University of Maryland Center for Environmental Science
Horn Point Laboratory

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1. UMCES Horn Point Laboratory

1.1 Research Programs

The Horn Point Laboratory (HPL) conducts operations from the site of the former Francis V. DuPont estate. The property offers HPL unique opportunities to conduct Chesapeake Bay-related environmental studies, as the campus embraces every Eastern Shore ecological system from estuaries and marshes to forests and farmlands. The Horn Point Laboratory conducts research that deals primarily with the detection and prediction of changes in estuarine and marine ecosystems and the population of organisms that inhabit them. Research projects address both basic and applied issues primarily within the Chesapeake Bay, its tributaries and Mid-Atlantic area coastal bays and actively involve partners and stakeholders, including diverse educational programs.

HPL contributes to the UMCES mission through research, education and services in four areas:

Aquaculture Restoration Ecology Program

Horn Point Laboratory has a multi-disciplinary team of scientists who specialize in aquaculture of fish and shellfish, marsh and seagrass ecology, and water quality of coastal systems. They are actively involved in science that supports holistic and proactive restoration of oysters, submerged aquatic vegetation, fish, and wetlands.

Research emphasis of the aquaculture restoration ecology group extends from shoreline erosion and remediation impact on SAV, ecosystem responses to nutrient management, estuarine macropyhte production, effect of turbidity and light on SAV, oyster culture and restoration technology and evaluation, fish culture technology, sturgeon enhancement, and aquatic plant nutrient management applications.


1. HPL Aerial Photograph


2. AREL - Aquaculture & Restoration Ecology Laboratory


3. Oyster Research at HPL

Biological Oceanography

Biological oceanography is concerned with the role of estuarine and marine organisms in biogeochemical processes and food web dynamics. An integrated group of researchers specializes in the study of bacteria, phytoplankton, protistan microzooplankton, zooplankton, seagrasses, marsh plants, and bivalves. HPL's strength lies in collaborative studies organized around central research themes such as food web ecology & modeling, harmful algal blooms, seagrass and marshland ecology, and the impacts of eutrophication.

Research extends from the analysis of intracellular molecular processes to watershed-scale ecosystem studies using an array of techniques including molecular and phylogenetic analysis of biomarkers, cultivation and examination of organisms, experimental mesocosms, field and ship-based observation and experimentation, automated sampling and observing systems, GIS, and modeling.

Nutrient and Biogeochemical Cycles

The Chemical Oceanography group at Horn Point Laboratory has expertise in both water column and sedimentary chemistry. Research interests include a wide variety of topics ranging from basic to applied research including instrument development. Much of HPL's focus is on nutrients that in excess lead to eutrophication and oxygen deficiency, and that may promote harmful algal blooms. A particular interest is the processes that control fixed-nitrogen concentration over regional to global space scales, and hourly to geologic time-scales.

Because of the inter-disciplinary nature of the research, collaborative research with several UMCES/HPL colleagues and a large number of U.S. and international colleagues is always encouraged. Collaborative projects with Horn Point Laboratory colleagues include investigations of harmful algal blooms and studies of how the drastic decrease in oysters may have exacerbated anthropogenic nutrient additions.

Physical Oceanography

The Physical Oceanography group at Horn Point Laboratory spans a diverse range of interests and research. Generally physical oceanographers are concerned with the motion of the ocean. This includes waves, currents, movement and erosion of sediments, pollutants and biology, interactions of the ocean with the atmosphere and the land surface, and the interactions of the ocean with climate variability.

1. Research at HPL

2. Aquaculture Restoration Ecology_Oyster cage

3. Biological Oceanography

The scales of these processes are diverse, ranging from dynamics in rivers and harbors, to Chesapeake Bay, to the coastal and global oceans. However, much of the effort is focused on issues of interest to Chesapeake Bay, ranging from basic science to applied restoration programs.

Faculty members in this group focus their efforts primarily in the discipline of physical oceanography and coastal engineering. However, the laboratory's strength lies in the interdisciplinary linkages formed among biologists, chemists, geologists, geographers and fluid dynamicists both at HPL and UMCES, and across the United States and globe.

1.2 Education & Service

Graduate education and undergraduate student internships are the laboratory's primary educational programs. Undergraduates are recruited from Maryland and throughout the nation to participate in a summer internship program in which students design and conduct research under the guidance of the HPL faculty.

The Horn Point Laboratory Environmental Education Center (EEC) is the premier Eastern Shore resource for environmental education that enriches and informs the connection between Its citizens and their natural environment. The Center uses the unique resources of the laboratory's marine and estuarine scientific research to further this vision.

A comprehensive residential educational and meeting facility was built in 1992 on 80 acres at HPL to support youth environmental education programs held at the laboratory.

Today the center offers programs such as:

- K-12 environmental science, environmental literacy, stewardship education and Science, Technology, and Math (STEM) education enhancement programs that include outdoor activities and experiences;

- Adult environmental education and activities on a variety of topics including those related to the Laboratory's research, as well as recreational and outdoor experiences;

1. Sediment testing

2. Physical Oceanography

3. Lecture Hall at Coastal Science Laboratory