

Atlantic Surfclam Fisheries Mitigation Workshop: Stock Enhancement as a Mitigation Strategy

November 20, 2024



Workshop Summary: January 2025

Prepared by Lisa DeMarsico, Special Initiative on Offshore Wind

Workshop Convener:

Tom Dameron, Surfside Foods, LLC.

Workshop Facilitators:

Patrick Field, Consensus Building Institute

Kris Ohleth, Special Initiative on Offshore Wind

Workshop Funders and Organizers:

Atlantic Shores Offshore Wind

Consensus Building Institute

MOCEAN

New Jersey DEP

NYSERDA

Special Initiative on Offshore Wind

Surfside Foods, LLC.



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Workshop in Brief

On November 20, 2024 43 stakeholders, including representatives from the fishing industry, state and federal agencies, academic research, and offshore wind (OSW) energy development, convened to discuss the potential for a stock enhancement-based program as a mitigation strategy for offshore wind energy impacts on the surfclam fishery.

Attendees' expertise included offshore wind development, federal and state regulations and permitting, compensatory mitigation, and surfclam biology, ecology, and seeding technology. The workshop was convened by Tom Dameron, Government Relations & Fisheries Science Liaison for Surfside Foods, LLC., with facilitation from Patrick Field, Senior Consultant for the Consensus Building Institute (CBI) and Kris Ohleth, Director of the Special Initiative on Offshore Wind (SLOW).

The workshop aimed to bring stakeholders together to address the intersection of offshore wind energy development and the Atlantic surfclam fishery. Focusing on practical outcomes, the discussion centered on identifying actionable strategies and realistic next steps to mitigate the impact of offshore wind energy on fishery access through a surfclam stock enhancement program.

Workshop Objectives

- Provide background on the research and evidence for stock seeding viability.
- Provide overview of the standards and key elements of a successful compensatory mitigation program.
- Build a shared understanding of stakeholder roles, authorities, and jurisdiction regarding a possible stock enhancement-based program.
- Explore stock enhancement mitigation and regional scaling via group thought experiments.
- Consider immediate, short-term, and long-term steps each sector can put into place to move stock enhancement mitigation from concept to reality.

Workshop Assumptions

- Seeding of clams is technically feasible.
- Incorporating the seeding of clams into the OSW process is a mitigation option desired by the surfclam industry.
- The goal is to determine next steps including logistics, funding, sector roles, and regulations.

Workshop “Rules of the Sea”

- Come in a can-do, problem-solving mode.
- No is easy; focus on the ways to get to yes.
- Ask hard questions and be prepared to think hard on how to overcome obstacles.
- Listen as well as speak.

- Be respectful.
- Focus on the topic; berth side issues.
- Refrain from discussions re: merits of fishing or OSW as businesses.
- Take action after convening.

Workshop Overview

Opening Remarks

Kris Ohleth welcomed participants and facilitated introductions. Tom Dameron offered brief comments on how coordinated efforts can balance environmental impacts, economic viability, and regulatory compliance, while promoting the long-term sustainability of the surfclam fishery. Patrick Field commenced the workshop with an overview of the agenda (Appendix A), workshop objectives, key assumptions, and “rules of the sea.”

Workshop Presentations

1. Background on the Research

Surfclam stock enhancement: Considerations – *Daphne Munroe, Rutgers University, Haskin Shellfish Research Lab*

Daphne Munroe, Assistant Professor at Rutgers University's Haskin Shellfish Research Lab, provided an overview of stock enhancement considerations including estimated surfclam impacts from offshore wind development, hatchery capacity and challenges, nursery siting, and existing data on the viability of stock enhancement programs. She also highlighted current and upcoming research on seed survival and growth in ocean environments, as well as advancements in seeding technology and habitat suitability modeling. Below are key takeaways from the presentation.

Impact on Fisheries

- **Offshore Wind Development:** 2.35 million acres leased in the U.S. Mid-Atlantic and Northeast.
- **Revenue Loss:** Atlantic surfclam fishery losses are estimated at 3-15% (\$1M-\$5M annually for fishing vessels) with impact concentrated in New Jersey.

Hatchery-Based Enhancement

- As aquaculture shifts from fishing to farming, reliance on domestication increases while dependence on wild populations decreases. *Predation – Protection – Domestication*
- Using hatcheries to enhance wild fisheries falls under the realm of *Protection*.
- Research by Gilsinan et al. (2024) which looked at surfclam growth and survival in hatchery and nursery environments, as well as hatchery costs (construction, operation, and maintenance) found:

- **Scale for 1M Bushels:** Producing 1 million bushels of market-size surfclams requires 374M-2.1B hatchery-stage clams, needing 4-18 hatcheries (\$4M-\$15M; ~\$0.01 per clam).
- **Key Costs:** Labor is the largest expense.

Current and Upcoming Research

- **Science Center for Marine Fisheries (SCEMFIS):**

- Design of a clam seeder for the planting of seed on the ocean floor.
- Assessing hatchery capacity and potential new sites.
- Estimating costs and risks.
- Evaluating fishery management implications.

Preliminary Findings

- Hatchery capacity varies across states and public/private partnerships.
- Challenges include:
 - Permitting
 - Water quality
 - Availability of space and public acceptance
 - Securing workforce
 - Hatchery failure rate ~33%, raising cost estimates

- **NYSERDA (Ongoing):**

- Evaluating response of seed clams to ocean environmental stressors.
- Seed growth and survival under various planting densities and sizes.
- Vulnerability to predators.

- **New Jersey Research and Monitoring Initiative (RMI) Research (2025):**

- Field experiments (ocean) to test how survival and growth of seed surfclams varies with density.
- Lab experiments to test the predation rates and size preferences of key predators on juvenile surfclams.

2. Standards for Compensatory Mitigation

Marine Compensatory Mitigation – *Nick Morgan, The Conservation Fund*

Nick Morgan, Director of Mitigation Solutions at The Conservation Fund, discussed mitigation standards and key elements of a successful mitigation program. He laid out several elements of a successful program.

Suitable Siting - Finding an ideal/suitable habitat.

- Habitat connectivity:
 - Assuring permitting doesn't conflict with other resources and users.
 - Making sure to avoid potential/future lease areas for re-seeding.
- Evaluating cost-effectiveness of location.

In-kind - Requires a clear nexus between impact and mitigation and that the mitigation is proportional to the impacts.

- Focus is on the species that is impacted:
 - Quantity of species impacted.
 - Magnitude of impacts.
- Similar spatial and temporal scales:
 - Impacts should be mitigated close to where they occur or will occur.
 - Ideally impacts should be mitigated before they occur, otherwise additional measures must be considered to account for prior impacts.
- Evaluating high vs low cost estimates for impacts:
 - High estimates cover worst case scenarios, but may overestimate impacts and costs.
 - Low estimates cover bare minimum, but may require the developer (and others) to shoulder additional costs if actual impacts are higher.

Reliable and Consistent Metrics - results need to be measurable and repeatable.

- Make sure the data is transferable.
- Employ scientific methods.
- Ensure that monitoring costs/effort do not swamp the mitigation costs/efforts.

Transparency and Predictability

- Reasonable likelihood of success - has this been done before and can we expect it to work?
- Is the mitigation progressing toward success, per the determined metrics?
- Report the methods and results.

Additionality

- Mitigation needs to be demonstrably new and additive.
- Cannot be a byproduct or claim effects from a different mitigation or regulation effort.

Timing and Duration

- Mitigation needs to take place concurrently and last for the length of the impact.
- If impact is permanent and ongoing, then mitigation needs to be permanent and ongoing.

Durability - Long-term legal and administrative measures to make sure the mitigation lasts.

- Includes financial assurances (e.g., bonds for failure to meet requirements).
- Includes adaptive management or contingency plans for course corrections.

Assurances of Accountability - Defines who is responsible for success.

- What are the consequences for not meeting the requirements?
- True-up payments - to correct discrepancy between the initial estimates of impact and the actual amount.

Full Group Discussions

1. Jurisdiction and Authority

As a way to build a shared understanding of roles and jurisdiction, federal and state stakeholders were asked to briefly discuss what authority they see their sectors having over the regulation and permitting of a possible surfclam stock enhancement-based program.

Federal Agencies:

BOEM (Bureau of Ocean Energy Management)

- Lead permitting agency for offshore wind on the Outer Continental Shelf (OCS).
- Evaluates Environmental Effects (EE) and impacts.
- Can impose mitigation measures (e.g., endangered species protections).
- Guidance for mitigation came from East Coast States, resulting in a draft with minimum safety nets and a direct compensation model.
- Mitigation can include design changes, research monitoring, and other actions
- Must consider the impacted area's use as a fishery.

NOAA (National Oceanic and Atmospheric Administration)

- Under the Magnuson Stevens Act - issues federal fishing permits, including for vessels involved in seeding and harvesting, as well as Exempted Fishing Permits (EFPs) for research involving catch.
- Under the Endangered Species Act - develops biological opinions and issues Incidental Take Permits for endangered species of fish and marine mammals.
- The Endangered Species Act (ESA) may trigger consultations if vertical lines are used.
- Regulations may dictate who can harvest, where and when, which can lead to consultation with fishing councils.
- Also reviews projects outside of regulations, providing scientific advice and determining how the project will be evaluated.
- NOAA adopts a "wait and see" policy re: aquaculture, especially since aquaculture has been contested in the Gulf of Mexico.
 - Some operations are considered fishing while others are defined as aquaculture.
 - Policy (2011): Uses 4 criteria for defining aquaculture but doesn't differentiate between closed or open ocean.

MAFMC (Mid-Atlantic Fishery Management Council)

- Oversees fisheries management, including closed areas.
- Research into habitat stability and distribution shifts due to ocean parameters and wind effects, potentially relevant for surfclams and similar species.

EPA (Environmental Protection Agency) Engaged in broader aquaculture considerations, but with no direct involvement in aquaculture permit issuance unless health or disease issues arise.

State Agencies:**New Jersey (NJ)**

- Jurisdiction is location-dependent; state vs. federal waters.
- Aquaculture permitting - General permit needed for aquaculture operations.
- May require an operation plan for water monitoring and EPA oversight.
- New areas may need approval from the NJ Shellfish Council.
- Siting of new areas in state waters can be contentious and may involve consultations with stakeholders.

New York (NY)

- Permitting: Issued by the Department of State (DOS) who is in charge of the Coastal Zone Management Program (CZM) and the Department of Conservation.
- NYSEDA: Evaluates projects through mitigation plans as part of OSW contracts, but lacks direct approval or regulatory authority; state approvals are still necessary.
- State-Federal Collaboration: states often consult with federal agencies.

Virginia (VA)

- Aquaculture permitting - Permits required in state waters, but the state loses authority in federal waters.
- Marine Enforcement Policy - Outlines potential negative effects and strategies for mitigation through agreements with developers.
- Ocean planning - VA is developing a state policy for co-location vs. open ocean and may leverage policies for funding and site development.

2. Thought Experiment #1: Project Specific Scenario (Appendix C)

Facilitators introduced a Thought Experiment that asked participants to consider a technically feasible stock enhancement program for a fictional offshore wind project within current Atlantic surfclam habitat. Each sector/entity was asked to examine their roles and current capacity to require or support such mitigation, questions they would need addressed to consider such a project-specific approach, and what may be needed to facilitate proactive mitigation efforts by developers. The questions and topics raised included:

Minimization and Mitigation

- The surfclam industry expects mitigation proportional to the impact on the surfclam population. The goal is to ensure the surfclam area doesn't experience significant reductions from one or multiple leases.
- BOEM requires mitigation measures, but has set no specific criteria (i.e., no strict 1:1 compensation ratio).

Submission and Timing

- Federal and state agencies cannot act without a proposal submission.
- Submission timing should be as early as possible, ideally during the Construction and Operations Plan (COP).
- Early inclusion provides clarity on contributions despite some uncertainties.

Survey, Monitoring, and Biomass

- Questions re: biomass:
 - How does biomass within the lease area impact responsibilities?
 - If the biomass shifts out of a particular wind energy area and into other regions would the responsibility for that biomass change accordingly?
- Surveys should account for biomass movement over time.
- Need to differentiate between regional monitoring and site-specific monitoring.
- Need clarity on which entities sample biomass, assess harvestability, and monitor these processes.

Surfclam Industry Considerations

- Timing is critical; clams take at least three years to become harvestable.
- Programs must be implemented proactively to maintain stability in the industry.
- Surfclam fishery operates on a high volume/low value model.
- Developers want to avoid open-ended financial obligations but the surfclam industry faces significant risk and uncertainty due to this new ocean use.
- Knowledge from the research needs to translate into actionable programs.

Offshore Wind Developer Considerations

- Developers want clarity on survey obligations for both general monitoring required by BOEM and survey mitigation required by NMFS, as well as more coordination from federal partners.
- Developers need clarity on financial obligations early in the process.
- A mixture of mitigation efforts should be considered as complete exclusion of access seems unlikely.
- Consider a hierarchy of mitigation rather than a single approach.
- Emphasize regional buy-in from states and developers.
- Ensure regulators support the mitigation plan.
- Clarify how mitigation aligns with other fisheries compensation and regional funds.

State-Specific Considerations

- Compensation agreements vary by project and state.
- States can require mitigation for in-state impacts.
- Need to consider which state purchases the power and does that match with state fishery operations?
- Could regional collaboration among states simplify mitigation?
- Permitting usually aligns with the Environmental Impact Statements (EIS), making early action crucial.
- Ensure compensation conversations include surfclams.

Funding and Program Design

- Potential supplemental funding sources beyond developer obligations:
 - Economic development funds
 - Working waterfront initiatives
 - Infrastructure and job creation grants
 - Hatcheries may qualify for \$10K per MW required in some procurements
- Regional Fund Coordination: States could collaborate to create regional mitigation funds just as they are doing for individual compensatory mitigation through the Regional Fund Administrator..
- Community Benefit Agreements (CBA): Highlight the social and economic benefits of these programs and explore mitigation scenarios within agreements between developers and communities, separate from regulatory requirements (e.g., Community Benefit Funds).

Cooperative Research

- Collaborative approaches can reduce uncertainty and improve outcomes.
- Improve predictive modeling for biomass movement; periodic updates needed.
- Leverage BOEM funding to improve biological surveys.

Breakout Sessions

1. Thought Experiment #2: Scaling Regionally (Appendix D)

Building on the project-specific scenario, participants broke into small groups (of mixed representation) to discuss a regional framework for stock enhancement. In considering scalability across projects and regions, participants were asked to focus on collaborative administration, ensuring economic feasibility for developers, and aligning regulatory frameworks to avoid disproportionate impacts on the surfclam industry. Groups reported back, and the below considerations were discussed:

Regional Administration Considerations

- Decentralization and Oversight
 - A neutral third party, potentially a non-profit, could administer the program.

- Models like BSEE, BOEM's permitting structure, or NOAA's freshwater fish hatchery program could be adapted for oversight.
- Governance Structure - Creating regional governance, or a coalition of stakeholders that have a direct interest in the issue, could avoid placing the burden on individual states or projects.
- Regionally Funded Administrator vs Project-Based Administrator
 - Different expertise.
 - A regional administrator may not have the expertise to make decisions in a specific location about mitigation versus just compensation.
- Funding Models
 - A regional fund could be managed collaboratively by developers, states, and fishery stakeholders.
 - Regional Fisheries Fund & Regional Federal Survey Mitigation efforts could be used as models.
- Monitoring and Metrics
 - Proposed monitoring should focus on practical metrics like Catch Per Unit Effort (CPUE) and biomass assessments within wind lease areas.
 - Transparency and consistency in data collection are essential for building credibility.

Neutrality and Economic Feasibility for Developers

- Monitoring within wind lease areas to allocate commitment, while ensuring monitoring expenses are not excessive, is important.
- Regionalization provides cost-savings and data sharing.
 - Prevents each project from having to develop its own mitigation surveys.
 - Better science with more accessible data.
 - No need to reinvent the wheel.
- Developers emphasized concerns regarding habitat change and biomass movement over time.
 - Will developers be responsible for surfclams that might disappear in the next 10 years due to factors such as climate change?¹
 - If biomass moves from one lease area or region to another how do you modify responsibility/commitment?
- What is the magnitude of costs?
 - Hatchery number vs. nursery number.
 - Smaller seeds are cheaper, but larger seeds have greater success.

Avoiding Disproportionate Impacts on the Surfclam Industry

- Reduction in cost for developers does not result in the reduction of risk for the fishing industry. The surfclam industry should not have to shoulder the most risk from actions taken by others in long existing surfclam fishing areas.

¹ There is increasing evidence, though not yet definitive, that surfclams are adapting to warmer waters (newly productive older beds off of Virginia) and may not change their location offshore over time as some species may (scallops, etc.).

- Surfclam lease areas' economic significance (\$54M over 14 years) highlights the need for fair compensation.
- States and developers need to negotiate fair contributions and allocations for surfclam and other fisheries.

Other Considerations

- How do you motivate developers or states without current surfclam fisheries to participate?
 - States could align policy to require developer participation.
 - States may need to foster regional buy-in by thinking about how benefits are spread regionally. Example: The developer providing the funding is generating energy for NY; the seed is being purchased from a VA hatchery; the seeding grounds land in NJ. All three states receive some type of benefit or service.
- How do new areas (either habitat or lease areas) get added after initial negotiations?

2. Sector Breakout

As a final activity, participants were organized into four groups by sector (Federal Agencies, State Agencies, Offshore Wind Developers, Surfclam Industry). Each group had a designated facilitator and notetaker. Groups were asked to address the following questions:

- What can you do, specifically and concretely, to move stock enhancement mitigation from concept toward reality?
 - In one year?
 - In three years?
 - Today?
- What do you need from other sectors to move forward?

Groups reconvened and reported out to the larger audience. Their discussions/answers are summarized below.

Federal Agencies (facilitator: Patrick Field, CBI)

- **Cross-Sector Needs**
 - Need a submitted proposal to review. The federal government is effective at providing information and clarity, but cannot take action until a proposal is submitted.
 - Awareness of timing to help streamline the review process.
 - Ideally the program proposal would be included in the COP and before an EIS was completed.
 - Waiting increases risk.
- **Actionable Next Steps**
 - 1- to 3-Years:**
 - Hire a modeling specialist to identify optimal seeding locations.
 - Investigate key questions related to biomass, such as the overlap between lease areas and clam populations.

- Evaluate alternatives to 1:1 biomass impact mitigation.
 - Develop Simulations:
 - Upper and lower bounds to model potential outcomes
 - Revenue-exposure simulations to determine impacts
 - Explore a model where BOEM calculates revenue-exposure impacts and developers compensate accordingly.
 - Compare the cost of investing in mitigation strategies versus negotiating compensation for impacts.
 - Agency summaries - each agency could prepare a summary or appendix outlining their meeting takeaways, plans, and resource needs.
 - Develop decision trees for aquaculture versus enhancement scenarios.
 - Use the Thought Experiment template (#1) to outline processes, responsibilities, and considerations.
- **Other Thoughts/Considerations**
 - Consider changes to the economy and surfclam habitat that may influence impact costs.
 - Consider other impacts to surfclam habitats:
 - Other types of fishing
 - Dredge/dump sites

State Agencies (facilitator: Kris Ohleth, Special Initiative on Offshore Wind)

- **Cross-Sector Needs**
 - More specificity and detailed guidance from BOEM re:
 - If this type of mitigation can be a part of the developer's lease stipulations.
 - Why the state's specific language regarding fishery-related mitigation as negotiated with developers are not included in the final lease terms and conditions.
 - Guidance is not a requirement, but could this be an opportunity to require developers to use compensatory mitigation in federal waters?
 - Need the clam industry and developers to discuss logistics regarding levels of loss.
 - If there is 100% or very high loss.
 - If there remains some access in lease areas.
- **Actionable Next Steps**
 - 3-Years:**
 - Consider adding compensatory mitigation terms to state offshore wind solicitations.
 - This could increase cost at which the developers bid (though cost increase may be de minimis at this relatively low level of investment, and the additional cost may be offset by risk reduction).

- States have strong incentives to reduce costs.
- Draft language for review by developers before solicitation is released (each state typically runs a formal RFI process for each solicitation).

1 Year:

- Develop a white paper that reviews all existing applicable regulations at both the state and federal level, to help establish a baseline understanding/starting point.
- Consider working either as one state (NJ would be the most logical lead) or across states to develop guidance.
- Encourage developers to put in an application for federal review as part of, or an addendum to, a submittal; thus jump-starting the review process (regulators need a specific application to provide feedback - they will not provide feedback on hypotheticals).
- Conversely, encourage the fishing industry to initiate mitigation considerations by proposing mitigation measures to state regulators.
- Determine clear cost of what funding is needed to execute the program in the near, medium, and long term.
- Work towards regional cooperation.
 - This could provide more political certainty.
 - Determine similarities and differences between states' approaches, costs, etc.

Today:

- Reach out to the states not represented at the workshop - DE, MA, MD, NC, etc.
- NJ DEP can share state waters specific shellfish mitigation fund calculations near shore (developed to calculate what Ocean Wind One was required to provide for mitigation as an example for a potential costing template).

● Other Thoughts/Considerations

- Where to obtain funding for research, meetings, workshops?
- Is there an existing entity that can help facilitate this process? NROC, MARCO, SLOW, etc.
- Consider merging issues of scallop fisheries with surfclam fisheries to increase the geographic reach of the initiative, thus increasing the number of participating states.

Offshore Wind Developers (facilitators: Josh Kohut, Rutgers University and Lisa DeMarsico, Special Initiative on Offshore Wind)

● Cross-Sector Needs

- Better estimates for true costs of programs from regulators, researchers, and surfclam industry.
- Awareness of timing - developers need to consider such programs early in the planning process.
- NOAA's engagement in conversations about efficacies on monitoring (i.e., federal survey, baseline, enhancement).

- Clarity on timing and pinch points.
- Clear indication from the regulators that this is going to “count” as developers’ mitigation responsibilities.
- Buy-in assurances from the greater surfclam industry (e.g., formal letter).
- Need a more clear definition of “regional”.
 - What are the priority areas?
 - Truly regional or semi-regional?
 - Where is the distribution and would the fisheries go there?

- **Actionable Next Steps**

- 3-Years:

- Engage NOAA in efficacies on federal survey, baseline, and enhancement monitoring.
 - Find efficiencies over all the monitoring obligations on projects to combine effort and data.
 - Incorporate periodic monitoring into federal surveys so developers can focus on other monitoring.
 - Pros: takes permitting out of it and provides jobs for NOAA.
- Developers can work together to coordinate preconstruction surveys so that data is comparable across projects.
- Identify research needs and opportunities across developers.
 - Work with ROSA, state, and federal agencies to identify needs.
 - Put an extra focus on enhancement efforts.
- Collectively fund research goals.
 - Developers fund and work with NGOs to set research goals.
 - Model SCEMFIS (<https://scemfis.org/>) program.
 - Could ACP coordinate?

- 1 Year:

- Coordinate more across industry.
 - Can ACP coordinate a workgroup specific to enhancement activities? Surfclams can be an easy commit.
 - Find places where all developers have to check the box. Not everything needs to be unique, especially when regulatory.
- Ask for and review other mitigation models.

- Today:

- Bring back internally and socialize with other teams within developer organizations.
- Continue these conversations among the relevant sectors.

- **Other Thoughts/Considerations**

- Overarching excitement of being proactive, but recognize challenges of fitting into a reactive process
- Can be worth figuring out now as similar fisheries will likely go this route (i.e., scallop industry).

- Need to consider timing mismatch. All projects are on different timelines.
- If the industry is meeting quota, is the developer still responsible for funding enhancement? For how long?
- The RFA is close to being adaptable. Look to it for standards of developer responsibilities.
- Administration changes – there are a lot of people who will need to get up to speed in Q1 of 2025.

Surfclam Industry (facilitators: Tom Dameron, Surfside Foods, LLC. and Daphne Munroe, Rutgers University)

- **Cross-Sector Needs**

- Need states to include stock enhancement requirements in offshore wind energy bid solicitations.
- Federal agencies to enforce NEPA principles, emphasizing avoidance, minimization, mitigation, and (lastly) compensation.
- Advocacy from NGOs and industry groups is critical to drive policy changes and create demand for hatchery outputs.

- **Actionable Next Steps**

3-Years:

- Transition from pilot projects to large-scale seeding efforts.
- Develop comprehensive budgeting and financial plans for program administration and operational costs.

1 Year:

- Build and deploy seeders.
- Use fishing vessels for actions and research.
- Advocate for state and federal support for stock enhancement as a mitigation strategy.

Today:

- Provide data (i.e., yield, position, and growth rates) to planning activities.

- **Other Thoughts/Considerations**

- Create demand for hatcheries.
- Identify additional points of leverage for stock enhancement:
 - Fisheries heritage - the historical and existing practices of fishing provide cultural value that we must make sure is properly assessed in the economic frameworks.
 - Make sure the environmental impact to the Atlantic surfclam fishery is included in NEPA analysis.
 - GLD - area delineated as a Geographic Location Description in federal waters where certain federal license or permit activities OCS authorizations will be subject to review under the Coastal Zone Management Act (CZMA) Federal Consistency Provision.

- States could outline fishery impact minimization requirements as part of their Power Purchase Agreements (PPA).

Key Insights and Moving Forward

To conclude, facilitator Patrick Field summarized the key insights derived from the robust discussions and outlined potential steps to transition from research to actionable outcomes.

Administrative Models

Decentralization and Oversight

- A neutral third party, potentially a non-profit, could administer the program.
- Models like BOEM's permitting structure or NOAA's Freshwater Fish Hatchery program could be adapted for oversight.

Regional Coordination

- Regional governance was emphasized to avoid placing the burden on individual states or projects.
- States can prioritize regional approaches to streamline consistency and scale.
- Foster multi-agency and industry partnerships to address permitting and operational hurdles.

Support - Possible entities for support include:

- ROSA
- MAFMC
- ASFMC
- The Conservation Fund
- IOOS
- NERPA
- NFWF

Monitoring and Metrics

Monitoring Costs

- May exceed mitigation costs, raising questions about the cost-effectiveness of extensive monitoring programs.

Collaboration

- Developer and federal agency collaboration re: efficacies on monitoring (federal survey, baseline, enhancement).

Practical Metrics

- Catch Per Unit Effort (CPUE).
- Biomass assessments.

- Transparency and consistency in data collection are crucial for credibility.

Funding Models

Regional Fund

- Managed collaboratively by developers, states, fisheries, and other stakeholders.
- Fair contributions and allocations for surfclam and other fisheries must be negotiated.

Allocation

- PPAs could allocate funding (\$\$/MW) managed by a regional entity like ROSA.

Socio-Economic Benefits

- States or developers could frame funding as socio-economic benefits within CBAs rather than mitigation.

First Actor Ideas and Leverage Points

Initiate Regulatory Review

- OSW Developers could initiate a federal review by putting in an application as part of/addendum to a submittal (regulators need a specific application to provide feedback - they will not provide feedback on hypotheticals).
- The fishing industry could initiate by proposing mitigation measures to state regulators.

Multi-State Collaboration

- East Coast States (11 states) and consortia of funders can lay the groundwork.

Cooperative Research and Federal Guidance

- Can further advance the initiative.

Criteria for an Effective Program

Core Elements

- Timely implementation.
- Effective clam seeding.
- Certainty in funding.
- Consistency, adaptability, and regional applicability.

Additional Considerations

- Ensure the program is permissible.
- Minimize stakeholder defections.
- Provide clear socio-economic benefits.

Risk Transfer

- Determining who bears the risk of failure is a key issue.

- Necessary to balance front-end and back-end responsibilities.
- True-up payments (adjustments based on actual impacts) can provide certainty to the clam industry and developers.

Siting and Habitat

- Ensure suitable habitats for surfclams and other species.
- Establish clear plans for vessel access and monitoring over the long term.

Research and Program Development

- Collaborative research is essential and results need to be translated into practical and adaptable seeding programs.
- Consider joint research initiatives for scallops and clams.
- Investigate the costs of seeding programs at various scales and regulatory barriers.
- Develop program design at project and regional levels.
- Establish funding sources and common language for BOEM's RODs/Terms and Conditions.

Closing and Next Steps

To close the workshop, Tom Dameron, Patrick Field, and Kris Ohleth thanked attendees for their active participation and valuable contributions.

Appendix A: Workshop Agenda

Atlantic Surfclam Fishery Mitigation Workshop

Date: November 20, 2024

Location: Convene Two Commerce Square / Welles Hub
2001 Market St, Philadelphia, PA 19103

Time: 8:00 AM – 5:00 PM

Participants: By invitation

Workshop Assumptions

- Seeding of clams is technically feasible
- Incorporating seeding of clams in the OSW process is the question for the workshop. What needs to happen, and by whom, to make this possible - regulatorily and business-wise?

Workshop Rules of the Sea

- Come in a can-do, problem-solving mode.
- Ask hard questions and be prepared to think hard on how to overcome obstacles.
- No is easy; focus on the ways to get to yes.
- Listen as well as speak.
- Be respectful.
- Stay focused on the topic; berth side issues.
- Not the place to discuss the merits of fishing or OSW as businesses.
- Be ready to act after

Workshop Agenda

8:00 AM – 9:00 AM – Breakfast Buffet

9:00 AM – Workshop Opening Remarks

- Welcome and Introductions, *Kris Ohleth, SLOW*
- Offshore Wind and Fisheries - Will We Coexist? – *Tom Dameron, Surfside Foods*

9:30 AM – Brief Background on the Science and the July Workshop

- Research and evidence for viability of stock seeding – *Daphne Munroe, Rutgers University*
- Questions

10:00 AM – Jurisdictions and Authorities

- Each entity will briefly outline their authorities and jurisdiction regarding a possible stock enhancement-based program (5 minutes each or less)
 - NOAA/NMFS/Council (Various Branches)
 - State Environmental Regulators
 - BOEM
 - OSW Developers

10:30 AM – Thought Experiment #1: Project Specific Scenario

- We will present a fictional lease area and Offshore Wind (OSW) project within current Atlantic surfclam habitat, along with a technically feasible stock enhancement program as a proposed mitigation measure.
- Brief time to read the Project Specific Scenario
- General Questions and Comments

11:15 AM – Thought Experiment #1:

- The objectives of this section are for each regulatory entity or OSW developer(s) to:
 - *Identify regulatory scope and gaps*
 - *Examine possible developer action*

12:15 PM – Lunch

1:00 PM – Summary of Morning

- Summary of morning discussion by Facilitators, *Kris Ohleth, SLOW and Patrick Field, CBI*

1:15 PM – Overview of the Key Elements of a Successful Program

- Presentation -- *Nick Morgan, Conservation Fund*

1:30 PM – Key Elements for a Surfclam Program

- Discussion of the key elements and questions/comments pertaining to each for a Surfclam program

2:15 PM -- Thought Experiment #2: Scaling Regionally

- Building on the project-specific approach, this session will explore how to develop a scalable, regional framework for stock enhancement and other mitigation measures across multiple OSW projects. We will focus on collaborative administration, ensuring economic feasibility for developers, and aligning regulatory frameworks to avoid disproportionate impacts on the surfclam industry.

3:15 PM - Afternoon Break

- Refreshments (coffee, tea, snacks)

3:30 PM - Sector Breakouts (by OSW, Clams, Federal, State, Academic)

- What can you do to move this concept toward reality, specifically and concretely? In one year? In three years?
- What do you need from other sectors to do so?
- One thing you can commit to today.

4:15 PM – Report outs from Sectors and Discussion

4:45 PM – Potential Next Steps and Actions

- *Kris Ohleth, SLOW and Patrick Field, CBI*

5:00 PM – Thank you and Workshop Ends

Appendix B: List of Participants

Name	Title	Organization
Brian Krevor	Sr Director, Offshore Environmental & Permitting	American Clean Power Association (ACP)
Candice Cook-Ohryn	Environmental Advisor	Atlantic Shores Offshore Wind (ASOW)
Doug Copeland	Business Development & Strategic Partnerships Manager	Atlantic Shores Offshore Wind (ASOW)
Laura Klewicki	Permitting Manager	Attentive Energy
Sebastian Velez	Fisheries Liaison	Attentive Energy
Brian Hooker	Biology Section Chief	BOEM
Lisa Landers	NEPA Section Chief	BOEM
Ursula Howson	Management and Program Analyst	BOEM
Pat Field	Senior Mediator	Consensus Building Institute (CBI)
EJ Marohn	Director, Marine Affairs	Invenergy
Matt Nixon	Owner	Merrymeeting Shellfish Company
Julia Beaty	Fishery Management Specialist	Mid-Atlantic Fishery Management Council
Michelle Duval	Pennsylvania Appointed Obligatory Member	Mid-Atlantic Fishery Management Council
Jane Rosenblatt Birkhofer	Deputy Commissioner	NJ Department of Environmental Protection
Janet Stewart	Bureau Chief	NJ Department of Environmental Protection
Joe Cimino	Marine Resources Administrator	NJ Department of Environmental Protection
Lindsey Davis	Environmental Scientist	NJ Department of Environmental Protection
Colleen Brust	Research Scientist	NJ Marine Resources Administration
Doug Potts	Fishery Policy Analyst	NOAA Fisheries, Greater Atlantic Regional Office
Douglas Christel	Marine Resources Management Specialist	NOAA Fisheries, Greater Atlantic Regional Office
Morgan Brunbauer	Senior Project Manager - Marine Fisheries	NYSERDA
Sam Asci	Fisheries Manager	Ocean Winds North America
Ross Pearsall	Sr Fisheries Relationship Manager	Ørsted

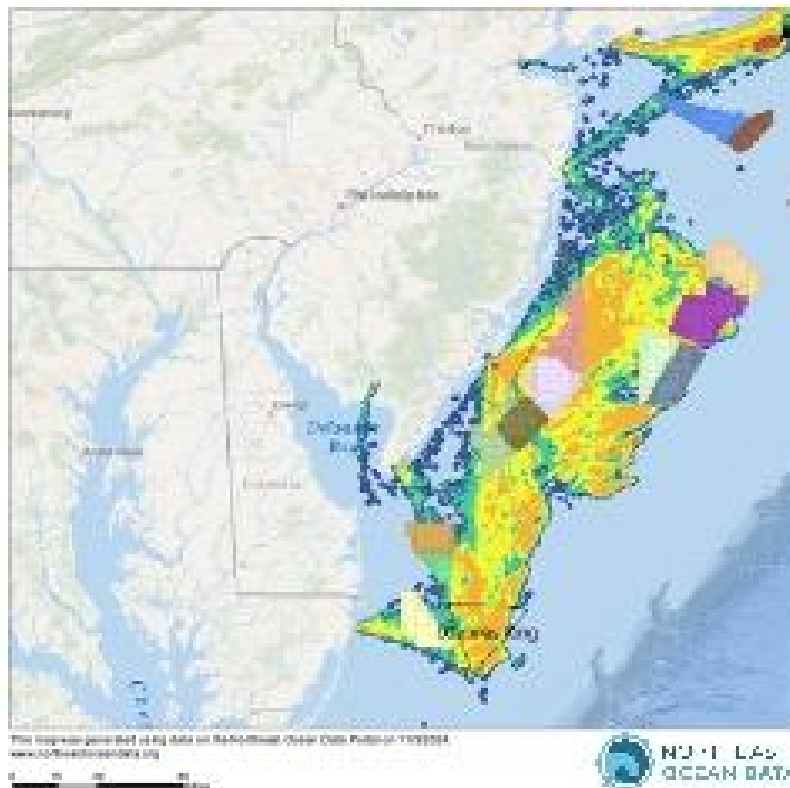
Fara Courtney	Principal	Outer Harbor Consulting / MOCEAN
Lane Johnston	Programs Manager	Responsible Offshore Development Alliance (RODA)
Reneé Reilly	Executive Director	Responsible Offshore Science Alliance (ROSA)
Scot Mackey	Executive Director	Garden State Seafood Association
Daphne Munroe	Professor, Haskin Shellfish Research Lab	Rutgers University
Hails Tanaka	PhD Student, Haskin Shellfish Research Lab	Rutgers University
Josh Kohut	Professor, Center of Ocean Observing Leadership	Rutgers University
LiYuan Byrne	Student, Haskin Shellfish Research Lab	Rutgers University
Michael Acquafredda	Research Scientist, Haskin Shellfish Research Lab	Rutgers University
Sarah Borsetti	Research Scientist, Haskin Shellfish Research Lab	Rutgers University
Sophia Piper	PhD Student, Haskin Shellfish Research Lab	Rutgers University
Deirdre Boelke	Fisheries Manager	RWE, Community Offshore Wind
Joe Myers	Director of Innovation & Sustainability	Sea Watch International, Ltd.
Kris Ohleth	Director	Special Initiative on Offshore Wind (SIOW)
Lisa DeMarsico	Program Manager	Special Initiative on Offshore Wind (SIOW)
Tom Dameron	Government Relations & Fisheries Science Liaison	Surfside Foods, LLC
Sal LaMonica	Vice President of Sales	Surfside Foods, LLC
Nick Morgan	Director, Mitigation Solutions	The Conservation Fund
Emmie Page	New York Fisheries Liaison	Vineyard Offshore
Todd Janeski	VA Fisheries Coordinator	Virginia Commonwealth University

Appendix C: Thought Experiment # 1

Project Scenario for Discussion

Delaware Wind, a new OSW wind company, has won the lease for a triangular area some 22 nautical miles from the Delaware-Maryland border at its closest point to shore. The project is estimated to hold up to 175 turbines (13.5 to 15 MW) generating some 2.5 or more gigawatts of electricity to power more than 600,000 homes. The project is located to the east of the US Wind MarWind project. Turbines are not expected to be visible from shore except in rare high visibility conditions and only then, barely on the horizon. The turbines are expected to be placed approximately in 1x1 mile grid.

The map below shows the approximate boundaries of the project in a black triangle. As can be seen by the VMS surfclam layer, this is also a prime location for surf clam fishing (based on data from 2015 to 2019). NMFS Fishery Footprint economic analysis indicates that this area generates \$14,000,000 million over 16 years, or an average of \$875,000 per year. The fishing ports most affected include Atlantic City and Cape May. While the individual permit holder impacts vary, some permit holders may experience up to a 40% loss in revenue. This does not include the upstream and downstream effects of the loss in landings on shoreside businesses.



There remains contention of how long surf clam fishing will be affected by the project and therefore, the magnitude of impacts. The BOEM fisheries' guidance suggests that clam fishing will be displaced for two years during construction, and five years after, with an increasing return to clamming within 5 years post-construction. Some state fishery agencies and the clamming industry maintain that, given the

turbine spacing, cabling, the patchiness of the resource, and the risks to vessel and crew fishing in the WEA, they will be essentially excluded from this area for the 30-year life of the project.

The clamming industry has approached regulators and the Delaware Wind project team seeking stock enhancement (seeding clams) outside the WEA to replace the surfclam biomass lost to fishing within the project area, thus avoiding or minimizing the impacts of the WEA on the surfclam fishery.

Draft Stock Enhancement Program for this Project Key Components and Details

- **In-Lieu Fee Program Structure**
 - An In-lieu Fee Program will be established as a funding mechanism for Atlantic surfclam mitigation, with contributions from the OSW developer.
- **Program Management and Oversight**
 - The Stock Enhancement Program will be managed by a neutral non-profit organization or State Agency.
 - Oversight will be provided by a governing Board including representatives from the fishing industry, state regulators, NOAA/NMFS, BOEM, and other relevant stakeholders to ensure balanced and transparent decision-making.
- **Duration and Financial Commitment**
 - The program will run for the life of the OSW project, with the developer making annual payments to fund stock enhancement activities.
 - The developer's annual payment obligation will end with each installment, fulfilling their mitigation responsibility for that period.
 - If access to and harvest of surfclams within the Wind Energy Area (WEA) is regained during construction or operations, these yields will be credited back against the developer's annual financial obligation.
- **Impact Assessment and Science-Based Determination**
 - Impacts of the OSW project on Atlantic surfclams will be assessed using a scientifically sound framework developed in collaboration with NOAA/NMFS.
 - Assessment will focus on quantifying effects related to noise, vibration, electromagnetic fields (EMF), and other stressors on surfclam behavior and health, with clear metrics to track impacts on feeding, respiration, body condition, survivorship, and fecundity.
 - All findings must be based on scientifically robust methods and peer-reviewed research, where possible.
- **Survey Mitigation and Monitoring Requirements**
 - NOAA will require regular surveys of the lease area (stratified by each lease) to align with the federal survey cycle. This will ensure continuity in data collection across the Atlantic surfclam habitat.
 - BOEM and NOAA will coordinate monitoring requirements for WEA conditions, with a specific focus on tracking potential biological consequences from increased noise, vibrations, and EMF impacts from Wind Turbine Generators (WTGs).
- **Data Collection and Utilization**
 - Monitoring will include gathering age and size class data to determine the Atlantic surfclam stock levels, measured in bushels, within the WEA that would recruit to the fishery each year until the next lease area survey.
 - These data will ensure accuracy in calculating the surfclam stock at risk due to OSW activities and will prevent double counting of clam stocks across years.
- **Developer Payments Linked to Stock Value**
 - Annual payments by the developer to the Stock Enhancement Program will be based on the average landed value of the biomass that would have otherwise been recruited to the fishery. Payments will be adjusted according to the calculated age and size class to avoid duplicating biomass values in successive years.
- **Implementation of Stock Enhancement Measures**

- The Stock Enhancement Program will allocate funds to purchase surfclam seed and secure services for open-ocean planting of the seed in designated areas.
 - BOEM and NOAA will provide input on siting and operational standards for seed planting to ensure ecological compatibility and to optimize stock enhancement outcomes.
- **Reporting and Accountability**
 - The program will implement a transparent reporting framework with annual progress reports to NOAA/NMFS, State regulators, and BOEM, detailing mitigation measures, survey findings, stock assessment data, and financial expenditures.
 - Independent audits or third-party evaluations will be performed periodically to verify compliance with the agreed mitigation measures and assess the program's efficacy.
- **Contingency Planning**
 - Provisions will be in place for unforeseen ecological or regulatory changes, with contingency funds available for adapting stock enhancement efforts as necessary.
 - If adverse impacts on surfclam populations exceed initial projections, NOAA and BOEM may recommend adjustments to stock enhancement measures or payment obligations, ensuring the program remains responsive to evolving environmental and industry needs.

Appendix D: Thought Experiment # 2

Regional Scenario for Discussion

Overview: Building on the project-specific approach, this session will explore how to develop a scalable, regional framework for stock enhancement and other mitigation measures across multiple OSW projects. We will focus on collaborative administration, ensuring economic feasibility for developers, and aligning regulatory frameworks to avoid disproportionate impacts on the surfclam industry.

Key Discussion Points:

- What are the administrative models that can support a cohesive regional approach?
- How can contributions be structured and incentives provided so that regional stock enhancements are financially neutral, competitively fair across developers and all are encouraged to participate?
- Which specific regulatory authorities need to align to make regional scaling feasible, and how can interagency coordination be improved?

Objectives:

1. Regional Administration of Mitigation Measures:

- Discuss how a regional stock enhancement program could be managed across multiple OSW projects and regions.
- Explore models such as BOEM's new acoustic monitoring approach or pooled regional funds to administer mitigation measures consistently and efficiently.

2. Financial Neutrality and Economic Feasibility for Developers:

- Examine structures to ensure that stock enhancement as a mitigation measure is financially neutral for developers across projects, while still meeting ecological and economic goals.
- Identify mechanisms to standardize developer contributions to mitigation without affecting competitive positioning, such as pooled funds, in-lieu fees, or regionally managed enhancement programs.

3. Reducing Competitive Pressure Among Developers:

- Consider ways to balance responsibilities so that mitigation measures are applied evenly across projects, avoiding a competitive disadvantage for developers while ensuring fair treatment for the fishing industry.
- Propose options for incentivizing voluntary compliance with regional mitigation requirements, potentially through streamlined regulatory processes or shared research resources.

4. Breaking Down Regulatory Silos:

- Identify specific regulatory bodies and authorities (e.g., NOAA, BOEM, state agencies) that would need to collaborate to enable regional scaling of mitigation measures.
- Discuss potential coordination frameworks or interagency agreements to address regulatory overlaps and streamline multi-project approvals.
- Define pathways to share data and monitor mitigation outcomes regionally, with input from industry stakeholders to ensure transparency and accountability.

Appendix E: Regulations & Permitting

Author: Janine Barr, M.S.

Updated: April 16, 2025

E1. Introduction

Experts participating in the Atlantic Surfclam Fisheries Mitigation Workshop 2024 have discussed the potential for a stock enhancement program (SEP) as a mitigation strategy for offshore wind energy impacts on the surfclam fishery. This appendix provides an overview of the regulatory and permitting requirements that may be applicable when planning, implementing, and maintaining a SEP in federal waters of the Mid-Atlantic from Virginia to New York.

This appendix is not an official government document and serves as a starting point for discussions among experts regarding next steps in pursuing a SEP. The regulatory and permitting requirements detailed below were applicable under the Biden Administration and may be subject to change under subsequent Federal and State administrations.

E2. What would a surfclam SEP entail?

Specific surfclam SEP methods are actively being discussed and investigated by experts, as summarized in the main body of this report (*e.g.*, the development of a seeding machine that would “plant” surfclam seed). The following is a summary of what surfclam experts generally expect a surfclam SEP may entail:

- **Method:** Surfclams will be produced in a hatchery, grown in a nursery to a certain size (size threshold not yet established), and then transported offshore and planted at the bottom of the ocean at a density and surface area to support multiple commercial fishermen. For the purposes of this appendix, ports in New Jersey are considered the location where ships would embark from to establish new surfclam bed(s).
- **Location Offshore:** Surfclams will be planted in federal waters outside of that dedicated to offshore wind farms. Surfclams could be planted in areas that currently have wild surfclam populations as well as areas that do not have wild surfclam populations. Surfclams could be planted in areas with or without existing wild populations. Experts agree that successful planting is most likely in areas with suitable benthic conditions and a history of surfclams, though warming waters may expand suitable habitat into previously unoccupied areas (Spencer et al. 2024).
- **Number of Planting Locations:** Surfclams will be planted in at least one location. Experts are open to planting in multiple locations as funding allows.

E3. Is the Surfclam SEP considered aquaculture under Federal law?

Yes. The process of producing surfclams in a hatchery and then releasing those surfclams into the wild for native population enhancement is considered conservation aquaculture under the 2024 National Aquaculture Development Plan (NADP, Prabhaker et al. 2024). The NADP provides national guidance to advance the United States’ interest in advancing aquaculture and is authorized under the National Aquaculture Act of 1980 (NAA, Public Law 96-362. 94 Stat. 1198, 16 U.S.C. 2801, et seq.) and the

National Aquaculture Improvement Act of 1985 (NAIA, Public Law 99-198, 99 Stat. 1641). The NADP defines conservation aquaculture as “the conservation, restoration, and enhancement uses of aquaculture typically pursued or implemented by public agencies. Products of conservation aquaculture include commercial or private sector activities, such as commercial and recreational fishing of species produced in a hatchery and released into the wild,” (Prabhaker et al. 2024).

There are many laws in addition to the NAA and NAIA that inform SEP activities. The National Aquaculture Association counts at least 23 federal Acts of Congress and 15 federal agencies with some regulatory authority over aquaculture operations (ECSGA 2023), but a **surfclam SEP would not have the same physical footprint as traditional marine aquaculture** (*i.e.*, the propagation and rearing of aquatic species using cages, nets, containers, and other structures in the ocean). Therefore, some of the regulations applicable to traditional marine aquaculture would not be as restrictive to SEPs.² Regulatory and permitting requirements are discussed in detail under Sections E4 and E5 of this Appendix.

E4. What are the applicable regulations and permits for a surfclam SEP in the Mid-Atlantic?

Regulations and permitting requirements apply during the planning, implementation, and management of a surfclam SEP, as well as during the life cycle of hatchery-reared surfclams. This includes obtaining approval to: gather environmental data for site suitability analyses (*i.e.*, the collection of baseline data to identify *where* enhanced surfclam beds will be planted); establish a hatchery and nursery (if new hatcheries are developed) transport surfclam seed beyond New Jersey borders if needed; plant, harvest, and manage the surfclams in the ocean; as well as the long-term monitoring of the sites. Below is an overview of the applicable regulations and relevant permits for a surfclam SEP.

1. **Offshore Wind Construction and Operations Plan (COP):** A COP describes the plans for the construction, operations, and decommissioning a commercial windfarm lease which the Bureau of Ocean Energy Management (BOEM) is required to review in concert with environmental reviews and consultations including the National Environmental Policy Act on other federal statutes (USDOJ 2023). Regulations describe the requirements for a COP at Subpart F (30 C.F.R. §§ 585.620 – 585.628) while the NOI Checklist (available at USDOJ 2023) outlines the recommended process for COP submissions. The NOI checklist identifies a COP: must have a project description which includes “all connected actions under NEPA” and may have a Project Design Envelope (PDE) which includes a reasonable range of design parameters for the construction, operation, and decommissioning of a wind farm (USDOJ 2018). The offshore wind industry is slated to pay for some of the SEP effort and it is therefore reasonable for the areas being considered for SEP to be included in the COP process, especially given the “COP provides the basis for BOEM’s analysis of the environmental and socioeconomic effects,” (USDOJ 2018) and that BOEM encourages lessees to identify layout and design options [...] that may avoid or minimize [...] potential impacts to *biological* and cultural resources,” (*emphasis added*, USDOJ 2023). Experts are encouraged to engage with lessees and BOEM regarding if/how to incorporate SEP areas into the COP process. In short, a seeding program could be a mitigation alternative in a COP submittal and subsequent environmental review. An overview of permitting and consultation requirements for offshore wind, including how the COP fits into offshore wind

² A comprehensive overview of offshore aquaculture regulations is available at U.S. Offshore Aquaculture Regulation and Development (CRS 2019).

energy project timelines, is available through the New York State Energy Research and Development Authority (NYSERDA 2025).

2. **Magnuson-Stevens Fishery Conservation and Management Act (MSA):** The MSA is the primary law that governs marine fisheries management in Federal waters. The term “Federal waters” is defined by the MSA as starting three nautical miles from the coastline (*i.e.*, the inner boundary which can vary state by state (NOAA 2012)) and extending 200 nautical miles from the inner boundary: this area is called the exclusive economic zone or EEZ. The MSA mandated the creation of eight Fishery Management Councils, including the Mid-Atlantic Fishery Management Council (MAFMC), and delegated authority for each council to manage fisheries within its respective EEZ regions via Fishery Management Plans (FMP) which are implemented by NOAA Fisheries (or NMFS, NOAA 2016). The MAFMC’s Surf Clam and Ocean Quahog (SCOQ) Fishery Management Plan (FMP) was first codified into federal regulations in 1977 (CFR 1997; 50 CFR part 648 subpart E) and has since been amended twenty times (MAFMC 2024).

Each FMP assigns essential fish habitat (EFH) to the managed species consistent with national standards (NOAA 2024j). The surfclam EFH covers a wide area within the Mid-Atlantic EEZ. Federal action agencies are required to consult with NMFS on any action authorized, funded, or undertaken that may adversely affect EFH. The MAFMC’s 13th Amendment to the SCOQ FMP found effects of clam dredging within surfclam EFH were short-term and minimal such that no changes to fishing gear requirements were necessary (CFR 2003).³ While it may be presumed that seeding has even less impact and thus will receive a similar review as dredging, no determination has been made regarding the impacts surfclam planting may have on the benthic environment of wild surfclam fishery. SCOQ FMP may need to be amended to reflect surfclam management strategy changes because of a SEP and the impact, or lack thereof, surfclam planting may have on the EFH. The updated SCOQ FMP would be effective once it is codified in the federal regulations.

MSA also allows for area closures within the surfclam fishing grounds at 600.815(a)(2)(iv)(B). Specifically, the MSA allows an FMP to manage adverse effects from fishing including “time/area closures [which include] closing areas to all fishing or specific equipment types during spawning,

³ Experts held a Workshop on the Effects of Fishing Gear on Marine Habitats off the Northeastern United States (hereafter “workshop”) in October 2001. Based on the most updated science, the workshop participants found that (1) surfclam harvest exists in high energy, sandy (HES) benthic environments, (2) hydraulic clam dredges do potentially cause large, localized impacts to the biota and physical structure of the benthic environment, (3) that the recovery time for the benthic environment to hydraulic clam dredges is relatively short such that the habitat and biota would recover within hours to months. This recovery time is consistent with EFH Final Rule’s (50 CFR Part 600) definition of “temporary impacts.” Additionally, workshop participants found hydraulic clam dredging impacts 100 square nautical miles of the 54,900 square nautical miles of HES benthic habitat annually which is a small fraction of the EFH for non-surfclam species impacted by the surfclam fishery. This small impacted area is consistent with EFH Final Rule’s definition of “minimal impacts.” Workshop participants and MAFMC found the temporary impacts and minimal impacts incurred by surfclam hydraulic dredging did not warrant a change in surfclam harvest methodology. (MAFMC 2003) The impacts cited in the 13th Amendment were based on a pre-published report by Stevenson et al. which would later be published in 2004 (Stevenson et al. 2004). A later report written for the MAFMC found the impact of hydraulic clam dredges “is not as great as bottom trawls or scallop dredges, which are used much more commonly and have a greater total footprint of impact,” (2015).

migration, foraging, and nursery activities and designating zones for use as marine protected areas to limit adverse effects of fishing practices on certain vulnerable or rare areas/species/life stages, such as those areas designated as habitat areas of particular concern.” There are currently four closed areas within the surfclam and ocean quahog fishery (NOAA 2025a), but these areas are closed due to environmental degradation (50 CFR 648.76). Closed areas have been used elsewhere as proactive measures to protect key habitats and species (DiCosimo 1998) and as a reactive measure to protect species that are close to being over harvested (e.g., scallop fishery, Ford et al. 2024). All closures must be approved through rules and/or amendments to the corresponding FMP (DiCosimo 1998). If the seeding program does not call for closures enacted by NMFS and the Council under the FMP, then seeding may not trigger any changes to the FMP.

3. **Endangered Species Act (ESA)** – The ESA provides a framework to conserve and protect endangered and threatened species and their habitats. Surfclams are not a listed species under the ESA, but the EEZ of the Mid-Atlantic has between eleven and sixteen Critical Habitat designations (Critical Habitat locations provided via the [ESA Section 7 Mapper](#)). Actions that occur within Critical Habitat for ESA-listed species triggers a Section 7 ESA Consultation Process (NOAA 2024k). The surfclam SEP team will need to apply for a “no effect” determination to demonstrate Section 7 Consultation is not necessary by following protocols outlined by NMFS to prove no effect on ESA listed species ([available here](#)). Separate requirements apply to proving no effect on ESA listed species with wide ranges (e.g., turtles, [available here](#)). Figure E1 provides a snapshot of Critical Habitat within the surfclams natural range (modified from [ESA Section 7 Mapper](#)). Additional resources for ESA consultation are available on NMFS’s Section 7 Consultations in the Greater Atlantic Region [website here](#). Tribal governments are also consulted at this stage for actions that impact ESA-listed species and EFH (NOAA 2025b).

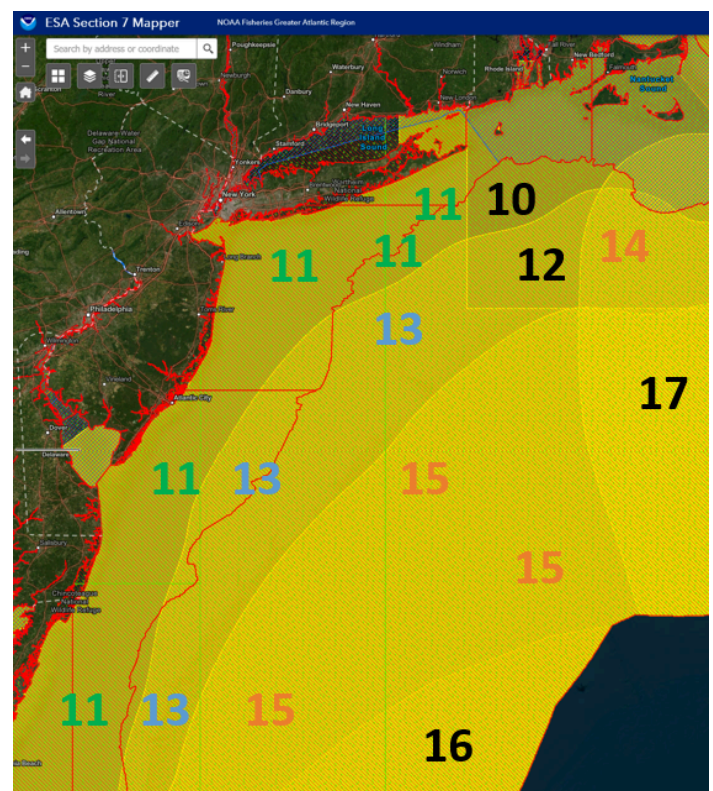


Figure E1. Quantification of the number of ESA critical habitats within the surfclams’ Mid-Atlantic range. (modified from [ESA Section 7 Mapper](#)).

4. **Marine Mammal Protection Act (MMPA)** – The MMPA requires NOAA Fisheries to publish an annual list of commercial fisheries and classify each fishery based on whether it has frequent (Category I), occasional (Category II), or remote likelihood (Category III) of incidental mortality and serious injury of marine mammals. The

surfclam fishery is classified as a Category 3 fishery (as designated by the authoritative 2025 List of Fisheries [available here](#) (NMFS 2025). Therefore, under the MMPA surfclam fishermen need to report any incidental death or injury of marine mammal(s) during commercial fishing operations, but surfclam fishermen do not need to go through requirements for Category I or II fisheries (NMFS 2025).

5. **National Environmental Policy Act (NEPA)** – The NEPA requires that Federal agencies include environmental considerations in their decision-making (NOAA 2017). One step in the NEPA process is to determine whether the proposed action is likely to have “significant” effects that require an environmental impact statement (EIS) (CRS 2023). Prior to preparing an EIS, the respective Federal agency will conduct an Environmental Assessment (EA). An EA results in the Federal agency either preparing an EIS or issuing a Finding of No Significant Impact (FONSI) to conclude the NEPA process. Many agency activities may be subject to a **categorical exclusion**, which refers to a type of activity undertaken by an agency that “normally does not significantly affect the quality of the human environment.” If the respective Federal agency determines that a Categorical Exclusion applies, NEPA does not require an EA or EIS. NOAA is the lead agency for NEPA review for aquaculture projects in the EEZ (NOAA 2025I). The NEPA process would begin when NOAA receives a permit related to the surfclam SEP and NOAA will decide if the action described within the permit qualifies for a Categorical Exclusion (CEQ 2007).
6. **Rivers and Harbors Act (RHA)** – Section 10 of the RHA renders decisions for aquaculture activities affecting navigable waters of the United States. Specifically work conducted⁴ in the navigable waters of the United States (including the EEZ) that affects the condition of such waters is considered unlawful unless the work has been authorized by the United States Army Corps of Engineers (USACE) through a permit (NMFS 2022). The surfclam SEP would require a Nationwide Permit 48 for Commercial Shellfish Mariculture Activities. A Nationwide Permit (NWP) with the USACE is considered a General Permit which is reissued every five years: as such, authorizations for activities under a NWP is called a “verification” as opposed to a “permit.” Additional details regarding NWP 48 are available on the USACE [website here](#) (USACE 2025).
7. **Coastal Barrier Resources Act (CBRA)** – The CBRA established a Coastal Barrier Resources System (CBRS) where designated coastal areas are restricted from receiving Federal funding and funding assistance to encourage the conservation of land in storm prone areas (FWS 2025). Any new structures built for a surfclam hatchery or nursery are therefore encouraged to be located outside of a CBRS area which are shown in [these maps](#) with [additional areas](#) added to the CBRS in 2024.
8. **National Aquaculture Act (NAA)** – The NAA authorized the creation of various plans for aquaculture advancement (including the Aquaculture Development Plan discussed in Section E3 of this Appendix.

⁴ A codified definition of work conducted could not be found. Determining whether an SEP is considered “work” under the authority of the RHA will require additional investigation.

9. **National Marine Sanctuary Act (NMSA)** – The NMSA authorizes the Secretary of Commerce to designate and protect areas of the marine environment with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, archeological, educational or esthetic qualities as national marine sanctuaries. Each sanctuary is managed by management plans that have minimal protections required nationally as well as any protections deemed appropriate at each site. There are no National Marine Sanctuaries within the mid-Atlantic. However, in 2022 Hudson Canyon off the coast of Long Island became a proposed National Marine Sanctuary. The closest sanctuaries to NJ include Monitor Sanctuary near Cape Hatteras, North Carolina and Stellwagen Bank to the east of Boston, and MA just north of Cape Cod, MA. (NMS 2025)
10. **Clean Water Act (CWA)** – The CWA protects the chemical, physical, and biological integrity of the nation’s waters by regulating the discharge of pollutants into aquatic and marine environments through the U.S. Environmental Protection Agency (EPA). The CWA regulates discharge by requiring entities to obtain National Pollutant Discharge Elimination System (NPDES) permit prior to discharging pollutants into waterways (EPA 2025a) including the discharge of dredged or fill material (NMFS 2022). It is unlikely that a NPDES permit would be required for the SEP as “shellfish [...] operations that add **no substances or materials** to waters of the U.S. at any time during the operations, may not be required to obtain NPDES permit coverage,” (NMFS 2022). Experts encourage consulting the relevant permitting authority to confirm this point. The EPA has delegated authority to issue NPDES permits in New Jersey to the New Jersey Department of Environmental Protection. As such the relevant contacts for NJDEP can be found [here](#) (NJDEP 2025) as well as EPA Region 2 [here](#) (EPA 2025b).
11. **Miscellaneous** – Permits and requirements like vessel operator permits, Exemptive Fishing Permit, Letter of Acknowledgement, and compliance with the National Shellfish Sanitation Program are not discussed in the list above for brevity but are included in the steps highlighted in Section E5 below.

E5. What decisions will impact what regulations and permits in Section E4 are applicable for a surfclam SEP in the Mid-Atlantic?

Where, when, and how SEP leaders decide to create a SEP will influence which regulations and permits are applicable. Moreover, applicable regulations and permits will be (1) determined by State and Federal experts and (2) influenced by when and how SEP leaders coordinate with offshore wind’s COP-approval process. Below is a summary of the specific steps or decision points in the planning, implementation, and maintenance of a SEP that will trigger certain regulations and permitting requirements highlighted above in Section E4.

To navigate through the nine steps below, answer each question sequentially: each question provides information relevant to each possible answer to help readers navigate the SEP regulatory and permitting requirements (*e.g.*, if the answer to question 4a’s “does the surfclam hatchery avoid CBRA areas” is “no” the list points readers to Section E4.7 if this appendix to give context for why the answer to question 4a should be “yes.”). Additional guidance regarding the applicable regulations and permits for a surfclam

SEP can be found by contacting NOAA's New England/Mid-Atlantic Regional Aquaculture Coordinator ([contact information](#)).

1. What entity is funding this project?

- a. **Federal** – If a federal agency funds the SEP, the federal agency is responsible for notifying NOAA Fisheries and other responsible agencies as soon as possible to ensure permitting and approvals are granted in a timely manner.
- b. **Non-Federal** – If a non-federal agency funds the SEP, the project team is responsible for reaching out to NOAA Fisheries as soon as possible to ensure permitting and approvals are granted in a timely manner.

2. Where is the surfclam hatchery?

- a. Does it avoid CBRA areas?
 - i. Yes – Proceed to Step 2b.
 - ii. No – See E4.7 above.
- b. Is the hatchery in NJ?
 - i. Yes – Proceed to Step 3
 - ii. No – The SEP will rely on seed transported from other states. When shellfish seed is transported between state borders and the seed is planted in state waters growers need to get permission from NJDEP by submitting an Application for [Permission to Import Shellfish from the Marine Resources Administration's Bureau of Marine Habitat and Shellfisheries](#) (instructions for completing the form are [here](#)). There is no similar requirement for planting seed in Federal waters, but the [Regional Shellfish Seed Biosecurity Program](#) provides best practices to lower the risk of disease in shellfish seed (RSSBP 2025). Additionally, aquaculture harvesters are required to produce shellfish that are safe for human consumption consistent with the National Shellfish Sanitation Program (NSSP). NSSP requires harvesters to obtain the appropriate permissions, an operational plan, and US Food and Drug Administration review to achieve this goal of safe seafood consumption for humans (FDA 2023, page 67).

3. What boats will be used to plant and monitor the surfclams?

- a. Research Vessel – should obtain a Letter of Acknowledgement from the NOAA Regional Administrator ([directions here](#)).
- b. Fishing Vessel –
 - i. The most likely vessel is one or more already permitted vessels for clam harvesting. Fishermen need to be compliant with State and Federal fishing permitting. In terms of federal requirements, fishermen will need a [Greater Atlantic Region Vessel Operator Permit](#). An exhaustive list of Federal permitting information for vessels can be [found here](#), but information regarding vessel and dealer permitting is [available here](#) and includes the Initial Vessel Permit and Vessel Operator Permit.
 - ii. Please also refer to Step 4 below.

4. Would an Exempted Fishing Permit (EFP) be needed for SEP work?

- a. An Exempted Fishing Permit (EFP) is a permit issued by the Greater Atlantic Regional Fisheries Office that authorizes a fishing vessel to conduct fishing activities on fishing grounds that would otherwise be prohibited under the regulations at 50 CFR part 648 or part 697. EFPs are generally issued to allow fishing vessels to support fisheries related research and can include sampling, collecting, observing, or surveying fishery resources in the EEZ. If the vessel is not harvesting any existing surfclams (just seeding), it is not as clear how an EFP would apply since they generally assume some kind of harvesting of species. Vessels are also encouraged to obtain a Letter of Acknowledgement (LOA) to prevent interruptions in work related to fisheries research. The process of applying for a EFP and LOA can only begin after the specific tasks that a vessel would conduct under an EFP and LOA have been identified (see Step 9 below), but engaging fishermen early and often can minimize permitting delays. Details regarding this process are available [here](#) (NMFS 2025b). An EFP could be needed or useful for a pilot project defined as research, but would not likely be a permanent vehicle for ongoing seeding.

5. Do baseline data need to be collected to identify the best location(s) for surfclam bed(s)?

- a. Yes – include this in permitting requirements in Step 7 below. (If you survey the benthic environment in pursuit of the best enhancement site, follow the data collection and sharing protocols established by the Interagency Working Group on Ocean and Coastal Mapping [available here](#). These guidelines apply to bathymetric data and imagery data.)
- b. No – Move to Step 6.

6. Will surfclams be transported among SEP beds as a form of rotational management?

Rotational management, for the purposes of this Appendix, refers to a strategy where specific areas of the SEP are opened and closed to harvesting on a planned, rotating basis. The goal is to allow for the shellfish populations in closed areas to recover or grow over time, while harvesting is allowed in other areas, thereby maintaining a sustainable yield over time.

- a. Yes – reflect this plan in Step 7 below.
- b. No – reflect this plan in Step 7 below.

7. Has the project team obtained the proper Federal Approval for the ideal surfclam bed locations(s)?

- a. Have restricted areas been avoided? These areas include and likely need to be avoided to proceed further.
 - i. NMFS Regulated Areas in the Northeast and Mid-Atlantic that are closed to surfclam fishing ([map here](#), [additional detailed maps here](#)).
 - ii. Marine Protected Areas (none in the area, [map here](#)).
 - iii. Historic Monuments (none in the area, [map here](#)).
 - iv. Areas that have been leased for oil and gas production or wind farms
- b. Have environmentally sensitive areas been avoided?
 - i. Essential Fish Habitat under FMPs authorized by MSA
 - 1. Yes – (not possible, see [Essential Fish Habitat Mapping Tool](#))

2. No – Contact MAMFC and review the Essential Fish Habitat Consultation protocols. Typically review of EFH is combined with existing environmental review procedures including NEPA and ESA.
 - ii. Critical Habitat as defined by ESA?
 1. Yes – (not possible, see [ESA Section 7 Mapper](#))
 2. No – Pursue the “no effect” determination as described in Section E4.3.
- 8. Has the SEP been categorized as having no significant impact on the environment?**
- a. Yes – move on to Step 9.
 - b. No – Apply for Nationwide Permit 48 for Commercial Shellfish Mariculture Activities per Section E4.6 above.
- 9. Have fishermen applied for Exempted Fishing Permits?**
- a. Yes – Begin work to establish the SEP (and renew permits as approvals when necessary). EFPs are not necessary for fishermen to harvest surfclams from the SEP.
 - b. No – EFP can be submitted online through [NOAA’s Fish Online](#) Portal. A description of EFPs is available on NOAA’s website [here](#).

E6. Are there other existing SEPs in the United States?

Yes, there are several instances of similar SEP operations which are listed below. SEP examples are from the East and West coasts, but the only SEP operations in federal waters are located in the Pacific Ocean. Indeed, the MAFMC reported there are no offshore aquaculture activities occurring in Federal waters off the Mid-Atlantic (MAFMC 2022). No existing SEPs align exactly with general methods outlined above in E2 and therefore a surfclam SEP will have unique regulatory and permitting requirements.

1. Salmon in the Pacific Northwest (Federal Waters):

- a. **Background:** Federal agencies have been working with states and tribes in the Pacific Northwest since the 1970s to enhance native salmon populations (WDFW 2024). Most salmon in the Pacific Northwest are produced from hatcheries (NOAA 2024a, NOAA 2024b) which are used to help support wild populations and provide fish for harvest in the wild. Several salmon populations in the Pacific Northwest are listed under the Endangered Species Act (ESA, NOAA 2024c) and rely on hatcheries, and other ongoing management strategies (*e.g.*, those described in (NOAA 2020)), to make progress toward reestablishing self-sustaining populations. States manage salmon populations that are harvested in state waters, while chinook and coho salmon (as well as pink salmon near the Canadian border) that are harvested in Federal waters are managed by the Pacific Fishery Management Council’s Pacific Coast Salmon Fishery Management Plan (PCSFMP, NOAA 2024d).
- b. **Permitting:** General permitting requirements for this fishery are available for review on NOAA’s permitting website (NOAA 2024h) and the 2022 Federal Regulations for West Coast Salmon Fisheries (NOAA 2022).
- c. **Conclusion:** The PCSFMP serves as an example for how the surfclam FMP could be updated to include surfclam “natural and hatchery” surfclams in the EEZ. However, the

PCSFMP contains additional language that would not be included in the surfclam FMP as the former fishery consists of salmon species listed under the ESA.

2. Alaska Salmon (Federal Waters):

- a. **Background:** The PCSFMP is separate from the Alaska Salmon Fisheries Management Plan (ASFMP, NOAA 2024e) which was designed to protect wild species as opposed to the PCSFMP which was designed to “mitigate habitat loss [and] supplement weak stocks,” (Evenson et al. 2018). The ASFMP prioritizes coordination and cooperation within regions including, but not limited to, regional comprehensive salmon plans which supplement the ASFMP (Evenson et al. 2018).
- b. **Permitting:** In addition to relevant permitting requirements discussed at Sections E4 and E5, individuals associated with the federal Alaskan Salmon fishery are required to complete specific permits based on their fishing ground location including permits related to bycatch and permits to fish in certain areas (NOAA 2024f). For example, a salmon federal fisheries permit, a salmon federal processor permit, and a registered salmon receiver permit depending on their role in the fishery (NOAA 2024g).
- c. **Conclusion:** The ASFMP serves as an example for how the surfclam FMP could be updated to include proactive management measures for surfclams in the EEZ. However, the ASFMP contains additional language that would not be included in the surfclam FMP as the former fishery consists of salmon species listed under the ESA.

3. Shellfish Enhancement and Restoration in the Pacific Northwest (State Waters):

- a. **Background:** Several efforts have been initiated in the Pacific Northwest in Washington State waters to introduce hatchery reared shellfish (*i.e.*, Olympia oysters, Pinto abalone, and White abalone) into the wild to restore native populations of oysters and abalone (NOAA 2024i). The Pinto abalone was listed on the Endangered Species List in Washington in 2019 (Duckworth 2024). Additional information regarding each project is available at:
 - i. Sea Grant Washington, How to Save the Pinto Abalone (Duckworth 2024)
 - ii. Washington Department of Fish and Wildlife Plan for Rebuilding Olympia Oyster Populations in Puget Sound with a Historical and Contemporary Overview (Blake and Bradbury 2011).
- b. **Permitting:** Requirements were not explored as these projects occurred in state waters.
- c. **Conclusion:** It is possible to use shellfish in conservation aquaculture initiatives in state waters.

4. Shellfish Enhancement in the Northeast (State Waters):

- a. **Background:** Massachusetts allows shellfish planting in state waters and has developed robust guidelines regarding the requirements and options available to individuals interested in planting shellfish (Hickey et al. 2015).
- b. **Permitting:** The [MA Guidance Document](#) (Hickey et al. 2015) outlines the general permit requirements for shellfish planting in state waters including: a Special Project Permit, a municipal site license, pathologist testing requirements, and merchant permits if individuals are interested in selling the shellfish.

- c. Conclusion:** While Massachusetts shellfish planting practices are specific to State law, this guidance could serve as a template for the considerations and types of applicable state laws that may apply to surfclam SEPs in state waters.

E7. How do applicable regulations and permits vary among states in the Mid-Atlantic?

This project will largely occur in Federal waters. As such, the list below represents a sampling of permits that would need to be awarded on a State-specific basis which are addressed in greater detail in Section E4 and E5 above. If the new surfclam bed were established in State waters, then the permitting requirements would change considerably.

- Any permits associated with the transport of surfclam seed across state borders.
- Any permits associated with a vessel's home port to allow them to participate in this SEP (see Steps 3, 4, and 9 in Section E5).

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Appendix F: Glossary

ACP	American Clean Power Association
Aquaculture	The farming of aquatic organisms, such as fish, shellfish, and plants, in controlled environments for commercial purposes.
ASFMC	Atlantic States Marine Fisheries Commission
Atlantic Surfclam	A species of clam (<i>Spisula solidissima</i>) found along the eastern U.S. coastline, harvested for commercial purposes.
Biomass	The total quantity or mass of surfclam population within a specific area. Important for determining responsibilities and assessing environmental impacts.
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
CBA	Community Benefit Agreements: Agreements where developers provide benefits to local communities to offset potential project impacts.
CBI	Consensus Building Institute
COP	Construction and Operations Plan
CPUE	Catch Per Unit Effort: A metric used to assess the abundance of fish stocks by measuring the quantity caught relative to the effort expended.
CZMA	Coastal Zone Management Act
East Coast States	The eleven states of ME, NH, MA, RI, CT, NY, NJ, DE, MD, VA, and NC
EE	Environmental impacts
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
Federal Survey	Research surveys conducted by federal agencies to monitor and assess fishery stocks and other environmental parameters.
GLD	Geographic Location Description
Hatchery	A facility where fish or shellfish are bred and raised to enhance wild populations.
IOOS	Integrated Ocean Observing System
MAFMC	Mid-Atlantic Fishery Management Council
MARCO	Mid-Atlantic Regional Council on the Ocean
Mitigation	Actions taken to reduce or compensate for adverse impacts caused by development.
MOCEAN	Mission being the OCEAN
MSA	Magnuson-Stevens Act: A federal law governing fisheries management, including consultations on projects impacting fisheries.
NEPA	National Environmental Policy Act
NERPA	Northeast Regional Planning Body

NFWF	National Fish and Wildlife Foundation
NGO	Non-Governmental/Non-profit Organization
NJDEP	New Jersey Department of Environmental Protection
NJ RMI	New Jersey Regional Monitoring Initiative
NOAA	National Oceanic and Atmospheric Administration
NROC	Northeast Regional Ocean Council
NSF	National Science Foundation
Nursery	An area or facility where juvenile fish or shellfish are raised.
NYSERDA	New York State Energy Research and Development Authority
OCS	Outer Continental Shelf
Offset	A compensatory action taken to balance out negative impacts by providing equivalent benefits elsewhere.
OSW	Offshore Wind
PPA	Power Purchase Agreement
Preconstruction Surveys	Assessments conducted before construction begins to establish baseline environmental conditions.
RFA	Regional Fund Administrator: An entity responsible for overseeing Atlantic Coast fisheries compensatory mitigation.
RFI	Request for Information
ROD	Record of Decision: A formal document outlining the final decision and actions after an EIS process.
RODA	Responsible Offshore Development Alliance
ROSA	Responsible Offshore Science Alliance
SCMFIS	Science Center for Marine Fisheries
Seeding	The process of releasing hatchery raised shellfish into the ocean
Seeding Technology	Techniques and tools used to plant juvenile clams in the ocean.
SIOW	Special Initiative on Offshore Wind
Stock Enhancement	The process of increasing fishery populations by breeding, raising, and releasing organisms into their natural habitats.
Surfclam Fisheries	Commercial operations that harvest surfclams for economic purposes.
True-up payments	Adjustments made post-project to ensure compensation reflects actual impacts.
Vertical Lines	Lines used in fishing operations
WEA	Wind Energy Area - Designated offshore regions where wind energy projects are permitted and developed.