

Photo: NOAA

Marine Debris Research

Marine debris is a globally pervasive issue that poses a significant threat to the marine environment. Research on this issue is multidisciplinary, including but not limited to the fields of chemistry, oceanography, limnology, ecology, toxicology, and economics. Marine debris research is on the rise, with the number of peer-reviewed articles published increasing exponentially over the last decade. However, there are still significant gaps in our understanding of this multi-faceted issue.

The NOAA Marine Debris Program (MDP) partners with academia, state and federal agencies, and non-governmental organizations in order to help close these gaps and advance the state of marine debris science.

Current Research Priorities

Exposure/Response Analysis
To what degree are individual organisms exposed to marine debris and is that level of exposure likely to cause harmful biological, toxicological, or ecological effects?

Ecological Risk Assessment
How likely is it that a species, population, or community may be impacted as a result of the exposure to marine debris?

Fate and Transport
How do local processes (i.e., tides, wind, currents) influence nearshore and coastal marine debris movement?

Economic Impacts
Does the presence of marine debris on beaches influence local beach recreation activities and subsequently affect associated tourism economies?

Research Highlights

The following are projects funded by the MDP. For more, visit <https://marinedebris.noaa.gov/current-efforts/research>.

Exposure/Response Analysis

The **University of Connecticut** is conducting research to determine the types and concentrations of microplastics ingested by oysters, how the plastic characteristics influence ingestion, and the effects of microplastic ingestion on their digestive processes. The **Virginia Institute of Marine Science** will examine whether microplastic ingestion increases the susceptibility of steelhead trout to disease. The **University of North Carolina Wilmington** is investigating whether black sea bass consume contaminated microplastics, and if they are transferred from prey to larval and juvenile bass.



Photo: NOAA

A sample of sea scallops collected to determine abundance of the species.

Fate and Transport

The **University of California, Riverside** is investigating the source and pathways of microplastics using modeling and field measurements of rivers, wastewater treatment facilities, and coastal waters to better understand the movement of microplastics in the Southern California Bight. **Rutgers University** is studying the movement of microplastics from the Delaware River to the Delaware Bay to determine the role this mixing area may play in the vertical movement of microplastics in the water column and as an entry for microplastics into the food chain.



Photo: NOAA

A day at the beach in Rehoboth, Delaware.

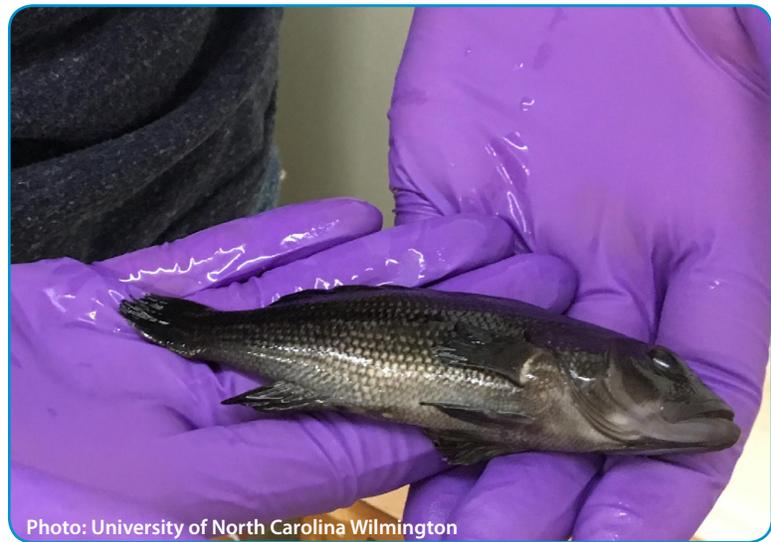


Photo: University of North Carolina Wilmington

A researcher holds a juvenile black sea bass.

Ecological Risk Assessment

Woods Hole Oceanographic Institution is conducting fieldwork and laboratory experiments to calculate the risk of microplastic ingestion to scallop populations in the Mid-Atlantic Bight. **Arizona State University** is quantifying microplastics and contaminants in water, sediment, fish, and bivalves in American Samoa and using a risk assessment framework to evaluate if there is concern for wildlife ingesting microplastics and humans ingesting seafood. The **University of Delaware** is evaluating the effects of microplastics on blue crab larvae at different developmental stages and will test whether microplastic exposure impacts their survival in Mid-Atlantic Bight estuaries.



Photo: University of California, Riverside

Microplastics, debris, and organisms collected from California surface waters.

Economic Impacts

Abt Associates, in collaboration with the MDP, conducted an economic study to understand how marine debris affects the economies of tourism-dependent coastal communities. The study found that the abundance of marine debris on beaches can have a substantial impact on coastal economies that depend on tourism, and when the amount of marine debris on beaches is doubled, there could be a significant negative impact to coastal communities from a decrease in the number of days visitors spend on the beach and their spending in the local economy.