

AUT

A FUTURE IN
**MARINE
BIOLOGY**



WHAT IS MARINE BIOLOGY?

The oceans are among the world's most valuable sources of food, medicine and raw materials. New Zealand's most productive asset is its coastline and the surrounding marine environment. Any attempt to understand and utilise this potential is dependent on a well-developed awareness of marine biology, which involves marine ecosystems, the ecology and biology of marine flora and fauna, and their role and interactions within their environment.

Marine biologists are engaged in a vast array of interactions with the ocean, including aquaculture (land-based fish and shellfish harvesting for commercial purposes), mariculture (sea-based fish and shellfish harvesting for commercial purposes), research, conservation, and fishery management. New discoveries are occurring daily in the areas of marine biology and ecology, making this an exciting and dynamic industry with huge potential.

The oceans are not only a source of food and employment, they also provide us with great potential for pharmaceuticals and nutraceuticals from a variety of organisms. Such advances in medicine and nutrition are at the forefront of marine biology and medical research.

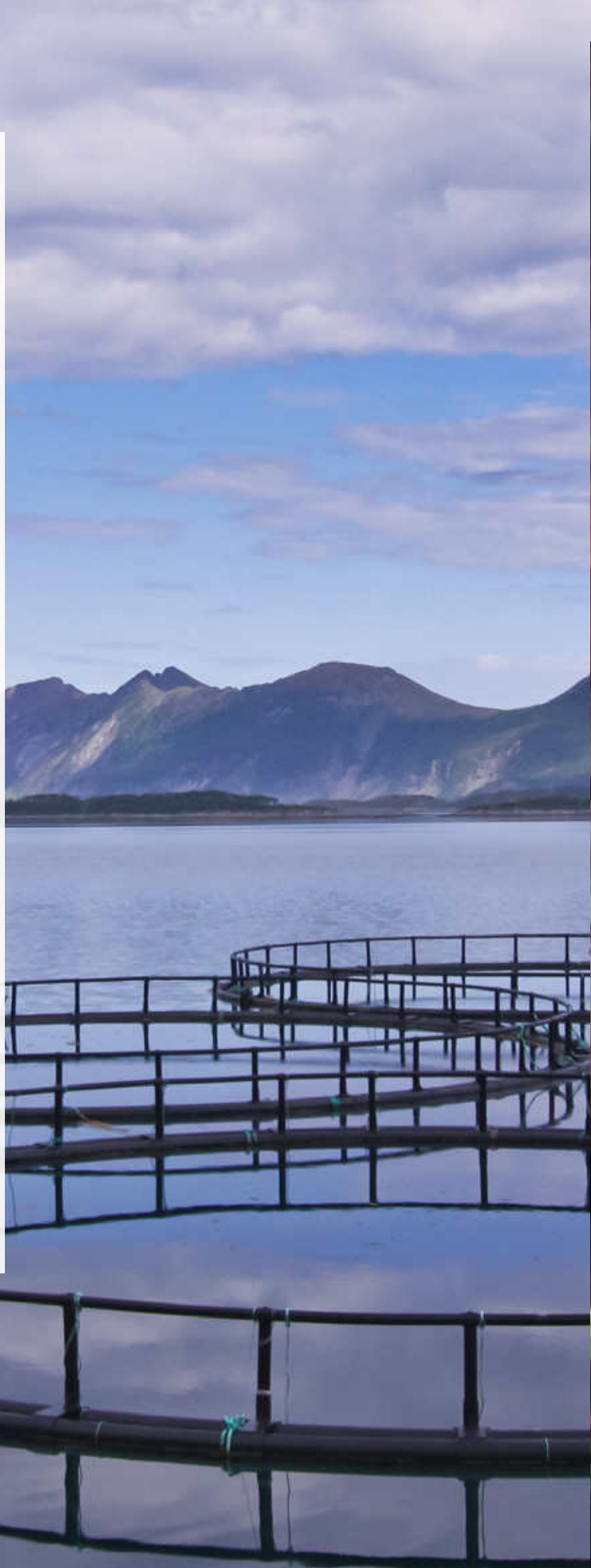
Graduates with marine biology knowledge are highly sought after in New Zealand. In particular, those with knowledge and expertise in fishery management are required to help manage and protect our multi-billion dollar fishing industry. Marine biologists are also highly sought after in Australia and the Pacific Islands, where coastal fisheries support millions of people, both nutritionally and economically.

Do you enjoy the marine environment and would you like your office to be in the outdoors?

Are you interested in the potential for the ocean to have a positive impact on our daily lives?

Are you a problem-solver who likes hands-on practical work?

Then a career in marine biology may be for you.



OUTLOOK AND TRENDS

Shortage of marine biologists

Marine biologists protect and manage New Zealand's extensive marine resources. Specialised knowledge and skills in fishery management and conservation are highly sought after by the Ministry of Primary Industries (MPI).

Marine biologists are also in high demand internationally, as coastal environments are increasingly the favoured choice for human settlement, where access to marine resources and recreation is easier. The management of coastal resources requires an in-depth understanding of aquatic ecosystems.

Significant role for iwi in marine biology

With the increasing number of Treaty of Waitangi settlements regarding the marine environment, iwi are having a growing influence over marine management in New Zealand. There is a need for Māori to support and employ their own scientists, in order to fulfil their role as kaitiaki (guardians).

Marine environmental monitoring in New Zealand

To begin the process of building a robust monitoring programme for New Zealand's marine environment, the MPI has commissioned the National Institute for Water and Atmospheric Research (NIWA) to build an online meta-database (inventory) containing high level information about time-series data that have been, or are in the process of being, collected from New Zealand's marine environment. People with knowledge in marine biology and ecology are required to help build and maintain this inventory.

This database (known as the New Zealand Catalogue of Marine and Environmental Monitoring Programmes) holds information about data owners and their contact details, variables monitored, where they are collected and how often.

Development of marine compounds for pharmaceutical products

The potential use of marine organisms for pharmaceuticals has been researched since the 1940s, and this field has huge opportunity for careers that combine marine and health expertise. As an example, marine sponges are acknowledged as a rich source of biologically active compounds with antitumour, antiviral, antibacterial, antifungal, antimalarial, antiprotozoal, and antituberculosis activities, and extensive effort has been made to isolate those compounds in the quest to find effective drug candidates.



WORK SETTINGS

Marine professionals can work in offices and laboratories, but they also work in rural areas, coastal waters or holding ponds and tanks, and may be required to work in all weather conditions.

Major employers are:

- Crown Research Institutes (CRIs), such as NIWA – the largest employer of marine biologists
- Universities
- Government agencies, such as the MPI and the Department of Conservation
- Regional councils
- Private companies such as aquaculture farms
- Environmental Risk Management Authority (ERMA)
- Fish and Game New Zealand

CAREER ROLE EXAMPLES

Fishery manager – manages the sustainable harvest of commercial fish stocks and monitors the activity of quota holders to ensure compliance with allocated limits.

Marine biologist – studies plants, animals and organisms that live in seawater, and their relationships with each other and their effect on ecosystems. Uses computer modelling techniques to predict future events in the marine environment, including the results of pollution.

Fisheries analyst – assists in developing, delivering and managing New Zealand’s fisheries management structure. Provides advice to government ministers, managers and stakeholders, develops initiatives to extend or support the government and implements policy to achieve government objectives.

Marine technician – works in private organisations or in research, mariculture or aquaculture organisations designing and/or maintaining fish stocks and the technology to support them.

Non-governmental organisation (NGO) consultant – provides guidance or technical assistance at one of the many international NGOs active in the Pacific, such as Conservation International or the Nature Conservancy.

SKILLS AND KNOWLEDGE

Technical skills

- Detailed knowledge of marine science, ecosystems, biology, and chemistry
- Well-developed research skills
- Strong statistical and computer skills
- Excellent writing skills, for compiling reports and for publications
- Boat handling and navigation
- Diving certification
- Awareness of health and safety practices

General skill requirements

- Ability to work in a team
- Excellent communicator, particularly in explaining complex ideas to clients or co-workers who may not understand technical terms
- Strong project management skills
- Hands-on practical aptitude
- Competent time management and organisation, especially the ability to prioritise
- Capable problem-solver

PERSONAL QUALITIES

- Lateral thinker
- Passionate about marine environments
- Logical, methodical and precise
- Flexible and quick to adapt to new projects or changing requirements
- Objective, enquiring and open to new ideas

SALARY GUIDE

	Salary
Marine biologists with master’s degrees	\$55,000–\$75,000
Senior marine biologists with PhDs	\$76,000–\$94,000 With more responsibility and experience, pay could rise to about \$130,000
Fisheries Analyst	\$47,500 – \$67,800
Senior Fisheries Analyst	\$64,300 – \$86,000

Sources – Landcare Research & Universities New Zealand, ‘University Staff Academic Salaries and Remuneration’, 2012/ Ministry of Primary Industries.

Salary range is indicative of the New Zealand job market at the time of publication (2015) and should only be used as a guideline.

THE AUT APPROACH

Final-year students can enrol in a research project, that may involve a placement with an employer organisation. Previous projects include researching survival aspects of surf clams and seaweed for private industry, and population dynamics of commercial fish species which are of interest to the MPI.

The AUT marine biology degree is globally focused, as lecturers come from all over the world and have a variety of research backgrounds, with expertise both in temperate and tropical ocean settings.

AUT is home for the Institute for Applied Ecology New Zealand, which houses the AUT Lab for Cephalopod Ecology & Systematics. The main research interest of this lab is the great diversity of cephalopods—mostly squid—that live in New Zealand waters. Other research groups are involved with marine ecology and aquaculture, aquatic biogeochemistry, fisheries science, cetacean conservation and mangrove ecology.

FURTHER STUDY OPTIONS

For those wanting more specialised study, postgraduate-level programmes include the Graduate Certificate and Graduate Diploma in Science, Master of Science and Doctor of Philosophy in Marine Biology.

Recent research in the school includes topics in aquaculture, aquatic biogeochemistry, fisheries and mangrove diversity.



SEVERINE HANNAM

Natural Sciences Collection Manager
Auckland War Memorial Museum

Master of Science in Marine Biology

“My father was a boat captain and marine pilot in the Pacific, so I grew up on boats. I was snorkelling from a very young age, and I only ever wanted to work in marine biology.

As a collection manager at Auckland museum, my role is very multi-faceted. One part of it is looking after marine specimens, which can mean collecting organisms from the field, preserving samples and organising transportation for loans. I support the curators of the exhibits and answer enquiries from other marine professionals and the general public. I travel quite a bit, both as a commercial diver and also giving talks on marine life to a wide variety of people.

I love the diversity of it, especially the various environments I work in. Auckland Museum is a great place to work, but I also love getting out to the coast and into the water. Keeping up with the science is challenging in terms of changes in taxonomy, technical developments and advances in genetics, but the variety is so stimulating. Really, I'm in my dream job, it's something I've always aspired to do. I want to stay in this environment and learn as much as I can – I'm very happy.”

EMPLOYER COMMENT

“Collection managers must be extremely organised and logical in their approach to caring for the collections. Museums are in the business of maintaining collections and their related data for centuries. Thus a long-term view in all decision-making is essential. Besides this, the collection manager must be familiar with Linnaean classification systems for biological organisms, have a high degree of competency in working with big databases and ideally have an interest in and knowledge of the biological entities that they work with.

What sets Severine apart is her passion for the marine environment, which she has displayed throughout her life – through her studies, and also through many, many hours fishing, swimming and diving. This gives her a depth of knowledge that study alone cannot fully develop.”

Dr Tom Trnski
Head of Natural Sciences
Auckland War Memorial Museum

USEFUL WEBSITES

Department of Conservation

www.doc.govt.nz

Science New Zealand

www.sciencenewzealand.org

National Institute of Water and Atmospheric Research

www.niwa.co.nz/our-science/coasts-and-oceans

Aquaculture New Zealand

www.aquaculture.org.nz

FURTHER INFORMATION


For the most up-to-date information on the study of Marine Biology and the Bachelor of Science, please visit our website:

www.aut.ac.nz/marine-biology

FUTURE STUDENTS

Contact the Future Student Advisory team for more information: www.aut.ac.nz/enquire


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For employability and career support, AUT students can book an appointment through <https://elab.aut.ac.nz/>


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The information contained in this career sheet is correct at time of printing, August 2019.

