



WELCOME TO WOODS HOLE

A WORLD CENTER FOR MARINE, BIOMEDICAL,
AND ENVIRONMENTAL SCIENCE

Welcome to Woods Hole

Woods Hole, a village in the Town of Falmouth on the southwestern corner of Cape Cod, is a world center for marine, biomedical, and environmental science. Its reputation in this broad field may seem out of proportion to its small size, yet, in addition to several smaller enterprises and labs, Woods Hole contains two large private organizations (the Marine Biological Laboratory and the Woods Hole Oceanographic Institution) and two federal government facilities (the National Marine Fisheries Service and the U.S. Geological Survey).

Together, these larger institutions occupy some 170 buildings, operate a dozen research vessels and collecting boats, employ more than 1,500 year-round people, and offer instruction to approximately 500 students. Woods Hole Oceanographic Institution outgrew its space in the village in the 1960s and expanded to the Quissett Campus, located a mile and a half to the northeast, where U.S. Geological Survey laboratories are also located.

A History of the Scientific Community

The village of Woods Hole was settled more than 300 years ago and for two centuries remained primarily a farming and fishing community. Then in 1871 the United States Commission of Fish and Fisheries (precursor of the Na-

tional Marine Fisheries Service) was established, and its first director, Spencer Fullerton Baird, set up a temporary collecting station in Woods Hole to study marine animals. Attracted by the abundance of fauna and unpolluted waters, he established a permanent laboratory in the village in 1875. Soon, visiting scientists were studying local marine plants and animals, and a hatchery was organized to stock rivers with shad, salmon, and other fish. At about the same time, the Fish Commission acquired *Albatross*, a 234-foot steamer and the first American ship to be designed and built as a research vessel.

In 1888, a second institution, the Marine Biological Laboratory (MBL), was established across the street. Its founders believed that some of the essential processes of life, such as cell division, nerve and muscle activity, and development, might be studied more easily in simple marine forms than in higher animals. Consequently, both teaching and research were begun in cellular biology, embryology, and biomedical fields as well as in marine biology in general. For almost 90 years MBL was solely a summer institution, but since the 1970s it has housed a number of major year-round programs.

The Woods Hole Oceanographic Institution (WHOI), a private nonprofit organization originally funded by the

Rockefeller Foundation, struck off in a somewhat different direction. It was incorporated in 1930 to study all branches of oceanography. Since much of the research was planned for the deep sea, the research vessel *Atlantis* was built and used from 1931 to 1964. In its first decade, WHOI was primarily a summer institution. During World War II it changed to a year-round operation to gather oceanographic information for anti-submarine warfare, amphibious landings, and other operations. After the war, WHOI continued to work with the government, and at present 80 percent of its annual budget is supported by federal grants and contracts.

In the 1960s, the Fisheries and MBL replaced old wooden buildings with a new aquarium and modern laboratories; WHOI expanded its research programs and facilities and established a graduate education program in concert with Massachusetts Institute of Technology (MIT). A fourth institution, the U.S. Geological Survey, headquartered its new Branch of Atlantic Marine Geology here to investigate the geology and geophysics of the Atlantic, Gulf of Mexico, and Caribbean. The Sea Education Association joined the community in 1975, and Woods Hole Research Center in 1985.



NEESC Photo Archives

Water Street, early 1900s. Candle House at right dates to Woods Hole's whaling days (1828–1864). Fisheries building is at left in background.



MBL Collection

MBL botany class students during an 1895 specimen collection trip.

National Marine Fisheries Service

www.nefsc.nmfs.gov



Founded 1871

The National Marine Fisheries Service (NMFS) is the federal agency with stewardship responsibility for our nation's living marine resources. The agency's Woods Hole Laboratory conducts research on fisheries resources and the fishermen who harvest them, and on marine mammals and other protected resources in the Northwest Atlantic Ocean. Information derived from this research is primarily used by those who make management decisions about these resources and their habitats.

Created by Congress in 1871 as a summer sampling station, the laboratory is the world's oldest facility specifically dedicated to marine fisheries research. It became a year-round institution in 1875, and is currently part of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

Laboratory scientists are primarily interested in three broad areas of research—resource assessment, ecosystem monitoring, and socioeconomics. Resource assessment scientists determine the distribution, size, and productivity of marine fish, shellfish, and marine mammal populations, as well as the effects of fishing and other human activities on those populations. Ecosystem monitoring scientists investigate the role that natural

or nonhuman factors (such as climate change and food web dynamics) play in marine populations and the overall ecosystem. Socioeconomic scientists study the social, economic, and cultural effects of fisheries and marine mammal management on coastal communities in the New England and Mid-Atlantic states. Fieldwork by laboratory scientists is supported by two research vessels, the 190-foot *Albatross IV* and the 160-foot *Delaware II*.

The Laboratory employs about 175 natural and social scientists, technicians, and administrators. It also houses the Woods Hole Science Aquarium, which annually receives more than 150,000 visitors, including several thousand students on science field trips.

The Laboratory further serves as headquarters for NMFS's Northeast Fisheries Science Center, which coordinates research not only at the Woods Hole Laboratory, but also at four other laboratories in the Northeast (Narragansett, RI; Milford, CT; Highlands, NJ; and Washington, DC). These other laboratories conduct research on marine ecosystem health, aquaculture, habitat conservation, and biodiversity.



Far left: Woods Hole Science Aquarium welcomed a new resident, Lu-Seal. See page 14 for hours and location.

Top left: A monkfish caught during a research survey conducted aboard a commercial fishing vessel.

Below: An endangered North Atlantic right whale sighted during a NOAA Fisheries whale research flight. NOAA operates the stranding and response network that disentangles whales.

Photos courtesy of National Marine Fisheries Service

Marine Biological Laboratory

www.mbl.edu



Founded 1888

The Marine Biological Laboratory (MBL) is an international center devoted to improving the human condition through basic research and education in biology, biomedicine, and environmental science. The oldest private marine laboratory in the western hemisphere, MBL has a year-round staff of more than 280 scientists and support staff working in such fields as developmental biology and infertility, cell dynamics and imaging, molecular biology and evolution, genomics and global infectious diseases, behavioral ecology and scientific aquaculture, and nutrient cycling and climate change.

Scientists at the Ecosystems Center study terrestrial and aquatic ecosystems and issues such as resource management and global climate change. Researchers at The Josephine Bay Paul Center in Comparative Molecular Biology and Evolution explore the genetic relationships among living organisms and identify human genes of biomedical importance. Investigators in the state-of-the-art Marine Resources building study, maintain, and cultivate aquatic organisms essential to modern biological, biomedical, and ecological research. MBL also hosts the Boston University Marine Program.

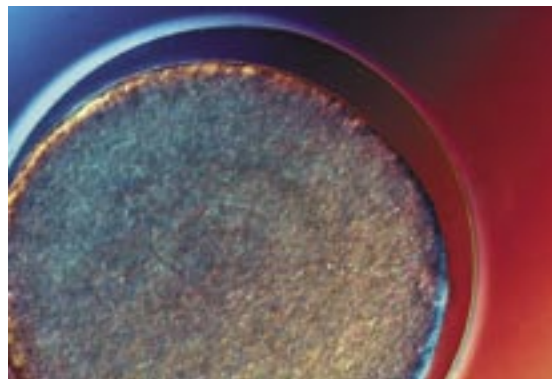
Each summer an additional 1400 scientists and advanced students from around the world come to MBL to conduct research, collaborate across scientific disciplines, and learn from one another. Many use the diverse marine organisms

found in local waters because their relatively simple systems make them good models for exploring fundamental biological processes common to all life forms, including humans.

It's an exciting annual gathering, unrivaled in the world of biology. To date, 49 Nobel Laureates have taught, taken courses, or conducted research at MBL. More than 50 members of the National Academy of Sciences are currently members of the MBL Corporation. In the words of author/physician Lewis Thomas, "The MBL stands as the uniquely national center for biology in the country."

MBL's outstanding educational program—six intensive summer laboratory/lecture courses and a number of shorter techniques-oriented courses offered throughout the year—is known throughout the life sciences for kick-starting research careers. Recent additions include the Semester in Environmental Sciences Program for undergraduates, offered by the Ecosystems Center, and the Brown-MBL Graduate Program for Biological and Environmental Sciences.

MBL also serves as a primary source of scientific information for the Woods Hole community through the MBL WHOI Library, which holds more than 200,000 bound journals and books and provides access to 4,000 electronic journals and scientific databases. Together these resources cover the biological literature of the last 300 years.



Far left: The MBL WHOI library, located in the Lillie building, contains one of the world's most complete collections of biological, ecological, and oceanographic literature.

Top left: MBL scientists study cells of marine organisms to learn more about biological processes common to all living things, including humans.



Left: Scientists and students from throughout the world come to MBL to conduct basic biological, biomedical, and environmental research.

All photos this page: MBL Collection

Woods Hole Oceanographic Institution

www.whoi.edu



Founded 1930

The Woods Hole Oceanographic Institution (WHOI) is a private, nonprofit research and higher education facility dedicated to the study of all aspects of marine science and engineering and to the education of marine researchers. Established in 1930, it is the largest independent oceanographic research institution in the U.S., with staff and students numbering about 1,000. The Institution is organized into five departments, four interdisciplinary institutes—ocean life, coastal ocean, ocean and climate change, deep ocean exploration—the Cooperative Institute for Climate and Ocean Research, and a marine policy center. Its shore-based facilities are located in the village of Woods Hole and a mile and a half away on the Quissett Campus. The bulk of the Institution's funding comes from peer-reviewed grants and contracts from the National Science Foundation and other government agencies, augmented by foundations and private donations.

In an interdisciplinary atmosphere that nurtures discovery, WHOI scientists, engineers, and students collaborate to explore the frontiers of knowledge about planet Earth. They develop theories, test ideas, build seagoing instruments, and collect data in diverse marine environments. Working in all the world's oceans, their broad research agenda includes: geological activity deep within the earth;

plant, animal, and microbial populations and their interactions in the ocean; coastal erosion; ocean circulation; ocean pollution; and global climate change.

Ships operated by WHOI carry research scientists throughout the world's oceans. The WHOI fleet includes three large research vessels (R/V *Atlantis*, R/V *Knorr*, and R/V *Oceanus*), coastal craft including R/V *Tioga*, the deep-diving human-occupied submersible *Alvin*, the tethered, remotely-operated vehicle *Jason II*, and autonomous underwater vehicles such as the Autonomous Benthic Explorer (ABE) and SeaBED.

WHOI offers graduate and post-graduate studies in virtually all areas of marine science. There are several fellowship and traineeship programs, and graduate degrees are awarded through a joint program with the Massachusetts Institute of Technology (MIT) or by the Institution itself. WHOI also offers other outreach programs and informal public education through its Exhibit Center (see pages 14 and 15) and summer tours. The Institution has a volunteer program and a membership program, WHOI Associates.



Terry Rioux, WHOI



Dan Fornari, WHOI



Tom Kleindinst, WHOI

Far left: Research vessel *Oceanus* departs Woods Hole on another voyage.

Top left: The three-person submersible *Alvin* is recovered aboard research vessel *Atlantis* in the Pacific Ocean.

Below: A small whale is scanned in the CT facility. Marine mammal research has been on-going since the 1930s.

United States Geological Survey

woodshole.er.usgs.gov



**Woods Hole
Science Center
Established 1962**

Earth scientists at the U.S. Geological Survey's Woods Hole Science Center explore and study the geology, chemistry, and physics of the underwater areas offshore of the United States. Established in 1962, the field office has grown from a handful of researchers exploring the frontier continental margin to a team of about 100, studying many of society's pressing issues, such as coastal erosion, marine pollution, resource extraction, and habitat degradation. The USGS research facility is located on WHOI's Quissett Campus.

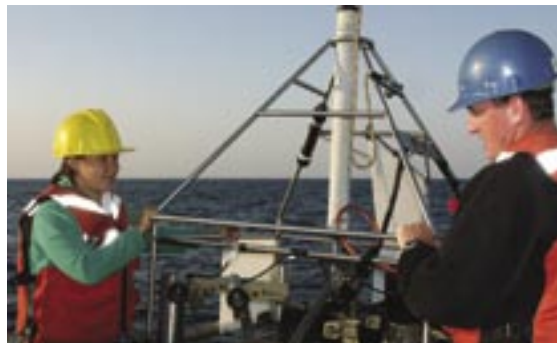
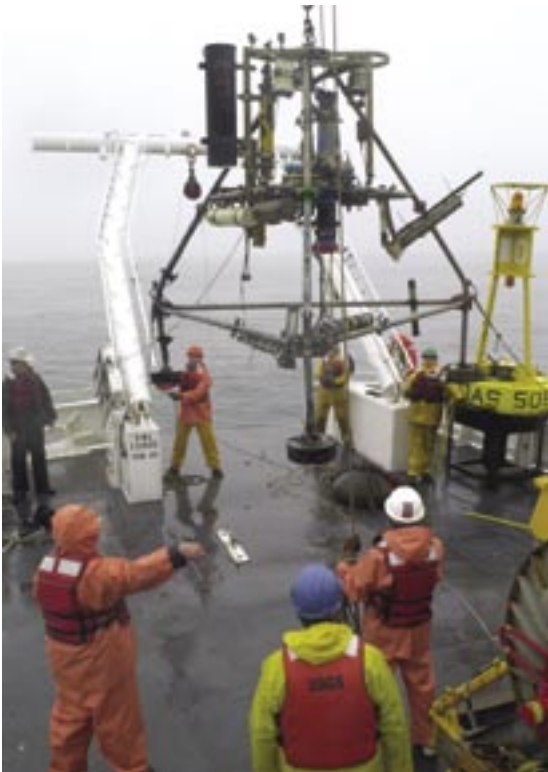
The Woods Hole team's research focuses on five general themes: coastal and shelf geology, sediment transport, environmental geoscience, energy and tectonics, and information science. A long-term goal is to develop predictive capabilities for geologic processes and to provide the basic geologic framework of the U.S.'s offshore areas. The results of these studies are released to the public as reports, maps, journal articles, books, atlases, and seminar contributions. Much of the data and information are accessible online through woodshole.er.usgs.gov.

The USGS Woods Hole Science Center has specialized capabilities to assist in oceanographic research, including sediment transport instrumentation, an inte-

grated seafloor mapping facility, geochemistry laboratory facilities, a 25-foot research vessel R/V *Rafael*, a gas-hydrates testing laboratory, and an advanced shoreline mapping vehicle (SWASH).

USGS research is used to increase basic understanding of geoscience processes, to help develop government policy, and to aid managers in their stewardship and regulatory functions. The USGS in Woods Hole collaborates with other research institutions and universities within the Woods Hole scientific community, the nation, and the world. USGS marine research also involves collaboration with states, and other government agencies such as the Environmental Protection Agency, the Army Corps of Engineers, the departments of Commerce, Energy, Defense, and State, and other bureaus within the Department of the Interior.

Publications by the Woods Hole team provide scientific information of national and international importance to the research community, federal and state agencies, as well as the general public. Additional information is available via the www.usgs.gov website.



Far left: Sediment transport bottom tripod instrument system.

Top left: SeaBOSS (Sea Bottom Observation and Sampling System)

Below: Sidescan-sonar subbottom profiler.



Photos courtesy of Dawn Blackwood, USGS

Sea Education Association

www.sea.edu



**Relocated to
Woods Hole
in 1975**

Founded in 1971, and located in Woods Hole since 1975, the Sea Education Association (SEA) has been a leader in marine education, developing an understanding of the importance of the ocean and of its powerful role in seemingly every aspect of our lives—whether we live on, near, or at great distances from the shore. The idea is to give students the opportunity to study the ocean from a multitude of academic perspectives and to do it from the platform of a traditional sailing vessel, therefore combining a rare blend of theoretical learning and the application of such knowledge. Coursework for students from any academic discipline involves the studying of maritime policy, history, and literature in addition to ship navigation and oceanography. They learn about the ocean’s power and mystery, use scientific technology to study it, and design research projects that will be the focus of their work at sea.

SEA offers programs for college students, high school students, and teachers, and for students in the MIT/WHOI graduate program. The SEA Semester is the primary program upon which the other programs at SEA are designed. SEA Semester was developed in direct collaboration

and affiliation with Boston University. Over time, SEA has sailed with students “studying abroad” for a college semester from 300 colleges and has formally affiliated with nearly 30 colleges/universities nationwide.

The SEA sailing vessels—134-foot brigantines—operate year-round. The SSV *Corwith Cramer* sails the waters of the North Atlantic and the Caribbean Sea, while the SSV *Robert C. Seamans* sails the waters of the Northern and Tropical Pacific.



**The SSV
Corwith Cramer
under full sail.**

Photo courtesy of Sea Education Association

Woods Hole Research Center

www.whrc.org

The Woods Hole Research Center was founded in 1985 to address global environmental problems. The 40-member staff engages in scientific research, global environmental policy, and education. Research focuses on the interaction of climate, soils, and living systems, with special emphasis on forests because of their controlling influence on these interactions. Projects include the effects of fire, logging, and land-use change in the tropical forests of Brazil and Central Africa, the boreal forest of Siberia, and in New England. Using satellite imagery, the Center's remote sensing lab creates computer-generated maps to monitor the earth's vegetation. The program on Science in Public Affairs works in the international arena to foster agreement on ways to safeguard the health of the planet. The Center created the World Commission on Forests and Sustainable Development, and the treaty on climate change, now ratified by over 160 nations, was drafted by Center staff. The education program is concerned with training

the coming leaders of environmental science in Brazil and Russia and postdoctoral American scholars.

The Woods Hole Research Center's Gilman Ordway Campus opened in the spring of 2003. The 19,300 square-foot building is intended as a model for 21st century construction in its use of energy, water, and environmentally friendly materials. Photovoltaic panels, ground source heat pumps, recycled woods, and a wastewater denitrifying system are among the sustainable measures employed at the building.



Photo courtesy of the Woods Hole Research Center



Founded 1985

The Woods Hole Research Center, Ordway Campus.

Contact Information

The Woods Hole Science Aquarium at NOAA Fisheries, Marine Biological Laboratory's Robert W. Pierce Visitors Center, and Woods Hole Oceanographic Institution's Exhibit Center and Information Office are open to the public.

Marine Biological Laboratory

Main Phone: 508-548-3705
Associates: 508-289-7281
Communications Office: 508-289-7423
Robert W. Pierce Visitors Center/
Gift Shop: 508-289-7230
Call for hours
7 MBL Street
Woods Hole, MA 02543
www.mbl.edu

National Marine Fisheries Service

Main phone: 508-495-2000
Aquarium: 508-495-2001 (Free adm.)
Mid-June to mid-September:
Tues.-Sat. 11am-4 pm
Rest of year: Mon.-Fri. 11am-4 pm
166 Water Street
Woods Hole, MA 02543
www.nefsc.nmfs.gov

United States Geological Survey

Main Phone: 508-548-8700
Crawford and Gosnold Laboratories
384 Woods Hole Road
Woods Hole, MA 02543
woodshole.er.usgs.gov

Sea Education Association

Main Phone: 508-540-3954
Admissions: 800-552-3633 ext. 770
171 Woods Hole Road
Falmouth, MA 02540
Mailing address: P.O. Box 6
Woods Hole, MA 02543
www.sea.edu

Woods Hole Oceanographic Institution

Main Phone: 508-457-2000
Associates Program: 508-289-4895
Academic Programs Office: 508-289-2200
Exhibit Center: 508-289-2663
Memorial Day to Labor Day:
Mon.-Sat. 10am-4:30pm, Sun. 12-4:30pm
Off-Season: Call for hours
Human Resources: 508-289-2253
Information Office: 508-289-2252
Media Relations Office: 508-289-3340
Mailing address: 266 Woods Hole Road
Woods Hole, MA 02543
www.whoi.edu

Woods Hole Research Center

Main Phone: 508-540-9900
149 Woods Hole Road
Falmouth, MA 02540
Mailing address: P.O. Box 296
Woods Hole, MA 02543
www.whrc.org



Map by Jayne Doucette, WHOI Graphic Services

Woods Hole at a Glance

Marine Biological Laboratory (MBL)

www.mbl.edu

508-548-3705

MBL is a private, nonprofit international center devoted to basic research and education in biology, biomedicine, and environmental science.

National Marine Fisheries Service (NMFS)

www.nefsc.nmfs.gov

508-495-2000

NMFS is the federal agency with stewardship responsibility for our nation's living marine resources. The Woods Hole Laboratory serves as headquarters for the Northeast Fisheries Science Center of the NMFS.

Sea Education Association (SEA)

www.sea.edu

508-540-3954

SEA offers programs for college and high school students and teachers primarily through classroom and at-sea experience aboard a traditional sailing vessel.

United States Geological Survey (USGS)

woodshole.er.usgs.gov

508-548-8700

The USGS Woods Hole Science Center, a federal government agency, conducts geoscience research on the Atlantic continental margin, in the Great Lakes, and in coastal regions around the nation.

Woods Hole Oceanographic Institution (WHOI)

www.whoi.edu

508-457-2000

WHOI conducts research around the world in oceanography and ocean engineering and is the largest private, nonprofit marine research and higher education organization in the U.S.

Woods Hole Research Center (WHRC)

www.whrc.org

508-540-9900

The Woods Hole Research Center addresses global environmental problems related to climate change, land-use changes in tropical and boreal forests, and the health of the planet.