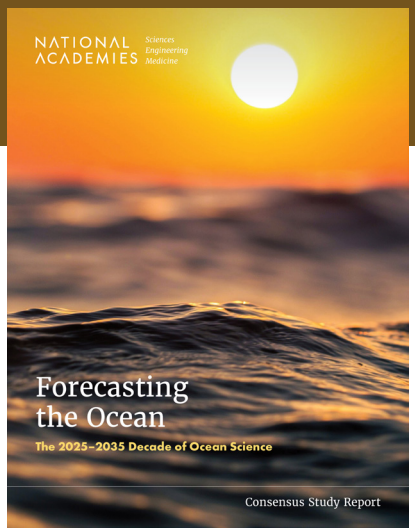
NATIONAL ACADEMIES Sciences Engineering Medicine

Forecasting the Ocean

The 2025–2035 Decade of Ocean Science



This report provides advice on how to focus investments in ocean research, infrastructure, and workforce to meet national and global challenges in the coming decade and beyond, and in doing so, enhance national security, scientific leadership, and economic competitiveness through a thriving blue economy.

OCEAN FORECASTING: A CHALLENGE FOR THE NEXT DECADE

The report sets out an overarching challenge for the National Science Foundation (NSF) and the broader research community to establish a new paradigm for forecasting the state of the ocean at scales relevant to human well-being in the next decade.

Agency and private-sector partners can use the results of basic NSF research in management and policy decisions to promote resiliency and prosperity and position the United States as a leader in transformational ocean science.

KEY SCIENCE QUESTIONS FOR THE 2025–2035 SCIENCE PORTFOLIO

Ocean and Climate:
How will the ocean's ability to absorb heat and carbon change?

Ecosystem Resilience:
How will marine ecosystems respond to changes in the Earth system?

Extreme Events:
How can the ability to forecast extreme events driven by ocean and seafloor processes be improved?

LOOKING FORWARD

Accelerating U.S. scientific progress in understanding and forecasting ocean processes is reliant on continued funding for basic research across ocean studies and reinvestment in ocean science infrastructure. It will require an integrated approach to research that takes full advantage of emerging technologies and opportunities for new partnerships. **Achieving U.S. research priorities and regaining U.S. leadership in ocean science will require NSF and the broader research community to (see Figure 1):**

- **Support basic research across the ocean sciences**
- **Build the required workforce and partnerships**
- **Support existing, new, and improved research infrastructure including the research fleet, ocean drilling, observing systems, and cyberinfrastructure**
- **Invest in innovation**

FIGURE 1 Steps to forecasting ocean processes.

Now is the time for the United States to invest and take leadership in answering the urgent ocean science priorities outlined in this report, allowing researchers, policymakers, and other leaders to anticipate and understand changes in the ocean system. **Such understanding is critical for national security, U.S. economic competitiveness and prosperity, environmental stewardship, and for the well-being of humans and the ecosystems on which they depend, in the next decade and beyond.**

To access the full report and additional resources, visit https://nap.nationalacademies.org/catalog/27846.