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Professional Marine Careers
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Professional Marine Careers

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Cooperative Extension Service
Michigan State University



Marine Careers

This is designed to help students gain a better understanding of the many marine-type careers. This is not a comprehensive listing, but includes examples of job descriptions from scientific, professional, and technical fields.

It should also assist college-oriented students in choosing high school and college courses that will prepare them for these positions. A number of colleges and universities offer undergraduate courses in marine-oriented subjects.

No effort has been made to specify undergraduate courses that would lead to graduate school placement in the various disciplines. Individual graduate schools' requirements should be obtained from the respective schools.

Some of the job opportunities do not require college degrees but may instead require special training. Students should request further information on this training from their guidance office or career resource center.

Michigan, along with certain other states, is instituting marine vocational/technical programs at the high school level. Contact the Michigan Department of Education for a list of these schools.

Training for certain jobs may be obtained by "on-the-job" experience without the need for post-secondary school studies. The availability of these jobs depends upon the condition of the general job market.

Wherever mentioned, the word "marine" is used in its broadest context, referring to both salt and fresh water systems.

Professional Careers

Education/Training

A broad range of high school studies and an interdisciplinary college program should generally be undertaken before specialization is sought. Professional personnel are highly trained, usually possessing at least an undergraduate college degree. Assistants to professionals require training in specific aspects of technology, business, or science.

Job Availability

There are generally more professional positions available in the job market than scientific openings, but substantially fewer than the technical positions.

Environmental Affairs Positions

Environmental Health Services Sanitarians plan and conduct programs related to sanitation. They promote the maintenance of health standards, and monitor the use of oceans for waste disposal. Sanitarians also enforce laws regarding handling, dispensing, and consumption of food from coastal waters.

Environmental Health Services Toxicologists detect and analyze poisonous substances in the oceans.

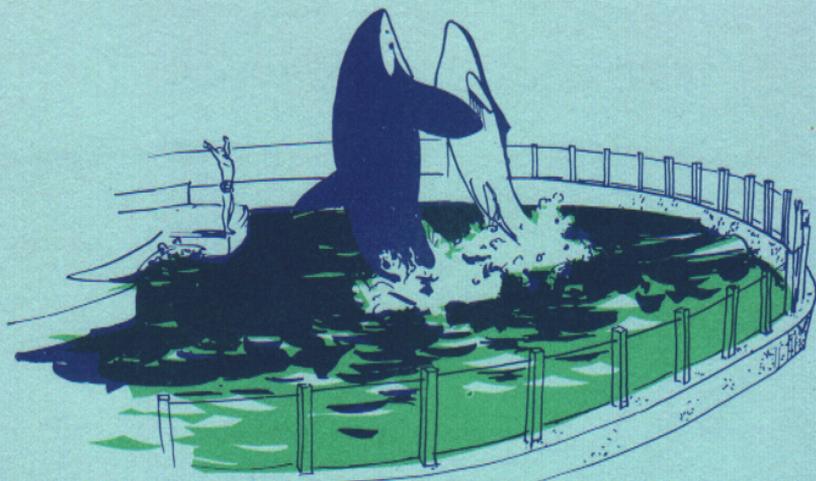
Environmental Planners attempt to prevent and alleviate environmental problems through the effective use of existing land, taking into consideration appearance as well as land use. They estimate the long-range needs of the coastal zone for a wide variety of problems and services.

Environmental Regulation personnel inspect all phases of coastal zones, and through governmental agencies (e.g., EPA) set guidelines for the implementation of a broad range of regulations.

Business and Industry Positions

Port Authority Management personnel are responsible for the efficient operation of port activities. Duties include such things as scheduling the in-port activities of cargo vessels, and managing port loading, off-loading, and storage facilities.

Marine Economists study and analyze the economic factors involved in marine-related products



distribution, and the use of goods and services. Techniques of financing and marketing are examined, and improvements are suggested. Organizational structures of marine-related business concerns are outlined. Governmental regulations and requirements are studied.

Seafood Processors utilize practical scientific and technological food processing data and procedures in the marine food processing industry.

Market Research Analysts monitor and analyze the marine products market in an attempt to answer questions about consumers, dealers, and competitors. The products include seafood, boats and accessories, and fishing equipment. The analysts work in research involving social and economic trends, as well as human motives and patterns of human behavior.

Museum and Aquarium Administrators manage the business aspects of, and oversee the construction of displays in museums and aquaria.

Energy and Mineral Explorers are engineers, geologists, and technicians engaged in exploration and research in natural gas, oil, and minerals located under offshore waters.

Marine Insurance personnel research and write insurance policies to cover both commercial and private fishing vessels, cargo transports, recreational boats, and marinas.

Consultation and Educational Positions

Coastal Resources personnel compile inventories of coastal resources upon which are based technical recommendations concerning coastal zone planning and management.

Education personnel prepare and disseminate a broad range of marine education materials to students, teachers, and the general public. They may also instruct in environmental and marine-related problems.

Education personnel fulfill the essential needs to create marine awareness and provide the insight necessary for long-range decision making on matters of global conservation. They may teach any of the following audiences: elementary and secondary, college and university, vocational, technical, public awareness groups, and museums and aquaria.

Fisheries personnel work as field specialists with experience and training in fisheries biology, management, and gear technology. They consult with such groups as agency fisheries staff, commercial fishermen, sport fishermen, and consumers.

Recreation personnel provide information to coastal planners, boating businessmen, marine insurance specialists, environmentalists, and marine researchers regarding coastal planning for marine recreation (swimming, boating, sport fishing, beachcombing, diving, etc.).

Ocean/Coastal Lawyers are responsible for the implementation and interpretation of national and international marine law, and the laws governing coastal zone management. An Admiralty lawyer specializes in legal matters that relate to inland waters and the high seas.

Environmental Lawyers implement and interpret Federal and State environmental law.

Engineering Positions

Ocean and Coastal Engineers study beach erosion, littoral drift, and the effects of tides, currents, and weather on the stability of coastal features. Physical forces that affect harbor, inlet, and waterway maintenance are also studied. They also do research and development on materials and structures to be used in the marine environment.

Mechanical Engineers work on prototype design, development, and tooling. They design and test the structural integrity of manufactured parts. They work on marine engines (gas and diesel), generators, steering, control, castings, pumps, hydraulics systems, plumbing, hardware, and extrusions.

Oceanographic Equipment Engineers design and build systems and instruments for oceanographic research and operation. Other tasks include laying cables,

supervising underwater construction, locating sunken ships, and handling the recovery of sunken cargoes.

Naval Architects design and draw up plans for waterborne vessels, whether floating, fixed, or submerged, and supervise their construction. They usually design the complete vessel system.

Civil Engineers perform a variety of engineering work; they plan, design and oversee construction and maintenance work in and around specific harbor areas or projects. The civil engineer also supervises field survey parties and maintains an accurate and up-to-date set of topographical maps indicating the depth, contour and other characteristics of the harbor area. They also prepare plans for required maintenance and construction projects and inspect these projects.

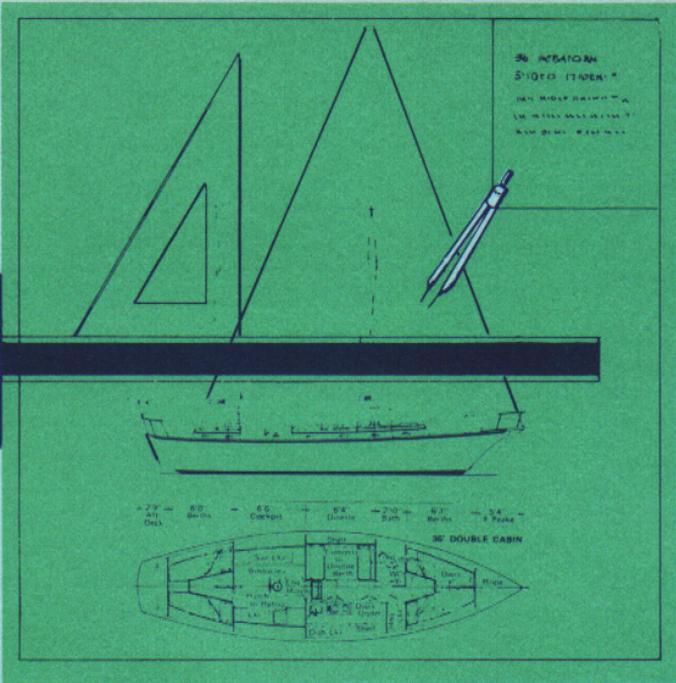
Petroleum Engineers devise methods to improve oil or gas well production and determine the need for new or modified tool designs. In addition to studying geological surveys, earth samples, and other data, they advise on the type of derrick and drilling equipment to be used for new wells. They oversee drilling operations and offer technical advice in order to achieve satisfactory economical progress. They direct tests on boreholes to determine pressures, temperatures, direction of drilling, strata encountered and other factors. Finally, they devise methods for bringing wells into production, for controlling oil or gas flows, and for re-establishing these flows by artificial means after they have ceased naturally.

Environmental Engineers specialize in applying engineering principles and practices to marine environmental problems with a view to improving and protecting living conditions. They seek to limit the degradation of natural resources, and to wisely manage the environment.

Acoustic Engineers are responsible for the design and implementation of sound systems used in the marine environment for such purposes as remote sensing (as with sonar) or underwater communications.

Project Engineers develop specifications for lighting, steering, controls, and other sub-assemblies. They develop the structure and construction of new boats, resolving technical problems as they arise. The project engineer supervises all phases of project development, and develops schedules, estimates production costs, and performs cost-and-schedule analyses.

Fisheries Engineers operate and design a wide range of gear including pumps and engines, fishing tackle, and dock-side facilities.



Electronic Engineers design highly sensitive electronic instruments used in all phases of oceanographic research. The instruments include sonar and radar equipment, ship-to-shore communication equipment, and all types of biological, physical, and chemical monitoring systems.

Sanitary Engineers design systems of waste disposal to be used in or near the marine environment.

Plastics Engineers study the properties and structure of materials used in the plastics/fiberglass industry. They study vacuum forming, dye casting, extrusion, and other processes that are used in the production of such products as pleasure boats.

Merchant Marine Positions (Officers)

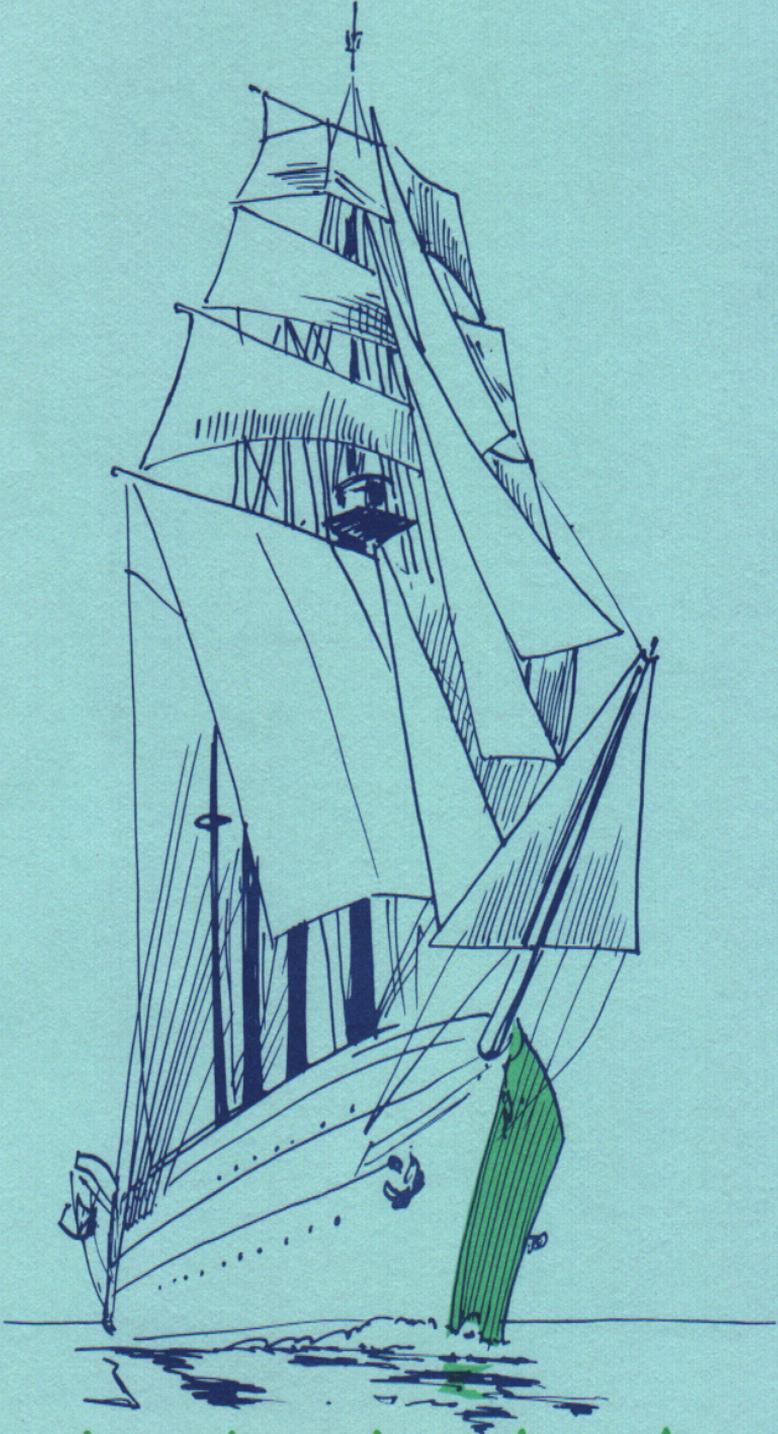
Captains are responsible for the operation of the ship, and supervise the deck, engine, and steward's crews, as well as the radio operator. They set the course of the ship and maintain the ship's log. They are responsible for maintaining order, and the safety of the passengers, crew, cargo, and vessel. Although formal education is not mandatory, advancement to a captain's position on some modern and automated ships can be obtained much more easily with formal schooling at a merchant marine academy.

Radio Operators operate, maintain, and repair the radiotelegraph and accessories aboard ship. In addition to these duties, the radio officer maintains a log of messages transmitted and received, time signals, and weather position reports. They also

monitor emergency frequencies for ship and distress calls.

Pursers supervise those activities related to shipboard business functions. They maintain payroll records, pay crew wages, and prepare the ship's entrance and clearance papers for visiting foreign ports. When discharging cargo in port, the purser checks the cargo manifest and supervises the storage and removal of baggage.

First Officers (First Mates) are second-in-command to the captain. They assign duties to the crew and



maintain order and discipline on board. In addition, they plan and oversee loading, unloading, and storage of the ship's cargo. They also aid the captain in directing the ship in and out of ports.

Second Officers (Second Mates) are navigation officers. They see that the vessel is equipped with the necessary navigational charts and equipment, and that the equipment is properly maintained.

Third Officers (Third Mates) serve as signal officers, and are responsible for all signaling equipment. Care and maintenance of the navigating bridge and chart room are their supervision. They also assist the first officer in supervising the loading, unloading, and storage of cargo.

Chief Engineers oversee operations of the power plant and mechanical equipment. Chief engineers are responsible for the log of equipment and supplies used in the engine department, as well as for maintaining and operating engines, boilers, deck machinery, electrical, refrigeration, and other related mechanical equipment aboard ship.

First Assistant Engineers supervise activities associated with starting, stopping, and speed control of the ship. The first assistant engineer also oversees the maintenance and repair of all engines, motors, and generators aboard ship.

Second Assistant Engineers are responsible for boiler maintenance, and operation of all associated boiler equipment.

Third Assistant Engineers oversee maintenance of the lubrication and engine auxiliary systems (such as the evaporator used to convert sea water to drinking water). They may also be responsible for electrical and refrigeration systems aboard ship.

Fine Arts Positions

Authors often use the marine environment as a setting for their works. Some authors are noted for incorporating the sea's many moods into their works.

Painters use maritime settings even more, perhaps, than authors. Marine scenes have always attracted artists and viewers alike.

Sculptors often specialize in creating works that represent different forms of marine life. Others create their works from materials that are from the marine environment.

Photographers find that marine settings are among the most colorful and diverse on earth. Some

photographers specialize in the field of underwater photography, taking both still and motion pictures.

Composers have also drawn from the rich maritime heritages of countries around the world to give their musical pieces life.

Government Related Positions (Local, State, Federal)

National Oceanic and Atmospheric Administration (NOAA) personnel are responsible for a wide range of duties that include weather forecasting, fisheries management, charting and navigation, coastal zone management, environmental research, data gathering, and university applied research programs.

U.S. Fish and Wildlife Service personnel are responsible for the conservation of the nation's wild birds, mammals, and fish for the enjoyment of all people. They coordinate with public agencies and private groups to achieve this end.

Coastal Zone Management personnel identify areas encompassed by the coastal zone and analyze the effects that changes in those zones have on interdependent units in areas designated as natural ecosystems. They also develop management criteria for carrying out land and water use guidelines in coastal areas.

Natural Resources personnel work toward the effective management of public land and water resources. They are usually the intermediary between legislators and the public on matters concerning natural resources.

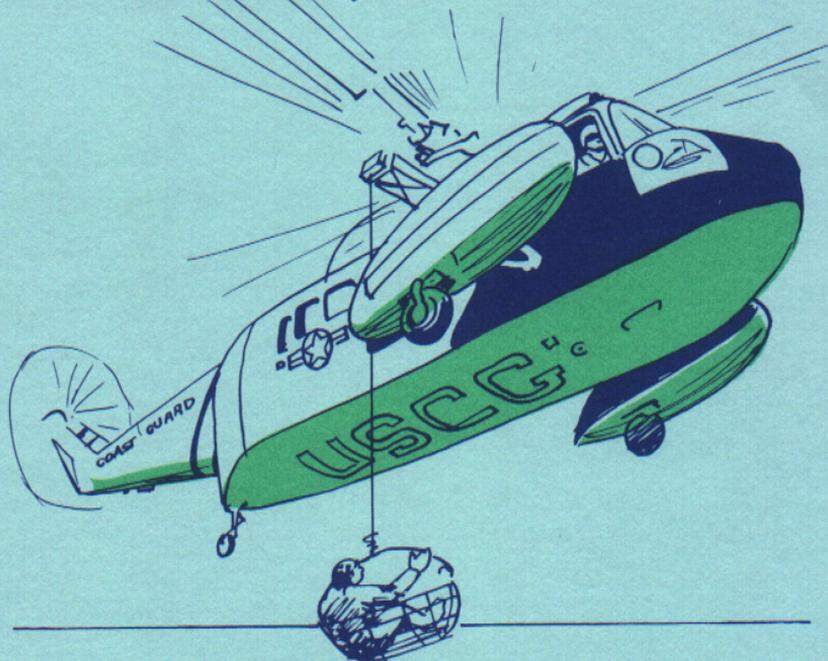
Wetland Management personnel develop systems for rating the quality of existing wetlands to set preservation priorities, and work with local and state officials to determine the possibilities for creating new artificial wetlands from environmental wastes.

U.S. Environmental Protection Agency (E.P.A.) personnel enforce a variety of federal laws concerning pollution control and the maintenance of environmental quality.

State Department of Health personnel seek to control pollution at its source, reduce health and safety hazards in the environment, improve the aesthetic value of the environment, and convert waste products to useful products.

Barrier Beach Management personnel identify areas to be regarded as barrier beaches, develop systems for their preservation, and determine policies for their use.

U.S. Coast Guard personnel are responsible for the protection of the nation's coastline. They regulate foreign and domestic fishing within U.S. coastal waters, promote recreational boating education, and maintain navigational markers. All tours of duty are within areas under U.S. jurisdiction.



U.S. Navy personnel perform a broad range of duties that involve seaborne military functions. Extensive research and development in ocean-related disciplines are carried out.

Army Corps of Engineers personnel are responsible for the design, construction, and maintenance of dams, navigational waterways, rivers, harbors, and shoreline structures.

Sheriff Marine Patrol officers are responsible for the enforcement of State boating laws, search and rescue of boating accident victims, body recovery, and marine safety education.

Other General Positions

Technical Writers produce manuals and technical publications dealing with all aspects of marine work. They also assist in the preparation and layout of publications used for recording research and technical work.

Statisticians collect, analyze, and interpret marine

data. They summarize findings in tables, charts, and written reports for use by professionals in the marine industry.

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