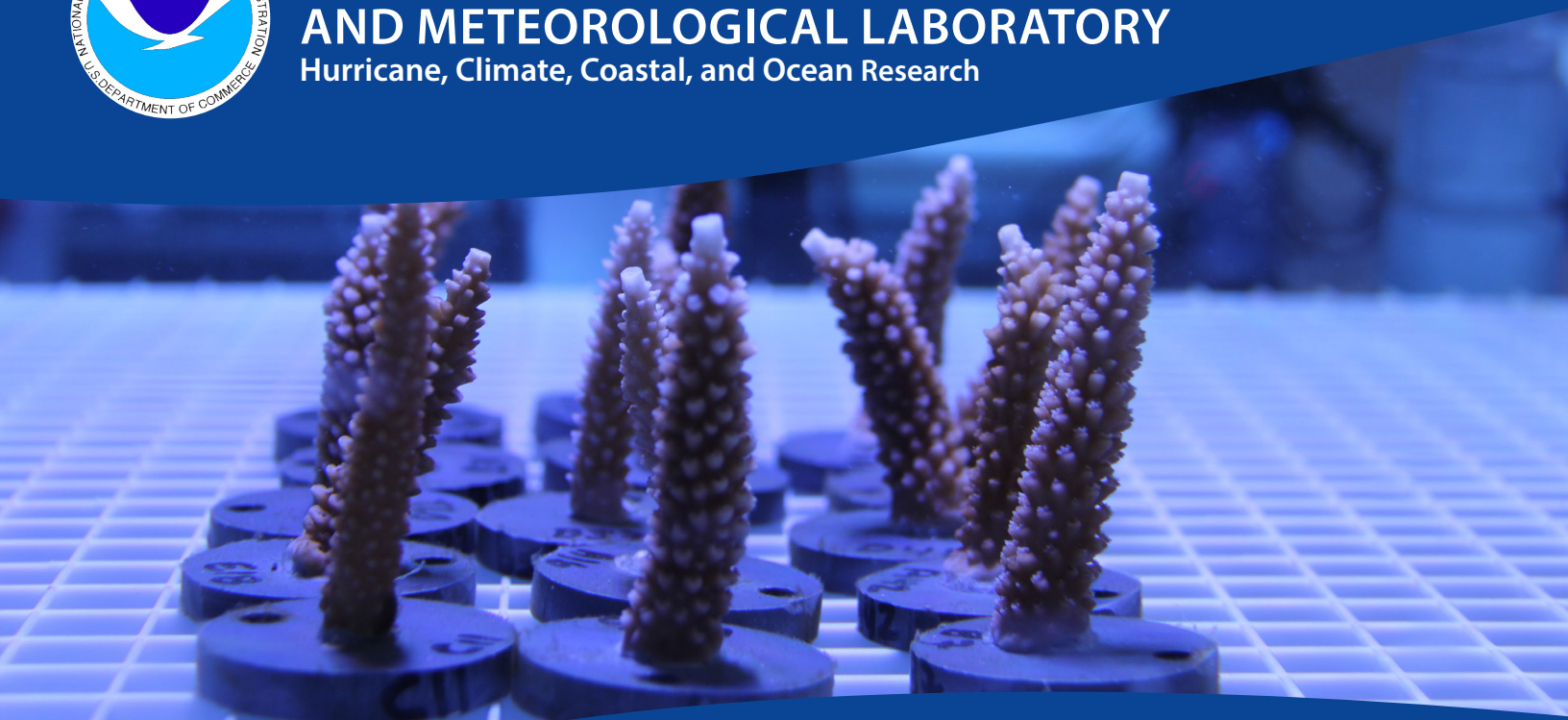
NOAA'S ATLANTIC OCEANOGRAPHIC AND METEOROLOGICAL LABORATORY

Hurricane, Climate, Coastal, and Ocean Research



Genomics technology enables quick, cost-effective sampling for better results.

Photo Credit: NOAA-AOML

Omics at AOML

The Omics program at AOML works to promote coral resilience, develop and transfer emerging technologies, advance Omics for fisheries and protected species, and protect marine resources. This work is a collaborative effort of coral, fisheries, and microbiome experts from across NOAA and through engagement with international partners.

Omics is an umbrella term for the study of various fields such as genomics, metagenomics, metatranscriptomics, proteomics, metabolomics, epigenomics, and high-throughput amplicon sequencing. These emerging fields help us answer research questions about DNA, RNA, proteins, and other small molecules from organisms and the environment. Equipped with this information, we can provide critical recommendations for ecosystem based management towards healthy marine systems.

Photo Credit: NOAA-AOML

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Photo Credit: NOAA-AOML

Advancing Environmental DNA (eDNA)

Because eDNA comes from cells that have been sloughed or excreted from a marine organism, eDNA offers a unique opportunity to detect what marine organisms have been in the area using only seawater samples. This can be especially useful in remote, sensitive areas. It also offers the ability to detect multiple trophic levels from a single sample. This detection allows scientists to better evaluate environmental conditions and food web influences on populations in a single area.

Coral Restoration and Omics

AOML research aims to identify what makes certain corals more resilient to stressors like heat, ocean acidification, and disease. Understanding the molecular underpinnings of coral resilience and susceptibility by identifying resilient genotypes allows resource managers to be more effective with their restoration plans, especially when out-planting corals on the reef.

Autonomous Omics

AOML and its partners at the Monterey Bay Aquarium Research Institute are testing new autonomous underwater vehicles that collect, filter, and process water samples to observe the types of microorganisms that inhabit a particular marine area. These autonomous vehicles are deployed from ships and small boats to provide a rapid response for measuring environmental changes and increasing sampling coverage without the added expense of deploying additional ships and crew.

Photo Credit: NOAA-AOML

Experimental Reef Laboratory

The Experimental Reef Laboratory located on the University of Miami's Virginia Key campus at the Rosenstiel School of Marine and Atmospheric Science was completed in September 2016. This unique experimental facility was designed to study the combined effects of heat stress and ocean acidification on corals to enable scientists to observe how coral organisms respond at the molecular level (i.e., DNA and RNA) under present, and possible future environmental conditions.

Omics for Fisheries and Protected Species

Our ability to effectively manage fisheries is limited by our understanding of fishery populations and their dependence on environmental conditions. By Including genomic information into fisheries management, we may improve the decision-making process and thus the sustainability of fisheries. AOML and NOAA's Southeast Fisheries Science Center have formed a collaborative partnership with a clear path to transition results into fisheries management plans.

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