November 12, 2025

Dan Salerno, Chairman
Executive Committee
New England Fishery Management Council

Dan –

On behalf of Intershell International, Inc., Nantucket Sound Seafood, LaMonica Fine Foods, and Atlantic Capes Fisheries, we would like to underscore the importance of the issue Massachusetts DMF Director Daniel McKiernan raised as a Council priority for next year. Specifically, that the Executive Committee add as a priority for 2026 a framework action to restore access for the surf clam fishery to the Great South Channel Habitat Management Area. Among the alternatives to consider in this action should be simply lifting all area restrictions on clam dredges throughout the HMA and reopening all the areas identified in the 2019 Clam Dredge Framework (*i.e.*, the Rose and Crown, Davis Bank East, etc.).

Director McKiernan highlighted some of the reasons that this action is important, including the fact that the closure has forced the small boat surf clam fleet to concentrate effort in Massachusetts state waters, where the resource is becoming depleted. We would add that the HMA has long been an important area for clam vessels that are too small to fish on Georges Bank. It has accounted for upwards of 20% of total surf clam revenues in past years and those landings supported both large fishing communities like Gloucester and New Bedford, as well as many smaller ones on the Cape and elsewhere. These communities' continued participation in the surf clam fishery is an essential National Standard 8 consideration.

As requested by the Council, Intershell and NSS have been involved in cooperative research programs with the Coonamessett Farm Foundation to do mapping and dredge impact analysis. While compensation fishing has covered some of the companies' costs for this research, it has been far from a breakeven proposition for us. The industry has been willing to contribute these resources because it is vital to our future to be able regain access. The information gathered through these EFPs and other research projects conducted since Omnibus Habitat Amendment II shows both that the fishery does not interact with complex fishery habitat and that its impacts are fleeting in this highly dynamic area with its mobile sand waves and strong tides. (Not to mention the lack of cod spawning in the HMA due to ocean warming.) We believe that it is important for the Council to keep faith with the industry and consider this information in a new rulemaking process.

We add that restoring access helps the Council, NMFS, and the industry achieve the most important goal of the Magnuson-Stevens Act's National Standard 1 – preventing overfishing and achieving optimum yield from the surf clam fishery on an ongoing basis for the American fishing industry. While we recognize that protecting essential fish habitat is an important MSA objective, it is to be undertaken to help achieve OY and only to the "extent practicable." More importantly, the law only requires minimization of "adverse" EFH impacts, or those that are "more than minimal" and "not temporary in nature." If our research has shown anything, it is that clam dredge impacts are not only minimal but disappear within as little as 24 hours in this dynamic environment.

We greatly appreciate the support of you and the other members of the Executive Committee in making a new clam dredge framework a high priority for next year.

Sincerely,

/s/ Monte Rome
Intershell Inter'l Inc

/s/ Allen Rencurrel
Nantucket Sound Seafood

/s/ Daniel LaVecchia
LaMonica Fine Foods

/s/ Sam Martin
Atlantic Capes Fisheries, Inc.

cc: Joe Cimino, Chair, Mid Atlantic Fishery Management Council

November 6, 2025

Cate O'Keefe
Executive Director
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950

Dan Salerno
Chair
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950

Re: Evaluation of Surf Clam Access in Federal Waters

Dear Dr. O'Keefe and Mr. Salerno:

I write to support a 2026 management priority to evaluate revisions to the Atlantic surf clam exemption fishery in the Great South Channel Habitat Management Area (GSC HMA). The conclusion of research activity in the HMA in early 2026 and concerns of shifting effort into state waters make this a timely priority for the New England Fishery Management Council (NEFMC).

In April 2018 the NEFMC established the GSC HMA. One year later, the NEFMC approved three surf clam exemption areas in the GSC HMA in the Clam Dredge Framework Adjustment. This framework also established the intent to develop a research program for potential development of additional exemptions in the future. In support of this intent, the NEFMC's Habitat Plan Development Team identified four objectives for focused habitat research which can be addressed through study of the Rose and Crown and Davis Bank East closed areas. It is my understanding that research conducted by Coonamessett Farm Foundation under an existing Exempted Fishing Permit (EFP) will conclude in early 2026. Analysis from this and previous EFPs should provide better information for the NEFMC to evaluate where Atlantic surf clams and mussels can be harvested with minimal impact to sensitive fish habitat in those areas.

It is extremely concerning that restrictive surf clam access in federal waters appears to be resulting in an unintended shift of effort into Massachusetts state waters. Preliminary findings reveal a likely displacement of effort from the federal restricted area to state waters manifested in a trend of Massachusetts surf clam landings coming increasingly from state waters (Figure 1).

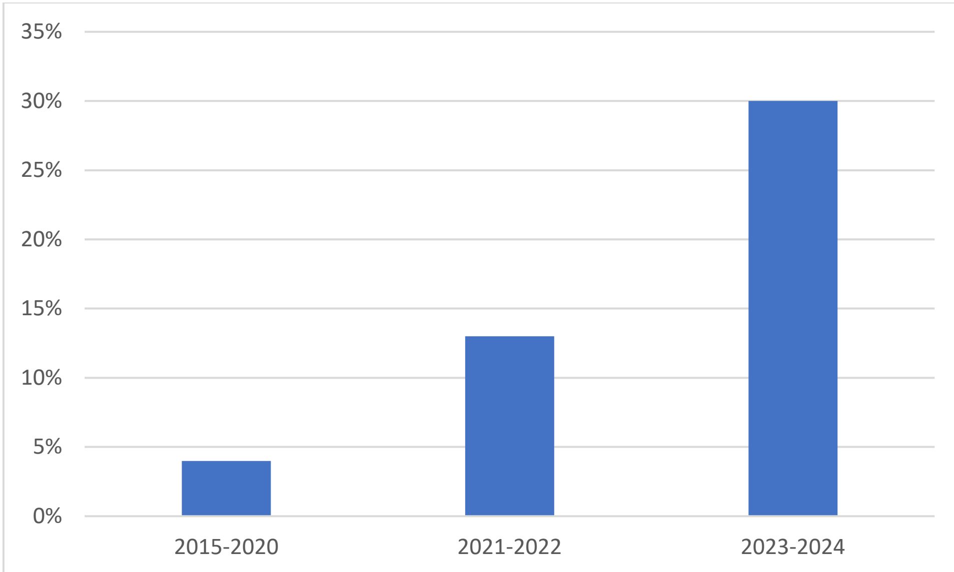

Figure 1. Average % of surf clams landed in MA harvested from state waters (2015-2024).

Simultaneously, Massachusetts Division of Marine Fisheries (DMF) is addressing potential conflict between surf clam dredging activities and habitat conservation that could be exacerbated by continued increasing activity in state waters. Current regulations rely on poorly defined depth contour lines as boundaries to restrict access shoreward of those boundaries. These regulations have proven challenging to comply with and enforce.

DMF is working toward modernizing the longstanding spatial management program for the surf clam and ocean quahog dredge fishery in state waters by utilizing GPS systems and low-cost cellular-based vessel tracking devices, like those required of federally permitted lobster trap vessels. Working with industry and municipalities, DMF has developed new spatial boundaries that generally incorporate a proxy for the 12' contour using straight lines between GPS coordinates and navigational beacons. These new proposed boundaries also incorporate a 200' buffer around mapped eelgrass beds and existing management area closures.

As part of this modernization effort, DMF will be requiring state-permitted surf clam and ocean quahog dredge vessels to install real-time, low-cost electronic vessel tracking devices that use cellular technology and allow for geofencing the newly created management areas. These state-approved trackers have a 1-minute ping rate, which we believe is sufficient to monitor these discreet management areas. Fine-scale tracking allows for spatial controls, including geofences around sensitive habitat (e.g., eelgrass beds), user-conflict zones, or area closures, as well as compliance monitoring.

Several vessels have installed these trackers during a voluntary pilot phase, allowing DMF to ensure the technology is sufficient for this purpose. Additionally, industry members with dually permitted (state/federal) surf clam dredge vessels have suggested that the more frequent ping rate of location data collected by the state-required devices would better capture their discrete fishing activity than their current federal vessel monitoring system requirements. These federal waters fishing location data could help inform the NEFMC and NOAA Fisheries on where they are fishing in the GSC HMA. Four vessels that fall into this category have recently requested tracker devices and DMF has furnished them as part of the ongoing pilot program. The vessel owners would have access to their own data and could make it available to NOAA Fisheries in the discussion concerning the appropriateness of the current closures.

I hope you will look favorably on this request and accept my pledge to facilitate the future sharing of the data consistent with existing data protocols. I am confident the fishery participants are eager to provide the best available data to engage with the regulators and policy makers on these matters.

Sincerely,

Daniel J. McKiernan
Director

Cc: Allen Rencurrel
Mike Pentony, GARFO

Nantucket Sound Seafood LLC
Captain Al's Finest

November 4, 2025

Mr. Daniel McKiernan
Director
Massachusetts Division of Marine Fisheries
836 South Rodney French Boulevard
New Bedford, Mass 02744

Subject: **Request for Regulatory Relief and Division Leadership on Nantucket Shoals Habitat Management Area Closures**

Dear Dan,

On behalf of Nantucket Sound Seafood and its partners in the Massachusetts surf clam industry (Intershell and Atlantic Capes), this letter respectfully requests your assistance and leadership in addressing the ongoing closure of the Great South Channel Habitat Management Area (HMA) on Nantucket Shoals. This closure has caused severe and unsustainable negative economic consequences for the fresh clam harvesting sector in the Commonwealth of Massachusetts, despite scientific evidence suggesting the area can support responsible surf clam harvest, with minimal habitat impact.

Since 2019, the Coonamessett Farm Foundation (CFF), in partnership with Nantucket Sound Seafood and Intershell Seafood, has invested approximately $800,000 in benthic surveys under NOAA EFPs #19066 and #23073. These efforts produced over 112,000 observations across 3,674 tows, covering 84 square miles. Key findings include:

- High surf clam productivity in sandy substrates with pebble/cobble coverage, especially in summer.
- Low bycatch rates relative to observed abundance, confirming dredge selectivity.
- Minimal groundfish presence: only six Atlantic cod observed across 2,114 fish events.
- The area is a high energy environment, one of the highest on the east coast, and is subject to seasonal habitat shifts, shaped by strong tides and winter storms;

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MA 02720
Tel 508-567-4284
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- Observed dredge impacts within the area dissipate within days.

- Simpler habitat structure in Davis Bank East, with sparse epifauna and virtually no complex habitat — yet the area still remains closed.

These data provide a fine-scale, science-based depiction of benthic habitats and species associations, offering managers critical insights in order to balance fishery access with habitat protection.

The current closure has had a devastating cumulative economic impact on the three companies. This is overwhelmingly a Massachusetts issue since all of the N. E. hand-shucking plants are located in the Commonwealth, and the economic losses are concentrated here. The total number of employees, most of which were or are Massachusetts residents, has declined from 265 to 154, or 42% in aggregate since the regulations were put in place by the Council. At the company level, Atlantic Capes Fisheries alone has had its production decline by 50%, the workforce dropped from 150 to 40 employees, and plant gross income has fallen 68%. In addition, their Rhode Island clam shucking operation was closed, and their customer base declined from 200 to fewer than 30 due to the lack of product. Across all companies, gross revenues have declined by 57% since the adoption of the HMA regulations. These impacts are now industry-wide, affecting Intershell, Nantucket Sound Seafood, and others smaller operations who have made significant investments in vessels, processing infrastructure, and research — all without regulatory relief. It is our collective conclusion that these declines in income are not sustainable, and threaten the very existence of this industry in the Commonwealth.

Compounding the matter, the Council's current program is not designed to reopen closed areas in a timely or economically viable manner. Surveying the entire HMA is prohibitively expensive and time-consuming, especially as sampling sites move farther from port. Nantucket Shoals was originally selected to avoid overlap with groundfish and scallop fisheries, yet remains closed despite minimal groundfish presence and a lack of complex habitat. While some complex habitat exists, it is actively avoided due to the risk of damaging $150,000 dredges. Unlike scallop dredges, clam dredges cannot operate in rocky terrain.

To make issues more untenable, NOAA does not survey this area, leaving a critical data gap that industry-led research is now attempting to fill. To add further complexity to the situation, surf clams are managed by the Mid-Atlantic Council, while habitat closures fall under the New England Council, thus coordination between the two is essential to achieve optimum yield, while minimizing habitat impacts.

Additional considerations include:

- Council habitat models show that increasing catch per unit effort reduces bottom contact time, and is one of the most effective ways to protect habitat. The closure has had the opposite effect, forcing small clam vessels inshore where yield is lower (9 lbs./bushel vs. 15 lbs./bushel offshore). In order to achieve the same production output, the vessels then have to increase tow/ bottom time, which increases bottom impacts, for both target and non-target species.

- Unharvested high-density clam beds violate National Standards requiring the Councils to achieve optimum yield.

- Inshore areas are more ecologically diverse, harboring juvenile species like small lobsters. Longer tows and depletion of inshore clam beds may cause unintended habitat impacts that were not fully anticipated nor analyzed in the final proposal.

- According to Intershell Shellfish staff, inshore surf clam stocks are not replenishing on a timely basis, and are in danger of being overexploited. Without access to additional areas on Nantucket Shoals, the lack of product will further jeopardize the economic viability of the Massachusetts surf clam industry.

Your division is respectfully urged to:

1. Advocate for regulatory relief for the Massachusetts surf clam industry at the Council/ NOAA.

2. Support repeal or revision of the HMA closure regulations as was suggested by Shaun Gehan Counsel for Intershell Shellfish, in his submission of "Petition for Rulemaking, Elimination of the Restrictions on Surf Clam fishing in the Great South Channel Habitat Management Area "(Petition attached).

3. Champion inter-council coordination, better align habitat protection with surf clam management, while achieving optimum yield of surf clams from Nantucket Shoals.

4. Ensure Massachusetts remains economically viable in the fresh surf clam sector by restoring access to productive offshore grounds.

Your attention to this urgent matter is appreciated, and any additional information or support needed to advance this effort will be provided.

Without Massachusetts' leadership, no other state is likely to prioritize this issue.

Sincerely,

Allen Rencurrel, CEO, President
Nantucket Sound Seafood

cc. Intershell Seafood
Atlantic Capes

GehanLaw
The Law Office of Shaun M. Gehan

May 7, 2025

Via Electronic Mail & Regulations.gov
The Honorable Howard Lutnick
Secretary of the Department of Commerce
1401 Constitution Ave NW, Room 5516
Washington, DC 20230

Russell T. Vought, Director
Office of Management and Budget
725 17thStreet, N.W.
Washington, D.C. 20503

RE: Petition for Rulemaking, Elimination of the Restriction on Surf Clam Fishing in the Great South Channel Habitat Management Area

Dear Secretary Lutnik and Director Voght:

Attached please find a petition for rulemaking submitted on behalf of Intershell International Corporation, a Gloucester, Massachusetts based fishing company. The petition requests elimination of the regulation prohibiting the dredging of surf clams and mussels in an area off Cape Cod referred to as the "Great South Channel Habitat Management Area" ("GSC HMA"). The regulation sought to be lifted imposes significant economic costs on small fishing businesses like Intershell and the communities they support, while providing no tangible conservation benefits. This request is consistent with President Trump's Executive Orders 14276, "Restoring American Seafood Competitiveness," and 14219, "Ensuring Lawful Governance and Implementing the President's 'Department of Government Efficiency' Deregulatory Initiative." Granting the requested relief will boost both the United States economy and exports.

Designation of these traditional fishing grounds as a "habitat management area" (a term not defined either by law or regulation) and the attended restrictions on dredge fishing undermines one of the principal purposes of the Magnuson-Stevens Fishery Conservation and Management Act ("MSA") – that is, the achievement of optimum yield from the Atlantic surf clam fishery on a continuing basis. Surf clams are not only <u>not</u> subject to overfishing, they are an <u>underutilized</u> and valuable food resource. <u>Less than fifty percent</u> of the annual total allowable catch is harvested each year, while in past years, this area has accounted for upwards of <u>twenty percent of the total Atlantic surf clam annual harvest</u>.

Moreover, this regulation elevates a subsidiary MSA objective – minimization of "adverse impacts" on essential fish habitat (but only to "the extent practicable," a term of limitation) – over the law's primary objective of realizing the economic and social benefits of this Nation's marine resources. The area was closed ostensibly to protect habitat of spawning cod. However, even had the area once been important for cod, it appears it is no longer utilized by the species.

More importantly, however, research shows that the GSC HMA is a highly dynamic environment, subject to strong tidal and storm forces. Relative to the bottom disturbance caused by natural forces, the small areas impacted by dredges are utterly inconsequential. In fact, there is a substantial amount of research showing that moderate dredging can <u>increase</u> shellfish and productivity of other bottom-tending fish and organisms by creating clean surfaces to which spat can attach and recirculating nutrients. It is questionable, therefore, whether the minimal impact of dredges in this highly dynamic area can even be considered "adverse" within the meaning of the law.

We appreciate your close attention to, and action on, the attached petition. Intershell International and I stand ready to answer any questions you may have. Thank you very much.

Sincerely,

/s/ Shaun M. Gehan
Shaun Michael Gehan

Counsel for Intershell Int'l Corp.

cc: Ms. Anne Hawkins, NOAA General Counsel
Mr. Eugenio Piñeiro Soler, Director, NOAA Fisheries
Ms. Kelly Denit, Director, Office of Sustainable Fisheries
Mr. Samuel D. Rauch III, Deputy Assistant Administrator for Regulatory Programs

Petition for Rulemaking to Reopen the Great South Channel Habitat Management Area to the Atlantic Surf Clam Fishery

Submitted by:

Shaun M. Gehan
The Law Office of Shaun M. Gehan
1101 30th Street, NW – Suite 500
Washington, DC 20007
(202) 412-2508

Submitted on Behalf of:

Intershell International Corporation
9 Blackburn Drive
Gloucester MA 01930

May 7, 2025

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Intershell International Corporation ("IIC" or "Petitioner") respectfully submits the following Petition for Rulemaking ("Petition") to the Secretary of Commerce pursuant to the Administrative Procedure Act ("APA").[1] This Petition pertains to the authority conferred upon the Secretary to conserve and manage United States Atlantic surf clam stocks pursuant to the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. § 1801 *et seq.* ("Magnuson-Stevens Act" or "MSA"). The relief requested is also consistent with President Trump's Executive Order, "Restoring American Seafood Competitiveness," which seeks to " to promote the productive harvest of our seafood resources [and] unburden our commercial fishermen from costly and inefficient regulation."[2]

Petitioner IIC respectfully requests the Secretary initiate a rulemaking to open the Great South Channel ("GSC") Habitat Management Area ("HMA") for the purpose of harvesting surf clams. (*See* Figure 1, below.) At the very least, Petitioner would request a reopening of the areas within the HMA of the areas colloquially referred to as the "Rose and Crown" and "Davis Bank East." Consistent with prior analysis relating to enforceability, this latter proposal incorporates a five-minute rate of vessel monitoring systems ("VMS").

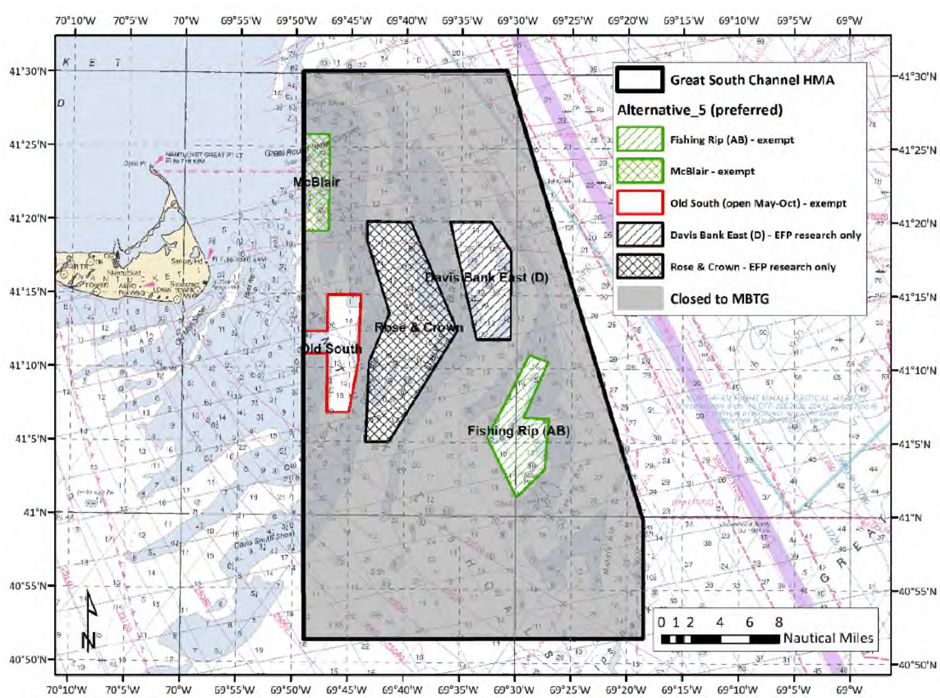

Table 1: The Great South Channel Habitat Management Area[3]

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[1] The APA states that, "Each agency shall give an interested person the right to petition for the issuance, amendment, or repeal of a rule." 5 U.S.C. § 553(e).

[2] Office of the Federal Register, Executive Order 14276, "Restoring American Seafood Competitiveness." 90 Fed. Reg. 16992 (April 22, 2025).

[3] NEFMC, Clam Dredge Framework Adjustment ("Clam Dredge FW") (Map 5), at 26 (July 22, 2019), *available at* https://d23h0vhsm26o6d.cloudfront.net/2020-04-21-Final-Clam-Dredge-Framework_signed.pdf.

It is appropriate for the Secretary to initiate and adopt this measure given that the two aspects of the MSA at issue – managing the Atlantic surf clam fishery and practicably minimizing adverse impacts on EFH in the Great South Channel – are divided among two fishery management councils, Mid-Atlantic and New England. The Mid-Atlantic Council is hamstrung in its ability to manage the surf clam resource to achieve optimum yield by the New England Council's designation of HMAs and attendant fishing limitations for stocks under its jurisdiction.

It is also appropriate in accordance with Executive Order ("EO") 14219, "Ensuring Lawful Governance and Implementing the President's 'Department of Government Efficiency' Deregulatory Initiative."[4] Section 2 of EO 14219, "Rescinding Unlawful Regulations and Regulations That Undermine the National Interest," directs all federal agencies to, among other things, identify –

(iii) regulations that are based on anything other than the best reading of the underlying statutory authority or prohibition;

(iv) regulations that implicate matters of social, political, or economic significance that are not authorized by clear statutory authority;

(v) regulations that impose significant costs upon private parties that are not outweighed by public benefits; [and]

(vii) regulations that impose undue burdens on small business and impede private enterprise and entrepreneurship.

Id. Sec. 2(a) The head of any agency should, in consultation with the Administrator of the Office of Information and Regulatory Affairs, should "develop a Unified Regulatory Agenda that seeks to rescind or modify" regulations meeting these criteria. *Id.* Sec. 2(d).

As explained in detail below, the current prohibition on surf clam fishing in the GSC HMA meets each of these criteria. For example, while the Magnuson-Stevens Fishery Conservation and Management Act ("MSA"), 16 U.S.C. § 1801 *et seq.*, does require fishery management councils to "minimize … adverse impacts on" essential fish habitat ("EFH"), such duty only extends "to the extent practicable." *Id.* § 1853(a)(7). The Secretary's primary duties under the MSA are to (1) "prevent overfishing" and (2) "achiev[e], on a continuing basis, the optimum yield from each fishery for the United States fishing industry." *Id.* § 1851(a)(1). Surf clams are not only not overfished, they are, in fact, an under-utilized resource largely due to inaccessibility to significant amounts biomass due to EFH restrictions like the one at issue here.

Neither the MSA itself nor the regulations promulgated by the National Marine Fisheries Service ("NMFS") to implement the EFH provision define or mention of "habitat management areas." **Elevation of the concept of "habitat management" over that of productive fisheries is antithetical to the law's purposes of "promot[ing] domestic commercial and recreational fishing under sound conservation and management principles" and "encourag[ing] the**

[4] 90 Fed. Reg. 10583 (Feb. 13, 2025).

development by the United States fishing industry of fisheries which are currently underutilized or not utilized by United States fishermen." *Id.* § 1801(b)(3),(6). As such, the designation of this area as an HMA and imposition of restrictions on that basis is wholly unmoored from the law. This action imposes significant costs on fishermen and the Nation while providing no identifiable benefits and significantly burdens small businesses that have traditionally relied on fishing in this area.

For all these reasons, and those explained below, IIC respectfully requests that the Secretary initiate a process to adopt Petitioner's proposed regulation. An implementing draft of regulatory language is appended hereto as Exhibit 1.

I. INTRODUCTION

The Atlantic surf clam fishery is managed by the Mid-Atlantic Fishery Management Council. Surf clams are neither overfished nor is overfishing of this resource occurring.[5] In fact, this fishery has been unable to harvest the full amount of its annual catch level, or the amount of harvest that Council has determined to be optimum yield for the fishery, on an ongoing basis. *See* Exhibit 2 ("Federal surfclam catch limits and landings: 2003 and 2016-2025").

An increasingly significant portion of the surf clam fishery occurs on Georges Bank and in the waters of southern New England, areas managed by the New England Fishery Management Council. As such, the New England Council has the responsibility for identifying and practicably minimizing adverse impacts on essential fish habitat ("EFH") for the species and the habitat under its jurisdiction. As explained herein, bifurcation of responsibilities between the Councils, one with a duty to manage the surf clam fishery to achieve optimum yield on an ongoing basis and the other with practicably minimizing adverse impacts on EFH for its managed fisheries, has impeded the surf clam fishery's ability to harvest this underutilized resource.

Specifically, designation of the Great South Channel Habitat Management Area[6] and its subsequent closure to most bottom-tending gear has resulted in significant surf clam biomass being unavailable to the fishery.[7] Ideally, under the MSA's EFH protection rubric, a fishery management council would consider closing a fishing ground as tool for minimizing adverse fishing impacts by evaluating not only fishing gear's impact on such habitat, but also determining the practicability of access denial in light of the MSA's primary objectives. Of

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[5] MAFMC, 2024 Atlantic Surfclam Fishery Information Doc. ("2024 Surfclam Doc."), at 1 (July 2024), *available at* https://static1.squarespace.com/static/511cdc7fe4b00307a2628ac6/t/66843584407961390a39bf6e/1719940484575/2024_SC_FishInfoDoc_2024-07-02.pdf#page=1.39.

[6] The term "habitat management area" does not appear in the Magnuson-Stevens Fisheries Conservation and Management Act ("MSA"), 16 U.S.C. § 1801 *et seq.*, nor is it defined or mentioned in the MSA implementing regulations relating to EFH. *See generally* 50 C.F.R. Part 600, Subpart J. In practice, the term "HMA" appears to be used synonymously with "habitat area of particular concern," a defined category of EFH that meets certain criteria. *See* 50 C.F.R. § 600.815(a)(8). "Habitat area of particular concern" is also not mentioned or defined in the MSA.

[7] Through its Clam Dredge Framework, the New England Council has allowed clam dredges limited access to fish parts of the GSC HMA. 2024 Surfclam Doc., at 1. However, the historically most productive areas, such as the Rose and Crown and David Bank East, remain off limits.

greatest importance is a council's duty to achieve optimum yield from a fishery on an ongoing basis for the fishing industry. 16 U.S.C. § 1851(a)(1).

In this case, however, the New England Council has implemented the closure ostensibly to protect species under its jurisdiction, while the Mid-Atlantic Council is precluded (likely more by comity than by the MSA itself) from separately undertaking a practicability analysis of such a closure for its impacts on the surf clam fishery it manages. Under these circumstances, it is appropriate for the Secretary and NMFS's Greater Atlantic Regional Office to take a role in evaluating the impacts of the surf clam fishery in this area on EFH for managed species, determining whether this fishery's impacts on such habitat is adverse within the meaning of the law, and, if so, whether a closure of the GSC HMA, or important fishing areas therein, to clam dredges is "practicable."

The potential for surf clam dredges to adversely impact EFH for, particularly, depleted species like cod depends on whether such impacts both reduce the quantity or quality of such habitat and whether such impacts are more than minimal and not temporary in nature. If the surf clam fishery's impacts on EFH are temporary or transitory, then the existing closures are not practicable and run counter to other important MSA objectives.

We first review the legal background governing fisheries management and the duty under the law to protect EFH. We then review the Nantucket Shoals surf clam fishery and the best available scientific information relating to the habit with key fishing areas within the HMA, particularly the areas referred to as the "Rose and Crown," "Davis Bank East," and the "Fishing Rip." This includes information considered in Omnibus Habitat Amendment 2 ("OHA2") and the Clam Dredge Framework as well as subsequent published research and reports from research projects. We conclude with an analysis of this research in light of the legal standards governing NMFS' duties under the MSA.

II. Legal Background Relating to EFH Protection

The Magnuson-Stevens Fishery Conservation and Management Act of 1976 ("MSA" or "Act"), as amended over the years, sets forth the framework for managing this nation's fisheries resources. In adopting the MSA, Congress found that

> [t]he fish off the coasts of the United States, the highly migratory species of the high seas, the species which dwell on or in the Continental Shelf appertaining to the United States, and the anadromous species which spawn in United States rivers or estuaries, constitute valuable and renewable natural resources. These fishery resources contribute to the food supply, economy, and health of the Nation and provide recreational opportunities.

16 U.S.C. § 1801(a)(1). To realize these benefits over the long term, the MSA establishes conservation and management system as "necessary to prevent overfishing, to rebuild overfished stocks, to insure conservation, to facilitate long-term protection of essential fish habitats" in order "to realize the full potential of the Nation's fishery resources." *Id.*§ (6). The statute thus "balances the twin goals of conserving our nation's aquatic resources and allowing U.S. fisheries to thrive." *Oceana, Inc. v. Pritzker*, 26 F. Supp. 3d 33, 36 (D.D.C. 2014).

Toward these ends, Congress established a process for promulgating fishery management plans ("FMP"), the development of which are guided by ten National Standards for fisheries conservation and management. *See* 16 U.S.C. §§ 1853, 1851(a). Chief among them is National Standard 1, which requires implementation of conservation and management measures that "prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry."[8]

While courts have found that the conservation mandate of the MSA is paramount,[9] it is so only to the extent that socioeconomic concerns cannot be used as an excuse to avoid action when the best scientific information indicates that a stock of fish is overfished or subject to overfishing. *See, e.g., id.* When a managed stock is "healthy" in the sense that, at a minimum, its biomass is above—and fishing mortality rates are below—their thresholds, the goal of management is to help ensure the fishery can harvest the full amount of catch which has been determined to be sustainable, both annually and over the long term. "Once optimal yield is set, the Secretary is charged with 'achieving' the optimum yield."[10]

As one measure to sustain fish populations for their economic and social benefits, FMP's must "describe and identify" EFH for the fishery. 16 U.S.C. § 1853(a)(7). Councils must also consider measures that "minimize to the extent practicable adverse effects on such habitat caused by fishing" in each FMP. *Id.* There are two elements to this prescription: (1) that fishery impacts must be "adverse" and (2) that measures to minimize such impacts must be "practicable."

NMFS' regulations explain these terms. For an impact from fishing activity to be adverse, it must reduce the "quality and/or quantity of EFH." 50 C.F.R. § 600.810(a). If an adverse effect is found, it must be minimized *only* if the impact "is more than minimal and not temporary in nature." *Id.* § 600.815(a)(2)(ii). Measures to minimize adverse EFH effects must also be "practicable." The practicability determination is made by (1) "determining the nature and extent of the adverse effect on EFH" and (2) evaluating "the long and short-term costs and benefits of potential management measures to EFH, associated fisheries, and the nation, consistent with national standard 7." *Id.* § 600.815(a)(2)(iii).

Courts have read the "practicability" language as a limitation, rather than a requirement to protect EFH no matter the cost. "The upshot of [the MSA's] structure is that Congress did not intend any of these specified goals — *i.e*., the ones limited to actions that are 'practicable' — to take priority over the others."[11] Indeed, "the 'practicable' language permits, or perhaps even requires, the Council to weigh social and economic harms to fishers against any conservation value." *Id.* at 90. The practicability limitation in the EFH and other MSA provisions is "the

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8 16 U.S.C. § 1851(a)(1); *see also Oceana, Inc. v. Pritzker*, 26 F. Supp. 3d at 37.

9 *See, e.g., Nat'l Res. Def. Coun. v. Daley*, 209 F.2d 747, 753 (D.C. Cir. 2000).

10 *Western Seas Fishing Co. v. Locke*, 722 F. Supp. 2d 126, 133 (D. Mass. 2010).

11 *Conservation Law Foundation v. Ross*, 374 F. Supp. 3d 77, 91 (D.D.C. 2019).

means by which [Congress] 'delegated to the agency the discretion to weigh the relevant factors' embodied in the MSA's competing objectives."[12]

With this background, we turn to the importance of the resource in the GSC HMA to the surf clam fishery overall.

III. The Importance of the GSC HMA to Fishing Communities, the Atlantic Surf Clam Fishery, and the Adverse Impacts of its Closure

A. The Importance of the Nantucket Shoals Surf Clam Fishery

The Southern New England ("SNE") Atlantic surf clam fishery has historically represented only a small portion of the overall species landings, but since 2010 landings from the SNE have become increasingly important to the fishery overall. Since 2011, the SNE surf clam fishery has comprised about twenty percent of the total coastwide landings. (Clam Dredge FW, at 69.) The areas of the GSC HMA that are now closed accounted for than a third of nominal revenue generated by the Massachusetts surfclam industry. (Surf Clam FW at 150, 66 (Fig. 6).) Surf clams inhabit sandy bottom but can be found in association with cobbles, rocks, and boulders.[13]

Medium sized clam vessels (60' to 80') comprise the majority of the New England fleet's catch. (Clam Dredge FW at 63, 188). Such clam vessels are concentrated in a small number of communities—New Bedford, Fairhaven, and Hyannis—which have "the high rates of dependence … on Great South Channel HMA" because they are unable to fish safely on Georges Bank. (Clam Dredge FW at 64.) "While a minority **(20%) of coast-wide surfclam revenues are generated in the Great South Channel HMA**, these revenues are **concentrated among a relatively small number of permits, owners, and communities**." (*Id.* (emphasis added).) At least until recently, in fact, surf clams were the second highest valued species landed in New Bedford after scallops. The amounts of lost revenue to these dependent surf clam fishing communities are significant. Prior to the New England Council's near total closures, the fishing grounds impacted by the HMA designation accounted for as much as $7,800,000 in annual revenues. (*See* Table 35 from the Surf Clam Framework below).

The surf clam fishing grounds within the HMA are also important because harmful algal blooms which can contaminate surf clams and cause Paralytic Shellfish Poisoning intermittently occur on Georges Bank.[14] Vessels fishing offshore must therefore adhere to costly testing

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[12] *Id.* at 91-92 (quoting *Oceana, Inc. v. Pritzker*, 24 F.Supp.3d 49, 67 (D.D.C. 2014).

[13] *See, e.g.*, E.N. Powell, *et al*., The conundrum of biont-free substrates on a high-energy continental shelf: Burial and scour on Nantucket Shoals, Great South Channel ("Powell et al. 2021"), Estuarine, Coastal and Shelf Science 249 (2021) 107089 (citations omitted) ("Cobbles, rocks, and boulders are routinely encountered on the neighboring Georges Bank in regions occupied by surfclams. Surfclams, however, are sand denizens and, presumably, do not require or benefit from the presence of such sedimentary components in their habitat.").

[14] N.F. Jennings, et al., Great South Channel Habitat Management Area Survey, Final Report for Exempted Fishing Permit #19066 ("Jennings et al. 2022"), at 7 (June 15, 2022), *available at* https://s3.us-east-1.amazonaws.com/nefmc.org/6.-CFF-PR-EFP19066-Feb2022.pdf.

protocols. (*Id.*) By contrast, fishing grounds southeast of Nantucket do not experience such algal blooms. (*Id.*) Thus, both proximity, which reduces trip costs, and costs avoided by not having to implement shellfish testing protocols make the GSC HMA a more efficient and profitable area to fish. Surf clams in this area are also unique because they grow to a larger size than elsewhere in the fishery. (Powell et al. 2021.)

Table 35 – Revenue (to nearest $100K) and fishing effort (hours) within the Alternative 2 areas (note that these are year-round estimates for Old South and Rose and Crown South) for January 2011-December 2017.

Metric	Area	2011	2012	2013	2014	2015	2016	2017	Average
Revenue (logbook)	Fishing Rip	$ -	$ 100,000	$ 700,000	$ 600,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000
	Davis Bank East	$ -	$ 300,000	$ 700,000	$ 400,000	$ 600,000	$ 500,000	$ 300,000	$ 400,000
	McBlair	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ -	$ -	$ 100,000
	Old South	$ 500,000	$ 300,000	$ 300,000	$ 1,200,000	$ 1,000,000	$ 1,300,000	$ 400,000	$ 700,000
	Rose and Crown N	$ 500,000	$ 1,300,000	$ 1,300,000	$ 1,000,000	$ 1,200,000	$ 600,000	$ 500,000	$ 900,000
	Rose and Crown S	$ 300,000	$ 1,200,000	$ 600,000	$ 1,100,000	$ 800,000	$ 900,000	$ 400,000	$ 800,000
	Total Alt 2	**$ 1,500,000**	**$ 3,400,000**	**$ 3,700,000**	**$ 4,300,000**	**$ 4,000,000**	**$ 3,600,000**	**$ 1,900,000**	**$ 3,200,000**
	Total HMA	**$ 2,800,000**	**$ 6,100,000**	**$ 7,800,000**	**$ 7,800,000**	**$ 7,100,000**	**$ 7,300,000**	**$ 4,700,000**	**$ 6,200,000**
	% of HMA revenue	**52%**	**56%**	**48%**	**55%**	**56%**	**50%**	**41%**	**52%**
Fishing Effort (hrs, VMS)	Fishing Rip	17	208	1,843	2,070	1,254	222	97	816
	Davis Bank East	45	248	1,956	532	1,375	2,974	2,077	1,315
	McBlair	795	10	106	178	564	300	34	284
	Old South	855	469	1,111	2,788	2,204	5,220	2,171	2,117
	Rose and Crown N	911	3,182	2,877	3,036	3,962	5,821	1,715	3,072
	Rose and Crown S	111	2,151	1,250	1,684	1,356	3,214	1,645	1,630
	Total	**2,734**	**6,268**	**9,143**	**10,288**	**10,714**	**17,752**	**7,738**	**9,234**
	Total in HMA	**3,887**	**7,562**	**11,262**	**12,364**	**13,100**	**21,567**	**9,645**	**11,341**
	% of HMA hours	**70%**	**83%**	**81%**	**83%**	**82%**	**82%**	**80%**	**81%**

Source: Revenue from surfclam logbook analysis, fishing effort from VMS.

The Nantucket Shoals surf clam fishery harvest area differs from all other productive East Coast harvest areas due to the clam's large physical size and the high yield of meat per unit of clam. The size and health of the resident surf clams in the GSC HMA have been crucial to the interests of New England processors for the ease of removing the meat in a hand shuck surf clam operation and the supportive yields to the smaller processing operations. (Jennings et al. 2022.)

B. The Closure of Most of the GSC HMA Adversely Impacts Fishing Dependent Communities and the Achievement of Optimum Yield for the Atlantic Surf Clam Fishery

In the late 1990s and early 2000s, the Atlantic surf clam fishery routinely met or approached its annual total allowable catch ("TAC").[15] The fishery has not caught its total allowable catch ("TAC") since 2003 and over the past four years, less than fifty percent of allowable landings were harvested. (2024 Surfclam Doc. at 5.) In 2023, the lowest amount of surf clams were harvested— only 10,653 mt or 41% of the TAC—since at least 1999. *Id.* Landings from Georges Bank and Southern New England have declined precipitously since 2019 even though the fishery is generally moving northward. (*Id.* at 6 (Figure 4), 1.)

The COVID pandemic may have affected landings in 2020 and 2021.[16] Even in those years, when restaurant demand was low, demand still exceeded supply. (*Id.* at 2-3.) Currently,

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[15] *See* 2024 Surfclam Doc., Table 1, reproduced as Appendix 1 below.

[16] MAFMC, Atlantic Surfclam and Ocean Quahog Fishery Performance Report ("2022 Performance Rpt."), at 2 (April 2022).

demand continues to exceed surf clam supply, limiting the potential for expanding export markets.[17] Also depressing overall landings was the closure of the GSC HMA in April 2019 to surf clam fishing following the expiration of the one-year exemption under the New England Council's Omnibus Essential Fish Habitat Amendment 2.[18] From 2013-2017, this area accounted for 16-28% of total surf clam fishery revenue. (Clam Dredge FW at 123-24 (Table 32).) In June 2020, access to some of those historic fishing grounds, specifically the areas referred to as McBlair, Fishing Rip, and Old South, were restored. However, access to fishing grounds that produced 87% of the surf clam revenue from the GSC HMA remain closed.[19]

Under the New England Council's Clam Dredge Framework, the alternative that would have restored access to the largest number of fishing areas, Alternative 2, still reduced total revenue by 60%. (*Id.*) Had the two additional areas, the Rose and Crown and Davis Bank East, been open, only 17.7% of the total area within the GSC HMA would be open to fishing. The footprint of the fishery, however, is much smaller due to the need to avoid large boulders (greater than 5') that can damage clam dredges and the industry's focus on grounds known to be most productive. (Jennings et al. 2022.)

C. The Minimal and Potentially Positive Impacts of Clam Dredges on EFH

1. Minimal Impact of Dredges

Furthermore, the Habitat Plan Development Team ("PDT") estimated the total area swept within the five exemption areas considered in the Clam Dredge Framework Action ranged from 4 to 20 percent annually. (Clam Dredge FW at 101.) During the industry-funded research project conducted by Jennings et al., only a total of 3.12 square kilometers of bottom within the 24 sq. km study area, or 13 percent, was swept during a total of 3,236 tows (104 trips). (Jennings et al. 2022.) On average, only 0.03 sq. km of bottom was impacted per trip during the two-year study period. By contrast, the Habitat PDT estimated that 160.52 sq. km of bottom was impacted by 985 trips by surf clam vessels in 2014.[20] That equates 0.16 sq. km per trip estimated by the PDT, which is over five times greater than the carefully measured trips studied during the Jennings et al. research project. This indicates that the assumptions used to estimate swept area in the Clam Dredge Framework are likely to be very conservative.

Overall, the total impact of the surf clam fishery in terms of swept area is small, particularly compared to other New England fisheries. On average, the total amount of annual bottom impacted by clam dredges ranged from 371 to 860 sq. km from 2000-2010. (OHA2, Vol.

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[17] *Id.* at 4.

[18] NEFMC, Omnibus Essential Fish Habitat Amendment 2 ("OHA2") (Dec. 8, 2016), *available at* https://www.nefmc.org/library/omnibus-habitat-amendment-2.

[19] *Id*. at 125 (Table 33) (showing a reduction from $6.3 to $0.8 million under the selected alternative). Some of those revenues have been recouped through research fishing, but such amounts have been low and a number of research proposals that could have generated landings and revenue, not to mention valuable data, have been denied.

[20] *See* Clam Dredge FW at 123 ("During 2011-2017, the entire HMA was fished on 423-985 trips per year."); *id.* at 102 (Table 24). It is here assumed that the year with the highest swept area estimates was the year with the highest number of trips.

4, at 46.) This is less than 0.3% of the area swept during that period by otter trawls, and between 2% and 3.24% of that by scallop dredges.[21] Even this may be an overstatement. **In 1998, it was estimated that the total area swept by the entire surf clam fishery was less than 100 square miles annually, or about 260 sq. km**.[22]

These figures almost certainly overstate the amount of EFH impacted by the surf clam fishery. "Surfclams are found primarily in sandy sediment and are predominantly oceanic, where they are most common in turbulent waters just beyond the breaker zone." (*Id.*, at 41 (citing Ropes 1980).) The fishery tends to return to the same areas over time, (Clam Dredge FW, at 94), and recovery rates of surf clams within the GSC HMA are high. (*See* Jennings et al. 2022 (noting that catch-per-unit-of-effort remained stable over the research period).)

2. Low-to-Moderate Dredging as a Tool for Benthic Productivity[23]

Dredging is often associated with habitat disturbance, but controlled low to moderate dredging can, in some contexts, enhance benthic productivity. A growing body of research indicates that mild seafloor disturbances may boost the recruitment, growth, or diversity of benthic organisms such as clams, oysters, and other infauna. This benefit aligns with ecological principles (*e.g.*, the intermediate disturbance hypothesis) whereby periodic disruption prevents stagnation and encourages new growth.

Mechanisms for Increased Benthic Productivity

- **Clearing Silt and Algae**: Light dredging can remove accumulated silt, detritus, and algal mats from the seabed, exposing cleaner substrate or even depositing fresh shell material. For example, experimental dredging in Alabama that removed silt and added oyster shell dramatically increased oyster spat settlement. By mitigating sedimentation and fouling, such disturbance creates a more hospitable surface for larvae to settle.[24]

- **Provision of New Settlement Surfaces (Cultch):** The act of dredging often breaks apart shells and invertebrates, redistributing shell fragments and gravel across the seabed. These materials serve as valuable "cultch" – hard surfaces on which larvae can attach. Studies have noted that dredge furrows tend to trap broken shells, effectively creating settlement hotspots for oyster and clam spat. In one observation, dredge tracks functioned as sinks where shell debris accumulated and subsequently yielded higher densities of young oysters

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[21] *Id.* From 2000 to 2010, generic otter trawls' swept area ranged from 125,694 to 297,954 sq. km, while limited access scallop dredges impacted 19,523 to 26,525 sq. km annually. *Id.*

[22] MAFMC, Amendment 13 to the Surf Clam and Ocean Quahog FMP, Vol. 1, at 173 (June 2003).

[23] This section is based on research by John Everett and Eric Newton of The Everett-Vehrs Conservation and Research Foundation, www.evcarf.org

[24] Mercaldo-Allen, Renee and Goldberg, Ronald, 1952- (2011). Review of the ecological effects of dredging in the cultivation and harvest of molluscan shellfish. https://repository.library.noaa.gov/view/noaa/3971 (and citations therein).

settling on the remaining shell. Similarly, spreading shell hash over a clam bed (whether by intentional cultivation or as a byproduct of dredging) increases clam larval settlement, as the shell material stabilizes sediments and offers ample attachment points. Hard clam and quahog abundance is known to rise in areas rich in shell hash, due in part to these enhanced settlement surfaces. (Mercaldo-Allen and Goldberg, 2011).

- **Reducing Overcrowding and Predation:** Mild seafloor disturbance can thin out overly dense populations of benthos (or their competitors/predators) in ways that favor recruitment. In the case of surf clams, removing a portion of large adults can reduce competition for food and space and may lower predation pressure on juveniles (since some predators target large clams). A Maryland study in the 1970s found that plots where adult softshell clams were removed by an escalator dredge subsequently had higher recruitment of young clams than undredged plots. One explanation is that the dredging eliminated adult clams which either preyed on larvae or attracted predators, thereby improving survival of the next generation. Additionally, the shell fragments left behind by dredging can "confuse" predators and protect small bivalves (by providing refuge and camouflage), further boosting juvenile recruitment (Mercaldo-Allen and Goldberg, 2011).

- **Sediment Mixing and Water Circulation:** By physically turning over bottom sediments, dredging can alter sediment texture and chemistry in ways beneficial to certain benthic species. In many shallow, dynamic habitats, benthic infauna are adapted to disturbance and actually thrive when sediments are periodically resuspended. Moderate disruption can mix oxygen into anoxic sediment layers and increase pore-water exchange, improving habitat quality for burrowing organisms. Field experiments have shown that "cultivating" the seabed (*e.g.*, by harrowing or dredging the top layer) increases sediment pore size and permeability, leading to better water circulation through the seabed. This creates a more oxygenated, sandier substrate that many benthic invertebrates prefer. In fact, fishermen have long observed that muddy, compacted bottoms are suboptimal for clams, whereas a turned-over, aerated sand bottom yields better clam sets. Dredging in a sandy habitat can thus rejuvenate the sediment profile – one early study noted that hydraulic harvesting could either degrade or improve the habitat depending on context, sometimes converting fine sediment into a coarser mix more suitable for clams (Mercaldo-Allen and Goldberg, 2011).

- **Nutrient Release and Trophic Stimulation:** Another mechanism by which disturbance can boost productivity is through the release of organic nutrients from the sea floor. Dredging stirs up sediment plumes that carry organic matter into the water column. These plumes can transiently increase the availability of nutrients and food particles for filter feeders and deposit feeders. A 2014 review noted that dredging disturbances have been reported to enhance the diversity and abundance of benthic fauna near dredged channels, possibly by releasing buried organic nutrients that enrich the local food supply.[25] In essence, the act of dredging can create a short-term pulse of productivity as benthic animals capitalize on the sudden influx of organic detritus. Suspension-feeding bivalves like clams and oysters quickly ingest resuspended matter; studies observed that oysters fattened rapidly when feeding on the fine particulates kicked up by nearby dredging operations. Those bivalves then excrete biodeposits back to the sediment, which further fertilizes the benthic environment and promotes microbial and detrital food webs. A moderate disturbance can set off a chain of nutrient recycling that ultimately supports greater benthic biomass (at least until the system re-equilibrates).

- **Intermediate Disturbance Effects**: The intermediate disturbance hypothesis suggests that ecosystems experience maximum diversity at intermediate levels of disturbance. Low-to-moderate dredging, if not too frequent, can create a patchwork of seafloor zones in various stages of recovery, thereby increasing overall benthic diversity. Immediately after a disturbance, fast-colonizing opportunistic species invade, and later, longer-lived species establish, resulting in a more heterogeneous community. A seafloor study in Long Island Sound found that one to two years after a clam bed was dredged, the site hosted significantly more species than either an undisturbed control site or a freshly dredged plot .[26] In that study, the undredged seabed (left fallow ~10 years) had fewer total species – likely dominated by a stable assemblage – whereas the moderately disturbed sites had a mix of both pioneer and equilibrium species, yielding higher diversity.

Controlled disturbances like low-to-moderate dredging can act as a form of benthic habitat management. The evidence – from improved shellfish recruitment and growth to higher post-dredging diversity – shows that under the right circumstances, dredging is not purely detrimental to benthic ecosystems. Key factors include the intensity, frequency, and technique of dredging, as well as the natural resilience of the habitat. When carefully implemented (*e.g.*, infrequent, shallow dredging that avoids sensitive areas), it can reduce siltation, increase habitat heterogeneity, and release nutrients, collectively supporting benthic productivity rather than suppressing it (Mercado-Allen and Goldberg, 2011).

IV. The Value of Habitat in the Great South Channel HMA to New England Council Managed Species

The designation of the "habitat management area" in the Nantucket Shoals/Great South Channel, *i.e.*, the GSC HMA, is predicated on scientific information demonstrating:

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[25] Todd et al. (2014), *ICES J. Mar. Sci.* – review of dredging impacts (noting nutrient release can enhance benthic prey) https://academic.oup.com/icesjms/article/72/2/328/676320.

[26] Mercaldo-Allen, Renee et al. (2016). Benthic Ecology of Northern Quahog Beds with Different Hydraulic Dredging Histories in Long Island Sound. https://doi.org/10.2112/jcoastres-d-15-00055.1

(1) use of the area by several life stages of stocks managed by the New England Council (primarily Atlantic cod)[27];

(2) bottom features within the area; particularly complex, structured habitat and emergent epifauna; and

(3) assumptions, based on research, about the importance of those habitat features to survival and reproduction of managed stocks.

More specifically, that cobble and boulder bottom provide refuge for young fish and hard surfaces to which epifauna may attach, creating sources of food and attracting a variety of marine life. Such habitat features can increase species diversity and expand trophic linkages that benefit managed stocks. Some research indicates that mobile bottom-tending gear such as clam dredges can adversely impact such habitat in a way that reduces the quantity and quality of such EFH. *But see supra*.

The GSC HMA is also within a highly dynamic region that faces some of the highest tidal, wave, storm, and current stresses of any area within the Mid-Atlantic Bight and Southern New England. As a result, large parts of the area are characterized by shifting sediments and mobile sand waves that can reach up to 5 meters in height. Some research suggests that bottom with significant percentages of coverage of gravel, cobble, and boulder can provide stability and resistance to such forces. More recent research, however, suggests that large areas within the HMA lack attached epifauna and that slow-growing epibionts are rare. These findings, coupled with frequent findings of barnacle scars on boulders and pebbles, are suggestive of sediment scour and processes of burial and re-exhumation, consistent with a high-energy environment.

Here we review the science related to these issues, including research conducted and published after adoption of the Clam Dredge Framework in 2019.

A. EFH Findings with Respect to the GSC HMA

"The function of the Great South Channel Habitat Management Area HMA as fish habitat is related partly to benthic habitat characteristics, including sediments and bedforms (geological features) as well as biota (biological features)." (Clam Dredge FW at 28.) "Field studies conducted in shallow water show that survival rates of juvenile cod were higher in more structured habitats (e.g., in vegetation or rocky reefs and on cobble bottoms) where they find refuge from predators." (*Id.* at 36.) Sand waves provide a similar protective function, while simpler habitats are used for foraging at night. (*Id.*)

"Substrate complexity is expected to add significantly to ecosystem value by expanding the range of habitat options and consequently increasing species richness and trophic linkages."

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[27] Though, notably, only small portions along the eastern and western edges of the HMA (including only a portion of one fishing area, Old South) are considered to be cod spawning areas. (Clam Dredge FW at 8.) **More recent research suggests that cod spawning no longer occurs within the area**. G. Bellin, Effect of Ocean Warming Trends on Cod Spawning, Analyzing the GSC HMA and looking at large scale temperature related trends (Nov. 13, 2022), *available at* https://storymaps.arcgis.com/stories/d83e34031dcf4d34a13a4260954c1297.

(Powell et al. 2021.) "[S]tructurally complex gravel, cobble, and boulder habitat, … supports a wide array of emergent epifauna that juvenile cod rely on for food and shelter from predation. Within the GSC [Habitat Area of Particular Concern], many different types of habitats exist that are important to juvenile cod. The area is sensitive to anthropogenic stresses, contains habitat features that are particularly sensitive to the adverse effects associated with bottom trawling, scallop dredging, and clam dredging." (OHA2, Vol. 1, at 392.)

Hydrodynamically, the Great South Channel HMA is subject to "strong southward-flowing tidal and residual currents on the western side of this area [that] have produced 5-15 m high sand waves that run east and west with steeper slopes on their southern sides." (OHA2, Vol. 1, at 118.) "Sand waves, typically 1–5 m in height and hundreds of meters in length, occur between major shoal systems and move with bottom currents and storm activity." (Powell et al. 2021) (citing Emery and Uchupi 1965, Twitchell 1983)).)

Research reported in the Omnibus Habitat Amendment FEIS suggest that critical bottom shear stress in this area "range from >2 to <0.5." (OHA2, Vol. 1, at 118 (citing Dalyander et al., (2013)).) In fact, the median annual bottom shear stress for Nantucket Shoals is 1.41-2.36. (*Id.* at 121 (Map 32).) Sediment mobility thresholds on Nantucket Shoals are exceeded over 50% of the time (annually) due to the combined effects of currents and wave action. (*Id.*) "Currents in these areas are strongest where water depth is shallower than 50 m." (*Id.*, at 118.)

Harris et al., mapped areas within Nantucket Shoals, the Great South Channel, and Georges Bank and estimated tidal currents over the region to identify areas of sediment stability.[28] Maps drawn from this study were used to identify areas of gravel, cobble, and boulder coverage in the second Omnibus Habitat Amendment. (OHA2, Vol. 1, at 120.) The researchers found extremely high stresses over the Nantucket Shoals, resulting in areas of stable seabed outcrops (generally areas of gravel pavement, cobble dominant, and larger particles) that "were patchy and surrounded by highly unstable areas." (Harris et al. 2012.)

Dalyander et al., measured critical stress throughout the Mid-Atlantic Bight attempting to take into account all the forces acting on the seafloor.[29] "In previous regional studies, numerical model estimates of wave, mean current, and tidal forcing, each calculated independently, have been used, which would underestimate wave–current stress in areas where strong storm-driven currents accompany large waves and neglect the non-linear effects of wave–current interaction." (*Id.*) They found that while, from a sediment transport perspective, Nantucket Shoals is dominated by tidal stress sufficient on its own to transport sediment over a tidal cycle, it is also subject to high levels of wave and storm-induced current stresses. (*Id.*)

While Harris et al., recognized that their study did not account for these additional forces that could impact seafloor stability, they indicated that the level of additional stress necessary to move increasingly large particles were unlikely to occur. As to areas which are unstable, the

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[28] B.P. Harris et al., Surficial sediment stability on Georges Bank, in the Great South Channel and on eastern Nantucket Shoals, Continental Shelf Research 49 (2012) 65–72.

[29] P. S. Dalyander et al., Characterizing wave- and current- induced bottom shear stress: U.S. middle Atlantic continental shelf. Continental Shelf Research 52 (2013) 73–86.

authors noted “that frequent seabed disturbances may mitigate anthropogenic impacts such as commercial fishing relative to less disturbed areas by selecting for organisms which are less susceptible to disturbances or are capable of faster recovery.”

B. Summary of Recent Research in the GSC HMA

Prior to and following the 2019 closure of the GSC HMA to clam dredges (and the subsequent 2020 reopening to some areas by the Clam Dredge Framework), there have been several industry-funded research projects to address questions about the fishery’s impact on EFH. Relevant findings of these projects are discussed below.

Powell et al., conducted a survey of an area off Nantucket in 2017, including a large portion that was then under consideration to become the GSC HMA.[30] In particular, the researchers examined the assumption that substrate complexity increases species richness and trophic linkages in “high energy subtidal regimes where burial, exhumation, and sediment scour” processes may limit epibiont coverage. In such high energy environments, the “assumed importance of substrate complexity in determining present-day community structure and in application to ecosystem management” may not hold.

The survey revealed that “[l]onger-lived attached biota are extremely rare. By inference from a range of studies, these substrates must be buried and exhumed frequently and exposed to scour by moving sand, all of which would be anticipated from the known tidal currents in the region and the presence of large mobile sand waves; otherwise occupation by attached epibionts would be much more common and a wider range of taxa would be expected.” Particularly striking was the finding that mussels rarely attached to hard substrate. **“**Their tendency to have limited resistance to scour and prolonged burial is consistent with their infrequent collection on these substrates in this survey.”

The authors concluded that the “rarity of long-lived attached epibionts suggests the ephemerality of exposed surfaces reminiscent of some intertidal sand-scoured rocky shores and that cobbles, rocks, and boulders contribute little to the community composition in the surveyed region, which is composed almost exclusively of infaunal clams, less commonly, mat-forming mussels, and exclusive of the mussel mats, infrequent gastropods and other mobile fauna.” Where epibionts where found, they tended to be “opportunistic fast-growing epibionts,” suggesting “hydrodynamic and edaphic processes minimize the importance of substrate complexity in community structure” within the study area.

Jennings et al., conducted a cooperative research study within a 24 sq. km area in a historically important surf clam fishing area known as the “Rose and Crown” within the GSC HMA. A total of 3,236 tows were videotaped over a period ranging from June 2020 to February 2022. The study’s purpose was “to document substrate, habitat features…, fishes and invertebrates within the Rose and Crown area”; “[c]reate spatiotemporal distributions of biotic and abiotic habitat features”; “[e]stablish relationships between high clam CPUE and habitat

[30] E.N. Powell et al. 2021. Some data from this research project was available to the NEFMC during development of the Clam Dredge Framework. This paper, however, was written and published subsequent to the Framework.

complexity[;] and "[d]etermine spatiotemporal presence of Atlantic cod in this area." Over the project, questions about changing substrate composition and shifts in sandy habitat arose.

Among the researchers' observations was significant interannual change in substrate within the study area. The mean proportion of pebble/cobble substrate composition was highest in the winter, intermediate in the summer, and lowest in the fall. "[I]n summer of 2020, 71% of observations saw less than 50% coverage of pebble/cobble while summer of 2021 consisted of 4% of observations." There was also evidence of a dynamic substrate on a much shorter time scale. "Bottom types in the area changed not only between seasons, but also over shorter time spans of weeks or even days following disturbance events like storms." "[D]redge paths from different time intervals were undetectable beyond a 24-hour period following disturbance." As with the Powell et al., researchers, Jennings et al., also observed the "presence of barnacle scars on some rocks and barnacles in the annotated video demonstrate[ing] that rocks can be subjected to sediment scour and burial."

In this regard, the report concluded: "The parameters in play and the limiting factors to productivity and hard bottom are less understood in areas like the HMA than in areas of low energy regimes. It is our speculation that productivity is a function of disturbance in this area, following disturbance theory norms. Heavily disturbed areas are hypothesized to have lower levels of diversity. This raises the question of whether fishing impacts are significant relative to natural disturbance. Due to the nature of our sampling, distinguishing between the two factors is difficult."

Finally, Jennings and other researchers with the Coonamessett Farm Foundation ("CFF") initiated a collaborative research project with the surf clam industry to use multibeam sonar to map habitat within the GSC HMA. The purpose was to "to elucidate the spatial and temporal dynamics" of bottom habitat features within the HMA.[31] The team mapped a 10 sq. km area within the Rose and Crown area, first on November 15, 2022 and again on April 14, 2023. Both backscatter and bathymetry were collected and mapped and compared between the two surveys.

The researchers found that the backscatter changes demonstrate positive and negative changes in seafloor hardness occurring as softer sediments shift to cover or expose areas of harder bottom. Specifically, "[t]he bathymetry and sediment composition of the R&C survey area changed during the 150-days between acoustic surveys…. Depth increased by up to 1.2 m to the north of the survey and decreased by up to 1.2 m within the central portion of the survey area." The CFF researchers found 10-meter movement of individual sand waves in the southern portion of the study area and positive and negative changes in seafloor hardness. This further supports prior findings that the area is highly dynamic and unlikely to be adversely impacted by surf clam dredges working in sandy or sand/cobble areas.

A similar research project by Jennings, et al., is currently underway in the Davis Bank East portion of the HMA. An interim report notes

[31] Jennings and CFF, Supplementary materials for the EFP request entitled: Great South Channel Habitat Management Area Study Phase II: A Video and Acoustic mapping Survey of Davis Bank East (2023), *appended hereto as* Exhibit 3.

> that the Davis Bank East study area is predominately characterized by coarse sandy sediments with granule, gravel, and pebble patches that had a little low-relief epibenthic growth. Epibenthic organisms identified were limited to barnacles, bryozoans, and hydroids. Boulders, dense mussel beds, and other features observed in the Rose and Crown research area were absent in Davis Bank East.[32]

In sum, the weight of the evidence shows a dynamic area with changing distributions of hard and sand bottom. While many areas may be stable, as suggested by Harris et al., there is widespread evidence of sand scour and processes of burial and exhumation limiting the growth of long-lived epifauna and epibionts throughout much of the area (at least the Rose and Crown) where productive surf clam grounds are found. Similar research is being undertaken in the Davis Bank East area and initial results suggest similar processes.

V. ANALYSIS

The MSA requires Fisheries Management Councils to "minimize adverse impacts on EFH to the extent practicable." An impact is considered adverse only where the impact is "more than minimal" and "not temporary." Even when an adverse impact on EFH caused by fishing activity can be identified, the MSA requires only that such impact be minimized, not avoided in its entirety. And any such conservation and management measures undertaken to protect EFH must be "practicable" in light of the MSA's other objectives. Thus, the relevant questions are whether the surf clam fishery's impacts on EFH in the GSC is adverse with the MSA's meaning and, if so, whether closing these grounds is a practicable means to minimize such impacts.

The GSC HMA was "based on the understanding that structured habitats enhance groundfish resource productivity by increasing the survival and growth of juveniles." (NEFMC 2019, at 35 (citing OHA2 FEIS, Vol. 1, Sec. 4.1.1).) The relevant question, however, is what aspects of complex, structured habitats with the HMA are benefiting juvenile fish? The surf clam fishery has no adverse impact on EFH's function as shelter. Even to the extent clam dredging results in burial of some cobble, either within the dredge track or through suspension and resettlement of silt and sand, those tracks themselves provide shelter. Furthermore, discarded shells enhance EFH by providing additional shelter and hard surfaces to which epifauna can attach.[33] Perhaps most importantly, the GSC HMA was primarily designed to protect spawning cod, a stock that appears to no longer use the area for reproduction and growth.

Thus, the pertinent question is whether operation of the surf clam fishery within the GSC HMA is disrupting emergent epifauna and attached epibionts in a manner that harms the biological communities and disrupts trophic linkages, and in a way that is more than temporary. Both research available at the time the Clam Dredge FW was considered and newly published and unpublished research available since then tend to suggest not. At least as to the areas

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[32] A copy of the interim report is appended hereto as Exhibit 4.

[33] *See, e.g.*, Powell et al. 2021 (observing common attachment of epibiota, primarily hydroids and slipper shells on discarded clam shells).

studied—productive surf clam fishing grounds within the HMA—research shows consistently changing subsurface and largely biota free hard surfaces within zones that are "characterized by prograding sand dunes, high tidal current velocities, and sand scour." (Powell et al. 2021.) Generally speaking, the impacts of the fishery are overwhelmed by natural processes within the region to the extent they are imperceptible.

In such a dynamic area, the impacts on the hard-bottom EFH in terms of its value as shelter and foraging grounds is undoubtedly temporary and unlikely to be adverse in either a legal or practical sense. The New England Council's habitat analysis also excluded research, cited above, that shows the potential for beneficial habitat impacts resulting from light to moderate dredging.

Understanding that the New England Council's Habitat PDT has raised questions about some of the findings of the various cooperative research projects, there is consistency in the findings of shifting substrate, a dearth of long-lived epifauna, and evidence of scour within mixed sand and cobble areas in which the surf clam fishery operates. It is therefore unlikely that the surf clam fishery operates in a manner which adversely affects the habitat value that extensive epifauna coverage is shown to provide.

There is, of course, no conclusive evidence that surf clam fishery operates exclusively in areas with the characteristics observed by researchers (although to the extent it occurs in areas with high percentages of gravel or cobble, they would be mixed with sand which is necessary habitat for clams). It is possible that the fishery operates in some areas with extensive, long-lived epifaunal growth. That possibility alone, however, is not a sufficient basis to prohibit the surf clam fishery from operating within the GSC HMA.

As discussed above, protection of EFH is not a primary goal of the Magnuson-Stevens Act. Rather, minimizing impacts on EFH from fishing activity is a means to ensure fishery resources remain productive and able to reach optimum yield levels over the long run. The pertinent question is whether prohibiting surf clam dredging throughout the GSC HMA is "practicable" within the meaning of the law. The evidence suggests that it is not.

For example, under Alternative 2 of the Clam Dredge Framework, the five areas within the HMA that would have been open constituted only 17% of its total area. Analysis in the framework noted that within these open areas, the fishery impacted only 4% to 20% of the bottom. This constitutes a total of only 0.7% to 3.4% of the total area within the GSC HMA that would be subject to disturbance, not accounting for the fact that the fishery tends to concentrate in and revisit productive areas.[34] Much of that activity will occur in primarily sandy, highly dynamic, and epifauna-free areas in which the fishery will have no adverse impact on EFH as defined by regulation, and may even have positive benefits.

In the practicability analysis, both the requirements of National Standard 1 and economic impacts are relevant. The Atlantic surf clam fishery currently is not achieving optimum yield.

[34] Not to mention the fact that amount of estimated area swept by clam dredges by the Habitat PDT is likely overestimated. *See supra* at 8-9.

The percentage of annual allowable catch found to be sustainable has been declining since the closure of the GSC HMA in 2017. This decline has been particularly steep in the New England region of the fishery, which is only going to become a more important part of the fishery as climate change continues to result in a northward-shifting stock. Reopening the HMA to the surf clam fishery will allow the sector to access areas that accounted for up to 21% of total landings prior to the closure and likely a higher percentage in the future.

National Standard 1 concerns are particularly relevant to the practicability inquiry because the Atlantic surf clam fishery is not overfished nor is it experiencing overfishing. Thus, achievement of optimum yield is the paramount MSA objective. Taking a fifth of the available resource out of production to prevent potential adverse impacts to a small fraction of vulnerable EFH runs counter to the law's primary objective. Perhaps more to the point, the creation of a "habitat management area" is sanctioned neither by law or regulation. It is a wholly artificial construct which unlawfully elevates habitat considerations over the MSA's primary purpose.

Economic considerations equally weigh heavily in favor of restoring access, particularly when coupled with the requirements of National Standard 8.[35] It is recognized that the fishing communities of Massachusetts have "high rates of dependence [on the] Great South Channel HMA. While a minority (20%) of coast-wide surfclam revenues are generated in the Great South Channel HMA, these revenues are concentrated among a relatively small number of permits, owners, and communities." (Clam Dredge FW at 188.) Furthermore, the New England Council's analysis demonstrated that all measures contained in the Clam Dredge Framework was likely to reduce "employment and the size of the fishery-related workforce." (*Id.* at 120.) This conservation measure has had a particularly severe economic impact on the communities of Hyannis, Fairhaven, and New Bedford whose surf clam infrastructure "is particularly dependent on the Nantucket Shoals fishery." (Clam Dredge FW at 120.)

National Standard 10[36] is also relevant to the practicability and impact of these closures. It is the smaller clam vessels which are dependent on access to Nantucket Shoals and the areas within the GSC HMA. It was recognized that its closure would have "negative impacts on vessel safety, particularly if the small vessels active in the GSC HMA attempt to fish further offshore. (Clam Dredge FW at 120.)

The practical effect of the exclusion of clam dredges from the HMA is to elevate one MSA objective, which is cabined by a practicability limitation, over several other goals found by Congress to be more important in making conservation and management decisions. While some of these considerations, like those under National Standards 8 and 10, are also constrained by a practicability requirement, the chief objective – achieving optimum yield on an ongoing basis for the United States fishing industry – is not. Indeed, it is the MSA's most essential objective.

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[35] 16 U.S.C. § 1851(a)(8) ("Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirements of paragraph (2), in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.").

[36] 16 U.S.C. § 1851(a)(10) ("Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.").

Notably, when the Mid-Atlantic Council assessed the practicability of using closed areas as a means to minimize the impacts of clam dredges on EFH, it reasonably found such measures to be impracticable. This was a particularly rigorous review of the science and the fishery's impact on EFH because the National Marine Fisheries Service had disapproved the Council's prior evaluation of this subject in Amendment 12 to the Atlantic Surfclam and Ocean Quahog FMP.[37] While this decision was made twenty years ago, current science and the state of the law suggests that such a determination was and remains correct.

VI. CONCLUSION

The surf clam industry is seeking reasonable access to the historic fishing grounds within the GSC HMA. This request is consistent with the Trump Administration's policies of reducing unnecessary and costly regulations, specifically within the commercial fishing sector. *See* E.O. 14276, Sec. 3 ("It is the policy of the United States to promote the productive harvest of our seafood resources [and] unburden our commercial fishermen from costly and inefficient regulation."). The relief requested promotes these goals by adding jobs, economic prosperity, and exports of domestic seafood products, all while maintaining a sustainable surf clam fishery.

Therefore, IIC respectfully requests that NMFS initiate a rulemaking to reopen this historic fish area. IIC, the surf clam industry more broadly, and their scientific partners stand ready to work with NMFS to achieve common fishery management objectives.

[37] MAFMC, Amend. 13 to the Atlantic Surfclam and Ocean Quahog FMP, at 5-6.

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EXHIBIT 1

Proposed Regulatory Change:

In 50 C.F.R. § 648.370, revise paragraph (h)(2) to read as follows:

(2) ***Atlantic Surfclam and Mussel Dredge Exemption.***

(i) ***Dredge Exemption Requirements.*** A vessel may fish in the Great South Channel HMA, provided the vessel meets the following requirements:

(A) Holds a federal Atlantic surfclam vessel permit.

(B) Has a NMFS-approved VMS unit capable of automatically transmitting a signal indicating the vessel's accurate position at least once every 5 minutes while in or near the Great South Channel HMA.

(C) Declares each trip into the HMA through the VMS.

(D) When fishing for surfclams in the HMA, uses only hydraulic clam dredge gear.

(E) When fishing for blue mussels in the HMA, any dredge on board the vessel does not exceed 8 ft (2.4 m), measured at the widest point in the bail of the dredge, and the vessel does not possess, or land any species of fish other than blue mussels.

EXHIBIT 2

Table 1. Federal surfclam catch limits and landings: 2003 and 2016-2025. Landings for state waters are approximated as total landings – EEZ landings and may not accurately reflect state landings.

Year	OFL (mt)	ABC/ ACL (mt)	Total Landings[d] (mt meats; w/state waters)	Total CAMS Landings[e] (mt meats w/state waters)	EEZ Landings (mt meats)	EEZ Landings[a,f] ('000 bu)	EEZ Quota ('000 bu)	% Quota Harvested
2003 (last time full quota taken)	NA	NA	31,526	31,526	24,994	3,240	3,250	100%
2016	75,512	48,197	18,202	18,344	18,339	2,378	3,400	70%
2017	69,925	44,469	17,690	17,761	16,902	2,192	3,400	64%
2018	Not specified by SSC[b]	29,363[b]	17,114	17,344	16,287	1,936	3,400	62%
2019	74,281[c]	56,419[c]	16,502	16,593	14,986	1,781	3,400	57%
2020	74,110[c]	56,289[c]	-	13,159	12,034	1,430	3,400	46%
2021	51,361	47,919	-	13,171	12,797	1,521	3,400	49%
2022	48,202	44,522	-	12,403	11,971	1,423	3,400	46%
2023	45,959	42,237	-	12,329	10,653	1,266	3,400	41%
2024	44,629	40,946	-	NA	NA	NA	3,400	NA
2025	44,048	40,345	-	NA	NA	NA	3,400	NA

[a]1 surfclam bushel is approximately 17 lb. [b]Revised previous 2018 values due to new stock assessment. [c]Revised previous 2019-2020 values due to new analyses. [d]Total landings for 2018-2022 were from a dealer database (CFDBS). [e]CAMS landings for 2019-2022 use CAMS LNDLB. [f]EEZ landings are from a logbook database (SFOQVR).

Source: Mid-Atlantic Fishery Management Council, *Atlantic Surfclam Fishery Information Document* (July 2024), at 5.

EXHIBIT 3

Supplementary materials for the EFP request entitled:

Great South Channel Habitat Management Area Study Phase II: A Video and Acoustic mapping Survey of Davis Bank East

Introduction

Encompassing the Nantucket Shoals and surrounding waters, the Great South Channel Habitat Management Area (HMA) was created in 2018 for the protection of essential Atlantic cod and other groundfish habitat from the impacts of bottom-tending mobile fishing gears. Prior to its closure in 2018, productive Atlantic surfclam (*Spisula solidissima*) grounds within the HMA were regularly fished by vessels from Cape Cod and Southeast Massachusetts using hydraulic dredges. While fishing vessels are able to access surfclam grounds within the HMA, there is a paucity in the scientific information concerning the area due to the navigation hazards that the Nantucket Shoals pose to large research vessels. Despite the limited availability of scientific information about benthic habitat and faunal distributions within the HMA, the productive surfclam fishery was displaced when the area was closed to mobile bottom tending gear.

The Nantucket Shoals form a notoriously dynamic benthic environment continuously re-shaped by shifting sandy sediments. Sand waves, typically 1–5 m in height and hundreds of meters in length, occur between major shoal systems and move with bottom currents and storm activity (Emery and Uchupi 1965, Twitchell 1983). The burial and exhumation of benthic features by sediment redistribution could be a determining factor in epi- and infaunal species distributions (Harris *et al*. 2012, Powell *et al*. 2020). The spatial and temporal scales at which these sediment redistribution and habitat modification processes occur are not yet understood. Relative to the natural processes that drive sediment movement within the HMA, the impacts of hydraulic clam dredging may be small and warrants additional investigation. Understanding the natural processes within the HMA is essential to determining the extent to which fishing practices could impact essential fish habitat among the Nantucket Shoals, and whether these fisheries can sustainably operate within the HMA through the refinement of area, seasonal, and gear closures.

Recognizing the potential impact of these sediment movement processes on habitat availability and epibenthic successional state, the NEFMC has determined that high-resolution bottom mapping is needed to elucidate the spatial and temporal dynamics within the HMA. Through a collaborative partnership with members of the surfclam fishery, Coonamessett Farm Foundation, Inc. (CFF) launched a program in 2018 to map habitat in the HMA using optical methods (Jennings et al. 2022). Presented below are the Methods and Results from recent additional acoustic surveys of the Rose and Crown fishery exemption area of the HMA (R&C).

Methods

We used a hull-mounted, 160 kHz Furuno WASSP generation 3 multibeam sonar with integrated real-time-kinematics and inertial measurement units (GNSS L1 by Hemisphere and Spatial by Advanced Navigation) aboard the F/V *Tom Slaughter* to chart the bathymetry and backscatter of 10 km^2 of the R&C on November 15, 2022 and April 14, 2023. The system was professionally installed and calibrated and operated using the surveying and backscatter licenses. Transect lines were oriented northeast to southwest to account for the dominant north-south current direction, and the exposure of this area to northeasterly winter storms notorious of this coastal region that are capable of substantial sediment redistribution. Survey lines were spaced 50 m apart to provide 19 m or approximately 28% overlap between adjacent transect lines based on the 1:3 depth:swath ratio of the beam pattern. Surveys were conducted between 6–8 knots.

The raw .wmb sonar files were processed using the software SonarWiz (by Chesapeake Technology). The beam segments from all files were cropped from 70° to 56° (20%) to reduce error at the outer beam areas while still retaining enough overlap for full area coverage. Patch test corrections of 1.5° and 2.5° were applied to the roll and the pitch, respectively to correct for the differences between the port and starboard portions of the beam pattern. Files were reviewed and any outlying pings (return signals) were removed manually. Tide files were created from the Great Point tide station on Nantucket, MA (NOAA station 8448566), and a 60-minute advanced offset was applied based on the known difference between this tide station and the R&C survey area. Backscatter processing was run on the resulting files and bathymetry and backscatter grids of the R&C survey area were generated with 10-cm spatial precision. Gaps in the survey ≤ 25 m were filled using inverse-distance weighted interpolation, and .geotif images were exported at 25-cm spatial resolution. Bathymetry contours were generated at 0.1-, 0.25-, 0.5-, 1-, and 2-m intervals and exported as shapefiles. Both sets of bathymetry and backscatter were consistently scaled (18 to 30 m and −30 to −18 db, respectively). The bathymetry and backscatter .geotif images and contour shapefiles from both surveys were imported into a geographic information system (Arc 10.8.2). Raster subtraction was used to create a set of new raster files providing the difference in each variable per 25-cm point between the surveys.

Results

The bathymetry and sediment composition of the R&C survey area changed during the 150-days between acoustic surveys. **Figure 1** shows the difference in bathymetry with 1-m contours and soundings plotted to highlight the differences. Depth increased by up to 1.2 m to the north of the survey and decreased by up to 1.2 m within the central portion of the survey area. Backscatter was substantially lower throughout the area on April 14, 2023 relative to November 15, 2022, with the greatest changes (±12 db) occurring to the northeast (**Figure 2**). These softer sediments were distributed as long streaks oriented from 9° to 189°. The magnitude of these changes highlighted by the raster subtraction in **Figure 3** provides the most clear presentation. The change in bathymetry shown in **Figure 3** (upper panel) also shows the movement of individual sand waves in the southern portion of the survey area. These features moved approximately 10-m to the southwest between surveys, or a rate of 6.67 cm per day (**Figure 4**). The change in backscatter shown in **Figure 3** (lower panel) emphasizes the positive and negative changes in seafloor hardness occurring as softer sediments shift to cover or expose areas of harder bottom. These patterns largely agree with those reported by Jennings et al. (2022) while providing higher spatial resolution.

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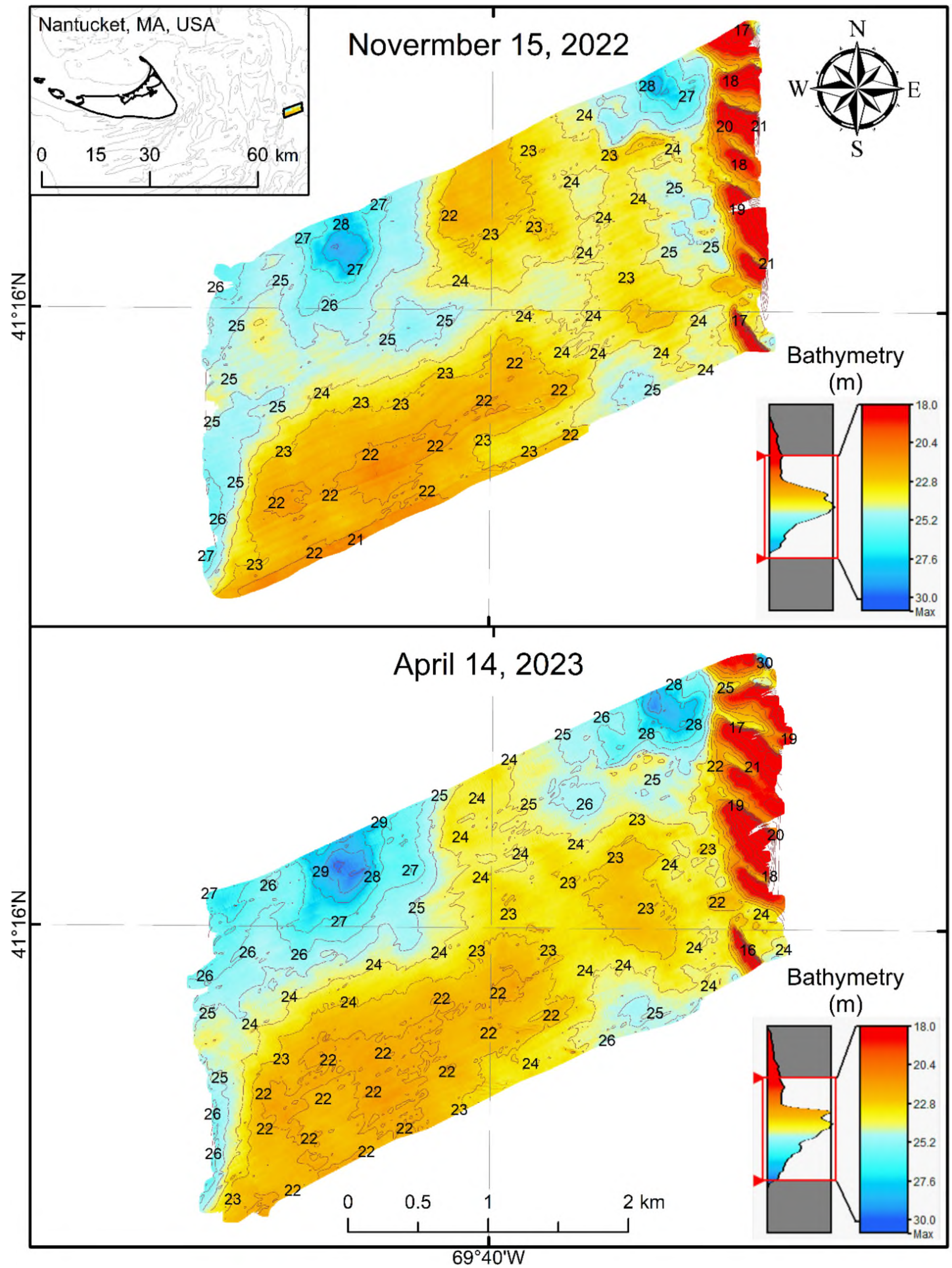


Figure 1. The tide-corrected bathymetry (m) of the Rose and Crown survey area on November 15, 2022 (upper panel) and April 14, 2023 (lower panel). Warmer and cooler colors represent shallower and deeper depths, respectively. Contour lines are plotted at 1-m intervals.

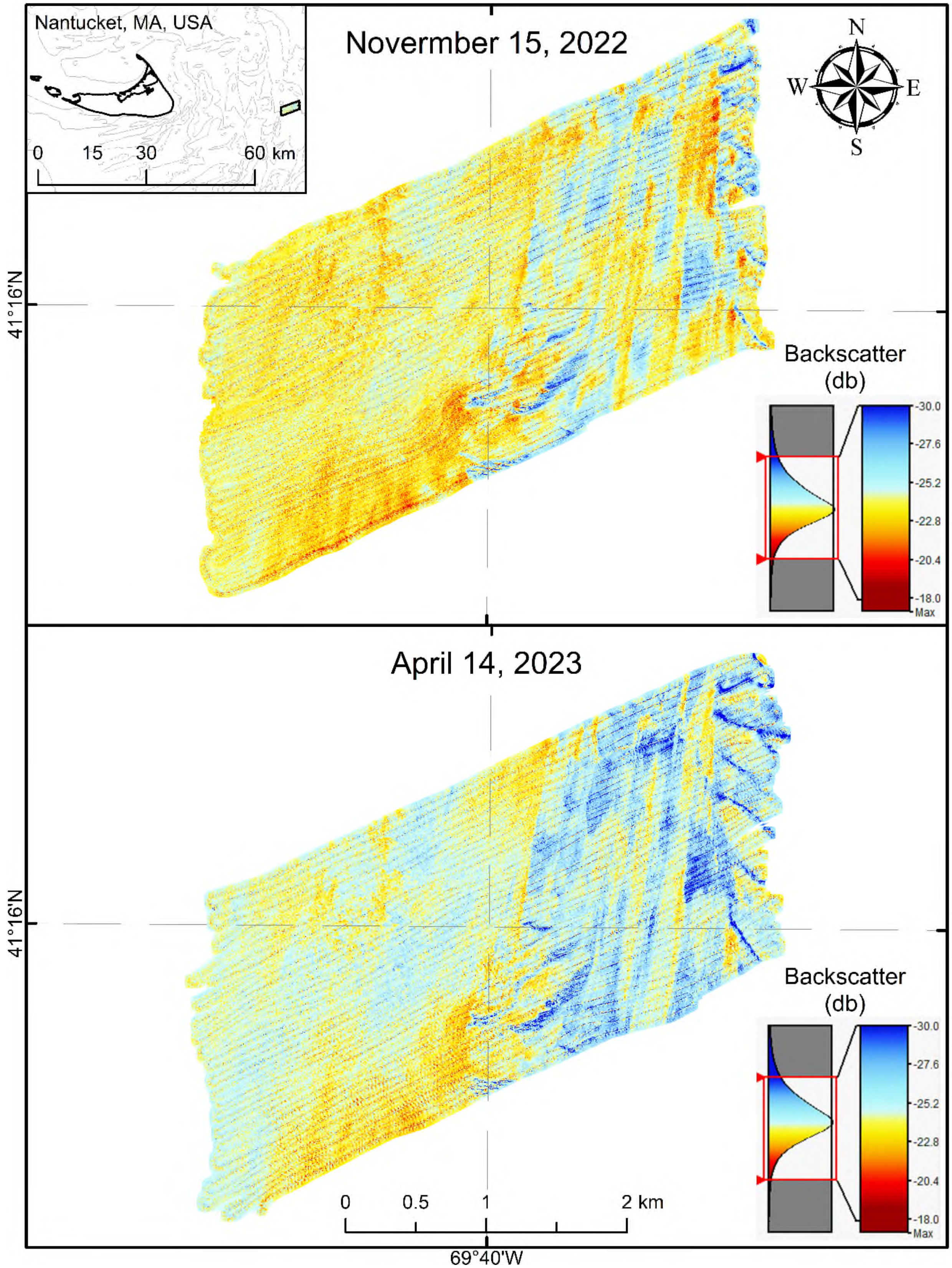


Figure 2. The backscatter (db) of the Rose and Crown survey area on November 15, 2022 (upper panel) and April 14, 2023 (lower panel). Warmer and cooler colors represent harder and softer seafloor sediments, respectively.

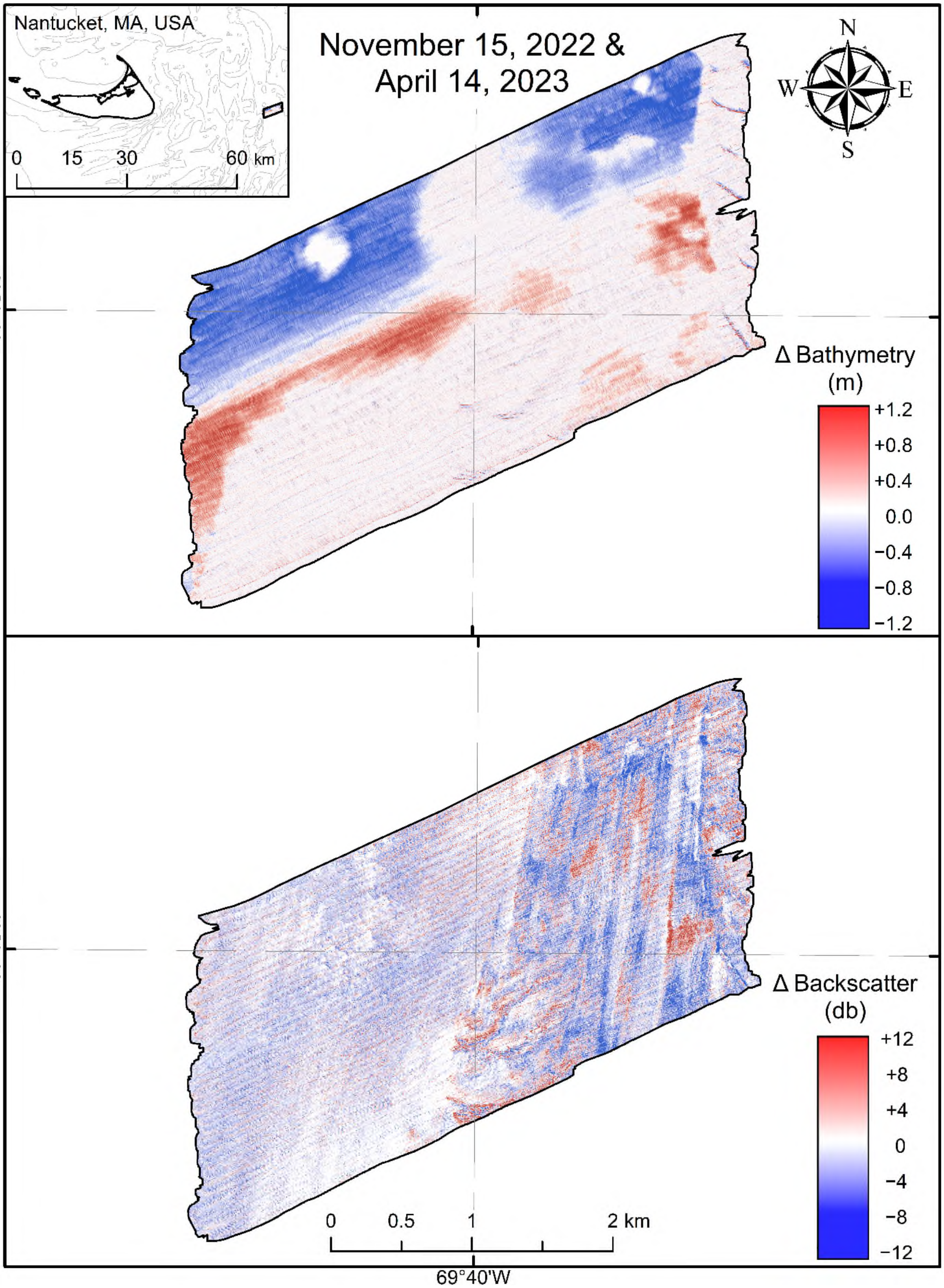


Figure 3. The change in the bathymetry (m) (upper panel) and backscatter (db) (lower panel) of the Rose and Crown survey area that occurred from November 15, 2022 to April 14, 2023. Warmer and cooler colors indicate positive and negative changes, respectively. White represents no net change.

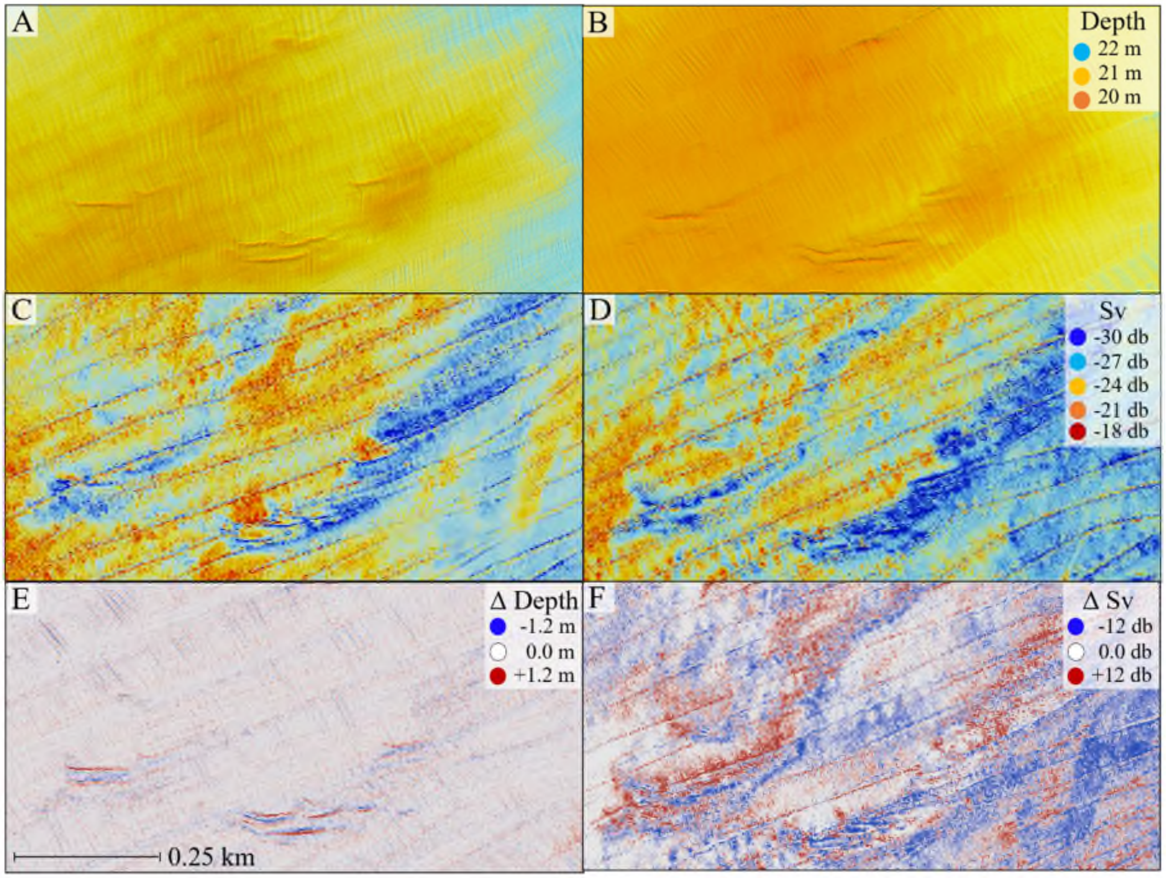
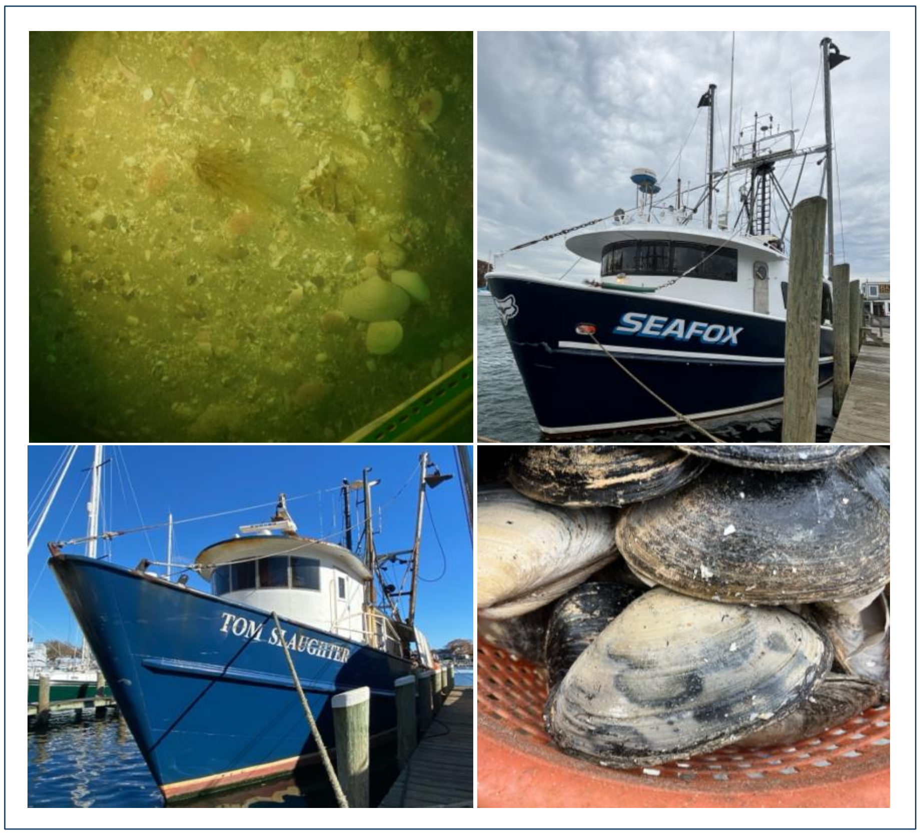


Figure 4. A close up of the sand waves in the southern-central portion of the Rose and Crown study area on November 15, 2022 (A, C, E), and April 14, 2023 (B, D, F). Panels A and B compare the change in bathymetry, panels C and D compare the change in backscatter (db), and panels E and F compare the bathymetry and backscatter differences between surveys using a raster subtraction, respectively.

EXHIBIT 4

Davis Bank East Survey

Progress Report for
Exempted Fishing Permit #23073
February 7, 2025



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Exempted Fishing Permit #23073 Progress Report
Project Reporting Period August 1, 2024 - February 1, 2025

Introduction

We report on progress from a habitat mapping project of the Davis Bank East research exemption area of the Great South Channel Habitat Management Area (HMA). Methodology for the reported study was developed through collaboration among Atlantic surfclam (*Spisula solidssima*) industry members of Nantucket Sound Seafood, Inc. and Intershell International, Corp., staff members of the GARFO, and Coonamessett Farm Foundation, Inc. following suggestions from a prior study in the HMA (Jennings et al. 2022, Exempted Fishing Permit #19066). Using paired multibeam sonar mapping and optical benthic imagery we surveyed a 60 km^2 area divided into fished and unfished subareas of 30 km^2 each. The research plan was to map both subareas prior to compensation fishing, and remap the area to assess changes due to natural processes compared with fishing. Fifteen percent of the landings from each compensatory fishing trip was used to fund the research.

When the research trips began, we had the 60 km^2 area broken into a north-south designation. After completing 18 fishing trips in the south box, catch rates were determined to be less than one cage per hour, which was not viable for supporting normal commercial fishing business operations and additionally funding the research costs. After conferring with GARFO, the area was changed to an east-west designation where the western 30 km^2 box was set aside for surveys assessing natural seasonal changes within the area and the east 30 km^2 box being reserved for fishing trips. Because analysis was already underway, the preliminary data analysis below is shown in north (survey) and south (fishing trip) boxes.

Goal and Objectives

The broad goal of this research is to identify habitats and species associations throughout the HMA, gauge their vulnerability to Atlantic surfclam fishing, and address a critical data gap to inform management decisions.

The specific objectives of this study include:

1. Map benthic features within the Davis Bank Easy fishery exemption area of the HMA
2. Assess seasonal changes in bathymetry and seafloor composition using multibeam sonar ground-truthed by optical benthic imagery using a drop camera array
3. Describe the epibenthic community associated with various substrates

Data Collection Tasks

<u>Research trips</u>

Sampling design

The pre-fishing surveys began August 5, 2024 and concluded September 12th. Multibeam surveys were completed aboard the *F/V Tom Slaughter* and drop camera surveys were completed aboard the *F/V Seafox*. The initial multibeam survey of the south box was used to guide the drop camera survey of the south box, which followed immediately after. Subsequently, the process was repeated for the north box. Compensation fishing trips began after mapping was completed.

Each multibeam mapping survey was 4-days in duration with 24-hour operations. Survey lines were spaced at 40 m intervals (10–50% path overlap depending on depth) oriented east to west. Along with collecting multibeam imagery (collected by a Furuno WASSP) on the trips, a Valeport mini sound velocity probe (SVP) was deployed. During the first trip, it was deployed every slack tide (twice a day) for the duration of the four-day trip. On the second leg of the multibeam survey the SVP was deployed once at slack tide. This information was used to correct for differences in sound speed through the water column due to summertime stratification, which affects mapping quality. Benthic features representative of the broad combination of bathymetric and backscatter characteristics of the area. Features of interest were marked and a stratified-random selection of 200 sites were selected for surveying with the drop camera array (**Figure 1a**).

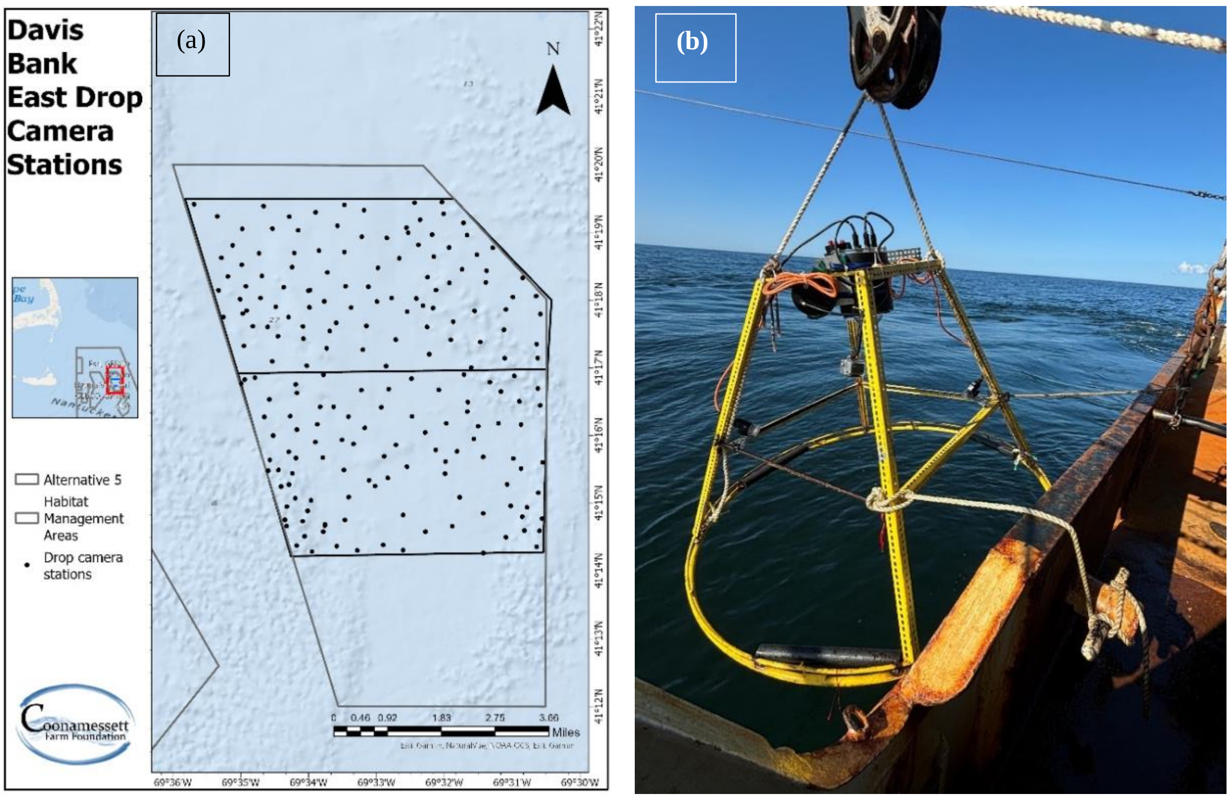

Figure 1. (a) Drop camera stations in the Davis Bank East sample area. (b) Drop camera array with a time lapse still-image camera system outfitted with 2 lights, a video camera pointed straight down, and a sideways facing GoPro camera recording video.

The drop camera array was outfitted with downward-facing time lapse camera (Marine Acoustic Technologies, Inc.) recording 1 image 5 s^{-1} with synchronized strobe lighting, a downward-facing high-definition video camera (ArtCam), and a horizontal facing video camera (GoPro Hero+) (**Figure 1b**). Still images were collected by deploying the drop camera array at each of the 200 stations and held on the seafloor for approximately 15 s. A temperature and depth logger (Lotek, Inc.) was attached to the drop camera frame for the duration of the trips.

Data analysis
The multibeam data was processed using SonarWiz 8.0 software, which allowed the merging of overlapping swath data, interpolate and grid the data to form a continuous bathymetric surface, filter the data to correct errors and extraneous noise in the data, and apply sound velocity profile and tidal stage corrections.

One image from each station was annotated in the software photoQuad (Trygonis and Sini 2012). This software allows for image calibration and a user defined species library. Two bars of the camera stand on the seafloor were visible in the still images and were used for image calibration (**Figure 2**); the smaller bar was 1cm while the larger bar was 2.3 cm. The field of view remained the same over the survey period. The species library included substrate characteristics such as sand, sand with shell hash, rock particles, clam shell, mussel shell, and epifauna such as barnacles, encrusting bryozoan, and hydrozoans. One hundred points were generated in the visible range of the image to characterize the substrate (**Figure 2**). If the points landed on rocks of any size, shells, or epifauna, the shape was outlined as a region of interest that is defined using the same species library. If a rock had more than one species of epifauna present, the most dominant species was listed on the annotation. For this report, the term "rock" refers to a hard particle, not a specific size. The size was characterized after measurement.

Figure 2. User interface when annotating in photoQuad. The bars of the drop camera stand in the lower right corner of the image were used for calibration. One hundred generated points were assigned whichever substrate or habitat characteristic on which the point landed from the species list. If the point landed on a rock or type of shell, a region of interest outline was drawn around it characterized from the same list.

Several variables describing the annotated substrate images were exported from photoQuad, including: point substrate classification, substrate and species regions, centroid relative location, eccentricity, perimeter length, short, and long axis lengths. These, along with station name, GPS position, and water temperature, were added to an Access database. Because the Wentworth scale (Wentworth 1922) classifies particles based on their diameter, rock sizes were categorized using the major axis length (cm) metric in photoQuad. This metric is the longest side of the region of interest that was measured.

Fishing trips

Surfclam catch data was collected from 15 compensation fishing trips. Data collected per tow includes tow start and end times and GPS positions, depth, vessel speed, number of surfclam bushels per tow, current tidal stage, and a 1-bushel catch subsample. Subsamples were sorted and all contents counted and weighed to the nearest hundredth of a kg. Surfclams, finfish, and American lobster (*Homarus americanus*) were measured.

Preliminary Results

Sonar data

Multibeam sonar imagery was processed in SonarWiz 8.0 (**Figure 3**). Both bathymetry and backscatter indicate sand dunes and large sand shoals on both east and west sides of the sample area. The other areas indicate a mixture of hard and soft substrate and varying depths.

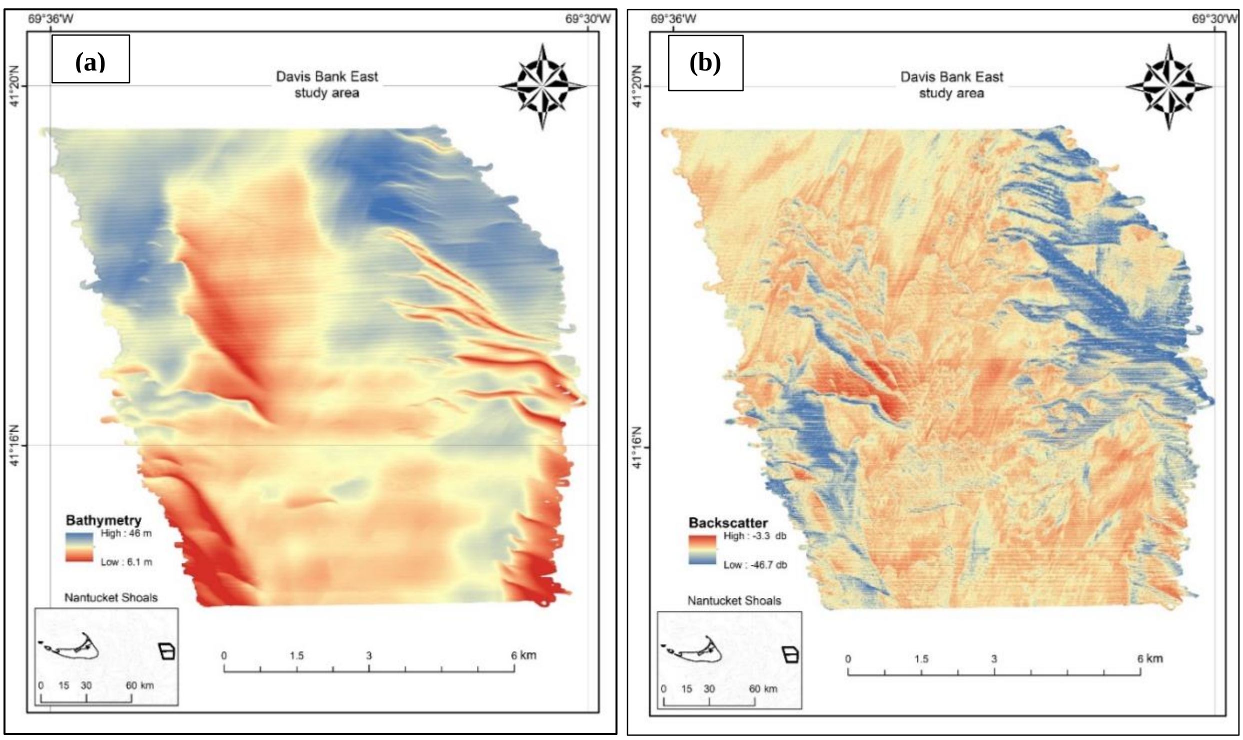

Figure 3. Multibeam sonar measured (a) bathymetry in meters of the sample area in Davis Bank East where cool and warm colors represent deeper and shallow areas, respectively. Multibeam sonar measured (b) backscatter where cool and warm colors represent soft and hard substrates, respectively.

Drop camera data

The 100 uniformly distributed points per image in the annotations yielded 19,899 data points describing substrate and other benthic habitat characteristics (see **Table 1A** in **Appendix A** for total point breakdown by habitat characteristic). One skate (*Leucoraja erinacea* or *L. ocellata*) and four Jonah crab (*Cancer borealis*) The dominant substrate by station was calculated (**Figure**

4) and the three major categories annotated were sand, sand with shell hash, and rock (see **Figure 1A** in **Appendix A** for example images of these substrates). The calculated dominant substrate generally agrees with the patterns seen from the multibeam backscatter where stations dominated by sand are most dense around the edges of the sample area where the dunes and shoals are located (**Figure 3b**).

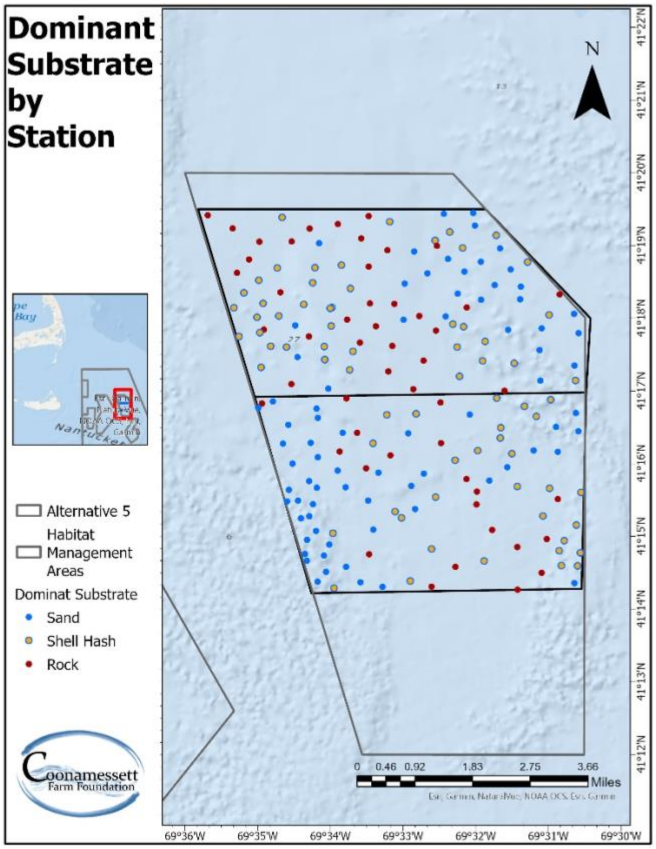

Figure 4. Dominant substrate recorded in the 200 drop camera stations in the Davis Bank East sample area. Blue station points represent stations where sand is dominant, orange with a blue outline represent stations where sand and small shell hash were dominant, and red represents stations where rocks were the dominant substrate present.

Three types of epifauna were annotated in the drop camera images including barnacles, encrusting bryozoan, and hydrozoan. These were seen growing on hard surfaces including rocks, clam shells, mussel shells, and other shells (full distribution of hard surfaces and epifauna coverage can be seen in **Appendix A**, **Figures 2A – 5A**). The north box stations had higher instances of rock, shell hash, and epifauna groups (**Figure 4, 5**).

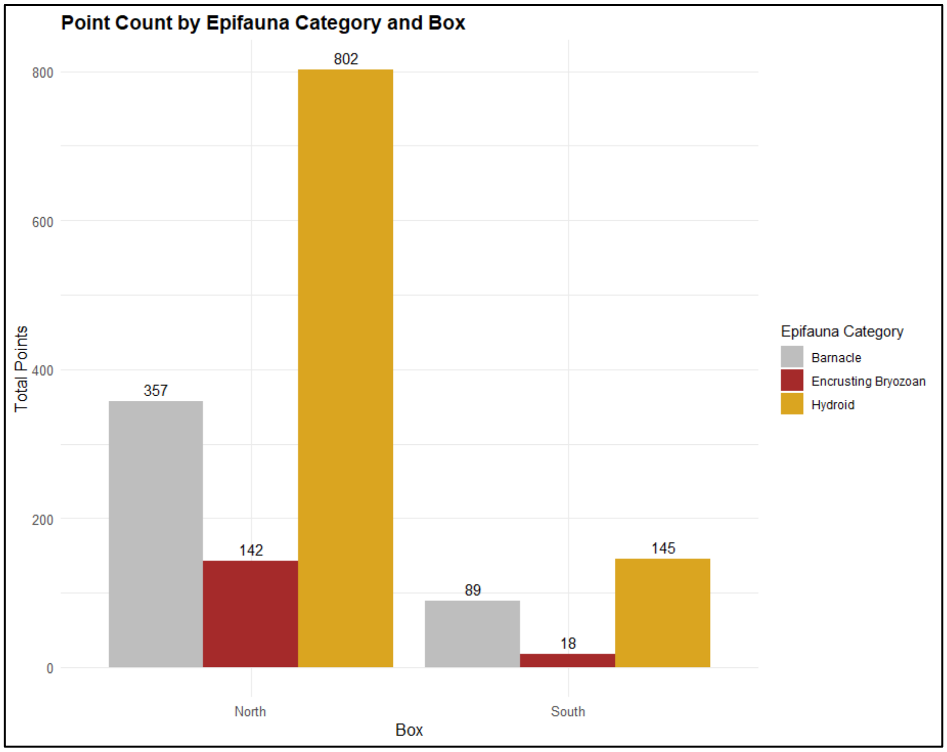

Figure 5. All epifauna points were pooled according to category and box in the Davis Bank East sampling area. Total point numbers are listed above the bars where gray were barnacle points, red were encrusting bryozoan points, and gold were hydrozoan points. The total number of points containing epifauna was 1,553 of 19,899 total points annotated (< 8%).

Rock particles were classified, using the Wentworth scale based on their maximum axis length (cm) for the whole sample area; granule, pebble, cobble, and boulder were identified within the area (**Table 1**). Distribution of the rock was patchy, and more rocks were recorded from the north box drop camera images.

Table 1. Rock particles categorized by the Wentworth scale and broken into the north and south boxes.

Rock Particle by Major Axis Length (cm)	Wentworth Scale (mm)	North Box	South Box	Total
Sand	0.625 < 2	6313	7636	**13949**
Granule	2 to < 4	24	11	**35**
Pebble	4 to < 64	3008	1846	**4854**
Cobble	64 to < 256	33	20	**53**
Boulder	256 to < 4,096	1	0	**1**
	Total	**9379**	**9513**	**18892**

At stations where rocks were annotated, the dominant epifauna on the rock was categorized. It was found that most stations were dominated by pebble sized bare rocks (**Figure 6a**). The north box had more stations dominated by rocks with hydroid present. Station images had anywhere from 1-99 rocks (**Figure 6b**).

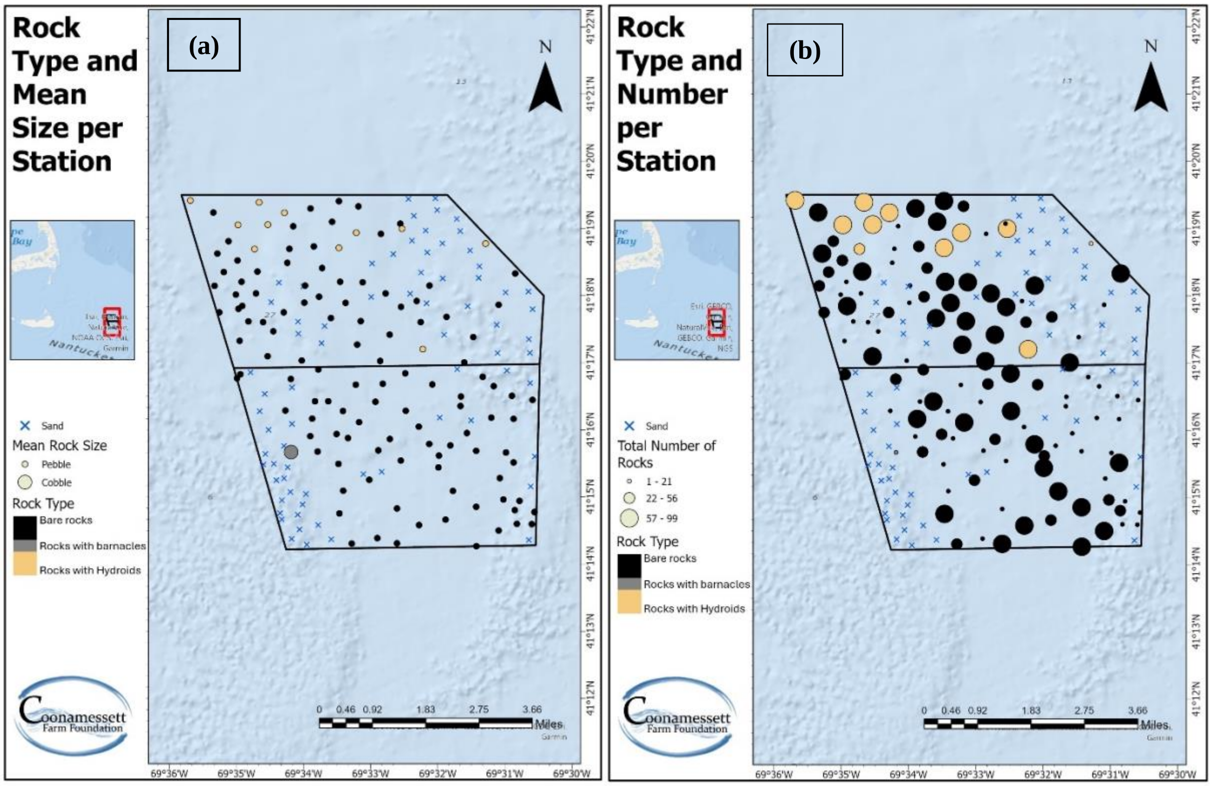

Figure 6. Rocks illustrated by dominant epifauna type found per station with (a) mean size of all rocks present at east station and (b) number of rocks found at each station. Stations represented by blue x's had no rocks present.

All substrate characteristics including substrate, types of shell present, epifauna category, and live mussels were analyzed in relation to depth using a linear regression. In the north box, the category "sand with small shell hash" was significant with a minor negative trend with increasing depth (**Figure 7a**). In the south box, both rock and sand with shell hash showed a positive trend with increasing depth while sand showed a negative trend with increasing depth (**Figure 7b**). This can be explained by the shallow nature of the shoals for which the area is known.

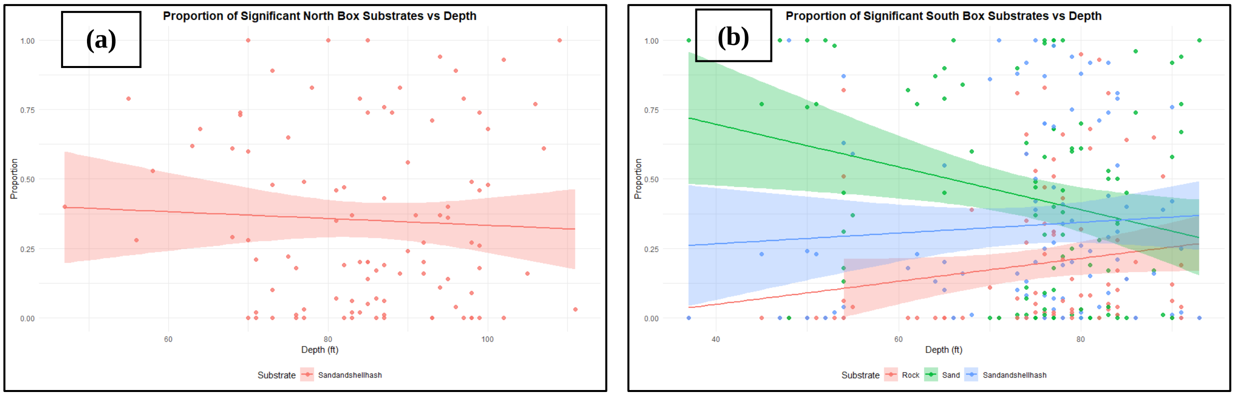

Figure 7. Habitat characteristics from the drop camera annotations were plotted versus depth using a linear regression. Significant characteristics are shown for the (a) north and (b) south boxes.

Compensation fishing trip data

Fifty-two compensation fishing trips have been accomplished between both vessels. CFF has had a scientist onboard 15 trips to collect tow and catch data. Data was collected from 438 tows (**Figure 8**) that ranged in time from 4 – 31 min with an average tow length of 17 min.

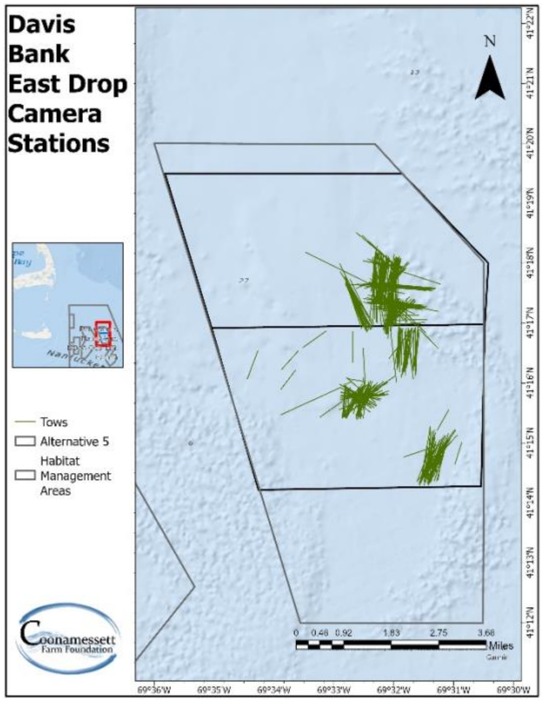

Figure 8. Mapped tows from the trips on which a CFF scientist was present to collect tow and catch data in the Davis Bank East sampling area.

The total tows on trips CFF covered account for approximately 124 h of dredge contact with the seafloor with a total area swept of 0.63 km^2 (**Table 2**).

Table 2. Tow information from 438 tows from which CFF collected data.

Data from Covered Trips				
Total Tows	Bottom Contact Time (h)	Total Tow Lengths (km)	Total Swept Area (km^2)	Average Swept Area per Tow (km^2)
438	123.87	515.38	0.63	0.0014

Organisms caught as bycatch were pooled from the one-bushel subsample taken in each tow (**Table 3**). The most common organisms caught, surfclam excluded, were northern moon snails (*Euspira heros*), skate, and *Cancer* spp. crab. Winter flounder (*Pseudopleuronectes americanus*) was the most common finfish bycatch species (35 fish from 438 tows).

Table 3. Bycatch species and their total number caught in the 15 compensation fishing trips (438 tows) where a CFF scientist was onboard.

Species	Scientific Name	Total Number Caught
Northern moon snail	*Neverita duplicata*	782

Leucoraja skate	*L. ocellata* and *L. erinacea*	233
Atlantic rock crab	*Cancer irroratus*	80
Waved whelk	*Buccinum undatum*	76
Jonah crab	*Cancer borealis*	46
Winter flounder	*Pseudopleuronectes americanus*	35
Cancer crab	*C. irroratus* and *C. borealis*	25
Windowpane flounder	*Scophthalmus aquosus*	12
Monkfish	*Lophius americanus*	7
Seastar	*Asterias* sp.	3
Barndoor skate	*Dipturus laevis*	2
Summer flounder	*Paralichthys dentatus*	5
American lobster	*Homarus americanus*	1
Northern sea robin	*Prionotus carolinus*	1
Longhorn sculpin	*Myoxocephalus octodecemspinosus*	1
Atlantic surfclam	*Spisula solidissima*	18,444 bushels landed

Along with weights, surfclams lengths were recorded from the bushel subsample. They were recorded in 5 mm bins and ranged from 47 to 177 mm (**Figure 9**). Three species of flounders were caught, winter, windowpane (*Scophthalmus aquosus)*, and summer (*Paralichthys dentatus)* (**Table 3**). Lengths were recorded for all flounders caught in each tow. Thirty-five winter flounder were caught, with a size range of 10-51 cm. Twelve windowpane flounder were caught with a size range from 25-33 cm. One summer flounder was caught at 17.6 cm (length frequencies for flounder can be seen in **Appendix A**, **Figure 6A**).

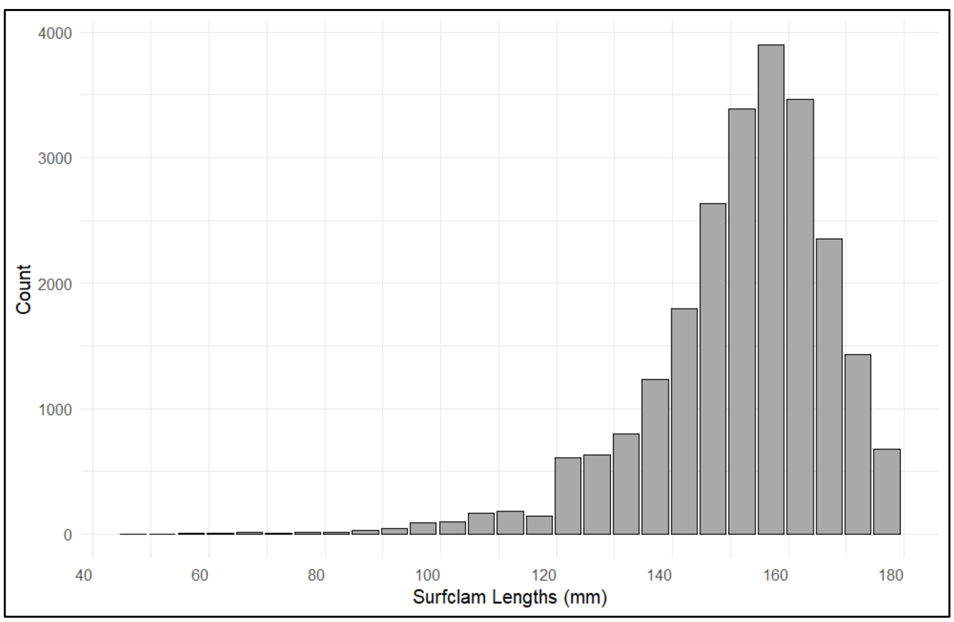

Figure 9. Length frequency of measured surfclams (mm) from a one-bushel subsample from approximately 438 tows from the compensation fishing trips.

Preliminary Findings and Next Steps

Our preliminary results indicate that the Davis Bank East study area is predominately characterized by coarse sandy sediments with granule, gravel, and pebble patches that had a little low-relief epibenthic growth. Epibenthic organisms identified were limited to barnacles, bryozoans, and hydroids. Boulders, dense mussel beds, and other features observed in the Rose and Crown research area were absent in Davis Bank East.

In this progress report we illustrate our process of using optical tools to accurately assess substrate and epibenthic composition and other benthic habitat characteristics of the HMA. We are currently working on correlating the backscatter from the multibeam sonar to the substrate composition in the images from the drop camera array.

We plan to re-survey the west box in April. Because data analysis started when the area was changed from a north – south to an east – west orientation, this report was completed with the data in a north – south fashion. The final report will be changed to an east – west designation to match with the bulk of the fishing and survey effort. The final report will include more complex analysis and multi-variate statistical models that will consider temperature, tidal stage, and other oceanographic variables.

Literature Cited

Jennings, N., Garcia, L., Davis, F., and Munnelly, R., 2022 Great South Channel Habitat Management Area Survey, Final Report for Exempted Fishing Permit #19066. (https://s3.us-east-1.amazonaws.com/nefmc.org/6.-CFF-PR-EFP19066-Feb2022.pdf)

Trygonis, V., Sini, M., 2012. photoQuad: a dedicated seabed image processing software, and a comparative error analysis of four photoquadrat methods. Journal of Experimental Marine Biology and Ecology 424-425, 99-108.

Wentworth, C.K., 1922. A Scale of Grade and Class Terms for Clastic Sediments. Journal of Geology, 30, 377-392.

Appendix A. Additional figures

Table 1A. Still image point annotations by category from the 200 drop camera stations in Davis Bank East by sample box.

Random Point Designation	North	South	Total
Sand	2808	4339	7147
Sand plus small shell hash	3511	3297	6808
Rock	2092	1843	3935
Rock with hydroid	658	86	744
Rock with barnacles	275	61	336
Clam shell	191	108	299
Mussel shell	73	53	126
Rock with encrusting bryozoan	73	12	85
Clam shell with hydroid	21	29	50
Clam shell with hydroid	49	0	49
Live mussel with barnacles	33	15	48
Mussel shell with hydroid	34	10	44
Live mussel with hydroid	39	4	43
Clam shell with encrusting bryozoan	39	1	40
Clam shell with barnacles	22	11	33
Mussel shell with barnacles	26	2	28
Mussel shell with encrusting bryozoan	20	1	21
Hydroid	9	11	20
Live mussel with encrusting bryozoan	8	3	11
Other shell	5	6	11
Live mussel	7	1	8
Other shell with hydroid	1	5	6
Algae	3	0	3
Other shell with encrusting bryozoan	2	1	3
Other shell with barnacles	1	0	1
Total	**10000**	**9899**	**19899**

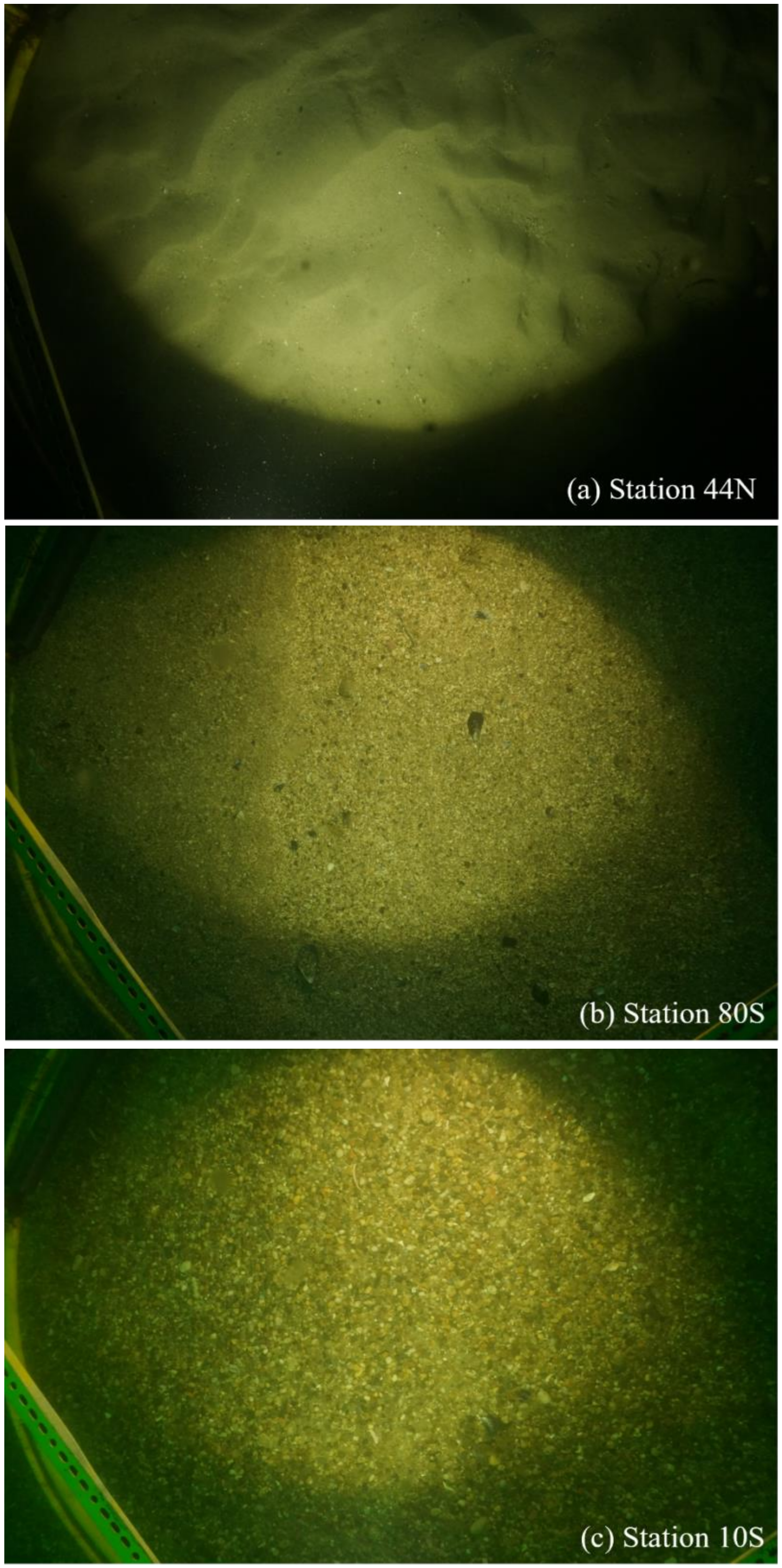

Figure 1A. Drop camera image examples of (a) sand, (b) sand with shell hash, and (c) rocks.

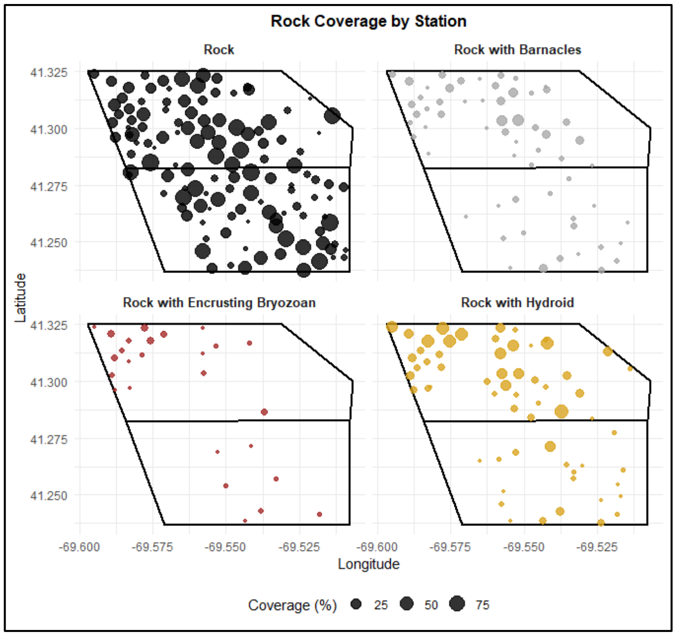

Figure 2A. Distribution of annotated rock particles by station. Coverage percentage refers to the percentage of the total points per station image (100) that were recorded as rocks. Gray points represent rocks with barnacles, brown are rocks with encrusting bryozoan, and gold are rocks with hydroids.

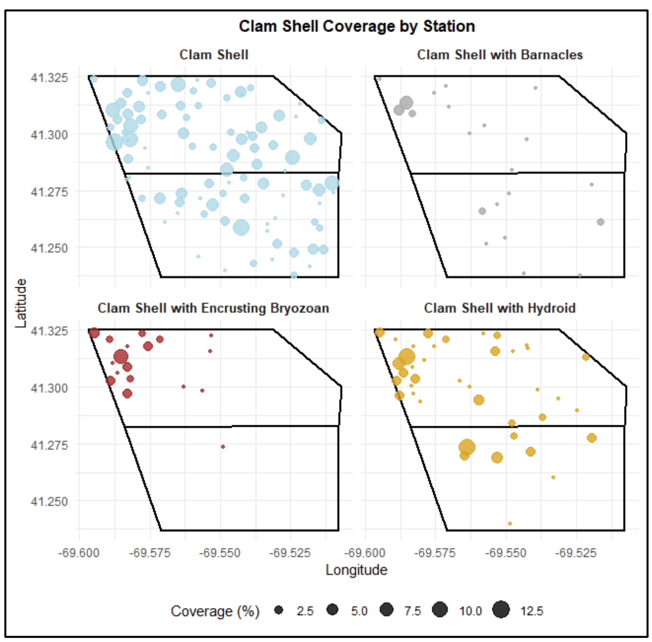

Figure 3A. Distribution of annotated clam shell by station. Coverage percentage refers to the percentage of the total points per station image (100) that were recorded as clam shell. Gray points represent clam shell with barnacles, brown were clam shell with encrusting bryozoan, and gold were clam shell with hydroids.

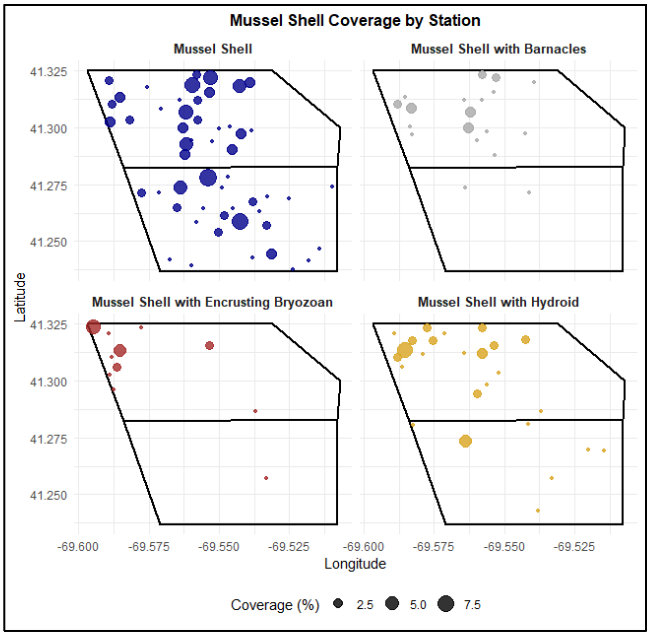

Figure 4A. Distribution of annotated mussel shell by station. Coverage percentage refers to the percentage of the total points per station image (100) that were recorded as mussel shell. Gray points represent mussel shell with barnacles, brown were mussel shell with encrusting bryozoan, and gold were mussel shell with hydroids.

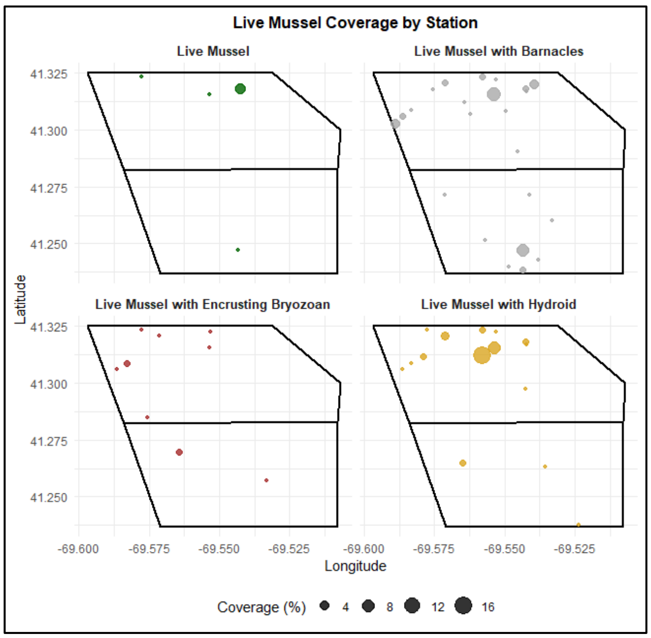

Figure 5A. Distribution of annotated live mussels by station. Coverage percentage refers to the percentage of the total points per station image (100) that were recorded as live mussels. Gray points represent live mussels with barnacles, brown were live mussels with encrusting bryozoan, and gold were live mussels with hydroids.

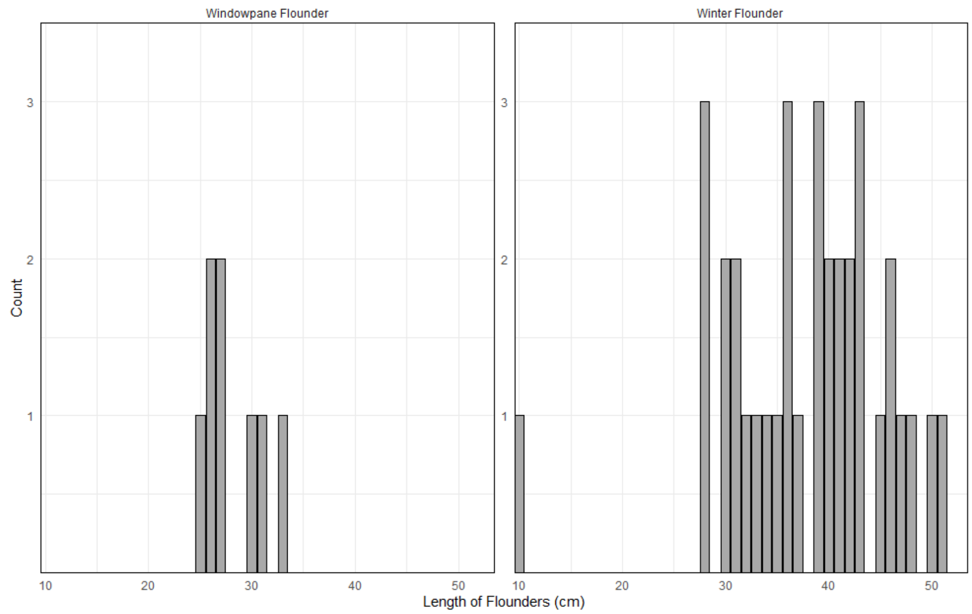

Figure 6A. Length frequency of all flounders caught (excluding one summer flounder) as bycatch in the dredge in 438 tows from 15 compensation fishing trips.