



National Center for Coastal Ocean Science  
Center of Excellence in Oceans and Human Health

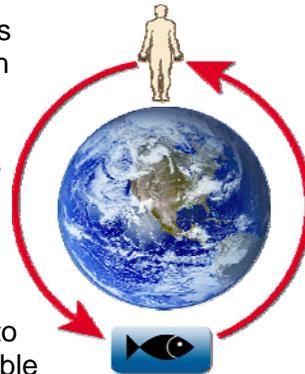
## Discovering the Linkages between Human Health and the Environment



As a Center of Excellence in NOAA's Ocean and Human Health Initiative (OHH), the National Centers for Coastal Ocean Science's Center for Human Health Risk at Hollings Marine Laboratory (HML) has developed new methods and approaches to

evaluate linkages between ecological process and human health and well-being. Core OHH research at HML evaluates the health responses of marine ecosystems to stress, and identifies and characterizes threats to human health. HML researchers are able to deliver reliable assessments and forecasts about ecosystem and public health risks to public health officials, natural resource managers and coastal planners.

*The results of the OHH research program are disseminated to environmental and public health managers, teachers, university students and citizens of all ages through education and outreach programming. New research methods, such as the use of nuclear magnetic resonance imaging and rapid detection tools will assist scientists in understanding marine ecosystems and the*



*health of marine organisms and humans as they relate to ecosystem conditions.*



### Partners with a Purpose

The HML is operated as a partnership laboratory by NOAA, the National Institute of Standards and Technology, the South Carolina Department of Natural Resources, the College of Charleston, and the Medical University of South Carolina. This unique partnership integrates basic, applied and biomedical scientists into multi-disciplinary research teams, and establishes programs that link environmental conditions in the coastal zone to human health and socio-economic well being. This research brings the assessment cycle full circle. That is, NOAA will have effective tools to evaluate *human impacts upon our coasts* and to assess the *impacts of the coastal environment on society*.

The OHH Center at HML collaborates with the following NOAA OHH Centers and organizations:

- Northwest Fisheries Science Center: Seattle, WA
- Great Lakes Environmental Research Laboratory: Ann Arbor, MI
- National Science Foundation
- National Institute of Environmental Health Sciences

The research conducted at the HML and other NOAA Centers addresses the following questions:

- Can we safely eat the seafood? Swim in the water? Walk along shore? Live, work and play nearby?
- What are the cumulative impacts of coastal development on our marine ecosystems?
- What can be done to detect and reduce these problems?

This is a "one health approach" to OHH research and collaboration.

## Marine Ecosystem Health

OHH scientists conduct research to better understand the impacts to and changes occurring in dynamic marine ecosystems. Integrated research in the following areas gives a broader view of the changes and impacts occurring in our coastal environments.

- **Pathogen Source Tracking**

Scientists have developed novel techniques for rapidly detecting, tracking and determining the source of marine microbes of public health concern. These tools are useful for rapidly assessing health risks for humans who swim in coastal waters or consume shellfish.



- **Ecosystem Research, Assessment & Prediction**

Researchers are evaluating the performance of environmental quality and public health indicators in sentinel habitats and organisms (i.e. tidal creeks, dolphins). Results are used to develop approaches for simultaneously monitoring and assessing the ecological condition and public health status of coastal environments, and to predict the effectiveness of alternative management actions.

- **Genomics Applications**

Genomics evaluate the genetic, biochemical and physiological responses of organisms to environmental stress and translates the responses into an overall understanding of organism and population health. Development of this technology provides an additional tool for monitoring and assessing ecosystem health, and signaling early warnings of ensuing harm.

- **Environmental Chemistry**

Researchers are working to identify and understand the potential harmful effects that contaminants in the estuaries and oceans have on humans and marine ecosystems. Compounds being studied include pesticides, herbicides, fire retardants, pharmaceuticals and personal care products. A nuclear magnetic resonance center allows scientists to explore natural products chemistry as well as the health of organisms.

## Marine Natural Products

Ocean and coastal waters can be a source of health hazards as well as a resource that can convey health benefits to humans. Understanding the source and nature of biologically based chemical interactions in the environment is critical to this research. Currently, HML scientists are investigating the implications of toxins associated with coral death and marine ecosystem degradation. By learning more about these chemicals, scientists hope to find compounds in the environment that may be a valuable asset in medicine or a product with commercial value.

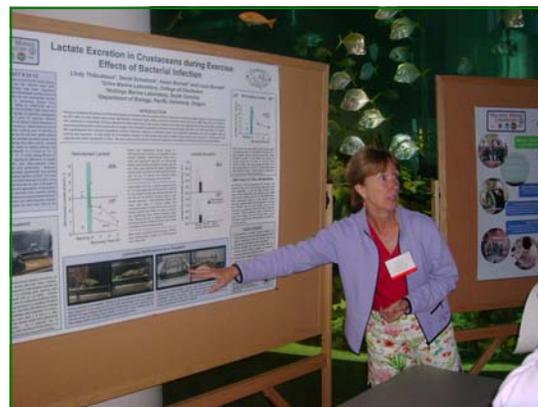
- **Seafood Health & Safety**

This program evaluates human health benefits and risks associated with cultured and wild seafood by developing aquaculture and assessment technologies that permit economically competitive production of seafood with low contaminant levels (such as organic food) and enhanced beneficial fatty acid profiles.



## Outreach & Education

The outreach and education program communicates to potential users the knowledge and technology developed by the OHH Center and other HML programs. Audiences include natural resource and public health managers, scientists, regulatory agencies, local decision makers, students, teachers and the public. Education of future scientists and the public is also facilitated through the hosting of visiting scholars and OHH training grants.



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