
Abstract:
Research Set-Aside (RSA) programs are unique to federal fisheries in the Greater Atlantic Region. No Federal funds are provided to support the research. Instead, research funds are generated through the sale of set-aside allocations for quota managed or days-at-sea (DAS) managed fisheries. There are active RSA programs established under the Atlantic Sea Scallop, Atlantic Herring, and Monkfish Fishery Management Plans.
The New England and Mid-Atlantic Fishery Management Councils (Councils) set aside quota or DAS, which are awarded through a competitive grant process managed by the Greater Atlantic Regional Fisheries Office. Money generated by the sale of the awarded RSA quota or DAS fund the proposed research focused on Council research priorities. RSA Programs have a demonstrated track record for supporting applied research to inform fishery management decisions and improve stock assessments.

Abstract #14
Title: Permits and Acknowledgments Support Cooperative Research
Author: Laura Deighan, Ryan Silva
Affiliation: Greater Atlantic Regional Fisheries Office
Contact: laura.deighan@noaa.gov
Abstract:
The Greater Atlantic Regional Fisheries Office (GARFO) recognizes the importance of fishing industry stakeholders and scientists working together. Cooperative research is an integral part of the region’s fishery science and management efforts. GARFO supports cooperative research through a program dedicated to providing research permits that enable projects to get on the water and perform their work.
Exempted Fishing Permits (EFPs) and scientific research Letters of Acknowledgement (LOAs) allow cooperative research and development activities outside of the regulatory system. An EFP exempts the participating vessels from specific regulations while participating in research activities. Under an LOA, the vessel is considered a research vessel under the control of a research organization and is not subject to regulations established under the Magnuson-Stevens Act.

APPENDIX IV – NEW ENGLAND COOPERATIVE RESEARCH SUMMIT POSTER PRESENTATION ABSTRACTS

Abstract #1
Title: An “angry public” no more? Cross-group engagement as a tool to de-escalate disputes over science
Author: Lindsey Williams
Affiliation: University of New Hampshire
Contact: lindsey.williams@unh.edu
Abstract:
Natural resource management efforts and the science that is used to inform management often fails to robustly consider the human element of science and management processes. Drawing lessons from dispute resolution and negotiation theory taken together with the literature on public engagement and collaborative processes, we present findings from two case studies, including New England groundfish management and science. Based on participant observation and analysis of semi-structured interviews with researchers, managers, and the regulated community within each case, we explore the role of credibility, legitimacy, and salience in the use of science as well as the impact of engagement and collaboration opportunities. We also explore lessons for how researchers and managers are trained, particularly in preparation for entry into work on at times contentious topics. This project also explored how science can be used as a bridge builder even in contentious settings. Results point to shared interest in collaborative research and other approaches to connect across groups. The role these approaches play in building trust and developing shared understandings of complex systems is also considered. These findings provide potential approaches to think differently about how engagement processes and opportunities to collaborate are designed but also how scientists and managers are trained. Understanding current challenges provides a window to learn and improve for the future.

Abstract #2
Title: Deep-Sea Coral Research
Author: Heather Coleman
Affiliation: National Oceanic and Atmospheric Administration, Office of Habitat Conservation
Contact: heather.coleman@noaa.gov
Abstract:
The Deep Sea Coral Research and Technology Program was established in 2007 under the Magnuson-Stevens Fishery Conservation & Management Act (Section 408), and is administered by the Office of Habitat Conservation within NOAA Fisheries. It is the nation’s only federal research program dedicated to increasing scientific understanding of deep-sea coral and sponge ecosystems. The Program supports multi-year regional fieldwork initiatives and targeted projects centered on integrating new and existing information—including maintaining a national database of known coral and sponge occurrences—to maximize conservation impact while allowing sustainable fisheries to thrive. Downloadable data records, interactive maps, images, technical

reports, and other products can be found on our data portal (https://deepseacoraldata.noaa.gov). The Program's cutting edge and collaborative research aids resource managers in developing and evaluating management options for valuable and vulnerable habitats on which U.S. fisheries and communities depend. To date the Program's work has informed critical management decisions in every region of the United States and its territories. While the Program leverages expertise and resources across NOAA and other agencies, our work would undoubtedly benefit from collaboration with the fishing industry. We have partnered on fishing vessels in the past to conduct seafloor surveys, and have supported creation of observer training materials. We welcome future collaboration opportunities!

Abstract #3
Title: Piloting the fuel efficient, low bycatch, and habitat friendly N-Viro dredge in the Southern New England sea scallop fishery
Author: Michael Long, Michael Marchetti, Christopher Roebuck, and David Bethoney
Affiliation: Commercial Fisheries Research Foundation, F/V Mister G, F/V Karen Elizabeth, F/V Yankee Pride
Contact: mlong@cfrfoundation.org
Abstract:
The Atlantic sea scallop (*Placopecten magellanicus*) fishery is worth more than $500 million per year, making it the most valuable scallop fishery in the world and the second most valuable fishery in the United States. The fishery typically uses New Bedford style dredges, which have been criticized for causing high flatfish bycatch rates and impacting benthic environments. The king (*Pecten maximus*) and queen (*Aequipecten opercularis*) scallop fisheries were criticized for similar impacts in the United Kingdom with New Haven dredges, but they have increasingly been utilizing the N-Viro dredge due to its improved fuel efficiency and reduced bycatch rates and habitat impacts. The Commercial Fisheries Research Foundation, Gulf of Maine, Inc., and Southern New England scallop fishermen conducted at-sea trials to determine the feasibility of the N-Viro dredge for use in the Atlantic sea scallop fishery. Through side-by-side comparisons of the N-Viro dredge and New Bedford style dredges in 2020, the N-Viro dredge showed increased fuel efficiency, reduced habitat impacts, and decreased bycatch rates of at least 50% for nearly all bycatch species. The N-Viro dredge also had decreased catch rates of scallops; however, the N-Viro dredge was more selective for the most valuable larger sized scallops. Further gear improvement work is currently underway in an attempt to increase the scallop catch efficiency of the N-Viro dredge to levels more similar to traditional New Bedford dredges, while still maintaining its benefits in fuel efficiency, bycatch rates, and habitat impacts. The ultimate goal of this work is to use the N-Viro dredge in the sea scallop fishery as a tool that scallop vessels could use to access areas of sensitive habitat, juvenile scallops, or bycatch species with reduced impacts.

Abstract #4
Title: Using An Integrated Ecosystem Assessment To Understand And Prepare For The Impacts Of Offshore Wind On East Coast U.S. Marine Fisheries
Author: Abigail Tyrell, Angela Silva, Fiona Hogan, and Sean Lucey

Affiliation: Ocean Associates, Inc, ECS Federal, Inc, Responsible Offshore Development Alliance, NOAA Northeast Fisheries Science Center
Contact: abigail.tyrell@noaa.gov
Abstract:
The recent plans for rapid development of offshore wind energy in the Gulf of Maine have caused concern among many stakeholders in the fishing industry. Among the many public comments voiced thus far, there has been near-universal agreement that fishing industry data must be adequately considered when the Bureau of Offshore Energy Management (BOEM) designates wind energy areas and when wind project plans are developed. To this end, the NOAA Integrated Ecosystem Assessment (IEA) Program has partnered with RODA and the University of Rhode Island to conduct an IEA on the interactions between fisheries and offshore wind development in the Gulf of Maine. IEAs are an approach to ecosystem-based management that seeks to integrate all components of an ecosystem, including humans, to help inform the decision making process so that managers can balance trade-offs and determine which strategies are most likely to achieve environmental and economic goals. In this project, we aim to (1) identify important linkages between fishing, the environment, and offshore wind development and operation in the Gulf of Maine, (2) discuss these linkages with the fishing industry and identify data to measure the current conditions and potential future impacts from offshore wind, and (3) gather data and use to facilitate the minimization of offshore wind impacts on the fishing industry and monitor the effects of offshore wind on fishing.

Abstract #5
Title: Studies Conducted by SMAST Marine Fisheries Field Research Group in partnership with commercial fishermen – scallop, cod, lobster, whelk, and wind.
Author: Amy Martins, A. Painten, A. Lisi, C. Lego, N. Calabrese, B. Morgan, A. Delargy, J. Richards, F. Phillips, S. Merhoff, S. Wachala, and K. Stokesbury
Affiliation: University of Massachusetts Dartmouth, School for Marine Science and Technology
Contact: amy.martins@noaa.gov
Abstract:
Bringing the fishing community and science together to address biological questions for management and sustainable use of marine resources.
The School for Marine Science and Technology (SMAST), at the University of Massachusetts Dartmouth, emphasizes collaborative research with fishers. Led by Dr. Kevin Stokesbury, the Marine Fisheries Field Research Group studies the population dynamics of marine fish and invertebrates, including their spatial distribution, abundance, life-history parameters, and habitat, and renewable energy development called Offshore Wind. We study the impacts of harvesting and gear effectiveness, and work cooperatively with the fishing community to develop improved fishing strategies. Current projects involving partnerships with fishers include: the Scallop Drop Camera Survey, the Video Trawl Survey, Ventless Trap and Larval Surveys, Whelk Biology, and Offshore Wind Impacts.
Since 1999, we have completed over 155 video cruises surveying Georges Bank, the Gulf of Maine, and the Mid-Atlantic (over 1550 days at sea), with support from the commercial sea scallop industry, the Massachusetts Division of Marine Fisheries (MADMF), and the sea scallop

Research-Set-Aside program (awarded through NOAA Fisheries and the New England Fishery Management Council). This data set provides fine-scale assessments of scallop and other macroinvertebrate densities, as well as sediment and habitat distributions. The data are used in sea scallop fisheries management plans and the Habitat Omnibus. Our research has expanded to lobsters, whelk, and by-catch avoidance systems (driven by industry) for both scallop/yellowtail flounder and sea herring/river herring fisheries.

Abstract #6
Title: Exploration of high-resolution long-term catch and effort series from the NEFSC Study Fleet
Author: Andrew Jones, Jack Wilson, Dave Goethel, and Jim Ford
Affiliation: Northeast Fisheries Science Center Cooperative Research Branch, F/V Ellen Diane, F/V Lisa Ann III
Contact: andrew.jones@noaa.gov
Abstract:
Fishery catch and effort change through time as stocks change in abundance and distribution. Often these trends are observed at a coarse resolution because fine scale data are not available. In the northeast U.S. industry members have participated in a long-running research effort to collect high-resolution catch-and-effort data via an electronic logbook system. These collections now represent valuable windows into how catch and effort have changed over a dynamic period. Here we highlight two fishermen's records that span more than 15 years. Captains Dave Goethel and Jim Ford participated in voluntary high-resolution data collection in a similar region of the Gulf of Maine. Despite differences in their fishing practices and business operations, similar patterns in catch can be seen in both efforts. Specifically, both vessels trended away from harvesting Atlantic cod to other commercially important species, and the depth at which most species were caught trended deeper across years. These examples point to the potential value of these long running records generated by fishermen.

Abstract #7
Title: CFRF Lobster and Jonah Crab Research Fleet
Author: Noelle Olsen, and David Bethoney
Affiliation: Commercial Fisheries Research Foundation
Contact: nolsen@cfrfoundation.org
Abstract:
The CFRF Lobster and Jonah Crab Research Fleet is an excellent example of the willingness and dedication of lobstermen to participate in collaborative research that contributes to the sustainable management of marine resources. Since 2013, commercial fishermen have been collecting biological data from over 200,000 American lobsters, nearly 119,000 Jonah crabs and coupled bottom water temperatures from Southern New England, Georges Bank and the Gulf of Maine. Many of the lobsters sampled are from offshore areas and during times of the year that are not traditionally sampled by federal surveys. These data were incorporated into the 2018 and 2020 lobster stock assessment. In addition, Jonah crab biosamples data were instrumental in the development of the 2015 Interstate Fishery Management Plan for Jonah crab and will be used in

the upcoming 2023 stock assessment. Different from other sampling programs, participant fishermen retain ownership of their data and receive personalized data reports. Finally, this nine-year time series has allowed for work that has extended the impact of the Research Fleet and provides scientists and stakeholders with a better understanding of the lobster and Jonah crab resource which further contributes to sustainable management.

Abstract #8
Title: Offshore wind and cooperative research in the Mid-Atlantic
Author: Colleen Brust
Affiliation: New Jersey Department of Environmental Protection
Contact: colleen.brust@dep.nj.gov
Abstract:
An unprecedented surge in ecological and fisheries research is beginning in the North East and Mid-Atlantic in response to offshore wind energy development. Many surveys and ocean-based experiments are being developed across the region, creating opportunities for cooperative research with commercial and recreational vessels and crew. This poster will provide information about the need for cooperative research for offshore wind, locations of existing leases, types of ocean-based research, successful cooperative offshore wind research projects in New Jersey, and challenges to engaging the fishing industry.

Abstract #9
Title: Environmental Drivers of the Hook Availability for the Gulf of Maine Bottom Longline Survey
Author: Lindsey Nelson, David McElroy, Anna Mercer, Andrew Jones, George Maynard, and Chris Tholke
Affiliation: Northeast Fisheries Science Center, Cooperative Research Branch
Contact: lindsey.nelson@noaa.gov
Abstract:
It is hypothesized that the catch rates of longline surveys are dependent on the availability of baited hooks to fish. Each hook is baited upon deployment, but bait can be lost or can be consumed by fish and invertebrates at any time during the set, thereby affecting catch rates. We sought to characterize the percent of retained baits and other hook dispositions of Northeast Fisheries Science Center's Gulf of Maine Bottom Longline Survey sets in relation to habitat and survey station variables. As a novel approach to collect these data, electronic monitoring camera systems were deployed on partner vessels to record video of the gear retrieval. Video was collected from two fall (2020 and 2021) and two spring (2021 and 2022) surveys and subsequently reviewed and annotated. Individual hook dispositions were recorded into one of four main categories (bait, empty hook, fish, and invertebrate), summarized, and examined across categorical variables (season, day or night, and bottom substrata) and continuous variables (bottom temperature, bottom depth, and substrate rugosity). Bait was the third most common disposition by mean value. Overall, high percentages of retained bait were correlated with low temperatures, rough bottom substrata, daytime hauls, increased bottom rugosity, and shallow

depth. The resulting hook disposition data will be incorporated into catch rate models to develop standardized indices.

Abstract #10
Title: The environmental Monitors on Lobster Traps and Large Trawlers (eMOLT) Program
Author: George Maynard, James Manning, Erin Pelletier, and Huanxin Xu
Affiliation: Northeast Fisheries Science Center, Cooperative Research Branch; Gulf of Maine Lobster Foundation
Contact: george.maynard@noaa.gov
Abstract:
The environmental Monitors on Lobster Traps and Large Trawlers (eMOLT) program is a collaborative effort between the Northeast Fisheries Science Center and the Gulf of Maine Lobster Foundation with support from commercial fishermen, the tech industry, and regional non-profit organizations. Fishermen who participate in the program use a range of sensors attached to their gear to collect environmental observations during the course of their normal fishing operations. The measurements are immediately visible to the captains on a computer in their wheelhouse and are wirelessly transmitted back to a server via satellite or cellular network in near real time. From there, the real time observations are used to fine tune ocean forecast models and the historic data are put to use in a range of data products at the Northeast Fisheries Science Center. The eMOLT program currently has nearly 100 participating vessels between New Jersey and Canada and over 12 million individual data points collected between 1996 and the present.

Abstract #11
Title: Industry-Based Biological Sampling Program
Author: Katie Burchard
Affiliation: Northeast Fisheries Science Center, Cooperative Research Branch
Contact: katie.burchard@noaa.gov
Abstract:
The industry-based biological sampling (InBios) program engages fishermen in collecting fish, shellfish, and cephalopod samples for analysis of age, growth, reproductive and energetic dynamics, and genetic structure. InBios focuses on collecting whole fish from areas and times of year that are otherwise not accessible (e.g., due to limited temporal and spatial coverage standard surveys), but are key to understanding biological and ecological dynamics. Since its inception in 2009, InBios has supported the collection of over 18,500 specimens from 34 different species. This collaborative research program has led to insights into the reproductive dynamics of groundfish, herring, mackerel, and redfish, including annual variation, variation between stocks, fecundity regulation, and the effects of female condition. Ongoing work aims to better understand the environmental and energetic factors that influence the reproductive dynamics of resource species.

Abstract #12
Title: GARFO's Cooperative Research Permitting

Author: Laura Deighan, and Ryan Silva
Affiliation: NOAA Fisheries Greater Atlantic Regional Fisheries Office, Cooperative Research
Contact: laura.deighan@noaa.gov
Abstract:
NOAA's Greater Atlantic Regional Fisheries Office (GARFO) issues permits and acknowledgments in support of cooperative research. This poster will provide information on the documents GARFO issues and the application process.

Abstract #13
Title: Study Fleet: Advancing Scientific Data Collection Through Partnerships with the Northeast Fishing Fleet
Author: Emma Fowler, and Michael Morin
Affiliation: Northeast Fisheries Science Center, Cooperative Research Branch
Contact: emma.fowler@noaa.gov
Abstract:
The Study Fleet program was developed in 2006 to engage commercial fishing vessels in collecting high-resolution catch, effort, and environmental data to address scientific data needs. Detailed information about fishing activity, including effort locations and catch and discard estimates, are logged by captains using a program called the Fisheries Logbook Data Recording Software (FLDRS). Study Fleet captains also record bottom water temperature data using a bluetooth temperature logger and are able to view these data on a laptop in the wheelhouse. Since 2020, a total of 66 vessels from Maine to Virginia have participated in the Study Fleet. The data collected by the Study Fleet are being used to create fishery footprints to better understand the economic and operational impacts of offshore wind energy development on the longfin squid fishery. Study Fleet data have also recently been used to develop standardized catch per unit effort indices for the haddock, American plaice, spiny dogfish, and black sea bass stock assessments. The Study Fleet program also provides a means to collect fish samples for life history research in coordination with the Industry Based Biological Sampling Program. Moving forward, the Study Fleet program will continue to advance the development of electronic data collection tools and application of fishery dependent data to stock assessments, while also expanding contributions to ecosystem-based fisheries science.

Abstract #14
Title: The CFRF-WHOI Shelf Research Fleet
Author: Noelle Olsen
Affiliation: Commercial Fisheries Research Foundation
Contact: nolsen@cfrfoundation.org
Abstract:
Recent warming in the northwest Atlantic has raised a number of concerns about the impacts on the ecosystem and commercial fisheries. In 2014, researchers from the Commercial Fisheries Research Foundation and Woods Hole Oceanographic Institution founded the Shelf Research Fleet to involve fishers in monitoring the rapidly changing ocean environment and encourage sharing of ecological knowledge. The Shelf Research Fleet serves as a model for a cost-effective

research program that engages fishers in the collection of oceanographic data and the process of scientific discovery, which has been effective at breaking down barriers between industry members and the scientific community. The Shelf Research Fleet is a transdisciplinary, cooperative program that trains commercial fishers to collect oceanographic information by deploying conductivity, temperature, and depth (CTD) instruments while commercially fishing. As of October 2022, a total of 792 CTD profiles have been collected by the Shelf Research Fleet. Participating vessels can view the salinity and temperature water column profiles they collect in real-time. These profiles help inform their fishing practices and give insights when unexpected species appear in their gear or if their catch composition changes from previous years. The data collected by the Shelf Research Fleet are shared with and processed by researchers from numerous partnering institutions. The Shelf Research Fleet data have been used by oceanographers to better understand oceanographic phenomena including marine heatwaves, shelf-break exchange processes, warm core rings, and salinity maximum intrusions onto the continental shelf. The scope of the Shelf Research Fleet has grown over time to include efforts to more directly link oceanographic results with biological observations to better understand how changing ocean conditions are affecting commercially important species like northern shortfin squid, *Illex illecebrosus*. This article describes the approach, successes, challenges, and future directions of the Shelf Research Fleet.

Abstract #15
Title: Community-Based Collaborative Fisheries Research: Successes, Challenges and Implications for Regional Natural Resource Management
Author: Owen Nichols
Affiliation: Center for Coastal Studies
Contact: nichols@coastalstudies.org
Abstract:
Community-based collaborative research involving fishermen, scientists and other stakeholders holds great promise for practical, science-based solutions to fisheries management challenges. Stakeholder and partner engagement are critical throughout this process. Three community-based collaborative research case studies from Cape Cod (Massachusetts, USA) are discussed: fish and shellfish habitat investigations in a coastal lagoon; development and testing of a modified sea scallop dredge for flatfish bycatch reduction; and a study of the effects of hydraulic clam dredging in a dynamic nearshore system. Management issues, scientific questions and the stakeholder engagement process were unique to each case study. Community partners were involved in all aspects of projects, from hypothesis development to dissemination of results. Participants in each study experienced successes and challenges associated with communication of management issues and study findings. Transparency in the engagement process was critical; a thorough understanding of stakeholder motivations for participation was required for effective implementation and application to management. Iterative approaches to project development and implementation allowed for expanded engagement of the fishing and management communities. Project partners were accessible to local communities and invested considerable time in outreach and engagement. Lessons learned from stakeholder and partner engagement in community-based collaborative research can be applied to fisheries management at multiple scales.

Abstract #16
Title: Cooperative Research in the North Pacific- 40 years of partnering with industry
Author: Paul McCluskey
Affiliation: Alaska Fisheries Science Center
Contact: paul.mccluskey@noaa.gov
Abstract:
AFSC has a 40 year history of stakeholder collaboration, and currently very successful yearly survey collaborations. The poster will highlight key industry sponsored collaborations with the Alaska Fisheries Science Center, and how stakeholder funds, though collaboration, stretch our cooperative research dollars- all in the name of healthy and productive fisheries.

Abstract #17
Title: Research Set-Aside Programs: Investing in Our Fisheries Through Cooperative Research
Author: Ryan Silva, and Laura Deighan
Affiliation: Greater Atlantic Regional Fisheries Office
Contact: ryan.silva@noaa.gov
Abstract:
Research Set-Aside (RSA) programs are unique to federal fisheries in the Greater Atlantic Region. No Federal funds are provided to support the research. Instead, research funds are generated through the sale of set-aside allocations for quota managed or days-at-sea (DAS) managed fisheries. There are active RSA programs established under the Atlantic Sea Scallop, Atlantic Herring, and Monkfish Fishery Management Plans.
The New England and Mid-Atlantic Fishery Management Councils (Councils) set aside quota or DAS, which is awarded through a competitive grant process managed by the Greater Atlantic Regional Fisheries Office. Money generated by the sale of the awarded RSA quota or DAS fund the proposed research focused on Council research priorities. RSA Programs have a demonstrated track record for supporting applied research to inform fishery management decisions and improve stock assessments.

Abstract #18
Title: Pairing high-resolution environmental data to high-resolution fishery-dependent catch data to understand the influence of oceanographic conditions on Northern
shortfin squid availability
Author: Sarah Salois, Kimberly Hyde, Adrienne Silver, Avijit Gangopadhyay, Glen Gawarkiewicz, Anna Mercer, Brooke Lowman, John Manderson, Sarah Gaichas, Daniel Hocking, Benjamin Galuardi, Andrew Jones, Jeff Kaelin, Greg DiDomenico, Katie Almeida, Bill Bright, and Meghan Lapp
Affiliation: Northeast Fisheries Science Center, University of Massachusetts School for Marine Science and Technology, Woods Hole Oceanographic Institute, Virginia Marine Resource Commission, Open Ocean Research, Greater Atlantic Regional Fisheries Office, Lunds Fisheries, The Town Dock, F/V Retriever, SeaFreeze Shoreside
Contact: sarah.salois@noaa.gov

Abstract:
Oceanographic satellite imagery is a powerful tool for assessing dynamic marine systems in a changing world. Remotely sensed data are well suited for environmental analyses and ecological forecasting as they provide long-term synoptic, near real-time coverage of oceanographic conditions at high spatial (1-4 km) and temporal (daily) resolutions. This study utilizes these long term time series, as well as global ocean reanalysis physical data to generate high resolution metrics which are then paired with high resolution fishery dependent catch data to serve as indicators for understanding the distribution of the commercially important Northern shortfin squid, *Illex illecebrosus*. Illex are a data poor species due to their sub-annual lifespan and offshore migrations. Recent years have seen above average availability to the U.S. fishery, yet the drivers associated with the high abundance years are unknown. The variable population dynamics exhibited by Illex in the U.S. Mid-Atlantic fishery are largely thought to be influenced by oceanographic conditions of the Northwest Atlantic, which have documented significant changes over the past decade. Using generalized additive models to examine the relationships between Illex catch and environmental covariates, we identified a suite of oceanographic indicators of habitat condition and primary productivity that may influence Illex availability throughout the fishery footprint. In particular, we found that cooler bottom temperatures, higher instances of warm core ring (WCR) occupancy in the winter and early spring months (ahead of the summer fishery), as well as physical processes that promote upwelling (e.g.: frontal dynamics and interactions between WCRs and subsurface features) are associated with greater CPUE. Understanding relationships between the spatiotemporal distribution of Illex catch and specific properties of oceanographic features (e.g.: mesoscale eddies, fronts) has great utility for advancing our understanding of the mechanistic processes influencing the availability of this species.

Abstract #19
Title: Shortfin Squid Electronic Size Monitoring Project (ILXSM)
Author: Anna Mercer, Thomas Swiader Jr.
Affiliation: Northeast Fisheries Science Center, Cooperative Research Branch
Contact: anna.mercer@noaa.gov
Abstract:
The life history and population dynamics of the northern shortfin squid (*Illex illecebrosus*) are poorly understood due to a paucity of data, yet the species supports a productive fishery on the northwest Atlantic continental shelf. The Shortfin Squid Electronic Size Monitoring Project (ILXSM) was developed in 2021 to address the need for individual shortfin squid size and weights throughout the fishing season, which are key for understanding the ingress, egress, growth, and reproduction of this semelparous species. To achieve this goal, the ILXSM team developed an electronic data collection system that can be used by the region's shortfin squid processors to collect biological data during the vessel offload process. Six shortfin squid processors were provided with Big Fin Scientific electronic fish measuring boards, Marel digital Bluetooth scales, and ruggedized Samsung tablets running the BioLogical Information System Software (BLISS) to efficiently collect paired mantle lengths and gram weights for a subsample of squid from each vessel offload. These data are uploaded to NEFSC databases for scientific

analysis and downloaded by processors for use in sales and marketing. In 2021 and 2022, processors collected over 60,000 shortfin squid mantle lengths and weights. This project plays a critical role in documenting rapidly changing dynamics of the shortfin squid population and promotes long-term conservation of this valuable fishery resource.

Abstract #20
Title: Characterizing bycatch and depredation in northeast U.S. sink gillnet fisheries.
Author: Andrea Bogomolni
Affiliation: None
Contact: abogomolni@gmail.com
Abstract:
Fishery interactions are a critical concern for marine mammal population and ecosystem health. Fishery bycatch is currently the primary cause of mortality for marine mammals globally. In the United States, gray seals experience the highest bycatch mortalities of all marine mammals while also being reported as increasingly depredating gillnets. Focusing on issues surrounding bycatch and depredation will help maintain sustainable fisheries and practices while addressing the impacts of conservation and management measures. We are using several methods to document interactions between gillnets and marine life, including underwater video cameras mounted on fishing gear, and on-deck documentation of depredation using scoring methods previously developed to identify predators of depredated catch. We have documented depredation using traditional hard-part analysis and prey and DNA sequencing analysis of stomach contents from bycaught seals. Our objectives are to provide scientific support to commercial fishermen to allow for scientific ground-truthing of anecdotal evidence of depredation events. Our overall objective is to build collaboration, trust, and community among local fishermen, researchers, and managers including documenting bycatch of marine mammals; and provide a platform for scientific research using commercial fishing operations. To date, we have obtained the first video footage of sink gillnet actively fishing in the northeast U.S., with documentation of depredation via this video analysis and from directly observed depredated catch. Results indicate the primary target species for seals remains forage fish surrounding the nets with some depredation of target catch. This was supported by prey DNA and hard part stomach content analysis. Video analysis was used to quantify and characterize how and when these events take place.

Abstract #21
Title: Overview of On-Demand Fishing Progress in US Northwest Atlantic: A Collaboration
Author: Eric Matzen, M. Amico., R. Asmutis-Silvia, E. Fuller, B. Galvez, C. Khan, H. Milliken, M. Moore, B. Sharp
Affiliation: Northeast Fisheries Science Center, Whale and Dolphin Conservation, Conservation Law Foundation, Woods Hole Oceanographic Institution, International Fund for Animal Welfare
Contact: eric.matzen@noaa.gov
Abstract:
Since 2018 the Northeast Fisheries Science Center (NEFSC) has collaborated with members of the pot/trap fishing industry, conservation NGOs, researchers, and engineers to advance the development of on-demand fishing systems that are feasible in a variety of commercial fishing

conditions. This gear has the potential to reduce or eliminate the entanglement risk buoy lines pose to endangered North Atlantic right whales and to enable fishing in areas closed to fishing with static vertical lines. As a direct result of input from fishermen using the gear under normal fishing operations, significant improvements in the design of the on-demand systems are in place. In addition, this collaboration addresses concerns related to testing, permitting, and outreach and resulted in the formation of a gear lending library. This library contains on-demand systems from multiple manufacturers and allows fishermen to trial a variety of gear, provide feedback to improve the operability of these systems, familiarize themselves with on-demand systems, and alleviate potential misconceptions regarding the gear. The Gear Research Team at the NEFSC has spent considerable time training and providing these on-demand systems in multiple fishing ports from Maine to North Carolina. The results of this work have led to: improved technical and operational success of these systems; a foundation for best practices on use of this gear in areas of high current, poor weather, and low light conditions; and safe handling of this gear. Additionally, this collaborative effort is helping to develop electronic methods to avoid gear conflict (see Khan et. al.). This work has succeeded in moving the development of new fishing practices forward because of the willingness of fishermen, NGOs, academics, state and federal scientists, managers and enforcement officers to work together to help fishermen access areas closed to vertical lines while also minimizing the risk of whale entanglements.