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DATE: May 22, 2026

TO: Habitat Advisory Panel, Habitat Committee

FROM: Habitat Plan Development Team

SUBJECT: Dedicated Habitat Research Area Review

This memorandum provides recommendations on retaining or sunsetting two Dedicated Habitat Research Areas (DHRAs), the Georges Bank DHRA and the Stellwagen DHRA. No action on the Jordan Basin DHRA is required by the Council as that area is not subject to three-year review and sunset provisions; however, information on research conducted there is provided in the second part of this document. Two other research areas, Davis Bank East and Rose and Crown, both located within the Great South Channel Habitat Management Area, are beyond the scope of this review. Recent research activities in the Davis Bank East and Rose and Crown research areas will be summarized later in 2026 as part of a Clam Dredge Exemption Program Review.

Summary of recommendations

1. The PDT recommends retaining the Stellwagen DHRA based on documented past, ongoing, and potential future research that addresses habitat research questions posed by the Council via Omnibus Habitat Amendment 2.
2. The PDT recommends retaining the Georges Bank DHRA pending further discussion of tradeoffs between having a relatively undisturbed area in which to conduct dedicated research and lost fishing opportunity costs.

Georges Bank and Stellwagen DHRA Three-Year Sunset Review

Purpose of the Stellwagen and Georges Bank DHRAs

In 2018, Stellwagen and Georges Bank DHRAs (Map 1) were established via Omnibus Habitat Amendment 2 (OHA2) to serve as focal areas where future studies can build upon past work in locations where fishing effort is restricted and research can therefore occur under controlled conditions. In OHA2, the Council identified specific research needs for these two DHRAs, which were to:

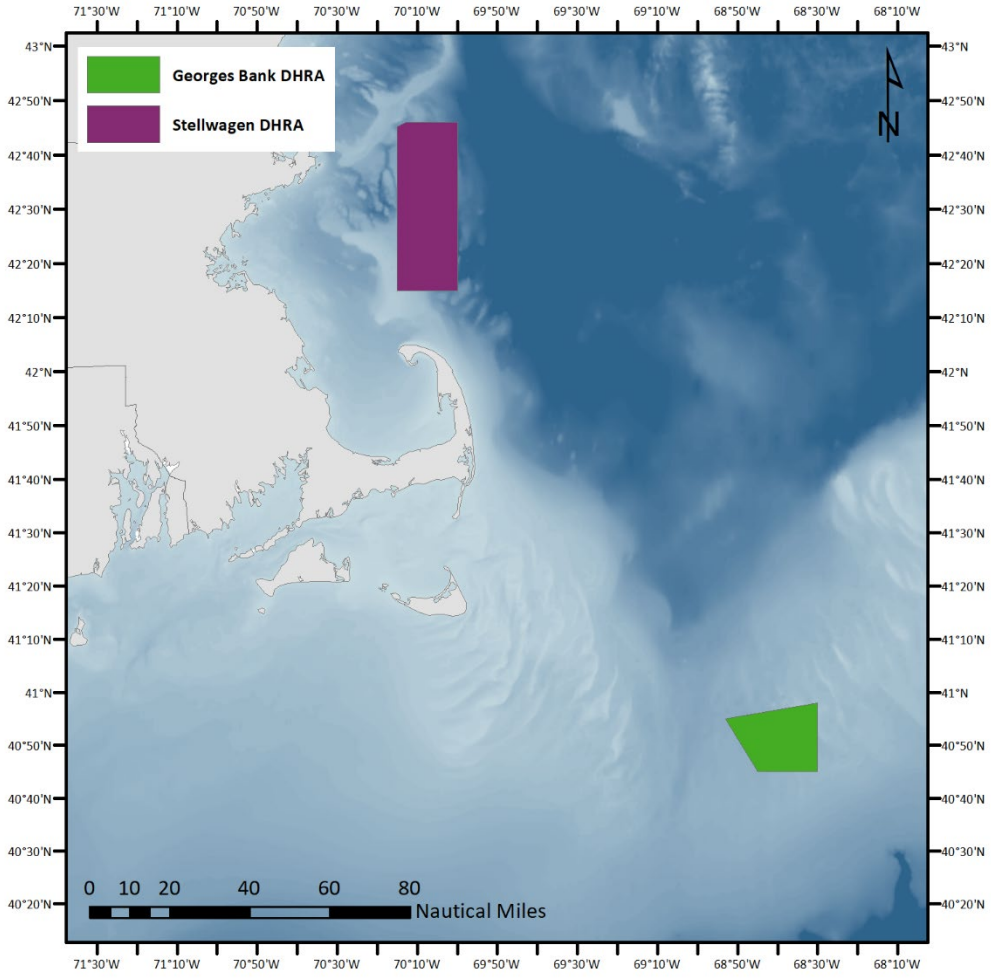
1. Test assumptions of fishing effects modeling; and
2. Improve understanding of linkages between habitat and productivity of managed species and their prey to better target management and conservation.

Research in DHRAs can potentially include experimental fishing activities designed to measure the effects of fishing gear on seafloor habitats. The fishing restrictions associated with the DHRA designation allow for the impacts of experimental fishing activities to be more clearly assessed as compared to "open" areas where non-research fishing activities are permitted. In

addition, the reduction in fishing within the DHRAs allows for studies that evaluate local ecology and habitat structure in the absence of fishing activity.

Through OHA2, the Council posed a series of specific questions that research in DHRAs could address; these are provided in the appended review document and generally oriented to the research needs for the areas, such as considering fishing effects, fish habitat, and habitat productivity and recovery from disturbance. While research would ideally be guided by these Council questions, projects are not permitted, funded, or conducted by the Council.

Map 1. Stellwagen and Georges Bank DHRAs



Restrictions in the Stellwagen and Georges Bank DHRAs

DHRAs are not no-take zones; only some fishing activities are restricted within these DHRAs. Fishing restrictions in the Stellwagen and Georges Bank DHRAs are summarized below.

Stellwagen DHRA	**Georges Bank DHRA**
Prohibited due to DHRA designation: Fishing with bottom trawls and dredges (i.e., mobile bottom tending gear), sink gillnets, bottom longlines	**Prohibited due to DHRA designation:** Fishing with bottom trawls and dredges (i.e., mobile bottom tending gear)

Stellwagen DHRA	Georges Bank DHRA
Prohibited due to overlapping managed areas: no fishing gear capable of catching northeast multispecies (Western Gulf of Maine Closure Area); no mobile bottom tending gear (Western Gulf of Maine Habitat Management Area)	**Prohibited due to overlapping managed areas:** Clam harvest, due to Georges Bank Paralytic Shellfish Poisoning Closure
Allowed: Recreational hook and line gear or handline gear with a letter of authorization; pot/trap gear	**Allowed:** Fixed gears including gillnet, longline, pot/trap; recreational hook and line gear

DHRA designation does not prohibit non-fishing activities (e.g., offshore windfarms, aquaculture facilities, or submarine cable laying). In practice, due to the existence of management areas such as DHRAs, habitat management areas, and groundfish management areas, non-fishing development of DHRAs has generally been avoided.

Three-year review process

The Stellwagen and Georges Bank DHRAs are subject to review and possible removal by the NOAA Regional Administrator every three years, as advised by the New England Fishery Management Council (Council; 50 CFR 648.371(e)). The areas were first reviewed (and retained) in 2022. The second, current three-year review began during summer 2025. The process begins with staff at NOAA's Greater Atlantic Regional Fisheries Office (GARFO) seeking input from researchers about their activities, with a focus on studies or cruises requiring a permit or letter of authorization issued by the Regional Office. This includes research conducted by NOAA's Northeast Fisheries Science Center (NEFSC), Stellwagen Bank National Marine Sanctuary (SBNMS) and other groups. During each review, GARFO staff prepare a report for the Council summarizing past, ongoing, and future planned research, to support the Council's discussion of whether to recommend retention of the DHRAs (Enclosure 1). GARFO's report also includes information about the Jordan Basin DHRA and Rose and Crown and Davis Bank research areas.

Regulations specify the following criteria that will be used to determine whether a DHRA should be maintained:

- Documented active and ongoing research in the form of data records, cruise reports, or inventory of samples with analytical objectives focused on DHRA topics, or
- Approved research proposals focused on DHRA topics, or
- Funding requests for pending research focused on DHRA topics.

Recent, ongoing, and planned research

Recent federally authorized studies in the Georges Bank DHRA include Northeast Fisheries Science Center surveys, specifically spring and fall trawl survey stations, and Ecosystem Monitoring (EcoMon) survey stations. These are ongoing, long-term survey efforts. There is no current research focused on DHRA-specific questions.

Recent federally authorized studies in the Stellwagen DHRA include Northeast Fisheries Science Center surveys, specifically spring and fall trawl survey stations, and EcoMon survey stations. These are ongoing, long-term survey efforts.

In addition, from 2023-2025, SBNMS in collaboration with Boston University and the University of Connecticut conducted a video analysis of patterns and processes of natural disturbances and species presence across habitats, a study that is reliant on the Stellwagen DHRA designation. Funding for this project concluded in 2025, but similar BRUV studies may continue in 2026 and future years through the Boston University Marine Program (A. Stratton, SBNMS, personal communication). From 2023-present, SBNMS also collaborated with NEFSC to conduct a passive acoustic monitoring study to understand the anthropogenic, environmental, and biological soundscape and its impact on marine resources. Additional information on this project can be found here: https://sanctsound.ioos.us/s_sbnms.html. SBNMS plans to continue these projects, and has future plans for (1) an autonomous underwater vehicle survey to compare habitat quality and species composition between areas inside and outside of the Stellwagen DHRA, (2) the deployment of a long-term oceanographic monitoring buoy, and (3) an economic analysis of commercial fishing and ecotourism operations in areas adjacent to the Stellwagen DHRA, to identify any "spillover" effect from increased catchable biomass due to the presence of the DHRA.

Gloucester Marine Genomics Institute (GMGI) has used environmental DNA (eDNA) to compare whole ecosystem biodiversity, inside and outside of the Stellwagen DHRA. Sampling occurred in 2021 and results were published last year (Polinski et al. 2025[1]). They have plans to conduct more focused eDNA studies within the Stellwagen DHRA.

PDT recommendation

The PDT recommends retaining the Stellwagen DHRA based on documented past, ongoing, and potential future research that addresses habitat research questions posed by the Council via Omnibus Habitat Amendment 2.

The PDT recommends retaining the Georges Bank DHRA pending further discussion of tradeoffs between having a relatively undisturbed area in which to conduct dedicated research vs. lost fishing opportunities. Fishing activity in this area has been controlled since 1994. Generally, areas that are closed to fishing, including the DHRAs, have been particularly informative for habitat, productivity, climate change, and managed species research that compares differences within and outside the closed areas. Examples of such studies include Murawski et al. 2005, Davies et al. 2015, Sherwood and Grabowski 2016, Vitaliano et al. 2013, and Pereira et al. 2012. Sunsetting the DHRAs would eliminate those research opportunities for projects that require a "closed area" comparison. Identifying and creating a new area with analogous "closed area" conditions could require several years of limited disturbance.

Lifting the Stellwagen DHRA restrictions would not result in a change in fishing gear access to the area as there are overlapping restrictions associated with the year-round Western Gulf of Maine Habitat Management Area, the Western Gulf of Maine Groundfish Closure Area, and the seasonal Cod Protection Closure Areas. Lifting the Georges Bank DHRA restrictions would allow fishing with bottom trawl and scallop dredge gears; clam dredging would still be prohibited due to the overlapping Georges Bank Paralytic Shellfish Poisoning (PSP) Closure. It is unknown the extent to which there would be interest in fishing within the Georges Bank DHRA should the restrictions be lifted. An informal examination of fishing effort distributions using data available on the Northeast Ocean Data Portal did not show past fishing activities occurring along the edges of the DHRA, as is observed for some other closed areas (e.g.,

[1] https://onlinelibrary.wiley.com/doi/10.1002/edn3.70138

Western Gulf of Maine Closure Area), but it is possible that regulatory regimes such as mesh size restrictions have influenced past patterns of fishing near the DHRA. The PDT noted that recent scallop resource surveys in the DHRA show that scallop biomass is very low, ~0 mt, with no recent recruitment occurring. Scallops were a species of interest / discussion during designation of the Georges Bank DHRA.

The PDT acknowledges that research from the DHRAs since they were implemented has not been used to evaluate changes to habitat management measures, however, a planned 10-year review of these measures where information from the research areas might be applied has yet to occur. Such an evaluation might be considered for 2028, which is ten years out from OHA2.

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Jordan Basin DHRA Update

The Jordan Basin Dedicated Habitat Research Area (DHRA), encompassing the "114 Fathom Bump" site in western Jordan Basin, was developed through the Council's Omnibus Deep-Sea Coral Amendment and went into effect in 2021. While there are other locations in Jordan Basin with structure-forming corals (*Parmuricea placomus, Primnoa resaediformis*); this site was the most extensive coral area known in the basin at the time the coral amendment was developed. There are no fishery restrictions associated with the designation. The purpose of this DHRA is to encourage further exploration of coral habitats at the site, and to encourage research on fishing gear impacts on these habitats.

The Coral Amendment briefly describes the coral habitats of Jordan Basin based on dives conducted during 2003, 2013, 2014, and 2017 research cruises. The 2013 and two 2014 cruises were conducted under the NOAA Deep Sea Coral Research and Technology Program 2013-2015 Northeast Research Initiative (Packer et al., in review; also see Northeast Chapter in Packer et al. 2017). Various pre-designation studies related to the DHRA are listed below under references.

Following the DHRA designation, NOAA's Deep Sea Coral Research and Technology Program's focus returned to the northeast for a second four-year research initiative during 2023-2026 (the prior initiative occurred between 2013-2015. A research prioritization workshop was held in Woods Hole, MA, during May 2023 (the workshop report is available here). One conclusion of the workshop was that it would be important to assess how, why, and how many fish use coral habitats, and to quantify effects of fishing and fishing gear on coral habitats and determine their rates of recovery after impacts occur. Jordan Basin was noted as a focal location for this type of research.

During the workshop, Council staff identified Council research priorities relevant for the Initiative, including to: (1) investigate the functional ecology of deep-sea corals; (2) estimate anthropogenic impacts, coral recovery rates, and how they relate to intertemporal tradeoffs around fishing and coral protection; (3) define areas/habitat conditions that support coral and sponge habitats; (4) study coral growth, reproduction, and population connectivity, and (5) develop models that predict coral presence/absence or relative abundance, not just likelihood of occurrence or habitat suitability.

Prior to and during the 2023-2026 Northeast Coral Initiative planning period, there was significant attention given to floating offshore wind development in the Gulf of Maine, and thus this was a priority planning consideration for the 2023-2026 initiative. Note that the Jordan Basin DHRA was excluded from the final Wind Energy Area (see map here). There are now four commercial offshore wind leases in the Gulf of Maine, but they are south and west of the Gulf of Maine Coral Protection Areas and the Jordan Basin DHRA (see map here).

The need for updated bathymetry data at higher resolution and with more comprehensive coverage to support research planning and identification of possible coral habitats was noted prior to and during the workshop. The workshop report describes plans to map a large area of the eastern Gulf of Maine using Saildrone, which are uncrewed surface vehicles. This work was completed during 2023 and 2024, and included the entire DHRA (map of planning area). As of August 2024, Saildrone had mapped 1,500 square nautical miles in the north-central Gulf of Maine using two Saildrone Voyager uncrewed surface vehicles (USVs). Depths of up to 300 m were mapped, revealing a complex and varied underwater landscape, reflecting the basin's glacial history and dynamic oceanographic processes.

In addition to the bathymetric mapping, a 2023 survey aboard the R/V Endeavor collected deep sea corals from the Gulf of Maine. Some additional information about that project is available from the Bigelow Laboratory for Ocean Sciences, here.

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Enclosure: March 2026 report from GARFO to NEFMC on DHRAs

Review of the Stellwagen and Georges Bank Dedicated Habitat Research Areas 2026

Purpose

The purpose of this document is to provide information regarding the continued use of the Stellwagen Dedicated Habitat Research Area (DHRA) and the Georges Bank DHRA since the 2022 evaluation. The regulations at 50 CFR 648.371, which established these DHRAs, included a provision that the Regional Administrator initiate a review of the DHRAs three years after their establishment to determine whether they should be maintained.[1] The New England Fishery Management Council's Omnibus Essential Fish Habitat Amendment 2 (OHA2) outlined the research agenda for the DHRAs and the process and information to be considered in the 3-year evaluation. The 3-year evaluation was conducted in 2022. The results of the evaluation found that one active and ongoing project relied on the Stellwagen DHRA; NMFS did not identify any past, current, or planned research activities in which the Georges Bank DHRA had played a critical role. The Council recommended that the Regional Administrator retain both the Stellwagen and Georges Bank DHRAs for an additional three years, after which time a review process would be initiated using the regulatory authority from OHA2. This document evaluates research projects identified as taking place in the DHRAs between late 2022 and early 2026.

At the request of the Council's Habitat Plan Development Team, this evaluation also includes the use of Jordan Basin DHRA, as well as the Davis Bank East (DBE) and Rose and Crown (RC) areas within the Great South Channel (GSC) Habitat Management Area (HMA). The evaluation of these areas was for informational purposes only; there is no maintenance determination associated with these areas.

Background

The regulations required the Regional Administrator to review, in consultation with the Council, the use of the DRHAs three years after their establishment to determine if they should be maintained. The 2022 review findings are documented in the *Review of the Stellwagen and Georges Bank Dedicated Habitat Research Areas 2022* document (Attachment), which was provided to the Council on September 2, 2022. This review follows a similar process as was conducted in 2022.

Criteria used to evaluate whether the DHRAs should continue include: Documented active and ongoing research in the form of data records, cruise reports, or inventory of samples; approved research proposals; or funding requests for pending research. The review is intended to evaluate whether appropriate research activities are ongoing or imminent, or if these designated areas are unused for their intended purpose of improving habitat science. For this evaluation, NMFS asked the following questions:

[1] The Omnibus Deep-Sea Coral Amendment established a third DHRA, the Jordan Basin DHRA, which we approved and implemented in 2021. This DHRA did not include a sunset provision and is not included here because it is not subject to review. We did not identify current or ongoing research that relies on the Jordan Basin DHRA designation during this process.

- Please tell us about your prior (last three years) experience conducting research in the Stellwagen, Georges Bank, or Jordan Basin Dedicated Habitat Research Areas (DHRA).
- Please tell us about your prior (last three years) experience conducting research in the Davis Bank East or Rose and Crown areas within the Great South Channel (GSC) Habitat Management Area (HMA).
- What was the primary reason for conducting research in the DHRA or HMA?
- Please tell us about any future (next two to three years) planned/funded research in the Stellwagen, Georges Bank, or Jordan Basin DHRA.
- Please tell us about any future (next two to three years) planned/funded research in the Davis Bank East (DBE) or Rose and Crown (RC) areas within the GSC HMA.

Removal of the Stellwagen and/or Georges Bank DHRAs, if warranted, would be completed consistent with the requirements of the Magnuson-Stevens and Administrative Procedure Acts.

Research in the DHRAs

2022-2026

From October 2022 through March 2026, 27 distinct applications were submitted to the Greater Atlantic Regional Fisheries Office indicating research in the DHRAs. These applications were for either a Scientific Research Permit, Letter of Acknowledgment, or Exempted Fishing Permit. Twenty-three applications were for Scientific Research Permits for NOAA Northeast Fisheries Science Center's (NEFSC) resource surveys. These are regular, ongoing resource assessments that are not focused on the effects of fishing on habitat. Three applications were focused on conducting rod and reel/jigging resource surveys, none of which included habitat-oriented research. One application was focused on a bottom trawl resource survey and was not focused on the effects of fishing on habitat. All these surveys would occur in these areas regardless of their status as DHRAs.

During the 2022-2026 timeframe, Coonamessett Farm Foundation (CFF) submitted several applications to conduct research in the GSC HMA areas. In late 2022 and early 2023, CFF was granted two Letters of Acknowledgement to conduct 24-hour sonar surveys in the RC area. In late summer 2024, CFF was granted a year-long Letter of Acknowledgement to conduct seasonal multibeam sonar and drop camera surveys in the DBE area, as well as an Exempted Fishing Permit (EFP) to conduct compensation fishing in both the DBE and RC areas in support of the surveys.

In addition to information collected from research permit applications, NMFS requested information from known and potential researchers about activities in the DHRAs and GSC HMA areas via email on February 6, 2026. The information collection period closed on March 6, 2026.

Stellwagen Bank National Marine Sanctuary (SBNMS) submitted information regarding two collaborative projects in the Stellwagen DHRA: 1) A video analysis of the patterns and processes of natural disturbances, conducted in collaboration with the Mystic Aquarium and the

University of Connecticut; and 2) passive acoustic monitoring stations, to quantify and better understand anthropogenic, environmental, and biological sounds and its impacts on resources, conducted in collaboration with the Northeast Fisheries Science Center. SBNMS also permitted projects in the Stellwagen DHRA, including eDNA research, scallop surveys, and fisheries surveys. SBNMS plans to continue several of the above projects, in addition to an autonomous underwater vehicle survey to compare habitat quality and species composition between areas inside and outside of the Stellwagen DHRA, the deployment of a long-term oceanographic monitoring buoy, and an economic analysis of commercial fishing and ecotourism operations in areas adjacent to the Stellwagen DHRA, to identify any "spillover" effect from increased catchable biomass due to the presence of the DHRA. SBNMS has not conducted research in the Georges Bank or Jordan Basin DHRAs, or in the GSC HMA areas, and does not have any plans to.

Gloucester Marine Genomics Institute (GMGI) responded with information regarding its ongoing eDNA study within the SBNMS to conduct whole ecosystem biodiversity assessments. It has sampling stations both inside and outside the DHRA to evaluate the effectiveness of management protections. GMGI plans to conduct more focused eDNA studies within the DHRA. GMGI has not conducted research in the Georges Bank or Jordan Basin DHRAs, or in the GSC HMA areas, and does not have any plans to.

NEFSC submitted information regarding its bottom longline survey, which uses randomly stratified stations, with a limited number occasionally falling within the Stellwagen DHRA. This and several other surveys conducted by the NEFSC are regular, ongoing resource assessments that occur in the Stellwagen and Georges Bank DHRAs but are not focused on the effects of fishing on habitat. These projects are excluded from further discussion. The NEFSC has not conducted research in the Jordan Basin DHRA, or in the GSC HMA areas, and does not have any plans to.

CFF provided additional information about its sonar and camera surveys, as well as the compensation fishing being conducted to support the surveys, in response to the request for information. CFF is using multibeam sonar and a drop camera array to collect information on the bathymetry, benthic biological community, surface sediment composition, and sediment distribution within the DBE area. Participating vessels are conducting compensation surfclam fishing in portions of the DBE and RC areas to generate funding to conduct the research. CFF stated it intends to pursue an additional EFP to conduct additional surveys in an uncharacterized portion of the RC area. CFF has not conducted research in the Stellwagen, Georges Bank, or Jordan Basin DHRAs, and does not have any plans to.

Evaluation of Research in the DHRAs

With respect to the research projects identified as taking place in the DHRAs, NMFS considered the questions outlined for the evaluation process:

- Is there active research being conducted in the DHRA?
    - Yes. Research activities are taking place in both DHRAs. The Science Center's resource assessments overlap with both the Stellwagen and Georges Bank DHRAs.
- Is it anticipated that research will continue beyond this fishing year?
    - Yes. NEFSC's resource assessments are multi-year projects with recent research acknowledgments from GARFO (see next question) and are expected to continue. The SBNMS video analysis began in 2021 and is expected to continue for the foreseeable future, dependent on funding. Continued funding is likely, as SBNMS indicated that research in the DHRA is a high priority.
- Is there potential research currently in the permitting process at GARFO or other entities, e.g., Stellwagen Bank National Marine Sanctuary?
    - Yes. NEFSC applies for Scientific Research Permits for resource assessments annually and has active permits in 2026 (DA26-006, DA26-008). The SBNMS video analysis is permitted under the Superintendent's permit for activities in the Sanctuary.
- Is there potential research currently in the funding process?
    - The ongoing research described above may have additional funding in process to support future activities. However, NMFS did not identify any additional potential research currently in the funding process.
- Is there a high likelihood that the project will be funded?
    - As NMFS did not identify potential research in the funding process, this question is not applicable.
- Are the fishing restrictions associated with the DRHA designation an explicit part of the design of the project?
    - NEFSC's resource assessments began prior to the DHRA designations and are regular, ongoing resource assessments. The DHRA designation is not an explicit part of the research. The SBNMS video analysis explicitly relies on the Stellwagen DHRA designation. The research addresses elements of natural disturbance and requires the exclusion of bottom tending gear from the DHRA. The Sanctuary Superintendent has indicated that research in the DHRA is a priority and emphasized the importance of the Stellwagen DHRA in the management and protection of the Sanctuary.
- Is there potential research [at some other critical stage in the idea-->funding process]?
    - NMFS did not identify potential research in another stage of development.

In summary, while a number of research activities take place in the DHRAs, the majority happen to overlap with the DHRA. Several active and ongoing projects rely on the Stellwagen DHRA. NMFS did not identify any past, current, or planned research activities in which the designation of the Georges Bank DHRA has played a critical role.

Additionally, CFF continues conducting research activities that assess habitat impacts from hydraulic dredge fishing in which the GSC HMA areas play a critical role. No research activities were identified as being conducted in the Jordan Basin DHRA.

Attachment:
Review of the Stellwagen and Georges Bank Dedicated Habitat Research Areas 2022

Purpose

The purpose of this document is to provide information regarding the use of the Stellwagen Dedicated Habitat Research Area (DHRA) and the Georges Bank DHRA since their establishment in April 2018. The regulations at 50 CFR 648.371, which establish these DHRAs, include a provision that the Regional Administrator initiate a review of the DHRAs 3 years after their establishment to determine whether they should be maintained.[2] The New England Fishery Management Council's Omnibus Essential Fish Habitat Amendment 2 (OHA2) outlined the research agenda for the DHRAs and the process and information to be considered in the 3-year evaluation. This document evaluates research projects identified as taking place in the DHRAs in accordance with that information.

Background

In OHA2, the New England Fishery Management Council recommended, and NOAA's National Marine Fisheries Service (NMFS) approved, the establishment of the Stellwagen DHRA and the Georges Bank DHRA to better understand how habitat management measures influence stock productivity and to allow for the design of more effective conservation measures in future actions (83 FR 15240; April 9, 2018). The regulations at 50 CFR 648.371 codify the Stellwagen DHRA, which prohibits fishing with bottom-tending mobile gear, sink gillnet gear, or demersal longline gear, unless otherwise exempted, and the Georges Bank DHRA, which prohibits bottom-tending mobile gear, unless otherwise exempted.

The DHRAs are intended to allow coordinated research and to build upon past studies and baselines by restricting certain types of fishing to create appropriate reference conditions in the research area. The DHRAs are set up as general closures where the investigators determine the study sites and treatments and arrange the necessary research fishing activity. The DHRAs are intended to provide opportunities for addressing the following research topics and question:

- Gear impacts
    - How do different types of bottom tending fishing gear (e.g., trawl nets, dredges, hook and line, traps, gillnets, longlines) affect the susceptibility and recovery of physical and biological characteristics of seabed habitat, and how do these impacts collectively influence key elements of habitat including spatial complexity, functional groups, community state, and recovery rates and dynamics?
    - Are our estimates of gear contact with the bottom accurate? Can we develop trawl gear that minimizes contact on the bottom, thereby reducing the potential for gear impacts?

[2] The Omnibus Deep-Sea Coral Amendment established a third DHRA, the Jordan Basin DHRA, which we approved and implemented in 2021. This DHRA did not include a sunset provision and is not included here because it is not subject to review. We did not identify current or ongoing research that relies on the Jordan Basin DHRA designation during this process.

- Habitat recovery
    - What recovery models (e.g., successional vs. multiple-stable states) are operant in the region and how resilient are seafloor habitats to disturbance? In other words, how do seafloor habitats recover, and are there thresholds after which habitats have achieved an alternate state and are no longer capable of recovering to their previous undisturbed condition?
    - Do "small" fishing-caused disturbances surrounded by unimpacted habitat recover more quickly and exhibit greater resilience in contrast to "large" fishing-caused disturbances embedded with small unimpacted patches?
    - When a particular area is fished for the first time vs. subsequent efforts, are these impacts equal per unit effort? Or, is the first pass over an area much more detrimental? Conversely, is there a tipping point beyond which the habitat is no longer capable of recovering?
- Natural disturbance
    - In the absence of fishing, what are the dynamics of natural disturbance (e.g., major storm events) on seafloor habitat (especially biological components) across five major grain size classes (mud, sand, coarse sand-granule, pebble-cobble, boulder) and across oceanographic regimes? In areas where natural disturbance is high, are signals of the impacts of fishing masked?
- Productivity
    - How does the productivity of managed species (and prey species) vary across habitat types nested within the range of oceanographic and regional settings? And how does this productivity change when habitats are impacted by fishing gear? Do durable mobile bottom tending gear closures increase fish production? Why are highly productive areas so productive?

The regulations require the Regional Administrator to initiate a review, consult with the New England Fishery Management Council about, and evaluate the use of the DRHAs beginning 3 years after their establishment to determine if they should be maintained. Criteria used to evaluate whether the DHRAs may continue include documented active and ongoing research in the form of data records, cruise reports, or inventory of samples, approved research proposals, or funding requests for pending research. The review is intended to evaluate whether appropriate research activities are ongoing or imminent, or if these designated areas are unused for their intended purpose of improving habitat science. Specific questions NMFS must consider in the evaluation include:

- Is there active research being conducted in the DHRA?
- Is it anticipated that it will continue beyond this fishing year?
- Is there potential research currently in the permitting process at GARFO or other entities, e.g., Stellwagen Bank National Marine Sanctuary?
- Is there potential research currently in the funding process?

- Is there a high likelihood that the project will be funded?
- Are the fishing restrictions associated with the DRHA designation an explicit part of the design of the project?
- Is there potential research [at some other critical stage in the idea-->funding process]?

Additional information and a flowchart outlining how these questions should be used in the evaluation process can be found on pages 116 and 117 of Volume 3 of OHA2.

Removal of the DHRAs, if warranted, would be completed consistent with the Administrative Procedure Act.

Research in the DHRAs

2018-2021

In 2019, NMFS updated the online form to apply for research documentation (e.g., Letter of Acknowledgement, Exempted Fishing Permit, Scientific Research Permit) to include a question regarding whether research was planned in a DHRA. From that time until 3 years after the establishment of the DHRAs (March 2021), 16 distinct applications indicating research in a DHRA were submitted. One application was for research located in the Great South Channel Habitat Management Area, which does not overlap with a DHRA. The applicant indicated that the research would take place in a DHRA in error, and this project is excluded from further discussion. Fourteen applications were for Scientific Research Permits for NOAA Northeast Fisheries Science Center's resource surveys. These are regular, ongoing resource assessments that are not focused on the effects of fishing on habitat. One application was focused on the development of electronic monitoring in the New England multispecies fisheries and did not include habitat-oriented research.

2021-2022

From March 2021 through May 2022, nine distinct applications were submitted indicating research in DHRAs. One of the applications requested a permit for research in the Great South Channel Habitat Management Area, not in a DHRA. Further, the permit was not granted, and the project is excluded from further discussion. Seven applications were for the continuation of the Science Center's previously mentioned annual resource surveys. The final application was a drop camera survey of Atlantic sea scallops conducted by UMass Dartmouth's School for Marine Science and Technology (SMAST). The survey provides spatial information on scallop density and size and includes study sites in both the Stellwagen and Georges Bank DHRAs.

In addition to information collected from research permit applications, NMFS published a request for information about research in the Stellwagen and Georges Bank DHRAs in the *Federal Register* on July 20, 2022 (87 FR 43246). The data collection period ended on August 19, 2022. SMAST provided additional information about the drop camera scallop surveys in response to the notice. It also provided information regarding a video trawl survey overlapping with the Stellwagen DHRA. The survey is designed to collect data on groundfish species, including size, density, abundance, and catch per unit effort. Stellwagen Bank National Marine

Sanctuary (SBNMS) submitted information regarding a video analysis of the patterns and processes of natural disturbances in the Stellwagen DHRA, conducted in collaboration with the Mystic Aquarium and the University of Connecticut.

Evaluation of Research in the DHRAs

With respect to these research projects identified as taking place in the DHRAs, NMFS must consider the questions outlined for the evaluation process:

- Is there active research being conducted in the DHRA?
  Yes. Research activities are taking place in both DHRAs. The Science Center's resource assessments and the SMAST scallop survey overlap with both DHRAs. The New England multispecies electronic monitoring research, SMAST video trawls, and the SBNMS video analysis include research activities in the Stellwagen DHRA.
- Is it anticipated that it will continue beyond this fishing year?
  Yes. The Science Center's resource assessments, SMAST scallop surveys, and SMAST video trawl surveys are multi-year projects with recent research acknowledgments from GARFO (see next question) and are expected to continue. The SBNMS video analysis began in 2021 and is expected to continue for the foreseeable future, dependent on funding. Continued funding is likely, as the Sanctuary Superintendent has discretion over how the Sanctuary's budget is allocated and indicated that research in the DHRA a high priority. While research on electronic monitoring in the multispecies fishery is ongoing, the project identified above ended in 2021. No other investigators indicated their electronic monitoring research takes place in a DHRA.
- Is there potential research currently in the permitting process at GARFO or other entities, e.g. Stellwagen Bank National Marine Sanctuary?
  Yes. The Science Center applies for Scientific Research Permits for resource assessments annually, and has active permits in 2022 (DA22-006, DA22-013). SMAST has an active Letter of Acknowledgment for drop camera scallop surveys on Georges Bank (DA22-054)—the project identified through the permitting system as taking place in a DHRA—as well as a number of other Letters of Acknowledgment and Research Set-Aside Letters of Authorization for drop camera scallop surveys. While the SMAST video trawl survey was not identified through the research permit system, NMFS recently issued a Letter of Acknowledgment for the project (DA21-060), which expired June 30, 2022. The SBNMS video analysis is permitted under the Superintendent's permit for activities in the Sanctuary.
- Is there potential research currently in the funding process?
  The ongoing research described above may have additional funding in process to support future activities. However, NMFS did not identify any additional, potential research currently in the funding process.
- Is there a high likelihood that the project will be funded?
  As NMFS did not identify potential research in the funding process, this question is not applicable.

- Are the fishing restrictions associated with the DRHA designation an explicit part of the design of the project?
  The Science Center's resource assessments began prior to the DHRA designations and are regular, ongoing resource assessments. The DHRA designation is not an explicit part of the research. The SMAST scallop survey began in the early 2000s, and the SMAST video trawl in 2016, prior to the designation of the DHRAs. SMAST indicated that neither project relied on nor considered the DHRA designation. Electronic monitoring research in the multispecies fishery focuses on the efficacy of electronic monitoring and does not rely on the DHRA designation. The SBNMS video analysis explicitly relies on the Stellwagen DHRA designation. The research addresses elements of natural disturbance and requires the exclusion of bottom tending gear from the DHRA. The Sanctuary Superintendent has indicated that research in the DHRA is a priority and emphasized the importance of the Stellwagen DHRA in the management and protection of the Stellwagen Bank National Marine Sanctuary.
- Is there potential research [at some other critical stage in the idea-->funding process]?
  NMFS did not identify potential research in another stage of development.

In summary, while a number of research activities take place in the DHRAs, the majority happen to overlap with the DHRA. One active and ongoing project relies on the Stellwagen DHRA. NMFS did not identify any past, current, or planned research activities in which the Georges Bank DHRA has played a critical role.