LENFEST OCEAN PROGRAM

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MARINE BIODIVERSITY DIALOGUES II
TASK FORCE TO INFORM MARINE BIODIVERSITY MANAGEMENT IN U.S. MARINE ECOSYSTEMS

In partnership with the National Marine Sanctuaries Foundation and Angell Foundation, the Lenfest Ocean Program is supporting Marine Biodiversity Dialogues II, an expert task force led by Dr. J. Emmett Duffy, Smithsonian Institution, Gabrielle Canonico, U.S. Integrated Ocean Observing System and the U.S. Marine Biodiversity Observation Network, NOAA, and Dr. Steven Scyphers, University of South Alabama, to explore and synthesize how diverse marine species and habitats in U.S. waters work together to support ecosystem function and resilience.

Changes in marine biodiversity can cause shifts in ecosystem health and resilience, potentially reducing the valuable resources it provides to U.S. coastal communities. This new task force aims to help managers more effectively conserve species and habitats by improving decision support for spatial planning and other management measures. It builds off Marine Biodiversity Dialogues I, an initial task force that developed and applied a comprehensive biodiversity assessment framework in U.S. waters.

MANAGING MARINE BIODIVERSITY IN THE U.S.

Several mandates exist in the U.S. to conserve or recover marine resources (e.g., Magnuson-Stevens Fishery Conservation Act, Marine Mammal Protection Act, Endangered Species Act), but there is no explicit mandate to protect the diversity of species and habitats. This makes it challenging for managers to define strategies for consistent spatial protection that will conserve marine habitats and by extension the important products and ecosystem services that benefit people. Effective management of these seascapes requires information about the varieties and abundances of species and habitats, and how they interact in time and space to affect the broader ecosystem's structure and resilience to ocean changes and perturbations.

In the initial phase—Marine Biodiversity Dialogues Task Force I—teams of experts created an assessment framework to map the location of marine habitats and species both inside and outside U.S. protected areas. Unsurprisingly, U.S. marine protected areas at a national scale fail to meet criteria for an effective network. But from a regional perspective, they vary widely in success. This means managers, stakeholders and others have the opportunity to build on what we have by strategically evaluating places where protections are neither adequately sized nor well-connected and enhancing existing protections or adding new ones. This second task force aims to help communities operationalize such findings by identifying the key components of marine biodiversity and how they buttress ecosystem health.

FOSTERING USABILITY THROUGH ENGAGED RESEARCH

Marine biodiversity can serve various roles in the well-being of ecosystems and coastal communities, and thus means different things to many people. The task force will be comprised of individuals across various backgrounds, expertise, and relationships to marine management and resource use. Stepwise, they will:

1. **Identify what information about marine biodiversity is needed to sustain resilient marine ecosystems**. The task force will start by establishing a shared language for working concepts of biodiversity, ecosystem function, and resilience that are relevant to existing U.S. marine conservation mandates. They will then identify regions of priority that can be used as case studies in the project.

2. **Engage resource users, managers, and others to build conceptual models that capture how biodiversity influences ecosystem resilience**. The task force will engage stakeholders and managers in each case study to understand how they interpret relationships between marine biodiversity (e.g., habitats and species interactions) and ecosystem health. Using collaborative modeling, researchers will work with individuals to draw conceptual maps of stakeholder groups and simulate potential effects of different policy options. The task force will then explore the various scenarios with the goal of selecting components of biodiversity that influence ecosystem function and other outcomes prioritized by stakeholders.

3. **Integrate conceptual models with additional scientific information to understand the role of biodiversity in resilient ecosystems**. For each case study, they will combine outputs from the conceptual models with evidence from the scientific literature to estimate the strength of biodiversity in driving ecosystem structure and function. Their aim will be to determine scenarios and thresholds that if crossed would significantly alter ecosystem health.

4. **Inform decision support to better manage biodiversity**. The task force will create decision support resources that define indicators of marine biodiversity and reference points that managers can use to target the key species and habitats that sustain the health and productivity of marine ecosystems.

Through such engaged research, the task force hopes to help communities strategically evaluate their own areas and explore ways to strengthen spatial protections based on their unique needs and values. Further, the results have the potential to inform management measures across jurisdictions—from fisheries to protected species, for example—that conserves marine biodiversity and fosters resilience.

Task Force Co-Chairs

- J. Emmett Duffy, Tennenbaum Marine Observatories Network and MarineGEO Program, Smithsonian Institution
- Gabrielle Canonico, U.S. Integrated Ocean Observing System and the U.S. Marine Biodiversity Observation Network, NOAA
- Steven Scyphers, University of South Alabama and Dauphin Island Sea Lab

CONTACT

For questions, please contact Emily Knight, Lenfest Ocean Program, at eknight@lenfestocean.org. To learn more about this research and stay up to date on our latest projects, follow us on Twitter @lenfestocean or sign up for our newsletter at www.lenfestocean.org.

901 E Street NW,
Washington DC 20004

E info@lenfestocean.org
P 202.540.6389

lenfestocean.org

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