



## New England Fishery Management Council

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### MEETING SUMMARY

#### Research Steering Committee

Holiday Inn, Taunton, MA

July 19, 2017

The Research Steering Committee (RSC) met on July 17, 2017 in Taunton, MA to: 1) discuss how the Council's research priorities and data needs may be met, 2) discuss the future of the Northeast Cooperative Research Program and stock assessments, and 3) review recently-completed research projects.

**MEETING ATTENDANCE:** Mark Alexander (Chairman), Bill Gerencer, Jake Kritzer, Richard McBride, Chris McGuire, Matt McKenzie, Peter Moore, Mike Pol, Ryan Silva, and Mike Sissenwine. The RSC was supported by NEFMC staff: Rachel Feeney (RSC Coordinator) and Jamie Cournane (Groundfish Plan Coordinator). About 8 others attended, including Northeast Fisheries Science Center (NEFSC) staff and participants of the research projects discussed.

**SUPPORTING DOCUMENTATION:** Discussions were aided by the following documents:

1. Meeting cover memo
2. Meeting agenda
3. Summary of March 23, 2017, RSC meeting
4. Research Priorities
  - a. Council's *Research Priorities and Data Needs for 2017-2021*
5. Northeast Cooperative Research Program
  - a. *Cooperative Research in the Northeast: A Strategic Direction for 2010-2014*
  - b. *Northeast Fisheries Science Center Strategic Science Plan, 2016-2021*
  - c. *Program Review of the Northeast Fisheries Science Center Northeast Cooperative Research*, September 2016
  - d. *Northeast Cooperative Research Program Review, Northeast Fisheries Science Center Summary and Response*, March 2017
  - e. NEFSC presentation slides (Hare)
  - f. NCRP presentation slides (Hoey)
  - g. Cooperative research summary and response
6. Future of stock assessments
  - a. *Implementing a Next Generation Stock Assessment Enterprise: An Update to NOAA Fisheries' Stock Assessment Improvement Plan – DRAFT document for discussion purposes*, presented at June 2017 Council meeting
  - b. NEFMC letter to NOAA Fisheries, with comments on the Stock Assessment Improvement Plan, June 23, 2017
  - c. Presentation slides (Gerencer)
  - d. Video of tracking software
7. Management reviews
  - a. RSC-related excerpts of the Council's *Operations Handbook*
  - b. RSC management review worksheet

8. Project: *Assessing recreational haddock discard mortality on Jeffrey's Ledge through an industry-led collaborative mark-recapture tagging program*
  - a. Project final report, January 20, 2017
  - b. Northeast Consortium's final technical evaluation criteria
  - c. NEC technical evaluation #1
  - d. Project final report as revised, July 2017
  - e. GIS map weblink: <http://arcg.is/1yGz1G>
  - f. Presentation slides (Bradt)
9. Project: *REDNET - A Network to Redevelop a Sustainable Redfish (Sebastes fasciatus) Trawl Fishery in the Gulf of Maine*
  - a. Project draft final report, May 16, 2016
  - b. NCRP final report review, June 28, 2017
  - c. Presentation slides (Pol)
10. Project: *GEARNET - Northeast Groundfish Gear Conservation Engineering and Demonstration Network*
  - a. Project final report with appendices, November 2, 2014
  - b. NCRP final report review
  - c. Presentation slides (Eayrs)
  - d. Summary table

### ***KEY OUTCOMES***

- At the next meeting, the RSC hopes to review how other Councils have prepared lists of research priorities and develop a proposal for a process that is more structured, with rationale and updates on the status of needs.
- The RSC hopes to continue engaging with the NEFSC in shaping the future of collaborative research and the direction of the Northeast Cooperative Research Program
- The RSC discussed three research projects, made recommendations on the use of project outcomes in management, and recommended that the network approach to funding research be reviewed.

### ***INTRODUCTION AND AGENDA REVIEW***

Chairman Mark Alexander began the meeting began at 9:05 a.m. There were no agenda changes.

### ***COUNCIL RESEARCH PRIORITIES AND DATA NEEDS***

RSC Coordinator Dr. Rachel Feeney updated the RSC that, with input from its Scientific and Statistical Committee (SSC), the Council approved its *Research Priorities and Data Needs for 2017-2021*. The document was submitted to the National Marine Fisheries Service (NMFS) on July 9. She updated the RSC on steps taken to date regarding communication/use of the priorities and asked for additional ideas.

- The document has been posted to the Council's website.
- The New Hampshire Sea Grant Director has been alerted that the priorities have been finalized, as a follow-up to an earlier discussion.
- On June 2, she spoke with NMFS staff regarding the Bycatch Reduction Engineering Program (BREP), which has been funding research since 2008. Ryan Silva (NMFS/GARFO) and Henry Milliken (NMFS/NEFSC) sit on a national committee of NMFS staff to help ensure that BREP is helping meet regional needs. Council Executive Directors have been asked for input on the relevance of research proposals. This has occurred annually, with the exception of 2017, but there are plans to continue this in

2018. There is no formal process for completed BREP projects to be communicated to Council, and an on-line searchable database is under development, but BREP staff can provide final reports upon request. Dr. Feeney has received several reports that may be relevant to the NEFMC.

- On July 5, the new NMFS Assistant Administrator Chris Oliver asked Council Executive Directors for input by July 17 on draft FY2018 Saltonstall-Kennedy (S-K) Grant Program priorities. Due to the turn-around time, Council staff developed comments on the four draft program priority areas (marine aquaculture; adapting to environmental change; seafood promotion, development and marketing; and territorial science (stock assessments and catch accounting in the U.S. territories)).

In support of the RSC's discussion of how the research priority setting process may be improved, she showed examples of research priority documents from two other councils (North Pacific and Gulf of Mexico) that have the priorities prioritized.

Chairman Alexander reviewed the key points of the SSC and Council discussions of the priorities, indicating that this is an opportunity to let NMFS know what is important to the Council and hopes NMFS will respond by incorporating the priorities into its research program. The SSC hoped for more context for the priorities, notes on progress towards fulfilling data needs, and a committee process including PDT representatives to help prioritize the list. There was concern that the list is underused. He opened the floor for ideas on how these priorities and needs may be addressed and improvements to future priority setting processes.

Dr. McBride noted that the Council's priorities were just used for input into the S-K priorities. Chairman Alexander noted that an annual update of the Council's priorities would help in responding to specific requests for input.

Dr. Sissenwine felt that the Councils should give input on the appropriateness, generally, of aquaculture as an S-K priority – that NMFS has “flip-flopped” its position on its role in supporting aquaculture development, and it is unclear how resources directed towards aquaculture may be competing for resources for wild capture fisheries. When aquaculture is a top priority, it raises the question about where NMFS stands in its priorities. To improve use of research priorities, there is feedback at the regional level (e.g., stock assessment needs). At the national level, there are many programs that fund research, but he doubts that RSC members know what they all are. What are the programs? Each has a program manager. Does NMFS have a process to look for input? We should ask questions of NMFS, so that it is a two-way street.

Mr. Moore sits on the Marine Fisheries Advisory Committee. There is a call in August and he offered to ask about the status of aquaculture as a priority, and if its funding is being taken from funds that have been targeted for wild fisheries. He asked how the NPFMC priorities were developed. Dr. Feeney was unaware, but could ask for a future RSC meeting. However, the NPFMC does not have a RSC like ours. Mr. Moore noted that there is a lot of state input on Alaskan fisheries.

Mr. Pol noted that there are no bycatch-reduction priorities in S-K. He thought that the RSC was going to give input on the 2017-2018 priorities (see Consensus Statement #7, RSC Meeting Summary, March 23, 2017), but that opportunity was no longer available. Thus, the RSC needs to define a role for itself. Likely, no one has the global knowledge to really say which the top priorities are. Dr. Kritzer thought the RSC's decision at the previous meeting was defensible, but the Council did not accept the recommendation to work on the priorities further. We should not assume that we will get another chance for input. Dr. Feeney clarified that since the Council last updated the list in 2009 for 2010-2015, and had been developing the current list over the last two

years, the list needed to get done. She encouraged the RSC to give input on improving the process for next time.

Mr. McGuire proposed that the RSC define the process for putting things on the list, like terms of reference for the experts on the PDTs. A more structured process may help. For example, ask the PDTs to rank their input in terms of its urgency. The Council's priorities could be helpful for the review of proposals to check whether the proposal matches regional priorities.

Dr. McKenzie offered that the annual setting of management priorities is a chance to highlight research priorities.

Mr. Silva agreed that the Council's research priority list is not used heavily, that it is a cumbersome, lengthy document. Since it is only updated every five years or more, its relevancy to annual competitions has been questioned. Many funding programs are national, and resist getting bogged down in regional lists. Henry Milliken and he have been giving regional input to the BREP program.

Dr. Sissenwine noted the need for two-way communication. At the regional level, there is good back-and-forth on shaping data needs. Then, there is the national process to prepare budget initiatives, which is a high level (aquaculture vs. stock assessment).

The Chairman suggested that, at the next meeting, the RSC review how other Councils have prepared research priorities and that PDTs should provide rationale and updates on the status of needs. Mr. McGuire supported this approach. Mr. Pol recalled that the RSC has been asking the PDTs for improvements in setting priorities, but it would be better to provide a structure/format for what the RSC wants. Mr. Moore reminded the RSC that Advisory Panels should be included in the process, to include user groups.

#### ***NORTHEAST FISHERIES SCIENCE CENTER/NORTHEAST COOPERATIVE RESEARCH PROGRAM***

Dr. Jon Hare (NEFSC Director) gave some introductory comments in support of the Council developing research priorities and hopes for strengthening research and engagement in cooperative partnerships.

Dr. John Hoey (NEFSC/Cooperative Research Branch Deputy Director) presented a recent history of NCRP, prior reviews, current activities, recent program review, NEFSC response, and next steps. Since the inception of the program, it has focused on improving the assessments in a quantitative manner. While the program invested in a variety of research projects during the years – recent peer reviews and public strategic planning meetings have focused priorities on surveys, fishery dependent monitoring, filling data gaps, and conservation engineering. From 2009-2011, NCRP funded six cooperative research networks: three for gear (GEARNET, REDNET, and a squid network) and three attempting to use spatial data for bycatch avoidance (e.g., a network led by the Gulf of Maine Research Institute regarding marine mammal interactions). In response to the recent program review, the NEFSC is planning internal workshops to communicate the value of cooperative research and improve awareness and integration of NCRP products and services. NEFSC goals for FY18 include instituting cross-cutting cooperative research study teams and mechanisms to engage industry in this process. The NEFSC will continue to support and emphasize the Fisheries Dependent Data Visioning Project (FDDV); continue to develop and support electronic data transfer from fishing vessels.

Mr. Moore noted that the GEARNET project's funder, the NEFSC/NCRP, had staff on the steering committee. This is an unusual approach, but seemed positive. Dr. Hoey agreed that it was unusual. Generally, grants are administered with a hands off approach, but it can be hard to get the data afterwards. Data archiving and access is an issue. Contracts are very specific with

little ability to adjust. A network approach is more flexible, and has a steering committee to stay on track. It was a new idea. The NEFSC ran a series of workshops ahead of time. There are some challenges in working with academia in this structure. This approach was tried simultaneously with the transition to the groundfish catch share program. Given the focus on the transition, it was a struggle to engage industry. We need ways to do more with less and overhead rates can gobble up a lot.

Dr. Kritzer noted that it seems like the industry surveys are producing similar answers to federal surveys, using similar gear. He appreciated learning about the longline survey to survey areas inaccessible to other gears. Environmental Defense Fund is interested in better using CPUE data in assessments (size and age composition) and wondered if the NCRP projects would be helpful. Dr. Hoey suggested that the biggest problem with fishery-dependent data is the denominator, the effort metric, which is highly variable and uncertain.

Dr. McGuire supports increasing the use of cooperative research data in the scientific process. The review documents suggest that NCRP should push others in the NEFSC to use the data, rather than a pull or initiative from others to seek out data or identify what their needs are – that there seems to be a disconnect. Is there not that much desire within the NEFSC to use fishery-dependent data? Dr. Hoey noted that the assessment world likes time series, and so there has not been as much interest in NCRP work that was focused on research and development. He felt that things are changing within the NEFSC to identify needs, but people have needed more confidence in the quality of the data.

Mr. Andrew Lipsky (NEFSC/Cooperative Research Branch Deputy Director) noted that a good example of getting industry input was in preparing for the mackerel assessment. The assessment team went to ports to meet with industry to understand data gaps. The NEFSC aims to create cooperative research study design teams to integrate cooperative research into research programs.

Dr. Sissenwine noted that using the data is an important challenge. He recalled lessons from 2002 about success factors: more funding, that programs are cooperative throughout (e.g., origin of the idea), and had realistic expectations (e.g., what can cannot be done with the data). We need to figure out processes that encourage both.

Chairman Alexander noted a lack of longevity for the cooperative surveys. There were a few monkfish surveys, but none since 2008. He asked what prevents surveys from progressing. Funding? Loss of industry interest? Dr. Hoey indicated that it's mostly a lack of long-term commitment of funds, but some of the surveys were not intended to be long-term, but answer a specific question. Snapshots can be helpful if replicated through time (e.g., MADMF cod surveys). The ME-NH and NEAMAP are multi-state, critical projects. He was disappointed to see the elimination of the scup ventless trap survey. There needs to be a larger, regional perspective on the appropriate mix of surveys.

Mr. Moore noted the recent article on the return of river herring to Maine rivers and asked if NCRP is involved in the ecosystem work (e.g., thermal habitat models) of the NEFSC. Dr. Hoey indicated that the NCRP has focused on avoiding bycatch caps, but other parts of the NEFSC have been more involved in ecosystem work, but there are opportunities for collaboration.

The Chairman asked the RSC to consider developing recommendations for NCRP and how it may contribute to addressing Council research priorities. He asked the NCRP staff about the review recommendation for developing a research prioritization within the NEFSC and how the Council's priorities can feed into that. Dr. Hoey indicated that the NEFSC is still working on developing that process, based on internal workshops being conducted, to have a broader group

within the center help decide what the NCRP priorities are. He looks for overlaps between Council priorities and the NEFSC programs. The Council's five-year plans, and input from specific PDTs or industry have been used, but are also working with MAFMC and ASMFC priorities too. The NCRP priorities have also been driven by who is willing to participate (e.g., the herring midwater trawl vessels). Mr. Lipsky indicated that the NEFSC will hold a series of internal and external workshops over the next 3-6 months, but he's interested in hearing the RSC's thoughts on how the NEFSC can engage with external partners. The Director has indicated that there needs to be a plan for collaborating in FY18.

Mr. Moore was involved in the butterfish and mackerel work, and the mackerel process was very effective in looking at the assessment schedule and laying the groundwork for the gaps and filling those gaps. The process is much more robust, in bringing the users into the process. Mr. McGuire agreed and stressed the need for collaboration (developing projects together) than simply cooperation (I have an idea and will pay you to go fishing). He hopes that the NCRP will create an atmosphere of collaboration.

Dr. Hoey hopes to continue working with the RSC to have regular forums for discussion and input on long-term vs short-term activities. Chairman asked if the internal and external workshops are to design a process or implement it. Mr. Lipsky thought that they would likely do both. RSC members would like to be involved in workshops. Dr. Sissenwine noted a plethora of ideas and interested people, but a lack of structure. Some needs are one-off experiments, some are methods development, and some are a long-term commitment to time series data collection. What is the role of cooperative research in developing time series? Workshops may help develop a balance between those needs. How do we get a collective agreement about which time series are important and the best vehicle for implementing them? The RSC should be engaged. Mr. McGuire agreed, indicating that the Nature Conservancy tends to fund one-offs projects, because that is how TNC is set up to fund projects. External entities can do the one-offs, but only the government has funding to do the sustained projects.

### ***FUTURE OF STOCK ASSESSMENTS***

Chairman Alexander reviewed the Councils comments developed in June 2017 on the *Draft Stock Assessment Improvement Plan*. For example, there should be a periodic/ongoing data gap analysis, there should be a focus on improving data-poor assessments, there was uncertainty whether the data acquisition process still existed and how assessments were prioritized, and that data should be more publicly available.

Mr. Gerencer presented his perspectives on some challenges with stock assessments. He felt that the best available science should have a low level of uncertainty and a high level of industry buy-in and support, but there are several examples of a "whipsaw" of drastically changing assessment advice. He is concerned that natural mortality (M) is typically set at 0.2, but that assumption is often not tested. Are landings a good indicator of stock size? No. Fishermen are avoiding certain species, which has shrunk the universe of fish being sampled portside. There is a lot of uncertainty about discards. He is concerned about the quality of key data sources feeding into assessment models. He offered ideas for how data collection may be improved with technology such as acoustics (to count fish when they aggregate during spawning) and analyzing video data with software that identifies species. Since there was a commitment to changing the way scallops are assessed, we can also change for cod. It takes commitment.

Mr. Moore asked for his thoughts on whether an ecosystem survey should be used. Mr. Gerencer clarified that because he feels that other data inputs have been compromised, the assessments lean heavily on the survey. Dr. Kritzer agreed with many points and that stock assessments are

the most important pieces of fisheries science, but offered a clarification that if landings are going down, the model does not necessarily indicate that the biomass is going down, unless the survey is too. The landings data help with scaling, and the survey is important for the trend, so it does need to be consistent in its application and selectivity. That's not to say that there are not improvements to be made, but we need to evaluate the data streams for what their intent is with the model. Dr. Sissenwine supported a process for dialogue, which seems lacking. NMFS trawl survey was designed in the 1970s as an ecosystem survey before there were stock assessments. Then, it was decided that it would be helpful for assessments. It's a backbone, but it has limitations. We can draw on the ecosystem survey for some data, but it needs to be supplemented with specialized surveys. We need to decide collectively which surveys are worth pursuing. Mr. McGuire noted a timing issue - the process for collecting data to implementing an ACL was built at a time of slow data. For the new generation of assessments there are efficiencies in how data is collected, but it still takes lots of time to respond, chugging through management. How do we start deliberately shrinking the time to respond? Mr. Moore asked how the assessments handle fishing avoidance in the fishery data. Dr. Kritzer clarified that, from the point of view of the assessment model, the major thing is what the catch was, so the biomass can be scaled and estimate the fishing mortality rate (F). Dr. John Manderson (NEFSC) noted that recently, mackerel landings were very low due to a haddock closure, and that landings was not an indicator of the scale of the population. Dr. Sissenwine pointed out that, historically, catch was used to scale the population with a correction for natural mortality. It used to be a little correction, but it tends to be larger now relative to fishing mortality. Mr. Pol noted that a lot of redfish and haddock pass through a 6.5" mesh net, and there is some damage from passing through the net. The associated mortality is not captured well in F or M. Mr. Gerencer noted that the trawl survey has been noisy, with an example of grey sole. People stopped fishing for grey sole, and then, during the next assessment, the index went down. The industry has little confidence in the survey. The net is known for not catching flatfish.

## ***MANAGEMENT REVIEW OF FINAL RESEARCH REPORTS***

### ***Staff updates***

Upon the request of Chairman Mark Alexander, Dr. Jamie Cournane (Groundfish Plan Development Team (PDT) Coordinator) provided updates on the projects that were discussed by the RSC at its March meeting:

*Small mesh fishery bycatch reduction in the southern New England/mid-Atlantic windowpane stock area (Hasbrouck):* This project was reviewed by the Groundfish PDT at its June 1 meeting. The PDT is working on a memo to the Groundfish Committee and Executive Committee prior to their August meetings, recommending that the Council recommend to NOAA that the gear be added to list of approved gears.

*Determining the post-release mortality rate and best capture and handling methods for haddock discarded in Gulf of Maine recreational fisheries (Mandelman):* This project was reviewed by the Groundfish PDT at its June 1 meeting, and the PDT is using project information in developing recreational measures in Framework 57. The SSC also felt that the project will be useful for the groundfish operational assessments. The project will also be discussed on July 24 by the Stock Assessment Oversight Panel.

*Mapping the distribution of Atlantic cod spawning on Georges Bank using fishermen's ecological knowledge and scientific data (DeCelles):* The Council is not working on cod

spawning protection measures at present. It is expected that the project would be useful for the upcoming workshop on cod stock structure coordinated by the NEFSC.

*Northeast multispecies fishery flatfish bycatch and market analysis (Cadrin):* This project will be discussed by the Groundfish PDT at its August 3 meeting, relative to the development of 2018-2019 specifications for Georges Bank yellowtail flounder. The SSC will also have the document for its meeting on August 8.

*Identifying offshore spawning grounds of Gulf of Maine winter flounder (Fairchild):* The Council is not working on spawning protection measures at present, but the PDT expects this project to be useful in the future.

*Synoptic acoustic and trawl survey of winter-spawning cod in Ipswich Bay, western Gulf of Maine (Sherwood):* The Council is not working on spawning protection measures at present, but the PDT expects this project to be useful in the future.

Mr. Pol noted that these projects were selected for funding, because they were high priorities of the Council. Because a few of the projects are no longer high-priority, are there lessons for priority-setting here? Dr. Cournane noted that they were at the time, and it may be not that far off in the future that spawning issues get worked on again. Having the information is helpful. For example, in 2014, we learned that the Gulf of Maine haddock stock was doing much better than was thought, and GOM cod much worse. At that time, prior research on spawning was useful in identifying area-based management responses in addition to quotas.

Mr. Silva asked about why the PDT is involved in the process of approving the gear from the Hasbrouck study. He thought that the process was that the recommendation goes straight to the Council. Dr. Cournane clarified that additional analyses were requested regarding the thresholds for gear standards. Chairman Alexander noted that it went to the PDT to help sort out the selectivity of the target species. Dr. Feeney clarified that when the Council asks for a gear approval, certain analyses are necessary first. Dr. Cournane commented that it is better to submit a full packet once rather than have several rounds of review.

*Project: Assessing recreational haddock discard mortality on Jeffrey's Ledge through an industry-led collaborative mark-recapture tagging program*

Dr. Gabriella Bradt presented a summary of the project, which aimed to calculate a recreational discard mortality rate for Gulf of Maine haddock through tagging 20,000 haddock from May 2015-Dec 2016 in collaboration with the largest charter business in New Hampshire, Eastman's. Although over 16,000 fish were tagged, due to low tag returns (0.005%), the mortality rate could not be estimated, though there is some interesting data on haddock movement and post-tagging survival.

Mr. Pol asked who returned tags. Dr. Bradt indicated there were cases when about three months had passed between when a tagged fish was landed and when the tag was reported. Tag returns are voluntary. Most tags were from Eastman boats. One tag was returned by a processing company in Indiana. A few were returned by commercial fishermen from Portland and Gloucester. Dr. Sissenwine asked if there was outreach to the commercial sector. Dr. Bradt indicated so. Mr. Silva noted there may have been low interest in returning tags or tag shedding, and it is hard to know which it is. He asked how vested the crew was in the project. Dr. Bradt indicated that the vessels had to satisfy their clients first before focusing on the research components. There were a lot more fish tagged before the season peaked. The crew were professional, but short-handed. The project was limited by money. Mr. McGuire asked if the



crew were compensated. She indicated so, but not a lot. Mr. McGuire asked if a conventional tagging program can answer this question based on this experience. She noted that for the effort (339 trips), this might not be the best approach. Tagging programs are notorious for low returns. She wondered if some other reward would help and if the project was too short (24 months). Dr. McBride asked how many fish were tagged in year 1. She indicated about 5,000. Dr. McBride asked if a tagging cradle and live well were used. She indicated not. Fish that were still in good condition got tagged, and the fish were watched once released. He asked if she was familiar with the Mandelman report, which projected a discard mortality rate of 56% and that most deaths were within 24 hours of release. She had not seen the report and noted some fish were returned several hundred days later. Dr. Sissenwine noted the conceptual issue of whether or not the fish were being handled similarly as in fishing operations, and if not, he was unsure how an unbiased estimate of mortality could be calculated; the fish that are already dead before tagging should be included in a mortality estimate. Dr. Bradt indicated that the project tried to mimic fishing operations, apart from tagging the fish and throwing it back. Dr. Sissenwine asked about preserving the data in the future; there should be policy about a permanent archiving of data. Dr. Meredith noted that there is a national tagging database (I-MARK), but the NCRP is also trying to archive cooperative research data. Dr. Cournane suggested forwarding the document and its data to the PDT for developing recreational measures – not necessarily for discard mortality, but catch and bycatch data may be useful and is rare.

**Consensus Statement #1:** The RSC recommends forwarding this project and its data to the Groundfish PDT for consideration in developing recreational measures and to forward the data to the I-Mark database for archiving.

*Project: REDNET: Redeveloping a sustainable redfish fishery in the Gulf of Maine (Pol)*

Mr. Mike Pol presented a summary of the project, which aimed to assemble a network of experts, convene meetings, establish a baseline of information, use exploratory fishing to gather information on temporal and spatial distribution of redfish, evaluate appropriate codend mesh sizes and shapes, develop bycatch reduction methods or strategies if necessary, evaluate potential markets and processing capacity, and provide outreach and recommendations. Harvesting redfish with a 4.5” diamond mesh could be conducted without substantial catch of undersized redfish and other commercially important species, and substantial escapement was documented. Continuity and stability of supply would increase demand. About 70% of redfish landings goes to the bait market, and processing capacity is not a limiting factor.

Mr. Moore asked for clarification on the mortality of redfish that escape through the net, and suggested that a quota fishery should use a smaller mesh if they are going to die anyway. Mr. Pol clarified that, with a 4.5” codend, 50% of the redfish that enter the net are going to escape, but escapee mortality is speculative. Redfish cannot off-gas their swim bladder. He noted many reasons for caution in managing the fishery, but a 6.5” mesh is very inefficient. Chairman Alexander noted that the RSC had already commented on the gear selectivity components in prior meetings. In 2014, the RSC supported considering sector exemptions for a smaller mesh size. Dr. McKenzie noted that the fishery emerged in the 1930, resurrecting Gloucester, but it has crashed several times with using small mesh. He wondered if using a larger mesh could create a more steady supply for market. Mr. Pol was concerned about the uncertainty of the codend escapee mortality.

Dr. Kritzer commented on the uniqueness of redfish in the groundfish complex, and wonders if it needs to be assessed and managed differently. Dr. Sissenwine agreed and noted that during the crash in the 1980s, it was concluded that there was no F that would have been sustainable, but that the fishery exists off of dominant year classes that come around periodically.

Dr. Cournane noted the upcoming operational assessments, and wondered if the assessment scientists have seen the data. The most recent stanzas for selectivity can be updated. Fishery selectivity could be used as a diagnostic/validation tool. There is an assessment oversight panel meeting on July 24 and she could help relay information. Changes would need to be agreed at that meeting. Mr. Pol indicated that he has been working closely with Brian Linton.

**Consensus Statement #2:** the RSC recommends that the outcomes of the REDNET project (e.g., codend selectivity for diagnostics and in projections) be conveyed to the stock assessment teams and the Groundfish PDT and Committee for scientific and management purposes. The RSC notes that the boom and bust nature of the historical fishery may warrant consideration of different management approaches.

Mr. Pol felt that his dissertation would likely be done in time for the operational assessments.

*Project: GEARNET: Northeast Groundfish Gear Conservation Engineering and Demonstration Network (Eayrs)*

Dr. Steve Eayrs presented a summary of the project with project partner Mr. Mike Pol. GEARNET developed a bottom-up approach that funded 35 separate research projects with fishermen in the New England groundfish fishery. The aim was to help groundfish fishermen develop and adopt fishing equipment that improves efficiency and selectivity, reduces environmental impact, and helps secure a sustainable, profitable groundfish resource and industry. Overall, more than 96 individual fishermen and others participated in these projects, spanning themes of fuel conservation, trawl and gillnet selectivity, seabed impact, alternative gear, and education. Fieldwork was completed from Maine to Rhode Island. Outcomes from projects included the adoption of small-diameter large-mesh trawl netting, semi-pelagic doors, and fuel flow meters to reduce fuel consumption (and seabed contact, in the case of the doors), the invention of an innovative self-closing codend that allows fishermen to limit catches to predetermined levels, and distribution of harbor-porpoise reducing, easier-compliant gillnet pingers at minimal cost. The projects had a number of challenges. In some cases, sectors were complaining about the state of the fishery, but they could not develop ideas for solutions. Fishermen requested fuel meters, but some did not install them. There was an overall lack of bandwidth; it has been a trying time for the industry, and there has been hesitation to change operations.

Mr. Silva asked if the industry commitment might be better now. Dr. Eayrs said that there are a lot of industry members just hunkering down and resistant to testing. Even if they could be more efficient, there would likely still be challenges with participation. Mr. Pol added that in regions where fishing is better, industry is more willing to try changes. Momentum for projects and relationships continues, including between the project leaders.

Mr. McGuire noted that the REDNET steering committee network was really big, but GEARNET was smaller, but with ties going out to other groups; he asked if one approach was preferable going forward. Mr. Pol indicated that both networks developed organically; in GEARNET, personal relationships mattered. For REDNET, a large group of people was needed to make decisions.

Dr. Sissenwine asked about how GEARNET started. Dr. Meredith explained that NCRP had funded 3-4 large, long term projects, and over 100 short-term projects over 5-6 years. This resulted in a “stovepipe” environment, where project participants were competing rather than collaborating. NCRP convened several workshops to build a community to solve problems. Dr. Sissenwine felt that there should be some thought to improving the network model, that perhaps

there should be more focus on networking the industry collaborators, rather than just the scientists.

Dr. Kritzer asked if it was the more successful fishermen who were willing to experiment and have creative ideas. Dr. Eayrs said that they tried to include all sectors, and a lot of new fishermen participated, but it was the fishermen who have a history of research participation that were the most active. He and Mr. Pol have continued collaborations since; they tried to have another network funded from another source, but the funders did not get the network idea. He noted that some fishermen are just now trying some of the gears; sometimes it takes a long time for outreach to be successful. Mr. Pol said that, prior to GEARNET, he wondered if the lack of industry uptake is because he was testing ideas that industry thought not practical; in GEARNET, they were testing industry-generated ideas, and there still was no uptake.

Dr. Meredith said that NCRP is planning workshops to help create workshops to better collaborate and have a mind-shift away from stove-piped work. Mr. Moore asked if the funding for networks was a one-off initiative. Dr. Meredith clarified that it was one-off federal money to support the transition to catch shares (\$6M for NCRP in 2009-10). There were 5-6 networks set up: REDNET, GEARNET, a squid network, and some bycatch avoidance networks.

Mr. Moore asked if innovation is going on within sectors on their own. Dr. Eayrs does not hear of much innovation. One example is Jim Odlin who lengthened a vessel, got processing capacity on board, and is doing some gear testing with him.

Dr. Feeney noted running 35 projects with 125 participants requires a lot of coordination, and asked if there were there too many projects to attend to the needs of each. Dr. Eayrs recalled it being a hectic time, and we wanted to ensure that there were as many projects as possible. He did not get any complaints about their support. Mr. Pol said that each PI with support staff had the lead on specific projects. Mr. McGuire asked if there were lessons about how much fishermen are willing to contribute financially and with their time. Dr. Eayrs said that is hard to know what we would change. What worked for one sector would not work for another; perhaps they would do more outreach at the beginning of the project. Mr. Pol said that they now propose paying for more of the uncertain costs.

Chairman Alexander asked if the incentive for fuel savings attracted fishermen to the network. Mr. Pol said that this was a time when fuel cost peaked. The grouping was made after the fact.

The RSC decided to not make a specific recommendation about GEARNET. Chairman Alexander noted that several projects do not have direct management applicability. There was one published study on a topless trawl, but that gear can be used in the fishery already.

### ***NETWORK APPROACH TO FUNDING RESEARCH***

The RSC had additional discussion of the the NEFSC/NCRP network approach to funding research. Mr. Silva suggested writing a technical paper about lessons learned from the network approach. Dr. Meredith said that NCRP started to do a network analysis, but the effort got derailed. However, he thought that it would be a valuable exercise to review the approach. Dr. Kritzer thought it might be interesting to compare the two approaches, that although there were false starts and inefficiencies, it was beneficial to have a lot of effort on a topic tied together. Mr. Pol clarified that many of the GEARNET projects were not designed for scientific rigor, but as demonstration projects. However, fishermen wanted more solid results, so maybe there should have been fewer projects done to a higher standard. Dr. Kritzer agreed, that public investments should have a broader reach. Dr. Eayrs said that GEARNET was about steering sectors to be more productive, building capacity, during a time of great hardship. If the aim is to impact management, then perhaps the GEARNET model would not work.

Mr. Moore commented that fishermen are motivated by the potential to have more access, make more money, reduce costs, and have less uncertainty. The scallop RSA program helps achieve that. The herring fleet came together around river herring bycatch avoidance. Industry gets involved in improving stock assessments, because they want an outcome that is certain. He cautioned a need for developing a mission – less about promotion and marketing, and more about reducing the uncertainty of management. Reducing fuel use is a great idea, but that does not fit into the Council's or NEFSC's mission. That's more in the realm of economic development.

Dr. Sissenwine contrasted the two network projects. REDNET had a specific focus (developing a sustainable fishery), where having a large network was helpful. GEARNET fostered a discipline of research and community working on a number of problems. There is a role for fostering a community of experts, but there should be debates and decisions about the best disciplines to encourage.

Mr. Pol recalled that the initial vision was that networks would improve efficiency, to bring expertise together. However, not all networks were successful. Dr. Kritzer felt that understanding the networks is worthwhile, because it is a substantial investment of public funds. What REDNET did was provide resources to tell a fuller story about the potential to develop a fishery, and the network helped accomplish that. Mr. McGuire felt that GEARNET was highly successful in stimulating the gear innovation economy.

**Consensus Statement #3:** The RSC believes that the REDNET and GEARNET networks were successful and recommends a review of the NCRP network approach to funding cooperative research to further identify lessons and identify the conditions for success and appropriateness of applying this approach for future collaborative research. There could be a benefit to having multifaceted projects stitched together, with the caution that projects should be designed with scientific rigor and have broad applicability if the intent is to inform management.

### ***OTHER BUSINESS***

There was no other business. Plans for the next RSC meeting (perhaps in the fall) will be made via email.

The meeting adjourned at 5:35 pm.

## ***APPENDIX I – RSC WRITTEN MANAGEMENT REVIEWS OF COMPLETED RESEARCH***

In preparation for the July 19, 2017, Research Steering Committee meeting, RSC members were asked to prepare for the management review of research projects by considering in advance the 11 questions guiding a management review relative to the final reports to be discussed. Each RSC member was assigned one project to be a lead reviewer for, but was encouraged to prepare comments on additional projects too. This appendix to the meeting summary compiles all written comments received from individual RSC members. These comments should not be considered the consensus of the RSC. Duplicative comments have been removed.

### ***Project: Assessing recreational haddock discard mortality on Jeffrey's Ledge through an industry-led collaborative mark-recapture tagging program***

(See March 23, 2017 meeting summary for other comments on this project)

#### ***1) Has there been a sufficient technical review of the project results and, if so, is that information available to the Research Steering Committee?***

- Yes
- 8c\_FTE-1-Bradt-recreational-haddock-report was the only technical evaluation available among the documents distributed to the Committee. In light of the limited conclusions from the study, a single technical review is probably adequate. The review correctly points out that more discussion of relevant experience from similar tagging studies could be useful to help understand why the return rate was so low. The review also points out that the report does not address the analytical method that would have been applied if the return rate was higher, but this was addressed in the power point presentation. The method seems appropriate had the tag return rate been high enough.

#### ***2) Did the project accomplish all of its stated goals and objectives?***

- Less than the target numbers of fish were tagged, yet a large number (16,667) of fish were tagged.
- No, it did not accomplish its most important goal/objective, which was to estimate recreational discard mortality. It did demonstrate stakeholder willingness to cooperate. This demonstration is not adequate justification for the project, as one would have expected good cooperation from recreationalists.

#### ***3) Are project deliverables available and formatted for use by the Council and its technical committees?***

- Some recapture summaries are provided in the revised report. The database of the released fish should be made available to technical persons as such a body of recreational length data could be useful in characterizing the selectivity of the recreational fishery and developing minimum length management measures.
- No worthwhile deliverables
- There is a data base of tagging data, which presumably is available. Immediate access is probably not a priority, since the project failed to generate result with scientific or management implications. However, long-term preservation of the database is an issue. Who knows what use some innovative scientist might make of it years from now. It is questionable (probably unlikely) that the University of New Hampshire will preserve the database indefinitely. In general, there should be provisions for research results (including electronic databases) to be preserved indefinitely.

#### ***4) Does the project address an immediate management need or contribute to a long-term strategy to rebuild and sustain stocks?***

- No results are available to address the intended management need.
- Provides some lessons on future similar efforts.

- The project's goal is not a high priority need. SAW/SARC59, states the following. Since the assumption about recreational discard mortality rate scales the assessment estimate of population size, and therefore ACLs, management is likely to be even more robust in the face of this assumption than the science.

*"... the assessment was conducted using the statistical catch-at-age model, ASAP. The catch inputs included landings and discards from both the commercial and recreational fleets. Trawl gear is the primary mode of capture in the commercial fishery, and as such, commercial discards were assumed to suffer 100% mortality. The recreational discard mortality was assumed to be 50%, though model results were relatively insensitive to alternate assumptions. Fishery removals were modeled as a single fleet, though model sensitivities which explored separate commercial and recreational fleets indicated that the model results were robust to this configuration."*

*5) Does the project support past work and/or provide new information?*

- No. No new information except lack of success. Not linked into past work.
- I am not aware of past work on this topic. The proposal indicates there hasn't been any. There is some limited new information on movement of fish, which is consistent with the current assessment and management stock definitions. Only about 1% of tagged fish was recaptured outside of the Gulf of Maine, and this fish "strayed" only a short distance over the SW boundary of Cape Cod which is known to be a "leaky" stock boundary.

*6) Does it point to a management action not in place now, or offer an innovative solution to a problem?*

- No. There is no information that points to a change in science or management. If anything, the study might indicate that the survival rate of discarded haddock is even lower than the assumed 50%. It would have been useful for the report to address why the rate of tag returns was so low. Was it that:
  1. Tagged fish were not representative of the population?
  2. Fishing mortality is lower than estimated?
  3. Discard mortality is very high?
  4. Tagging mortality and tag shedding was high?
  5. Recreational and commercial did not return recaptures either because they had a disincentive or they were ill-informed about the reasons to cooperate?

*7) Did the project elucidate other information not specifically stated in the goals and objectives?*

- No, other than that the proposed methodology is not an optimal approach for determining discard mortality.
- Lessons learned from lack of success.
- There was some information on fish movements. However, this information does not point to any scientific or management changes.

*8) Is there a need for further work or follow-on research such as wider field-testing?*

- No. The question of haddock recreational discard mortality was suitably addressed in other work. No other work except database maintenance for a few more years.
- Yes. There is a need for more research to address the objectives of the study, since they were not achieved. However, additional research is not a priority.

*9) Who is the appropriate end-user and are there recommendations/caveats about how this information should be used?*

- The project database may be useful to the Groundfish PDT or other technical persons.
- Other researchers interested in the topic.

- The NEFSC and the NEFMC would have been the appropriate end-users had the project been successful.

*10) Overall rating based on the above criteria: excellent, very good, good, fair, or poor.*

- Good, in terms of fish tagged. Fair to poor in terms of intended results or utility of the data.
- Good, considering the low tag returns
- The overall rating is poor, or fair at best. No useful new information was produced, but the demonstration of stakeholder cooperation was a positive outcome.

*11) Additional comments.*

- The additional figures were an improvement to the revised report, but the report could have provided more precise (smaller binned) length frequency data.
- Why weren't fish handled with gloves? Mucous removal is a factor in survival. Also, could the tag marking as a recreational fishing operation inhibited returns from the commercial fleet? And, were water temperatures recorded to gain insight into possible thermal stress from tagging and releasing?

*Project: REDNET: Redeveloping a sustainable redfish fishery in the Gulf of Maine (Pol)*

*1) Has there been a sufficient technical review of the project results and, if so, is that information available to the Research Steering Committee?*

- Yes. The report was accompanied by a fairly comprehensive technical review dated June 28, 2017. It is unclear how many reviewers contributed to this review.

*2) Did the project accomplish all of its stated goals and objectives?*

- For the most part, this project achieved its goals with the exception of realizing an outreach plan (as of Oct 2014). Has anything happened since?
- Yes, mostly with respect to network meetings, exploratory fishing and mesh selectivity (components 1-3). Bycatch reduction (component 4) was explored, but the grate system was unsuccessful. Marketing (component 5) had results of an informative survey, but was uncertain about the prospect of building a market for redfish. It's unclear why network building and outreach were separate components, as the latter was important for the former, and an outreach plan would have been helpful from the beginning.

*3) Are project deliverables available and formatted for use by the Council and its technical committees?*

- The project report is extensive and describes all aspects of the project.
- To navigate through the results, a table of contents and PDF bookmarks would be helpful.

*4) Does the project address an immediate management need or contribute to a long-term strategy to rebuild and sustain stocks?*

- Yes. The report provides information on codend selectivity and bycatch that have been incorporated into management (i.e., SAPs for smaller codends).
- Addresses an important opportunity to harvest a presently underutilized stock.

*5) Does the project support past work and/or provide new information?*

- Yes, the results on bycatch, codend selectivity and marketing are novel.
- The project provides a wealth of information. Because the project had been underway for six or so years, and component 2 & 3 results have already been the subject of RSC review (August 2014) and recommendation and subsequent NOAA sector exemptions, much of the information cannot be considered "new".



*6) Does it point to a management action not in place now, or offer an innovative solution to a problem?*

- It appears that the results have already been incorporated into management.
- Previous action by NOAA implemented access to the fishery, but component 5 (processing/marketing) suggests further studies to develop markets.

*7) Did the project elucidate other information not specifically stated in the goals and objectives?*

- Pollock mesh selectivity.

*8) Is there a need for further work or follow-on research such as wider field-testing?*

- Component 4 (escape mortality/bycatch reduction) was inconclusive, largely due to small sample sizes. While some observations were possible (e.g., most escapement occurred during haulback), the authors recommend further testing of dual grid system (for escapement of small redfish). Further research is also needed to find better markets than bait for smaller fish.
- An additional gear solution that would be more effective than the grate system examined in Component 4. More market research do develop redfish markets.

*9) Who is the appropriate end-user and are there recommendations/caveats about how this information should be used?*

- Industry, managers (Groundfish PDT), processors, dealers, consumers. It should be noted that some aspects of the study were not fully fleshed out (e.g., monitoring of grid system for bycatch reduction – Component 4).

*10) Overall rating based on the above criteria: excellent, very good, good, fair, or poor.*

- Excellent to very good

*11) Additional comments.*

- The habitat concern as raised in the technical review (e.g., fishing in sensitive and complex habitat) could be explored.
- The technical review comment regarding TOC or outline is on point. The document was very difficult to navigate. Even the embedded PDF bookmarks were haphazard and incomplete. In the component 4 paper, what is codend pulsing and what is it caused by?
- I am heartened to see the promising results of the REDNET project come before the NEFMC's RSC. Placing sustainability at the core of reestablishing both redfish harvesting and marketing represents an important step for New England fisheries, as sustainability of supply and market have proven challenging throughout the region's history.
- I have some concerns about the characterization of this resource's potential, however. On page 6 of the draft REDNET Final Report (dated 16 May 2016), it is stated "Historically, redfish represented a significant fishery in the region, and the best available estimates assert that the resource can support a larger fishery. The directed redfish fishery began in the 1930's and total landings rose from 100 mt to a peak of over 117,000 mt in 1951 and then steadily declined." Historical records suggest that landing not just declined, but crashed due to overharvesting. The crash of such an important fishery—indeed, the fishery that resurrected Gloucester's moribund waterfront in the 1930s—led to significant social and economic dislocations. Strikes, lost revenues, vessel bankruptcies, and political turmoil ensued as the region wrestled with how to adapt to the failure of the redfish resource to sustain the industrial infrastructure hastily erected to prosecute the fishery. The details of this failure appear in part in the references below. Similar dislocations



appear to have occurred again in the 1970s and 1980s when the resource showed signs of recovery and attracted fishing effort.

- As we move ahead with creating this third manifestation of New England's redfish fishery, we need to be mindful of the limits of what this resource can provide. While large landings had been seen in the past, such landings proved very short-lived. I am heartened to see the RSC and the Council mindful to not make the same mistake.

*References:*

Donald J. White, "The New England Fishing Industry: America's Oldest Industry Faces Crisis," Monthly Review of the Federal Reserve Bank of Boston, (March, 1950), p. 11. As included in the transcripts of "Hearings . . . On S. 2801 A Bill to Give Effect to the International Convention for the Northwest Atlantic Fisheries . . . (Washington, DC: Government Printing Office, 1950), pp. 5-19, esp. p. 12.

Donald J. White, *The New England Fishing Industry* (1954), pp. 6-11.

Edward J. Lynch and George P. Draheim, "The Groundfish Industries of New England and Canada: A Comparative Economic Analysis." US Department of the Interior, Fish and Wildlife Service Circular 121 ([Washington DC: US Fish and Wildlife Service, Jul7, 1961), p.2, 39, *passim*.

US House of Representatives, *Hearings before a Subcommittee on Merchant Marine and Fisheries on H.R. 4303, H. R. 5829, H. R. 7441, H. R. 7641, and H. R. 7671, To Further Encourage the Distribution of Fishing Products*, (Washington DC: Government Printing Office, 1954), pp. 47-50.

*Project: GEARNET: Northeast Groundfish Gear Conservation Engineering and Demonstration Network (Eayrs)*

*1) Has there been a sufficient technical review of the project results and, if so, is that information available to the Research Steering Committee?*

- A single, very insightful, review was provided.
- Technical review and comments were completed and provided to the RSC. Comments were submitted by NEFSC Northeast Cooperative Research Program.

*2) Did the project accomplish all of its stated goals and objectives?*

- For the most part, the project achieved its state goals and objectives.
- No, but NCRP technical reviewers state that the nature of a regional network, involving many partners and projects, and the evolution of such a structure was a challenge and yet may be a good learning opportunity for future collaborative projects.

*3) Are project deliverables available and formatted for use by the Council and its technical committees?*

- The very lengthy project report contains a review and summary of the entire effort as well as individual reports of each project attempted. As indicated by the reviewer, the report could have benefitted from a summary table that indicated "some measure of the data collected (e.g., #tows/sets), a column indicating success or failure of the investigated technology, and a recommendation as to whether additional research in this area is warranted."
- Yes, in the GEARNET final report project results summary (pages 11-28) and in detail in the Appendices.
- The format in the Appendices is very well thought out and very accessible to the reader.

*4) Does the project address an immediate management need or contribute to a long-term strategy to rebuild and sustain stocks?*

- The development of the industry network, if it can be sustained, would be very helpful to future gear research that could have positive management implications. Some of the sub-projects, with further development, could address management needs in terms of gears that reduce unwanted bycatch and trawl gear that minimize bottom contact and seabed impacts.
- Qualified “YES”, in that not all of the GEARNET projects were completed, or widely adopted by industry. However, the benefits and successes appear to outweigh those projects that were not completed or resulted in successes, which is the reality of cooperative fisheries industry research.

*5) Does the project support past work and/or provide new information?*

- The network approach, if it could be perpetuated, could be an incubator for fruitful collaborative innovation. The projects provided useful guidance on promising gear technology and directions for more thorough focused testing on some specific gears. The relatively low cost of each individual project provided the opportunity for proof-of-concept pilot studies.
- YES. Some of the projects provide universally applicable information and opportunities, such as the Fuel Flow-meter project, and the Semi-Pelagic door financing model.
- New information is that GEARNET provides an example of how a collaborative research network can be developed and sustained and this experience and the expertise developed by the PIs and project partners can be replicated and “exported” to the Mid-Atlantic, for example. It is clear that much of the success of GEARNET is due to the personal commitment of the PIs, in particular, and the project partners in general.

*6) Does it point to a management action not in place now, or offer an innovative solution to a problem?*

- Many of the promising projects require additional work and are not “management ready” at this point.
- There were several sub-projects conducted by GEARNET which certainly offer innovative solutions to increasing catch efficiency and reducing operating costs (e.g., the Fuel flow meter, semi-pelagic door financing model) that had positive results.

*7) Did the project elucidate other information not specifically stated in the goals and objectives?*

- The project elucidated many lessons learned in the development of a collaborative network, including the obstacles, pitfalls, as well as the potential rewards.
- To have fundors and PIs at the same table was novel. While initial adjustment was needed, this arrangement proved to be a benefit to the project results in terms of:
  - 1) Streamlining decision-making and administrative issues;
  - 2) Providing a greater understanding of how the NCRP was measuring the success of GEARNET, and so guided the project toward these metrics;
  - 3) Tracking progress, or lack thereof, by NCRP in near-real time and context, which improved awareness and communications; and
  - 4) Facilitating project awareness within NOAA, and Sustainable Fisheries Division in particular, which aided in project outreach and permitting issues that arose.

*8) Is there a need for further work or follow-on research such as wider field-testing?*

- Yes, for the projects that showed promise.
- Development of fuel-saving paravanes and the economic viability of cod pots were identified as two areas worthy of follow-on research.

*9) Who is the appropriate end-user and are there recommendations/caveats about how this information should be used?*

- Anyone who is interested in implementing future collaborative networks, or is looking to make future refinements to some of the gears that were the subject of the funded studies.
- GEARNET was designed to be driven by the end users (commercial fishermen) and was successful in that respect. The commercial fishing industry participated in design and execution of the projects and have presumably adopted those new ways of operating that made sense financially.

*10) Overall rating based on the above criteria: excellent, very good, good, fair, or poor.*

- Excellent
  - While many of the projects did not pan out, that is to be expected when testing new ideas. It did get scientists, industry, NGOs, and government working together to find solutions to various issues.
  - Given the challenges of managing such a widespread and diverse network, particularly in light of the management constriction on available fishing opportunities that was unfolding simultaneously during the project period of September 2010-April 2014.

*11) Additional comments.*

- Can the collaborative effort be duplicated? Enhanced?
- Is the reduction in scientific rigor and consequently potential for publication an impediment to future network projects?
- It was mentioned that sometimes the target species in gear trials was not found in sufficient quantity. This has been an issue in other reviews. What is the best recommendation to deal with this issue?
- It is important to note the highlights of the GEARNET project, which might otherwise be buried in the final report. The project final report documents the duration and complexity of managing multiple partners and projects over multiple years.
- Given their experience, my suggestion for future networked research projects is to limit the scope in terms of participants and projects, but to embed a network sharing mechanism, such as YouTube videos, flume tank visits, and FISH EXPO-type collaborative meetings-seminars.