Northeast Trawl Advisory Panel Meeting

November 21, 2019, 9:00 a.m. - 4:00 p.m.

DoubleTree by Hilton Baltimore-BWI Airport
890 Elkridge Landing Road | Linthicum, MD 21090
Frederick Douglass Room

This document summarizes the discussions of the Northeast Trawl Advisory Panel (NTAP) that convened on November 21, 2019 at NOAA's Northeast Fisheries Science Center. A summary of key discussion points, recommendations, and action items is included. This summary does not capture every comment or discussion point, and included comments may not represent consensus.

I. Participants

A. NTAP Members

Name	Affiliation
Terry Alexander	NEFMC Member
Tony DiLernia	MAFMC Member
Vicent Balzano	NEFMC Member
Wendy Gabriel	NEFSC
William Gerencer	MAFMC Stakeholder
Vito Giacalone	NEFMC Stakeholder
David Goethel	NEFMC Stakeholder
Dustin Gregg	MAFMC Scientist
Anna Mercer	NEFSC
Timothy Miller	NEFSC
Frank Mirarchi	NEFMS Stakeholder
Christopher Parkins	ASMFC Representative
Michael Pol	NEFMC Scientist
Philip Politis	NEFSC
Christopher Roebuck	MAFMC Stakeholder
Robert Ruhle	ASMFC Representative
Michael Sissenwine	NEFMC Scientist
James Gartland	MAFMC Scientist

B. Other Participants:

Name	Affiliation
Paul Rago	MAFMC SSC
Matt Seeley	MAFMC Staff
Katie Burchard	NEFSC Staff
Andy Jones	NEFSC Scientist

II. Summary Discussion Points by Agenda Topic:

A. Wingspread Experiment -Presentation of Experiment and Preliminary Observations by Anna Mercer and Andy.

F/V Karen Elizabeth, captained by Chris Roebuck, was chartered for 14 sea days with the objective of quantifying species and length-specific efficiency of the NEFSC bottom trawl survey gear at various wingspreads. To estimate the efficiency of the net at different wingspreads the vessel towed two trawl nets in a twin-trawl rig: the control net maintained a constant target opening similar to the NOAA Ship Henry B. Bigelow target net spread of 12.99 meters, while the other tested a range of openings seen in NOAA Ship Henry B. Bigelow operations (between 9 and 16 meters). The targeted wingspread of each net was achieved using restrictor cables, and monitored throughout each experimental tow with mensuration systems attached the wings of each net. At each station, both nets were towed simultaneously for 20 minutes at 3.0 knots. It was a 24-hour operation where tows were conducted through day and night. There were two legs in the experiment: The first leg covered shallow in SNE and deep stations in the Gulf of Maine targeting witch flounder and American plaice. Based on data from that leg, the second leg targeted shallow water to better capture target species windowpane flounder and winter flounder. This experiment utilized trawl doors larger than the NEFSC standard survey doors and warp to depth ratios in order to consistently achieve the target net spreads and a clump was used between each net since this experiment was conducted with a twin-trawl rig. The experiment completed 170 tows. Preliminary observations suggest that the effect of wingspread on catch efficiency is subtle and that swept area may have a larger effect on catch rates.

Panel Conclusions:

1. Length based analyses of the data are needed to determine if there are major differences in size composition with different wingspreads.
    a. Will include all tows, including pairs when a species was absent in one net
2. In some cases, the experimental net performed better than the optimal net, even when corrected for swept area.
3. We do not need more observations for this experiment. Given the noise we observed from this experiment, it would take a lot of tows to chase down the variability in relative catch rates at different spreads. There may be other research that could be more informative.

Action:

1) Conduct length based analysis of wingspread experiment data- will include paired tows when species was absent.

B. Flume Tank Testing- Presentation of flume tank summary by Phil Politis

On July 29th 2019, NTAP coordinated with the Marine Institute at the Memorial University of Newfoundland to deploy a 1:7 scale model of the NEFSC survey trawl in the flume tank at various net spreads ranging from underspread to overspread to evaluate physical changes to the model as net spread varies. Additionally, the water speed in the flume tank was increased and decreased from the standard towing speed of 3.0 kts. Spread in the flume tank is dictated by the mast spread at the forward end of the tank, not by the spreading force of the model doors. The optimal net spread for this survey trawl is 13 m. Still images were taken at each net spread and water speed from different locations (above, side, into). Net spread, door spread and headrope height were also measured. Philip Politis (NEFSC) lead the observations in person at the flume tank. A video feed was set up at SMAST to allow NTAP panel member to participate remotely. The net links were checked for stretching.

Observations of physical net changes from different panel members are listed below but do not necessarily represent the perspective of the whole panel:

1. A harmonic bouncing of the sweep was not observed at any spread or configuration.
2. When underspread it seems that tension is being concentrated in the side panels and reduced in the upper and lower bellies
3. The forward portion of the sweep lifted off bottom at the wingends when the model was underspread.
4. No loss of bottom contact was observed when the model was overspread.
    a. Panel members hypothesized that the overpread net actually causes the wingends and sweep to dig into the bottom.
5. Some panel members raised concerns regarding the tension and shape of the meshes in the lower corners of the trawl, with tighter and more square shaped mesh occurring at wider spreads.
6. The bolschline was observed to ride on top and inward of the sweep as it goes outward from center. This was observed at all net spreads.
    a. Same thing happens on NEAMAP survey net
7. The flume tank has a uniform bottom and it is not possible to know the downward force of the sweep. However, there is nothing uniform in the ocean, therefore the flume tank can't accurately mimic real conditions.
8. Changes in the net in the tank may seem significant, and may support hypothesized effects on catch. However, under experimental conditions in the field, no major differences in catch were observed.

There was discussion about size dependent escape opportunity in relation to change in net spread as well as between cookies on uneven bottom. The fish travel at right angles of the net

to get caught in the corners. There is a difference in twine configurations in the corners from one extreme spread to the other. The twine is square shaped under overspread conditions and baggy diamond shaped in underspread conditions. This will change the escapement chances and hence catchability of smaller fish. There may be the possibility of modelling changes in escape opportunity as wingspread changes. Is it possible the escapement opportunity of a rockhopper making it more difficult to see differences across wing spread?

Street-sweeper gear, essentially rockhopper gear with brushes between discs, would be very efficient for flatfishes, but destructive to the bottom and currently a prohibited gear type. If overspreading causes the net to be tighter on the bottom, that increased efficiency may lead to increases in catch rather than increases in swept area. Panel members observed that it is difficult if not impossible to fish consistently at different depths with a single gear. The net was intended to sample multiple species in different areas, doing a "good enough" job rather than a perfect one. This is an appropriate approach when a survey is used to track relative abundance trends over time. When the focus is on changes in relative abundance over time, rather than area, different gear performance in different areas is less important. However, these effects can become important if fish are changing their spatial distributions (e.g. habitat or survey strata) significantly over time. There were several dimensions to directions forward: there was interest in developing a comprehensive new data collection system. There were also observations that management systems may now demand precision from surveys that cannot be obtained cost-effectively. Panel members are willing to accept wing spread will be a proxy for sweep digging in.

Panel Conclusions:

1. Panel members reiterated the importance of evaluation of effects of wingspread on length-based catch efficiency.
2. The Panel needs to look at what would be needed to change the data collection system going forward so that we are in a better position in 10-20 years.

C. Door Testing on NOAA Ship Henry B. Bigelow: Presentation by Phil Politis

The performance of different types of doors were evaluated on NOAA Ship Henry B. Bigelow in August. The goal was to find a door that achieves the targetnet spread of 13m over the range of depths sampled in the survey. The first leg (21-24th) focused on deep water and the second leg (25th-28th) focused on shallow water. NTAP Panel members Terry Alexander and Dustin Gregg participated on the ship with door testing. The doors evaluated included: 1.5m^2 Thyboron Type 21 Flipper, 66" Thyboron Type IV (used in NEAMAP survey) and Bison 9.

Both the Bison 9 and Thyboron Type IV doors achieved stable target spread in shallow water. Thyboron Type 21 flipper doors were generally unstable at all depths and were underspread in

shallow water and overspread in deep water. Both the Bison 9 and Thyboron Type IV doors overspread in deep water. Currently no door was able to consistently achieve the target spread in deep water.

For the Thyboron Type IV, doubling the length of the ground cable did not correct overspreading at depth.

The Panel discussed several possible options for achieving optimal spread in deep water. There was discussion of testing two more door types: Bison 8 and Thyson. There was a discussion around if there was a way to restrict the bollards more towards the center of the NOAA ship vessel or a way to bring the wires together. On the Bigelow, it would be difficult and complicated to re-rig and/or redirect the wires. A panel member recommended that the survey use oversized doors with restrictor cables to maintain spread. Several questions arose related to restrictor cables: What effect do they have on catch? How does different material used for restrictor cables affect environment, and behavior of fish? There are significant potential safety concerns related to the use of restrictor cables on NOAA Ship Bigelow, including risk of hang ups. Risk of hang ups could be slightly mitigated with the use of a weak link. There is a limited amount of literature on restrictor cables. Although some published work indicated a potential reduction in variability in physical trawl performance, there is the potential for increased variability due to behavioral reactions. It was discussed that it would be possible to do some pilot restrictor cable work in conjunction with the NEAMAP survey in spring, but also that an effect was unlikely to be detected at low sample sizes unless the effect was enormous.

Panel conclusion:

1. Optimal spread in deep water may require changing more features than just the door, e.g., bridle, wire configurations may also be necessary.
2. Two more door types could be tested:
    a. Thyboron Tyson
    b. Bison 8
3. If changing the doors doesn't help with consistent optimal spread in deep water then we need to investigate other ways (mechanical, analytical).
4. Research on restrictor cables would be valuable. {See comment]

Action:

1) Evaluate performance of Bison 8 and Tyson hybrid doors on Henry B. Bigelow in summer 2020

D. Catchability in Groundfish Stock Assessments- Tim Miller

a. A two page document summarizing the use of the catch efficiency study data in 2019 Groundfish Stock Assessments was distributed [available on MAFMC NTAP webpage]
b. Estimates of relative efficiency from chain sweep experiments were used in some way for six stock assessments of the following species: yellowtail flounder (two stocks), witch flounder, American plaice and windowpane flounder (two stocks).

c. Yellowtail stock research track assessment is not scheduled until 2024. There is more than enough lead time to assess use in assessments.
d. Goosefish stock assessments are considering the use of relative efficiency estimates.
e. The assessment of Georges Bank winter flounder required relative efficiency estimates for larger sized winter flounder than the ones caught in the original experiments. Otherwise, the utility has been fairly widespread for target flatfish species.

E. FY2020 Research Plans

Wendy Gabriel summarized available resources for gear performance research: about $140K is available and a contract has not been awarded for the funding. We have the opportunity to define the scope of the contract. [Note: To be consistent with the fund source, work should target New England groundfish.]

It was noted that one problem we are trying to solve is the lack of trust in assessments. Is this something science can fix or is this a systematic management problem? Panel members raised a range of alternatives, including adopting new different data collection systems, continuing to use what we have as we develop better tools and improved technology, expanding the types of data streams used to track stock abundance (e.g., study fleet data and other fishery-dependent data sources, fixed gear surveys) and defining what new types of information are needed for assessment and management (including whether required levels of uncertainty are realistic).

The Panel also noted the importance of changes in species distributions due to warming waters. This may lead to changes in timing of annual migrations and other behaviors, which in turn may affect survey performance.

<u>Proposals for Gear Performance Research in Summer 2020</u>:

- Test doors (Bison 8, and possibly Tyson Hybrid) on NOAA Ship Bigelow to see if consistent net performance at optimal spread across depth range is possible. **Priority 1**
- Explore the possibility of using a restrictor cable on NOAA Ship Bigelow and evaluate the effect of restrictor cable of catch: **Priority 2**
    - Explore logistics and safety concerns associated with using a restrictor cable on NOAA Ship Bigelow
    - Evaluate through ABBA (e.g., integrated in spring and fall NEAMAP surveys) or twin trawl experiments. Latter would require development of new twin trawl procedures.
    - Assess impact on catch of roundfish
- Continue to do chainsweep catchability work and expand to other species. This work/data has had an impact. Over time, expand to estimate catchability across a broader range of species. **Priority 3**
    - Georges Bank winter flounder
    - Round fish

- Additional wingspread research: Prioritize species according to assessment schedule. Expand tows in deep water at overspread conditions. **Priority 3**

Additional Research Topics of Interest:

- Street-sweeper research: this research would provide additional estimates of rockhopper efficiency for flounders, but may be too destructive.
- Explore effect of area and volume swept (due to variable headrope height across spread) vs. area swept
- Evaluate alternative/supplemental survey approaches for finfish:
    - Acoustics
    - Traps
    - Open cod end/camera
- Evaluate effect of uneven sea bed on net performance

<u>Proposals for Analytical Research in Early 2020</u>:

- Conduct length based analysis of wingspread experiment data (designated as action item above). **Priority 1**

<u>Additional Analytical Research Topics of Interest</u>:

- Investigate influence of seabed topography on efficiency (may include field component, noted above)
- Consider developing calibration factors to be applied on species and under environmental conditions which are shown to decrease gear efficiency
- Explore uses of fishery dependent data to understand the limitations of fishery independent surveys as well as identify species spatial temporal shifts to understand changes in distribution.
- Compare/contrast fishery independent and fishery dependent data sources, specifically for relative abundance use study fleet information in areas where survey can't sample.
    - Compare trends in CPUE in fishery dependent with fishery independent trends, allowing for regulatory effects on fishing effort.
    - Use fishery dependent and fishery independent data to identify footprint of fishery/species
        i. Expand seasonal data (year round, rather than spring/fall)
    - Use fishery dependent CPUE to understand relative abundance, e.g. as a diagnostic in the assessment.
- Explore using habitat correlations to extrapolate areas not surveyed. This would provide a more realistic estimate of abundance then applying survey results across an entire stratum.
- Explore what we know about migration and behavior and how they have shifted over the decade and what the implications of those might be in how the survey performs.
- Evaluate distributions relative to thermal habitat.
- Evaluate spatial variability using VAST models.

F. Other Business, Wrap-up

The timing of the next meeting will be contingent on the completed analysis of wing spread experiment and the formation of a plan for 2020 NTAP gear research from the NTAP working Group.

Panel member suggested to send a doodle poll for the next meeting- and to schedule the meeting as quickly as possible after the doodle poll to maximize participation.

The Panel briefly discussed a letter proposed in the previous meeting by David Goethel and Michael Sissenwine expressing concern about the impact of windfarms on survey time-series data streams. A draft will be circulated to members, to be forwarded from either the respective Fishery Management Councils or the Panel to Jon Hare. The Panel encouraged this action.

Action:

1) Draft thank you letter to Terry Stockwell.
2) Send email to poll for NTAP working group volunteers - email sent 11/27.
3) Schedule NTAP webinar for wingspread analysis presentation - late January 2020
4) Schedule NTAP working group meeting - February 2020
5) Send Doodle poll for next full NTAP meeting - March 2020
6) Circulate draft windfarm letter- Circulated on 11/27