Briefing Document: Industry Workshop on Turtle Excluder Devices (TEDs) in Mid-Atlantic Trawl Fisheries

Executive Summary

This briefing document synthesizes the proceedings of a multi-regional workshop led by the Cornell Cooperative Extension (CCE), involving NOAA/National Marine Fisheries Service (NMFS) staff and commercial fishing industry stakeholders. The workshop addressed the potential expansion of Turtle Excluder Device (TED) requirements in the Mid-Atlantic summer flounder (fluke) fishery and shared results from recent research in the inshore longfin squid fishery and upcoming research on a newly designed TED for summer flounder.

Critical Takeaways:

- **Regulatory Status:** Currently, TEDs are required in the summer flounder fishery south of Cape Charles, Virginia. There is currently no proposed rule to move the TED requirement line north of Cape Charles, but the possibility is under consideration to further Endangered Species Act (ESA) recovery of sea turtles . NOAA is currently in a "research and data gathering" phase regarding the potential northward extension of this boundary, though no formal rule has been proposed. See NOAA Fisheries for current information https://www.fisheries.noaa.gov/new-england-mid-atlantic/endangered-species-conservation/sea-turtle-bycatch-reduction-trawl-1#modifications-under-consideration
- **Industry Opposition:** Stakeholders expressed near-unanimous skepticism regarding the necessity of TEDs north of Cape Charles. Veterans of the industry reported near-zero turtle interactions over decades of fishing and argued that current TED designs cause unsustainable catch loss (estimated up to 35% in some studies) and eliminate the "mixed fishery" bycatch (e.g., fluke, sea bass) that makes trips profitable. The fishing community views the move toward northern TED requirements as a "solution looking for a problem," arguing that the biological impact of the fishery on turtle populations is negligible compared to other threats like wind energy expansion and vessel strikes.
- **Technological Evolution:** Research is shifting from rigid metal TEDs to flexible cable-based designs (such as the Type 2 and Type 3) that can be utilized on net reels.
- **Research Outcomes:** Recent testing of flexible cable TEDs in the inshore squid fishery focused on studying squid catch retention showed minimal squid loss and zero turtle interactions but confirmed significant losses of summer flounder and sea bass, rendering the designs problematic for mixed-trawl operations.
- **Data Divergence:** A central point of contention exists between NOAA's extrapolated bycatch estimates and the industry's "on the water" experience. Interactions documented by fisheries observers on trips where summer flounder was the top landed

species by hail weight remain low (50 [1] interactions over a 24 -year period). Sea turtle bycatch in all trawl fisheries in the Greater Atlantic Region are estimated at 343 from 2019-2023. It is important to note that this is not an actual discrepancy but different data streams. Observers only cover a limited number of trips; the bycatch estimate factors in total fishing effort to estimate bycatch across the fleet.

Workshop Overview and Context

The workshop was held Thursday, March 19th from 11am-2pm was conducted across three primary locations: Hampton, Virginia; Riverhead, New York; and Point Judith, Rhode Island along with additional virtual participation. It aimed to facilitate communication between gear specialists, researchers, resource managers, and the fishing industry regarding considered measures for sea turtle protection.

Primary Goals

1. **Outreach and Education:** Informing the industry of considered measures, and the status of Endangered Species Act (ESA) listed turtles loggerhead, Kemp's ridley, leatherback and green).
2. **Gear Demonstration:** Presenting various Turtle Excluder Device (TED) designs, including rigid frames and new flexible cable grids.
3. **Collaborative Research:** Gathering industry input to design a more effective, "workable" TED for the summer flounder fishery.

Regulatory and Biological Framework

The workshop outlined the current legal landscape and the drivers behind the focus on TEDs in the Mid-Atlantic.

Ellen Keane, representing NOAA Fisheries' Greater Atlantic Regional Fisheries Office (GARFO), Protected Resources Division delivered a presentation focused on the sea turtle bycatch data, the performance of existing gear, and the agency's ongoing research initiatives regarding TEDs.

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[1] 54 interactions in the summer flounder fishery were presented at the meeting. As discussed in the Additional Info Document for Responses, upon subsequent review of the observer data, four of the summer flounder interactions involved decomposed turtles, so those records were removed from our analysis. 50 interactions occurred in the summer flounder fishery (identified as top landed species by hail weight) from 2000-2024.

The "Cape Charles Line"

TEDs are required for summer flounder trawlers fishing in the summer flounder-sea turtle protection area, south of Cape Charles, Virginia to the NC/SC border. Vessels north of Oregon Inlet, NC are exempt for this requirement January 15 through March 15 each year . NOAA is considering whether to move this regulatory line northward based on shifting turtle populations and observed interactions in more northern waters.

Sea Turtle Species and Bycatch Data

Keane highlighted that four species of sea turtles—**loggerheads, Kemp's ridleys, leatherbacks, and greens**— occur in the region and remain protected under the ESA as they have not yet recovered. She provided the following data points:

- **Sea Turtle Bycatch Data (2019–2023 Estimates)**
  - NOAA presented estimates for turtle interactions across all Mid-Atlantic and Georges Bank bottom otter trawl fisheries:

Species	Estimated Interactions (2019-2023)
Loggerhead *(Caretta caretta)*	273
Kemp's Ridley *(Dermochelys coriacea)*	37
Leatherback *(Lepidochelys kempii)*	33

- **Key Data Points:**
  - The estimated mortality rate for turtles in trawl gear is approximately **53%**.
  - **78%** of observed bottom otter trawl interactions from 2000-2024 occurred in three fisheries[2]: Summer Flounder, Longfin Squid, and Atlantic Croaker.
  - In the summer flounder fishery specifically, **50** [3] **interactions** have been observed between 2000 and 2024.
  - Estimated interactions have trended **downward** in the most recent five-year estimate (2019-2023) compared to previous five-year estimate (2014-2018), presented in 2022.

Gear Performance and Mitigation Research

Keane reviewed the challenges of existing TED designs, particularly for the summer flounder fishery where testing of approved TEDs showed variable **catch losses ranging from 13 to 35%**.

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[2] Fishery identified by top landed species by hail weight by trip.

[3] See footnote 1.

She noted that while some modifications improved catch retention slightly, the losses remain a primary concern for the industry.

- **Topless Trawls:** This alternative was researched but ultimately dismissed because it significantly decreased target catch alongside turtle exclusion.
- **Tow Durations:** Keane suggested that limiting tow times could be a mitigation strategy, noting that turtle mortality increases notably when tow durations exceed **one hour**.
- **Data Loggers:** She discussed the potential use of data loggers to monitor tow times as a non-gear-based mitigation option.

Regulatory Status and Industry Feedback

A key takeaway from Keane's presentation was that **no new regulations are currently being proposed**. She stated that the agency is strictly in a "research gathering" phase to understand what gear measures to reduce sea turtle mortality might work for different fisheries. She acknowledged previous industry (longfin squid, croaker, summer flounder) feedback from 2022, which included strong opposition based on:

- **Operational feasibility and safety concerns**.
- **Potential for gear damage and economic impacts**.
- **A need for more industry-specific data** rather than broad extrapolations.

Response to Inquiries

During the subsequent Q&A, Keane addressed several specific points:

- **Geographic Data:** While she could not release specific point locations of interactions due to confidentiality, she offered to provide a **"heat map"** showing general areas of interaction, which she described as ranging from northern Virginia through southern New England.
- **Biological Opinions:** She clarified that the incidental take statement in the 2021 Biological Opinion Link to https://www.fisheries.noaa.gov/resource/document/biological-opinion-10-fishery-management-plans is for fisheries authorized under **10 different Fishery Management Plans** (FMPs) in part due to, the mixed nature of the trips makes it difficult to isolate interactions by a single target species.
- **Follow-up Commitments:** She promised to provide more detailed information later regarding the specific mortality status of recent interactions and the annual "allotment" of takes allowed under current Biological Opinions. Information provided in response to questions was provided after the meeting; see Additional Info Document for Responses.

Jeff Gearhart, the Branch Chief for the **Harvesting Systems Branch** at NOAA Fisheries' Southeast Fisheries Science Center, provided a comprehensive overview of the history, technical evolution, and current state of **Turtle Excluder Device (TED)** technology in the summer

flounder fishery. His presentation emphasized the transition from rigid structures to flexible cable-based designs intended to accommodate modern fishing practices.

Historical Context and Regulatory Background

- **Long-standing Requirements:** Gearhart noted that TEDs have been required in the summer flounder fishery south of Cape Charles, Virginia, since **1993** .
- **Documented Interactions:** He clarified that the push for research north of this line is driven by documented turtle "takes" (interactions) in those northern waters, suggesting the effort is a response to observed data rather than a "solution looking for a problem".
- **Original Design Challenges:** The original flounder TEDs featured rectangular holes at the bottom to allow shells and debris to pass through without clogging the device. However, these rigid grids were often damaged by **net reels**, leading many fishermen to move north of the Cape Charles line to avoid using them.

Evolution of TED Designs

Gearhart detailed the transition from rigid metal frames to **flexible cable designs** that can roll up on net drums.

- **Sorting Area:** He explained that as the industry shifted from two-seam to larger four-seam trawls, TEDs needed to become larger to provide more "sorting area" for catch retention.
- **Prototypes:** He discussed several iterations, including:
    - **Type 2 (T2) TED:** A flexible cable design that folds like a "taco" to roll onto a reel.
    - **Type 3 (T3) TED:** A wedge-style cable design with horizontal bars.
    - **Cattle Catcher:** An experimental wedge design that was ultimately abandoned due to poor results.
- **Testing:** He shared video of cable TEDs being tested in Panama City, Florida, explaining that these designs use **hydrofoil action** to maintain their shape and ensure the escape flap seals properly while towing.

Technical Challenges and Trade-offs

- **The "Balancing Act":** Gearhart described a tension between conservation and catch efficiency. While larger bar spacing (5–6 inches) improves catch retention, federal regulations currently require **4-inch spacing** to protect small Kemp’s ridley sea turtles.
- **Catch Loss:** He acknowledged that TEDs can result in the loss of larger "jumbo" or "large" flounders because they may not pass through the bars as easily as the "medium" grade fish preferred by restaurants.
- **Debris Management:** He emphasized that designs must be "self-cleaning" to prevent garbage and dogfish from piling up and blocking the target catch.

Compliance and Alternatives

- **Penalty Matrix:** Gearhart explained the "penalty matrix" used in the shrimp fishery, where fines are scaled based on the risk to the turtle (e.g., minor technical violations result in smaller fines, while a missing TED or sewn-shut flap results in catch seizure). See Additional Info Document for information on TED penalties provided after the meeting.
- **Tow Timers:** He discussed **tow timers** as a non-gear alternative to TEDs. Enforcement would use readers to check "doors up to doors down" times; however, he noted that a usable TED would be preferable as it wouldn't limit a vessel's bottom time.

Collaboration with Industry

Throughout his remarks, Gearhart stressed that these designs were developed through years of input from **reputable fishermen**. He invited the industry to continue "thinking outside the box" to refine designs, noting that a successful solution would likely require the direct help of the fishermen themselves.

Industry Perspectives and Concerns

Industry participants raised significant objections to the implementation of TEDs, citing a lack of fishery-specific data to justify new mandates.

Core Arguments against Expansion

Industry stakeholders challenged many of the figures presented and questioned NOAA observer data. Industry members provided personal testimony from years of fishing experience.

- **Lack of Evidence:** Multiple fishermen with 40–60 years of experience (e.g., Mark Phillips, Sean Macy) reported never encountering a dead turtle in a fluke trawl. They characterized the proposal as a "solution looking for a problem."
- **Economic Viability:** With high fuel costs and narrow profit margins, industry members stated they cannot absorb the catch losses associated with TEDs. One participant noted that if TEDs are mandated, "we're done."
- **Mixed Fishery Impacts:** Stakeholders explained that they rarely target a single species. A TED designed to retain fluke might exclude high-value bycatch like black sea bass or scup, which are essential for a profitable trip. Further, industry members noted that interactions are often categorized by the "top landed species," which may not accurately reflect which gear or specific fishing activity led to the interaction.
- **Effort Displacement:** It was noted that current regulations south of Cape Charles have already pushed the southern fleet north of the line to avoid using TEDs, increasing fuel consumption and carbon footprints. Moving the TED line north would only force vessels

to steam further to avoid TED-regulated zones, increasing fuel costs and carbon emissions.

Historical Precedent

Stakeholders from North Carolina recounted the "failure" of TED implementation in the 1990s, stating it effectively ended the viable flounder fishery off their coast because the devices "chafed out" tail bags and allowed the majority of the catch to escape.

Alternative Threats

Industry members questioned why trawl fisheries are being targeted when other sources of turtle mortality are perceived as higher. Industry members indicated:

- **Power Plants:** Large numbers of turtles are reportedly "sucked up" into power plant intakes in New Jersey.
- **Dredging and Infrastructure:** Significant mortality is attributed to channel dredging and vessel strikes.
- **Wind Energy:** Concerns were raised regarding the acoustic and sonar impacts of offshore wind development on marine mammals and turtles.

TED Design and Technical Analysis

The workshop reviewed several iterations of TED technology, focusing on the transition from rigid to flexible designs.

Rigid Designs

- **Flounder TED:** The currently accepted rigid metal grid. While effective at excluding turtles, it is not compatible with net reels and is prone to damage when used over rough bottoms or when large, heavy catches are encountered.
- **Modified Flounder TED:** Includes a hinge to better accommodate net reels but faced issues with catch retention.

Flexible/Cable Designs

- **T2 and Type 3 (NOAA Design):** Constructed from flexible cable (e.g., 1x7 stainless steel) to allow the grid to roll up onto a net reel.
- **Industry "Reed TED" Design:** A simplified, stainless-steel cable design developed by fisherman Bill Reed, intended to be a cost-effective alternative to the more complex T2 model.

Technical Challenges in Design

1. **Bar Spacing:** Current regulations require 4-inch spacing to protect small turtles, but industry members suggested that wider horizontal spacing (up to 5 or 8 inches) might be necessary to retain fluke.
2. **Gilling and Clogging: CCE** researchers observed squid gilling in the webbing just ahead of the TED tested in the squid fishery. Debris (shells, sharks, skates) can also clog the grid, leading to catch loss.
3. **Angle and Flow:** Grids are typically set at a 30-to-45-degree angle. Lower angles may improve "self-cleaning" but may affect the flap seal.

Gear Performance and Research Findings: Inshore Longfin Squid Study

CCE presented results from a 16-day study (128 paired tows) testing the T2 and Reed TED designs in the inshore longfin squid fishery.

Research Findings (128 Paired Tows)

Metric	T2 Design	Reed Design
Squid Catch	Minor loss (not statistically significant)	Slight increase (not statistically significant)
Fluke/Sea Bass Catch	Significant Loss	Significant Loss
Turtle Interactions	0	0
Operational Ease	Issues with squid "gilling" in webbing ahead of the TED. High flexibility; easy to wind onto net reel	High flexibility; easy to wind onto net reel

Key Findings:

- **Turtle Interactions: Zero** turtles were caught in either the control net or the experimental TED nets.
- **Target Catch (Squid):** There was no statistically significant loss of squid; the Reed TED actually caught slightly more squid by weight than the control in some instances.
- **Bycatch Loss:** Both TED designs resulted in significant loss of summer flounder, sea bass, dogfish, and skates.
- **Size Selectivity:** The TED designs tended to catch slightly smaller squid on average.

Conclusion: While the designs successfully retained squid, the significant loss of summer flounder and black sea bass makes these TEDs untenable for vessels relying on a mixed-catch economic model.

Future Directions and Collaborative Research

The workshop concluded with plans for ongoing research to find a "workable" solution that minimizes economic harm while meeting potential conservation needs.

- **No Immediate Rulemaking:** NOAA confirmed that there is no current proposed rule for TEDs in the northern summer flounder fishery.
- **Improved Design Needed:** Both industry and agency officials agreed that if TEDs were to be implemented, they would require a design that maintains summer flounder catch—a goal that current research has yet to achieve.
- **Documentation:** Cornell Cooperative Extension is actively collecting public comment forms to document industry concerns for inclusion in their final report to NOAA's Bycatch Reduction Engineering Program (BREP).

Upcoming Projects

- **Inshore Fluke Testing:** Planned for September/October 2026 using a twin-trawl vessel *(F/V Providence)* for direct control-vs-experimental comparisons. CCE will be performing 7 research days at sea with a goal of 56 paired tows of a TED design that will be developed collaborating with fishing industry input.
- **Offshore Testing:** A newly funded project will test TED designs on a large "twin rig" offshore vessel *(F/V Princess Scarlet)* to evaluate performance with larger catch volumes and different sea conditions in the offshore longfin squid fishery. This project will perform 10 research days at sea with a goal of 90 tows using 2 TED designs. (Reed TED and T2) in the offshore squid fishery. Catch retention and operational feasibility will be assessed for this study.

Research Priorities

Industry members recommended that any future studies must:

- Evaluate the impact on **all** target species in a mixed fishery, not just the primary species.
- Test gear across the **entire seasonal range** of the summer flounder fishery, as fish behavior changes significantly between spawning aggregates and wintering grounds.
- Explore "outside the box" ideas, such as horizontal bar configurations and alternative materials.

Economic Impact and Multi-Species Viability Framework

In the commercial sector, catch retention is the only metric that matters. If a piece of gear reduces the target species, it is not a conservation tool—it is a *de facto* closure of the fishery. The Mid-Atlantic fleet relies on a "Mixed Fishery" model. As noted by stakeholders like Amanda Jones and Sean Macy, a vessel's viability often depends on the ability to retain Summer Flounder, Scup, Black Sea Bass, and Croaker on a single trip.

Economic Variables for Resource Management

- **Market Grade Impacts:** Historically, "Medium" (dinner plate) flounder fetched ~$1.00/lb. While TEDs may retain these, they often inadvertently exclude other high-value "Jumbo" or "Large" grades. Losing this premium catch negatively impacts the vessel's ability to cover overhead costs.
- **Fuel-to-Catch Ratios:** A 15–35% catch loss forces more "doors up to doors down" cycles. With current fuel prices, the labor and fuel required for extra tows to hit a trip limit make the fishery economically impossible.
- **Operational Constraints:** Modern vessels utilize net reels for efficiency and safety. Rigid TED frames are functionally incompatible with these systems. Any proposed gear must move away from the rigid designs that have historically failed in fisheries that use net reels.

At-sea cooperative research is the strategic vehicle for proving gear viability before it reaches the rulemaking phase.

Tara McClintock committed to several follow-up actions to ensure continued communication and collaboration with the fishing industry regarding the development and testing of TEDs :

- **Industry Design Consultations:** She stated she would **circle back with industry members** specifically to discuss gear design for the upcoming summer flounder work and gather further input. (Summer 2026)
- **Ongoing Project Communication:** Tara intended to use the list of workshop attendees to **keep the group informed** as the research project progresses. (Fall-Winter 2026)
- **Information Sharing:** In response to questions about the regulatory history of TEDs and what is being considered now, she offered to **send links to websites** detailing the previous public comment periods and considered measures that had been discussed several years prior. (https://www.fisheries.noaa.gov/new-england-mid-atlantic/endangered-species-conservation/sea-turtle-bycatch-reduction-trawl) (Summer 2026)
- **Mobile Gear Demonstrations:** To ensure more industry members could see the technology, she promised to **bring the TED designs to various ports** so fishermen could get "eyes and hands" on them and have their feedback officially documented. (Summer 2026)
- **Reporting:** She confirmed that the feedback gathered through the workshop's **public comment forms** would be documented in the project's final reports to BREP

Questions from 3/19 CCE TED workshop - NMFS responses 4/13/26

1. What is the penalty for not using a TED in the summer flounder fishery in the sea turtle-summer flounder protection area? Question originated from Amanda Jones

NOAA Office of General Counsel, Enforcement Section utilizes a national Penalty Policy that provides guidance for the assessment of civil administrative penalties and permit sanctions under the statutes and regulations enforced by NOAA. TED violations are specifically delineated in the penalty schedule. *See* 2019 Penalty Policy at 53-55. Violations related to TEDs range anywhere from a Level I to a Level IV offense, depending on the gravity of the offense. For example, violations with slight discrepancies of the required TED angles may amount to a Level I violation and range in penalties from Written Warnings to $1,500; whereas, more egregious violations, such as fishing without a TED, may amount to a Level IV violation and be charged anywhere from a Written Warning to the statutory maximum (which right now, adjusted for inflation is $31,513 (see 15 CFR 6.3)).

2. Where are the observed summer flounder takes? Question originated from Amanda Jones with a similar inquiry from Greg DiDomenico

The most recent NMFS trawl bycatch estimates contain maps of observed sea turtle interactions in trawl gear (see Precoda and Murray (2024) for 2019-2023 and Murray (2020) for 2014-2018). However, these maps include all trawl gear interactions, and are not delineated by fishery. Observed sea turtle interactions in trips where summer flounder was the top landed species by hail weight have occurred off southern Cape Cod to North Carolina. The majority of interactions from 2000-2024 were found off the Virginia eastern shore, Maryland and Delaware, with another concentration off northern New Jersey and New York.

3. Were the two takes in 2023 dead? Question originated from Amanda Jones and fishermen in her office at Inlet Seafood.

As shown on the chart presented at the workshop, there were four observed takes on trips where summer flounder was the top landed species by hail weight over the last five years. This includes 2 in 2022 (1 Kemp's ridley, 1 loggerhead) and 2 in 2023 (both loggerheads). All four turtles were found alive with varying levels of activity. The post-interaction mortality assessment by the Northeast Sea Turtle Injury Workgroup (Upite et al. 2026) ranged from 10% for two of the turtles to 50% mortality for the other two turtles; so, while captured alive, it is possible that the turtles did not survive the fishery interaction.

4. What was the species composition of the 54 takes over the 24 years? Question originated from Greg DiDomenico with similar follow up questions from Mike Bauhs and Brent Fulcher.

Upon subsequent review, we determined that four of the summer flounder interactions involved decomposed turtles, so those records were removed from our analysis. There were 50 sea turtle interactions in trawls where summer flounder was the top landed species by hail weight from

2000-2024. Species composition included 43 loggerheads, 3 Kemp's ridleys, 1 green, 1 leatherback, and 2 unknown species.

5. What are the mortality rates for the specific fisheries?

Question originated from Jeff Kraus but similar follow up questions came from Amanda Jones, Eric Reid and Rose Willis.

The mortality rate for trawl gear from 2012-2024 is 53% (using 144 trawl records; Upite et al. 2026). Rates are calculated by gear type (e.g., trawl gear), and NMFS does not currently calculate mortality rates for individual fisheries. The Northeast Sea Turtle Injury Workgroup will be evaluating sample sizes for individual fisheries and whether confident mortality rates could be calculated. We will share those results if and when available.

6. What is exempted under the Biological Opinion?

Question originated from Brent Fulcher.

The 2021 "Batched Fisheries" Biological Opinion[4] considered the authorization of fisheries under ten Fishery Management Plans (FMPs), including the Summer Flounder/Scup/Black Sea Bass FMP. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not the purpose of carrying out an otherwise lawful activity is not considered to be prohibited under the ESA provided that such taking is in compliance with the terms and conditions of the Incidental Take Statement (ITS). The ITS of that Opinion anticipated the average annual take over a 5-year period of 6.4 greens (3.2 dead), 10.6 Kemp's ridleys (5.4 dead), 190.8 loggerheads (95.4 dead), and 8 leatherbacks (4 dead) in the trawl fisheries authorized under the ten FMPs (see section 7.3.1.3 of the Opinion for more information). There have been 50 observed sea turtles in the summer flounder fishery (identified by top landed species by weight), which represent documented interactions in just one of the trawl fisheries authorized under the ten FMPs. The Opinion uses extrapolated data from observed take to anticipate overall take.

The ITS has non-discretionary Reasonable and Prudent Measures and implementing Terms and Conditions (T&C). One of the T&C in the 2021 Opinion specifically states "NMFS must continue to investigate both new and existing modifications to gillnet, bottom trawl, and trap/pot gear and their effects on large whales, sea turtles, Atlantic sturgeon, Atlantic salmon, and giant manta rays."

7. How is the extrapolation done? Share the bycatch report.

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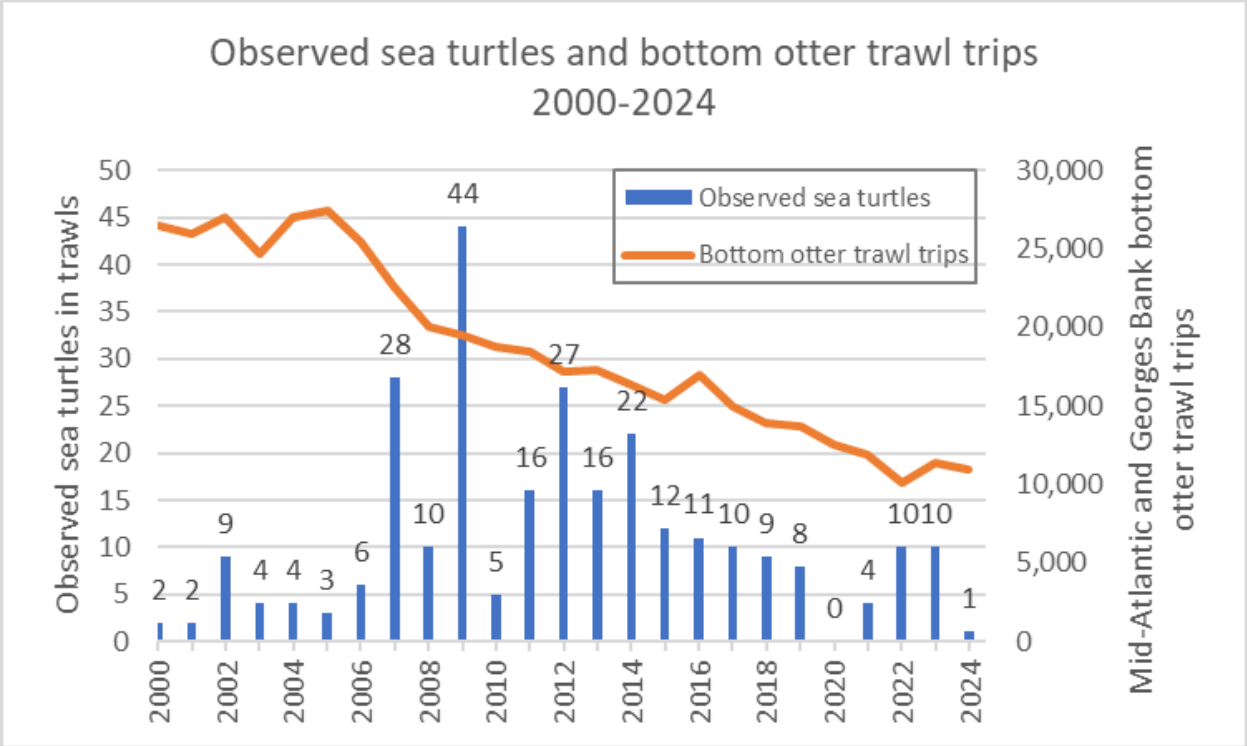
[4] Endangered Species Act Section 7 Consultation on the: (a)Authorization of the American Lobster, Atlantic Bluefish, Atlantic Deep-Sea Red Crab, Mackerel/Squid/Butterfish, Monkfish, Northeast Multispecies, Northeast Skate Complex, Spiny Dogfish, Summer Flounder/Scup/Black Sea Bass, and Jonah Crab Fisheries and (b) Implementation of the New England Fishery Management Council's Omnibus Essential Fish Habitat Amendment 2).

Question originated from Mike Bauhs with follow up question from Eric Reid.

Please see Precoda and Murray 2024 for details on the analysis.

8 . What was the number of trips taken relative to the number of turtles observed taken over the 24 year period? Question originated from Mike Bauhs with similar follow up from Brent Fulcher.

We queried Vessel Trip Report (VTR) data for all bottom otter trawl trips taken from January-December 2000-2024 in the Mid-Atlantic and George's Bank[5]. The following figure includes the number of bottom otter trawl trips in relation to the number of observed sea turtles taken in bottom otter trawl gear by year. The number of observed trips is a fraction of the total bottom otter trawl trips. In 2019-2023, 10% of total commercial bottom trawl effort was observed in the Mid-Atlantic and Georges Bank (Precoda and Murray 2024).



[5] Mid-Atlantic defined as the area bounded on the south by 35 deg N lat, on the west by the shore, on the north by 42 N lat, and on the east by 70 W long. Georges Bank defined as the area bounded on the south by 40 deg N lat, on the west by 70 W long, on the north by 42.5 N lat, and on the east by 66 W long.

References Cited

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