



# NOAA 'Omics Strategy

The NOAA 'Omics Strategy will dramatically expand our application of 'omics—a suite of leading-edge methods used to analyze materials such as DNA, RNA, or proteins—by improving the efficiency, effectiveness, and coordination of 'omics development and usage across the agency. As 'omics are revolutionizing our ability to monitor and understand the biological communities of the oceans and Great Lakes, this Strategy will guide transformative advancements in the quality and timeliness of NOAA science, products, and services.



*This at-sea 'omics laboratory to promote biodiversity and deep-sea exploration represents a collaboration between NOAA's Northwest Fisheries Science Center and the Ocean Exploration Trust. Photo Credit: Ocean Exploration Trust.*



*eDNA can provide comprehensive biological data with increased efficiency, resulting in more timely public access to information.*

## Demonstrated Leadership in 'Omics

In recent years, NOAA and its multisector partners have worked tirelessly to advance successful 'omics solutions that address our mission priorities. Specific fields include genomics, transcriptomics, proteomics, and metabolomics. Now we are leveraging that experience to integrate modern 'omics technologies across our agency. These advances will increase operational efficiency, improve ecosystem assessments and forecasts, and support stewardship. Example applications include:

- Sustaining fisheries;
- Developing aquaculture;
- Combating harmful and invasive organisms;
- Improving seafood forensics and traceability;
- Discovering pharmaceuticals and other beneficial compounds; and
- Protecting vulnerable species and habitats, such as corals, that provide essential fish habitat and support tourist economies.

## 'Omics Strategy Goals

1. Enhance infrastructure to meet the analytical demands of 'omics data.
2. Execute 'omics research targeted to support and advance the American Blue Economy.
3. Accelerate transition of 'omics research to applications.
4. Expand partnerships to advance 'omics research and applications across the agency.
5. Promote workforce proficiency in 'omics.

### NOAA's 'Omics Strategy aligns with:

- The National Science and Technology Council's *Science and Technology for America's Oceans: A Decadal Vision* as well as the Executive Office of the President's August 30, 2019, Memorandum "Fiscal Year 2021 Administration Research and Development Budget Priorities."
- The November 19, 2019, Presidential Memorandum, "Memorandum on Ocean Mapping of the United States Exclusive Economic Zone and the Shoreline and Nearshore of Alaska."



At-sea eDNA analysis conducted by NOAA Fisheries' Dr. Jeanette Davis during a U.S. west coast survey by the NOAA Ship Bell M. Shimada to estimate fish distributions and generate biomass indices.



A sample collected from a Monterey Bay Aquarium Research Institute UUV is prepared for 'omics analysis at the NOAA Great Lakes Environmental Research Laboratory by microbiologist, Dr. Kelly Goodwin. Expanding UxS applications can provide timely and affordable comprehensive biological data.

## Bold New Era in Harnessing 'Omics

To ensure the NOAA 'Omics Strategy realizes transformational advances in quality and efficiency, NOAA is developing an 'Omics Strategic Implementation Plan or "Roadmap" that defines detailed action items, deadlines, and responsibilities. In the meantime, the NOAA 'Omics Strategy is already improving performance in achieving our economically impactful missions and setting the course to strengthen our renowned environmental science and technology leadership. Through this, NOAA will achieve our agency priority to sustainably expand the American Blue Economy.