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Marine science resources

Starting points for researchers and students

The American journalist and author Ambrose Bierce once defined the ocean as a body of water occupying about two-thirds of a world made for man who has no gills. Perhaps it is for this reason that humans are so captivated by the marine environment, for it is one that has been the least understood. Despite the fact that the ocean covers the majority of the Earth's surface and contains many organisms unique to it, human knowledge of the ocean is significantly less than that of terrestrial life. Yet with continued advancements in technology over the last 150 years, humans have increasingly ventured into the deep. And with a new millennium of ocean exploration upon us, the need to improve our understanding of the ocean environment and its impact on humans is paramount.

Like the oceans, the Web is also a complex and deep environment in need of human understanding. Despite the pervasiveness of Google and other search engines, finding information on the marine environment can be complex and daunting. By no means comprehensive, this guide serves to provide a starting point for researchers and students using the Internet to study this area. While emphasis has been placed on those sites significant for academic studies, many of these sites may appeal to the general public as well.

Metasites and general

AquaNIC: Aquaculture Network Information Center. Coordinated by the Mississippi-Alabama Sea Grant Consortium, AquaNIC is a gateway to the world's electronic aquaculture resources. AquaNIC provides links to thousands of state, national,

and international aquaculture publications; newsletters; visual media; calendars; job services; directories; and specialty sections for species and production systems. *Access:* <http://www.aquanic.org/>.

Census of Marine Life (CoML). Coordinated by the Consortium for Oceanographic Research and Education, CoML is a decade-long, international research program assessing and explaining the diversity, distribution, and abundance of marine organisms throughout the world's oceans. Through field studies and other projects, ranging from analyzing historical documents to modeling future ecosystems, CoML will enable scientists to compare what once lived in the oceans to what lives there now, and to project what will live there in the future. *Access:* <http://www.coml.org/comml.htm>.

EurekaAlert Marine Science Portal. Maintained by the American Association for the Advancement of Science, the Marine Science Portal is an online global news service and directory providing links to digital libraries, databases, educational tools, maps, U.S. and international laws and regulations, programs, publications, and organizations. Of particular value are the press releases announcing significant news, new articles in journals, funding opportunities, and meeting dates. *Access:* <http://www.eurekaalert.org/marinescience/>.

OceanPortal. Maintained by the IOC Ocean Services Section of UNESCO, OceanPortal includes a directory of Web

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sites providing information and data about the ocean and ocean-related topics. These include sections on marine data resources, scientific topics, agencies and institutions, associations, commerce and trade, marine policy and conservation, and an extensive list of resources for librarians. *Access:* <http://ioc.unesco.org/oceanportal/>.

UN Atlas of the Oceans. An Internet portal providing information relevant to the sustainable development of the oceans, the UN Atlas of the Oceans is designed for policymakers needing to become familiar with ocean issues and for scientists, students, and resource managers needing access to databases and approaches to sustainability. *Access:* <http://www.oceansatlas.com/>.

Federal offices, agencies, and programs

Coastal and Marine Geology Program (CMGP), U.S. Geological Survey. CMGP is charged with studying the marine geology of the nation's coastal and offshore marine environment. The site provides access to the Interactive Map Server, allowing users to view and create maps using available CMGP datasets; sea floor mapping surveys; and an online resource locator for finding research projects, educational materials, photographs, movies, maps, publications, and datasets. *Access:* <http://marine.usgs.gov/>.

National Oceanic and Atmospheric Administration (NOAA). NOAA is the lead federal science-based agency responsible for predicting changes in the oceanic and atmospheric environments and living marine resources and providing related information to a diverse body of user groups. The NOAA site is a valuable starting point for obtaining information on tides and currents, current and archived weather data, buoy data, series statistics, marine mammal protection efforts, paleoclimatology, air quality and atmospheric processes, coastal services and management, navigation, mapping, real-time imagery and remote sensing, and historical information. *Access:* <http://www.noaa.gov/>.

National Centers for Coastal Ocean Science (NCCOS). Formed within the Na-

tional Ocean Service in March 1999, NCCOS centralizes all of NOAA's coastal research centers in one group. NCCOS conducts and supports research, provides monitoring and assessment, and offers technical assistance to people managing coastal ecosystems and society's use of them. Information on coastal ecosystems, particularly climate change, extreme natural events, pollution, invasive species, and land and resource use is available. Also included on the site is a searchable catalog of NCCOS publications from 1968 to the present, some of which are available full text. *Access:* <http://www.nccos.noaa.gov/>.

National Oceanographic Partnership Program (NOPP). An innovative program established by Congress in 1997, NOPP facilitates new interactions among 15 federal agencies, academia, and industry to increase visibility for ocean issues, and achieve a higher level of coordinated effort and synergy across the broad oceanographic community. Information on funding opportunities, projects, reports, and a national integrated and sustained ocean observing system are available. *Access:* <http://www.nopp.org/>.

Office of Wetlands, Oceans, and Watersheds (OWOW). One of four program offices within the Office of Water at the Environmental Protection Agency, OWOW manages, protects, and restores the water resources and aquatic ecosystems of marine and fresh waters in the United States. This Web site is an excellent source of information on estuaries, lakes, rivers and streams, and wetlands. Also available is information on pollution assessment and monitoring and habitat restoration. Users can also access the 2002 National Water Quality Assessment Database for state-reported water quality information and assessments of individual waterbodies along with information and datasets for Total Maximum Daily Load by EPA regions and the states. *Access:* <http://www.epa.gov/OWOW/>.

Sea Grant. Administered through NOAA, Sea Grant is a nationwide network of 30 university-based programs that work

with coastal communities to conduct scientific research, education, training, and extension projects designed to foster science-based decisions about the use and conservation of aquatic resources. Users can access information on theme research and national priority areas, funding opportunities, outreach and education initiatives, and a searchable directory of Sea Grant programs and directors through the Web site. *Access:* <http://www.nsgo.seagrant.org/>.

International organizations

Intergovernmental Oceanographic Commission (IOC). IOC is an agency of the United Nations Educational, Scientific and Cultural Organization (UNESCO) whose mission is to provide a mechanism for global cooperation in the study of ocean and coastal issues. Information on IOC efforts to study and facilitate marine environmental protection, fisheries and ecosystems, climate change, ocean observation and monitoring, coastal management, data management, and disaster mitigation, along with news and announcements, is available. A searchable interface for access to IOC publications and reports, some of which are accessible in full text, is also provided on the Web site. *Access:* <http://ioc.unesco.org/>.

International Council for the Exploration of the Sea (ICES). Founded in 1902, ICES is an organization that coordinates and promotes marine research in the North Atlantic. It is the prime source of advice on the marine ecosystem to governments and international regulatory bodies that manage the North Atlantic Ocean and adjacent seas. Users can access the ICES database, DATRAS, to obtain data on fish distribution from trawl surveys in the North Sea, Baltic Sea and Southern and Western part of the Atlantic Ocean, and obtain yearly catch records from 1973 to 1990 for more than 200 species in the Northeast Atlantic Ocean using the site's Fish Stats section. Also available via the ICES Web site is information on fish stocks and marine ecosystems, status reports on ocean climate (1998–2004), zooplankton (1999–2002), maps

presenting the distribution of diseases of the fish and shellfish, and maps representing harmful algal bloom events from 1990 to 1999. *Access:* <http://www.ices.dk/>.

International Tsunami Information Center (ITIC). Established in 1965 by the Intergovernmental Oceanographic Commission of UNESCO, the ITIC monitors the activities of the Tsunami Warning System in the Pacific. The Web site also provides information about tsunamis; what to do in case of a tsunami; access to the Historical Tsunami Databases for the Mediterranean, Atlantic, and Pacific oceans; a directory of tsunami experts; links to tsunami-related research efforts; and a list of ITIC publications organized by year. *Access:* <http://ioc3.unesco.org/itic/>.

International Whaling Commission (IWC). Set up under the International Convention for the Regulation of Whaling in 1946, the IWC reviews and revises measures which govern the conduct of whaling throughout the world. The Web site provides brief summaries on the classification of species, life history, abundance estimates, and some descriptions of individual whale species. Individuals can also access information on catch limits, welfare issues, whale sanctuaries, environmental impacts on whales, a list of member nations, latest news, and information on ordering IWC publications, including the Reports of the International Whaling Commission. *Access:* <http://www.iwcoffice.org/>.

Academic societies and organizations

American Elasmobranch Society. This society is a nonprofit organization that seeks to advance the scientific study of living and fossil sharks, skates, rays, and chimaeras. The Web site includes information on species profiles, meetings, funding, bookstore, links to Web sites on elasmobranchs, and careers. Also included is an image gallery and link to the International Shark Attack File. *Access:* <http://www.flmnh.ufl.edu/fish/organizations/aes/aes.htm>.

American Fisheries Society (AFS). Founded in 1870, AFS is the oldest and largest professional society representing fisheries

scientists who work to improve the conservation and sustainability of fishery resources and aquatic ecosystems by advancing fisheries and aquatic science and promoting the development of fisheries professionals. Links to meetings, AFS chapters and divisions, an online bookstore, career information and job postings, and educational information are available. *Access:* <http://www.fisheries.org/html/index.shtml>.

American Society of Limnology and Oceanography (ASLO). A leading scientific organization for researchers and educators in the field of aquatic science. Information on publications, membership, funding, careers and job opportunities, minority programs, meetings, public policy, and related links are available. *Access:* <http://aslo.org>.

Consortium for Oceanographic Research and Education (CORE). A nonprofit organization representing 74 of the nation's academic institutions, aquaria, nonprofit research institutes, and federal research laboratories, CORE conducts a variety of public policy, research, and educational activities. A directory of CORE institutions along with links to research and education programs, federal ocean agencies, policy reports and speeches, weekly reports, employment opportunities, and related links are available on the site. *Access:* <http://www.coreocean.org/>.

Crustacean Society. This scientific organization focuses on the study and dissemination of knowledge regarding all aspects of the biology of the crustacea. The site includes information on society business and news, various downloads, and links to crustacean-related resources on the Web. *Access:* <http://www.vims.edu/tcs/>.

National Association of Marine Laboratories (NAML). NAML is a nonprofit organization representing 120 member laboratories providing academic, research, and public service programs. NAML is composed of three regional associations: Northeastern Association of Marine and Great Lakes Laboratories, Southern Association of Marine Laboratories, and the Western Association of Marine Laboratories. The site includes infor-

mation on meetings, funding and educational opportunities, downloadable videos, job postings, information on minority recruitment and retention, links to affiliated marine laboratories, and LABNET (a pilot project for sharing data from multiple coastal data systems). *Access:* <http://www.naml.org/>.

Scientific Committee on Oceanic Research (SCOR). Established by the International Council for Science in 1957, SCOR is a leading nongovernmental organization promoting international cooperation in planning and conducting oceanographic research. Links to the SCOR newsletter, meetings, research highlights, national reports, and research cruises are available. *Access:* <http://www.jhu.edu/~scor/>.

Society for Marine Mammalogy. Founded in 1981, the Society for Marine Mammalogy studies, evaluates, and promotes the educational, scientific, and managerial advancement of marine mammal science. Information on meetings, funding and educational opportunities, publications, careers, and links to related sites are available on the site. *Access:* <http://www.marinemammalogy.org/>.

Databases and catalogs

FishBase. Developed at the International Center for Living Aquatic Resources Management in collaboration with the Food and Agriculture Organization of the United Nations and many other partners, FishBase covers more than 25,000 species of fish and has more than 70,000 synonyms and 180,000 common names in more than 200 languages. More than 35,000 pictures illustrate these fish, and information about them has been extracted from 20,000 references. The classification of higher taxa follows the version of William N. Eschmeyer's Catalog of Fishes. Data includes family, order, class, environment, climate, importance, resilience, distribution, biology, ecology, diet, reproduction, and references. *Access:* <http://www.fishbase.org/home.htm>.

Marine Realms Information Bank (MRIB). A collaborative effort of the USGS Coastal and Marine Geology Program at the

Woods Hole Field Center and Woods Hole Oceanographic Institution, the MRIB Web site is a distributed geolibrary that catalogs and provides organized access to information about coastal and marine environments, the adjacent parts of the atmosphere and solid Earth, as well as to people, techniques, and organizations involved in marine science. *Access:* <http://mrrib.usgs.gov>.

NOAA Central Library Catalog. An online bibliographic catalog containing the holdings of NOAA libraries around the country, and, in some cases, containing the full text of the documents cataloged. Collections consist of reports, special data files and datasets, documents, articles, and audiovisual resources related to ocean and atmospheric sciences. *Access:* <http://www.lib.noaa.gov/>.

ReefBase. An online information system on coral reefs, ReefBase provides information services to coral reef professionals involved in management, research, monitoring, conservation, and education. ReefBase provides data and information on the location, status, threats, monitoring, legislation, and management of coral reefs in 131 countries, along with data on coral bleaching between 1963 and 2005, downloadable datasets, and a bibliography of nearly 23,400 publications. *Access:* <http://www.reefbase.org/>.

Sea Grant Database. Maintained by the National Sea Grant Library, this database includes 36,000 bibliographic records for various Sea Grant publications, and, in many cases, the full text of the document is also available online through the database. Subjects include oceanography, marine education, aquaculture, fisheries, limnology, coastal zone management, marine recreation, and law. *Access:* <http://nsgd.gso.uri.edu/searchguide.html>.

WODselect. The WODselect interface allows a user to search the World Ocean Database 2001 using user-specified search criteria. The World Ocean Database is the world's largest profile collection covering the oceans and contains measurements from 1874 through 2000. Retrieval options include data on temperature, salinity, dissolved oxygen, inorganic phosphate, and 20 other profiles.

Access: <http://www.nodc.noaa.gov/OC5/SELECT/dbsearch/dbsearch.html>.

Discussion lists and e-newsletters

CORAL-LIST. Provides a forum for Internet discussions and announcements among coral health researchers and scientists pertaining to coral reef health and monitoring throughout the world. *Access:* <http://www.coral.noaa.gov/>

FishNews. An automated, e-mail newsletter distributed by the NOAA Fisheries Services that provides electronic notification of important actions, rules, policies, and programs that may be of interest to researchers, practitioners, educators, and the public. *Access:* <http://www.nmfs.noaa.gov/shnews.htm>.

IAMSLIC. Discussion list for the International Association of Aquatic and Marine Science Libraries and Information Centers, an association of individuals and organizations interested in aquatic and marine library and information science. *Access:* <http://www.iamslic.org/about/listproc.html>.

MARBIO. Discussion list providing a forum for all issues of interest to marine scientists throughout the world. *Access:* <http://www.mote.org/marbio.phtml>.

Marine Science and Education Lists. A directory of discussion lists related to marine science compiled by the Sea Grant Marine Advisory Program at the Virginia Institute of Marine Science. *Access:* <http://www.vims.edu/adv/ed/lists.html>. *↗*

More resources online

A more complete marine science resource listing, including links to status reports not covered here, is available online. Visit www.acrl.org/c&rlnews.

Correction

In the May 2005 Internet Resources article, "Women's resources," the National Organization for Women (NOW) was mistakenly referred to as the National Organization of Women. The editors regret the error.