

The Society for Marine Mammalogy

STRATEGIES FOR PURSUING A CAREER IN MARINE MAMMAL SCIENCE

What is marine mammal science?

There are about 100 species of aquatic or marine mammals that depend on fresh water or the ocean for part or all of their life. These species include pinnipeds, which are seals, sea lions, fur seals and walrus; cetaceans, which are baleen and toothed whales, ocean and river dolphins, and porpoises; sirenians, which are manatees and dugongs; and some carnivores, such as sea otters and polar bears. Marine mammal scientists try to understand these animals' genetic, systematic, and evolutionary relationships; population structure; community dynamics; anatomy and physiology; behavior and sensory abilities; parasites and diseases; geographic and microhabitat distributions; ecology; management; and conservation.

How difficult is it to pursue a career in marine mammal science?

Working with marine mammals is appealing because of strong public interest in these animals and because the work is personally rewarding. However, competition for positions is keen.

There are no specific statistics available on employment of students trained as marine mammal scientists. However, in 1990 the National Science Board reported some general statistics for employment of scientists within the US: 75% of scientists with B.S. degrees were employed (43% of them held positions in science or engineering), 20% were in graduate school, and 5% were unemployed.

Marine mammal scientists are hired because of their skills as scientists, not because they like or want to work with marine mammals. A strong academic background in basic sciences, such as biology, chemistry, and physics, coupled with good training in mathematics and computers, is the best way to prepare for a career in marine mammal science. Persistence and diverse experiences make the most qualified individuals. Often developing a specialized scientific skill or technique, such as acoustics analysis, biostatistics, genetic analysis, or biomolecular analyses, provides a competitive edge.

What are typical salaries in marine mammal careers?

Marine mammal scientists enter this field for the satisfaction of the work, not for the money-making potential of the career. Salaries vary greatly among marine mammal scientists, with government and industry jobs having the highest pay. Salary levels will increase with years of experience and graduate degrees, but generally remain low considering the amount of experience and education needed. High competition in this field most likely will keep salaries at a modest level. A 1990 survey of 1,234 mammalogists conducted by the American Society of Mammalogists indicated that 42.7% of the respondents earned >\$40,000/year. The salary range that included the most respondents (21.2%) was the \$30,000-\$40,000 range.

What types of jobs involve marine mammals?

Most jobs with marine mammals are not as exciting or glamorous as popular television programs make them seem. Marine mammal studies often involve long, hard, soggy, sunburned days at sea, countless hours in a laboratory, extensive work on computers, hard

labor such as hauling buckets of fish to feed animals, hours of cleanup, numerous reports, tedious grant applications and permit applications.

As in other fields of science, jobs dealing with marine mammals vary widely. Examples of marine mammal jobs include researcher, field biologist, fishery vessel observer, laboratory technician, animal trainer, animal care specialist, veterinarian, whale-watch guide, naturalist, educator at any level and government or private agency positions in legislative, management, conservation, and animal welfare issues. Many marine mammal scientists work with museum displays and collections, as a curator, an artist, an illustrator, a photographer, or a film maker.

Answers to the following questions will help focus interests and indicate which marine mammal scientists and facilities to contact for education, work experience, and job opportunities.

- 1) What specific areas are of interest, e.g. anatomy, physiology, evolution, taxonomy, ecology, ethology, psychology, molecular biology, genetics, veterinary medicine, pathology, toxicology, biostatistics, management, conservation, museum curation, or education?
- 2) What species or group of marine mammals is of interest, e.g. cetaceans, sirenians or marine carnivores?
- 3) Is a career involved in field or laboratory work desired?
 - 4) Is a career involved with care of animals, teaching, research, or legislative/policy matters wanted?
 - 5) Is working for government, industry, academia, oceanaria, museums, private organizations, or self-employment best?
- 6) In what part of the world is work desired?

For example, the manatee is an endangered species in Florida. They have a high mortality rate because of accidental entrapment in flood control gates, collisions with speed boats, and loss of habitat. Local, state, and federal governments fund research on this species. Some local industries also are involved with management of manatees. Therefore, people wanting to study manatees most likely should look for education and work experience at universities and research facilities in Florida.

Who employs marine mammal scientists?

A variety of international, federal, state, and local government agencies employ marine mammal scientists for positions in research, education, management, and legal/policy development. U.S. federal agencies include the National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Minerals Management Service, US Fish & Wildlife Service, US National Biological Service, US Navy, Office of Naval Research, Coast Guard, and Marine Mammal Commission. Other Federal agencies that work on marine-related issues include the National Park Service, Army Corps of Engineers, Environmental Protection Agency, National Science Foundation, National Aeronautics and Space Administration, Department of State, and Smithsonian Institution.

When oceanic operations, such as oil and gas exploration, production, and transportation, affect marine mammals these industries often hires marine mammal experts. Because commercial fishing operations can conflict with marine mammal conservation, some fishing organizations hire marine mammal scientists. Many environmental, advocacy, and animal welfare organizations hire marine mammal specialists. Oceanaria and zoos hire marine

mammal specialists for veterinary care, husbandry, training, research, and education programs. Museums hire marine mammal specialists for educational programs, research, and curatorial positions.

What education is necessary to become a marine mammal scientist?

High School Studies:

A broad education is essential for finding employment in marine mammal science. High school courses such as biology, chemistry, physics, mathematics, computer science, and language will provide a good educational base. Consult a guidance counselor for help in selecting course work. Good grades are essential for admission to a university.

Undergraduate Studies:

Most entry-level marine mammal jobs require a B.S. degree, with a major in biology, chemistry, physics, geology, or psychology. A minor in any science, computer science, mathematics, statistics, or engineering also can be helpful. Good language and technical writing skills are essential. Many people are surprised by the amount of writing involved in marine mammal professions. Because marine mammals are found worldwide, foreign language training often is useful.

A student must first become a scientist before specializing in marine mammals. Generally, undergraduate students will concentrate on a basic science curriculum and rarely have an opportunity to take courses related to marine mammal science. Specialization in marine mammals generally comes later through practical work experience or while working toward an advanced degree. In other words, if your B.S. degree program does not include courses in marine sciences, do not become discouraged. Concentrate on finding practical experience and/or a master's degree with emphasis in marine mammal science. Maintaining a high grade point average as an undergraduate is very important to gain admission to graduate school.

Graduate Studies:

The master's degree is usually the first opportunity college students have to specialize in marine mammal science. Care should be taken to select an advisor with experience in the subject and a reputable university with a diverse curriculum that will enable focus on marine mammal science.

Students who have dual majors or interdisciplinary training sometimes have more employment opportunities. Because the field of marine mammal science is so diverse, students who train in specialized areas have practical tools that may help them gain employment. For example, a graduate degree in statistics can be very useful for entering the field of population assessment. A degree in electrical engineering can be particularly useful for bioacoustic research. A graduate degree in environmental law can be important for developing a career in government policy-making or conservation.

What additional career opportunities will a graduate degree provide?

With a B.S. degree, potential positions include animal care specialist, animal trainer, field technician, laboratory technician, consultant for industry, and entry-level government position. Generally, jobs at this level offer little opportunity for self-directed work.

The M.S. degree can facilitate individual work with marine mammals, e.g. designing research projects, developing management plans, supervising field or laboratory studies, or heading programs in education, husbandry, or training.

The acquisition of a Ph.D. or D.V.M. (or both) provides more career opportunities, including design and management of field and laboratory research programs, university faculty positions, coordination of government and industry programs, and management positions in oceanaria or museums.

Years of practical work experience sometimes can substitute for a graduate degree, but the time required to advance is typically longer.

How to find a university program in marine mammal science:

There are very few universities that offer a marine mammal science curriculum. To select an undergraduate university, visit campuses and talk with professors and students about career interests. Most university libraries or counseling centers have university catalogs to identify schools. In addition, there are several publications that list graduate programs by state and discipline, list marine mammal scientists by address, or summarize areas of research by marine mammal scientists (see list at the end of this brochure).

An interest in a certain marine mammal species may influence the geographic location of the graduate university selected. However, in most instances the best university is determined by selecting a graduate advisor specializing in a particular field.

Students should consider applying to several graduate schools. Application deadlines vary, but typically applications should be submitted in January for admission into a graduate program the following fall. Many universities require graduate school applicants to take the Graduate Record Examination (GRE) and include the test scores with their applications.

How to find an advisor for graduate studies:

Selecting an advisor for a graduate degree is a very important decision. He or she will become a mentor, a career-long colleague, and will help establish a network of scientific colleagues. An advisor helps to obtain funds to support graduate student research and helps make contacts for future employment.

First, identify marine mammal scientists who are doing current research in an area of interest, their university affiliation, whether they have funds to support graduate students, and if they are accepting new students. Keep in mind that many government and industry scientists also have adjunct appointments at universities and can serve as co-advisors.

There are two ways to find potential advisors:

1) Find the names of authors in current scientific journals, such as Marine Mammal Science, Aquatic Mammals, Journal of Mammalogy, Canadian Journal of Zoology, Journal of Zoology, Behavioral Ecology and Sociobiology, or Fisheries Bulletin, or in recently published books on marine mammals. Scientists who publish may be in situations where they can accept graduate students.

2) Attend specialized scientific conferences on marine mammals hosted by professional societies such as The Society for Marine Mammalogy, International Marine Animal Trainers' Association, European Association for Aquatic Mammals, European Cetacean Society, American Cetacean Society, or International Association for Aquatic Animal Medicine. Dates and locations of these meetings are published in the newsletter or journal of the respective societies. At these meetings, make a personal contact with a potential advisor and

express your interest in doing graduate work with him or her. Follow-up any good lead with a telephone call, letter, or visit.

Because there is competition for advisors in the field of marine mammal science, an advisor will select students from a pool of applicants. Students should realize that, unlike the case in undergraduate study, graduate school faculty do NOT have to advise students just because they are enrolled at their university. Students sometimes enroll at a university because of a well-known professor and assume they will have the opportunity to work under him or her. BEFORE entering a graduate program, contact the professor and establish his or her willingness to serve as an advisor. If necessary, discuss the possibilities of financial support and decide on a potential research project. Choose a thesis research topic carefully so it is practical, scientifically sound and potentially fundable. Seek advice from others on this, perhaps in the form of a draft research proposal. At many universities, the advisor needs to notify the graduate school to approve an application. Many prospective graduate students with good grades and experience are rejected because they do not have an advisor working from inside the university to facilitate their acceptance.

Many graduate schools will not accept students without financial support. Graduate assistantship funds for marine mammal studies are rare, and most graduate programs have a limited number of teaching assistantships. Students should be prepared to support themselves or find research funds on their own.

How to write a cover letter with an application:

To write the most appropriate cover letter with a job or graduate program application, carefully review the description of the position and tailor the cover letter to fit those requirements. Proper spelling and grammar are essential because they reflect the thoroughness of work. Include the telephone/fax number and address where you can be reached, so a potential employer or advisor can easily find you. Include a list of three names, addresses and telephone numbers of people who can be contacted for a recommendation. Contact these references in advance to ensure they are willing to provide a good recommendation.

What information to include in a résumé:

Opinions vary about the appropriate résumé style and length. The attached sample résumé provides some example headings and topics for a résumé. Remember that the priority of items on the résumé might be reordered or changed, depending on the specific job or graduate program. Proper spelling and grammar are essential! Many résumés end up in the "circular file" if spelling or grammar errors are detected. Expensive paper with fancy logos generally does not enhance an applicant's chances. [Sample Résumé](#)

How to obtain letters of recommendation:

Always ask a person directly if he/she is willing to write a supportive letter of recommendation. Consider asking past employers, work colleagues and instructors to write letters of support. Choose people who know you and your skills well. The best letters of recommendation are written to match the specific description of the job or graduate program. For example, an instructor will write a letter of recommendation with a different emphasis depending on whether the position is for research, teaching or graduate study. To facilitate this, always give the writer a copy of the job or graduate program description along with a résumé, a pre-addressed, stamped envelope and the deadline for submitting the letter of recommendation. If possible, provide an outline or draft proposal of any research to be conducted.

How to convince an advisor to accept a graduate student:

- 1) Talk to current or former graduate students of a particular advisor and ask how to promote yourself.
- 2) Send the advisor a letter and resume, inquiring about the possibility of working with him or her. Be specific about research interests and career goals. Follow-up with a telephone call or visit.
- 3) Initiate a personal contact with a potential advisor. Faculty members rarely request visits by potential students because such encouragement might be misconstrued as an agreement to serve as the student's advisor. As mentioned earlier, one good opportunity to meet a potential advisor is at a scientific conference. Another strategy is to contact a potential advisor, noting that you just "happen to be in the area" and would like to meet. It is very useful to be informed about the advisor's background, research interests and publications and point out ways that interests interface.
- 4) Gain practical work experience, which is an increasingly important factor in admission to a graduate program. Develop a well-rounded set of experiences, including work in the marine environment.
- 5) Publish in a scientific journal. Co-authoring a paper still can impress a potential advisor.

How to gain practical work experience with marine mammals:

As a high school or undergraduate student, practical experience can be gained by volunteering at federal, state, or local organizations that work with marine mammals. For example, volunteer as a laboratory assistant for a research project with marine mammals or volunteer for the marine mammal stranding network in the United States. Also, oceanaria, zoos, and museums often have large volunteer or docent programs. This volunteer experience provides practical skills, an employer reference, a network of contacts in the field of marine mammal science, and most importantly helps determine whether this type of work is appealing. Because they already have observed a volunteer's work habits and commitment, organizations often hire from their pool of volunteers. Many oceanaria, zoos, museums, and government agencies have internships that provide practical experience (see list at the end of this brochure).

Many careers in marine mammal science require experience in the marine environment. SCUBA certification, boat-handling experience, or sea time can be helpful in securing employment in the field of marine mammal science.

How to become a marine mammal trainer:

Most marine mammal trainers start by volunteering at an oceanarium or zoo. Often people work in other departments, such as operations, maintenance, or education, before transferring to a job in animal training. For the best advice about a career in marine mammal training, contact the [International Marine Animal Trainers' Association](#).

How to become a marine mammal veterinarian:

To become a marine mammal veterinarian, follow the basic curriculum and schooling of other veterinarians, but try to gain practical experience with marine mammals by volunteering at an oceanarium or zoo. A few veterinary schools are developing specialized course work in the area of exotic animal medicine, including marine mammals. For more information, contact the [American Veterinary Medical Association](#) and the [International Association for Aquatic Animal Medicine](#).

How to find out about jobs with marine mammals:

Often a good source for job announcements is the personnel department of a specific agency. The journal "Science" and "The Chronicle of Higher Education" list academic positions at junior colleges, colleges, and universities. Some sources of job announcements in marine mammal science appear at the end of this brochure.

Many jobs are not announced, rather are filled by volunteers at an organization, by a graduate student of a colleague, through an informal interview at a scientific conference, or from a recommendation by a colleague. In addition to what you know, who you know is very important in finding a marine mammal job. It is valuable to keep an active network of marine mammal colleagues. Attending scientific conferences is very useful for maintaining the network and identifying job opportunities. Electronic bulletin boards, such as [MARMAM](#) or [WHALENET](#) announce upcoming jobs. When looking for a job, make that fact known in these informal networks of marine mammal scientists.

Many job opportunities are a matter of being in the right place at the right time. Controlling the right time is difficult, but obtain the appropriate education, be in the right place, and wait for the right time. For example, chances of obtaining a career designing educational exhibits on marine mammals are greatly enhanced if a candidate has an M.S. degree and volunteers in the exhibits department of an oceanarium.

Good luck in pursuing a career in marine mammal science!

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