



National Marine Sanctuaries Climate Science and Monitoring Needs

Objective

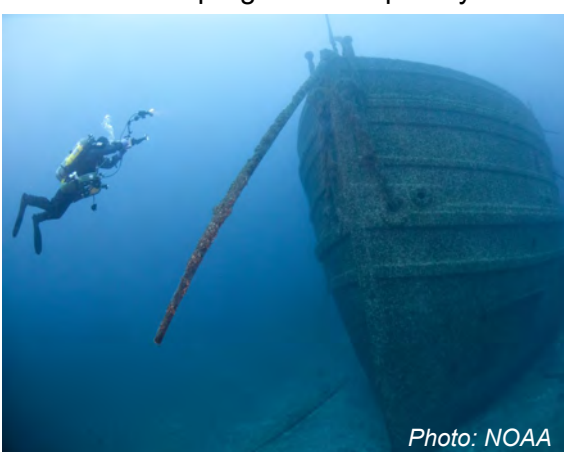
In the coming year, NOAA's Office of National Marine Sanctuaries (ONMS) will work with partners and sanctuaries across the National Marine Sanctuary System (NMSS) to identify key climate parameters to be monitored system-wide, analyze current monitoring data and infrastructure to identify gaps in both geography and parameters monitored, and develop a framework to guide the development of a NMSS-wide climate monitoring network that will provide critical information that sanctuaries and the nation need to address climate change impacts. To achieve the goal of an integrated, system-wide climate monitoring network, the NMSS must continue and enhance ongoing sanctuary climate science and work with partners to acquire, analyze, and interpret additional climate-related information.

Addressing a National Priority, and Local Need

The National Marine Sanctuary System is a network of federal marine protected areas responsible for the stewardship of a vast array of marine and Great Lakes resources significant to the American people (16 U.S.C. 1431). One goal of national marine sanctuaries is "to support, promote, and coordinate scientific research on, and long-term monitoring of, the resources of these marine areas" (16 USC 1431 *et seq.*). Sanctuary resources are increasingly affected by the impacts of climate change, which are accelerating and intensifying globally, nationally, and locally.

To successfully implement its conservation mission in light of the climate crisis, the NMSS must better understand impacts of climate change on ecosystems and the people that are connected to them. This will require monitoring changes to sanctuary resources, changes to ecosystem services provided by sanctuaries, and measurable indicators of climate change. Successful, efficient, and comprehensive climate monitoring in sanctuaries will require both NOAA and partner activities.

The need to address the climate crisis has been recognized at the highest levels of government¹ and identified as a programmatic priority for ONMS.² The broad diversity of ecosystems, geographies, and



climates represented across the NMSS serve as ideal locations for the long-term monitoring and science necessary to understand environmental change and guide management decisions. In fact, partners have noted that "as permanent, place-based protected areas, sanctuaries can meet the growing needs for observations of changes to the environment ... and the production of the long-term, high quality datasets necessary to parameterize advanced climate and ecological models and forecasts."³ Through the unique combination of diverse ecosystems united by integrated management and monitoring, the NMSS is well positioned to contribute to the national and global discussion of climate change monitoring and action.



Photo: NOAA

To answer this call, the sanctuary system must work with partners to select and monitor appropriate indicators to understand how conditions and ecosystem services are changing within sanctuaries. This need is formalized in Strategy 1.6 of the [ONMS Climate Resilience Plan 2021-2023](#) which charges ONMS to “promote, establish, and fund [national marine sanctuary] sites as “climate sentinels” where critical research, observation, outreach, and management can be conducted with partners and tracked over time.”

Sentinels for a Changing Ocean

Sanctuaries are ideally positioned to act as “climate sentinels.” Beyond monitoring, sanctuaries are places where science, restoration, education, awareness, public engagement, and management align to create change and address the most pressing challenges to

ocean and Great Lakes management. As living laboratories, sanctuaries are well positioned to find and test solutions to climate impacts at local and regional scales. The role of sanctuary sites as “climate sentinels” cannot be achieved without strong partnerships. The permanently protected status and convening role of sanctuaries make them ideal locations for partner organizations inside and outside of NOAA to focus climate monitoring infrastructure and research. Through focused partnerships and a dedication to creating a system of climate sentinel sites, the NMSS has the potential to provide an integrated long-term monitoring network with the capacity to support ocean and Great Lakes climate research and management needs, similar to the NSF system of Long Term Ecological Research (LTER) sites. Such a system would work in tandem with partners like the Integrated Ocean Observing System (IOOS) Regional Associations to further elevate both the NMSS and NOAA as leaders in ocean climate science, monitoring, and management while providing critical information the nation needs to respond to climate change.

The need for integrated climate monitoring across the NMSS and the nation is at the core of sanctuaries’ ability to meet their stewardship mission. Sanctuaries’ needs are threefold: to understand where environmental changes decrease the effectiveness of sanctuary protections and disrupt the provision of ecosystem services; to identify additional protections that may be needed in the future; and to understand how management actions can be used to enhance the resilience of sanctuary resources and dependent communities. These needs can only be met through the integrated system-wide monitoring of sanctuary resources and environmental parameters for climate change impacts.



Photo: NOAA

Citations:

1. Executive Order 14008 “Tackling the Climate Crisis at Home and Abroad”
2. ONMS (2021). [Office of National Marine Sanctuaries Climate Resilience Plan 2021-2023](#). National Oceanographic and Atmospheric Administration, Office of National Marine Sanctuaries.
3. Cannizzo, Z. J., & Selz, V. (2021). [National Marine Sanctuaries Climate Change Science Priorities: Workshop Report](#). National Oceanographic and Atmospheric Administration, Climate Program Office.

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<https://sanctuaries.noaa.gov/management/climate/welcome.html>