UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND

SCHOOL OF GEOGRAPHY

A guide to the BAppSc Environmental Management course

YOUR place in the world

For further information please contact...

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Introduction

This guide is intended to help you manage your BAppSc Environmental Management degree programme and get the most out of the opportunities provided in the University. It has been written partly with intending students in mind, but will also be relevant to first year students who are thinking about possible directions to take in years 2 and 3, and making choices that will allow progression in useful directions in coming years whether as postgraduates or in employment. It will also help students in their second year who may be reflecting on progress to date and starting to review future options, including the possibility of entering a postgraduate programme after their third year. For third year students there is a separate guide to Postgraduate options, available on the Geography website or from the course co-ordinator.

Whatever your level in the programme, if you have questions about the shape and direction of your degree, talk to Associate Professor Mike Hilton (course coordinator). Email us, or contact the Geography reception, to make a time to chat.

As the Environmental Management programme is housed in the School of Geography you should also refer to Course Information on the school's website, which has information about staff, papers, and policies on student support, assessment, and involvement in the School of Geography.

Prospective first-year students are strongly advised to seek advice from Associate Professor Mike Hilton about the possible direction of their programme over the three years, and how that might be reflected in the choice of papers (alongside the required papers) in the first year. It is important to make wise choices when selecting papers (including choice of minors, second subjects or even second degrees), as unwise choices can close options in future years, and sometimes extend the period required to complete the programme.

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About Environmental Management

Every day we hear about environmental issues and concerns, some local, others more extensive, and some, such as climate change, global in scale. New Zealand has a good reputation for the quality of its environment, but we cannot afford to be complacent: many aspects require improvement, from water and air quality to biodiversity, through to the quality of life in urban and rural settlements. Environmental management is a response to these concerns. It fuses the understanding of natural environmental systems with knowledge of the methods and techniques necessary to manage human activities to ensure sustainable use of resources, and minimum impact on people, communities and the environment.

The BAppSc Environmental Management has a science focus, with a core of physical geography papers that deal with various environmental systems, but it also covers the wider social, economic and political context, including the requirements of environmental legislation. In line with the overall philosophy of the Applied Science Programme, the Environmental Management course encourages students to build a secondary specialism that complements the environmental management major, through specific minors (or approved second majors), or by assembling papers that equate to a minor and constitute a coherent grouping. (More on this later in the guide).

New Zealand has a large community of environmental professionals meeting the needs of the major pieces of environmental legislation, such as the Resource Management Act, the Hazardous Substances and New Organisms Act, and the Biosecurity Act. Recent surveys of job prospects in New Zealand, the UK and the US all show strong growth prospects for environmental scientists, environmental consultants and environmental management practitioners (see the last section of this guide). The Environmental Institute of Australia and New Zealand (EIANZ) acts as a professional body for the rapidly growing community of environmental practitioners, including environmental managers, scientists and consultants. EIANZ has introduced a professional certification scheme, which means that practitioners can seek recognition as Certified Environmental Professionals (CEnvP) after working for a number of years to build their practical experience.

Environmental management skills are in demand around the world, and although it will usually be necessary to learn about local statutory requirements and procedures, there are plenty of opportunities to practise overseas.

Broad structure of the course

You have the opportunity in the programme to study environmental systems in some depth, and learn the important tasks required of an environmental scientist, such as how to relate theoretical knowledge to practical problems, how to investigate problems and conduct fieldwork. You will learn how to use state of the art instruments to observe, measure and analyse the environment, in the field, in the laboratory, and on computers. Field trips and practical work are a strength of the programme

You also have the opportunity to develop specialist skills within this degree which will greatly enhance your career opportunities. For example, by taking papers in environmental chemistry, as well as hydrology papers, you'll be able to work on water pollution projects, communicating with regional council staff on the one hand and industry on the other. Or you might choose to develop an environmental economics specialism, or one in geographic information systems (GIS). Every graduate is different, and that is a strength of the programme. Read the material on pathways, later in the guide, carefully and think about your own pathway through the programme.

Overall, this degree is not about learning lots of techniques: it is about recognising problems and then being able to identify and shape appropriate responses, using the information and the skills you develop over the course of your studies...and then being able to work effectively with decision-making processes to achieve the necessary outcomes.

After completing the three year degree, several options are available for continuing your study as a postgraduate, should you wish to. These include the honours programme and the PGDipAppSc Environmental Management (both one year), the coursework MAppSc Environmental Management (nominally 12 months), and an MSc Environmental Management (either as a two year papers plus thesis programme, or one year thesis only). There is a separate guide on postgraduate programmes in environmental management at the University of Otago: check the Geography website or contact the course co-ordinator, Mike Hilton.

Planning your BAppSc Environmental Management course

General Points

When planning your Environmental Management (ENVM) course, bear these broad guiding principles in mind:

- You need to take sufficient papers so that you understand how environmental and human systems operate, and why management of those systems is necessary to address existing or potential environmental problems.

- The Applied Science philosophy at Otago is to attach approved minor subjects (or second majors) to the major subject, to develop specific skill sets that are attractive to potential employers. If you are interested in environmental management but don't want to be constrained by this requirement you can enrol for the BSc (or BA) Geography degree and take the same environmental management papers, but without the constraints of the BAppSc regulations.

We'll look first at the requirements for the Environmental Management major and how to approach selecting papers alongside the required papers. Then we'll consider the minors (or second majors) that all BAppSc programmes need, and some possible pathways through the ENVM degree that will allow you to focus on specific areas of expertise. Those are intended as examples, not prescriptions.

Requirements for the BAppSc Environmental Management major

Year	Papers	Points
1st year	**GEOG 101** Physical Geography	18
	GEOG 102 Human Geography	18
	ENVI 111 Environment and Society	18
	One of **STAT 110**, **MATH 160**, **MATH 170**	18
2nd year	**GEOG 290** Field research Methods (Sci)	18
	GEOG 216 Resource Evaluation and Planning	18
	Two of: **GEOG 281-289**, **298**, **299**	36
3rd year	**GEOG 380** Field Research Studies	18
	GEOG 397 Environmental Management	18
	Two of: **GEOG 387-395**, **398**, **399**	36

This is science-based programme, so you are expected to plan a course that has a clear science orientation, especially at first year. If you would prefer to construct an environmental management programme with a strong socio-political flavour (which is a very useful perspective and can lead to careers on the social policy arena, for instance) you are advised to enrol for a BA Geography degree, which would allow you do this. And remember that all BAppSc programmes must have an approved minor subject (or equivalent) or second major.

Developing the first year course

A typical first year programme would have seven papers, perhaps eight for those with stronger NCEA results. With four papers prescribed for Environmental Management, there is space for three (or four) other papers. Your selection of which papers to include is important: do not simply choose three/four "interesting" papers to fill the slots. The choice needs to be made thoughtfully: the first year is when you build a solid platform of papers that keep options open for second year and above. So it is better to leave pure "interest" papers until second and third year, once the foundation for your degree has been developed.

We normally recommend taking some papers that would lead to at least one other major subject in case you decide not to continue with Environmental Management at the end of the first year. So it is useful to look at the requirements for other subjects that may be of interest to you and thinking about their core first year requirements (e.g. EAOS 111 and GEOL 112 for Geology; or BIOL 112 and CELS 191 for Zoology; or PSYC 111, 112 for Psychology).

And, of course, you will need to decide a likely minor subject: there is a list of approved minors (or second majors) in the next section, plus a series of broad, indicative "pathways" for developing specialist areas within the degree, many of which also have defined minors. You need to declare a minor from the outset, but can take the necessary papers over the three years; in some cases it may be more practical to start taking the minor in year two, but in most situations we would expect students to take at least one paper towards their minor in year one. Note that you can change the choice of minor during the programme, though that may have implications for extending the period of enrolment in order to complete the requirements of the new minor.

Examples of possible paper selections for the first year of an Environmental Management degree

Enrol for first year BAppSc Environmental Management major and plan for:				
...possible minors in Ecology or Zoology	...possible minors in Geology or Applied Geology	...a minor in Geographic Information Systems (GIS)	...a minor in Economics	
GEOG 101	GEOG 101	GEOG 101	GEOG 101	GEOG 101
GEOG 102	GEOG 102	GEOG 102	GEOG 102	GEOG 102
ENVI 111	ENVI 111	ENVI 111	ENVI 111	ENVI 111
STAT 110	STAT 110	STAT 115	STAT 110	STAT 115
ECOL 111	EAOS 111	SURV 102	BSNS 104	ECOL 111
BIOL 112	GEOL 112	COMP 150	ECON 112	BSNS 104
CELS 191	CHEM 111	MATH 160	BIOL 123	MAOR 102
This student might enrol for an Ecology minor this year, but has the option of switching to a Zoology minor next year (or they could add either subject as a second major)	This student is interested in Chemistry; they could have taken another paper, to reflect other interests or strengths (e.g.PHSI 131, MATH 160, BIOL 123)	This student is taking STAT 115 instead of STAT 110, perhaps to ease workload in semester 1. MATH 160 could be replaced by another paper of use to the student (e.g. ECOL 111, MAOR 102)	This student is keen to develop environmental economics as a strength in their BAppSc degree, but the BIOL paper also keeps open the option of building a Botany minor. Another paper could be used in its place to lead to other options	This student intends to build a set of useful papers during the degree including: SURV 208 (GIS), SURV 309 (Remote sensing) and POLS 207 (Env Politics), to add to the BSNS and MAOR papers at first year. They would enrol for an APPS minor, but it will not appear on their degree transcript on graduation.
All examples are hypothetical. Subject to availability and potential timetable clashes. KEY: BAppSc major requirements, minor requirements, another minor option available.				

Second and third year courses

If you have taken the time at the start of the degree to think about the way it might unfold, then at second and third years you will be looking at how your intentions have been working out. If they still seem appropriate you will be making paper choices that are consistent with those plans. But if your ideas have changed, then you will need to re-think your direction and the papers within the programme. Whatever the situation, please feel able to seek advice from Associate Professor Mike Hilton.

Minor (or second major) subjects

It is a requirement of the BAppSc programme that every student should normally include an approved minor subject (or an approved second major subject) in their course. Below is a list of the approved minor or second major subjects for Environmental Management. Course coordinators can approve a minor or second major subject not listed in the table, provided that the overall combination of subjects and papers constitutes a coherent and integrated programme of study.

Bachelor of Applied Science	Applied Geology Computational Modelling Data Science Energy Management Geographic Information Systems Software Engineering
Bachelor of Arts	Asian Studies Communication Studies Environment and Society (Minor subject only) Indigenous Development / He Kura Matanui Māori Studies Pacific Island Studies Politics Sociology
Bachelor of Science	Biochemistry Botany Chemistry Computer Science Ecology Environmental Toxicology (Minor Subject only) Geology Marine Science (Minor Subject only) Mathematics Microbiology Physics Plant Biotechnology Psychology Statistics Zoology
Bachelor of Commerce	All Commerce subjects
Bachelor of Health Sciences	Public Health (Minor Subject only)

When choosing a minor or a second major, you need to think about how that subject will sit with respect to environmental management, and how you will benefit from the two working together. Overall, you might want to think about how you would sell the combination to a prospective employer: will the two subjects position you in the job market as someone with a useful set of skills? This in turn relates to your own interests, and where you see yourself going in terms of career choices after finishing the course.

Note that the second major option within the BAppSc degree is particularly useful for students interested in a Commerce subject, such as Economics. Rather than having to take a full BCom Economics, which has compulsory BSNS papers at 100 level in other Commerce subjects, students can take the papers for the Economics major itself within the BAppSc. Similarly, the second major provides a useful alternative to the BASc degree, if you want a major in Environmental Management and another in one of the approved Arts subjects such as Politics or Sociology.

The "APPS" minor

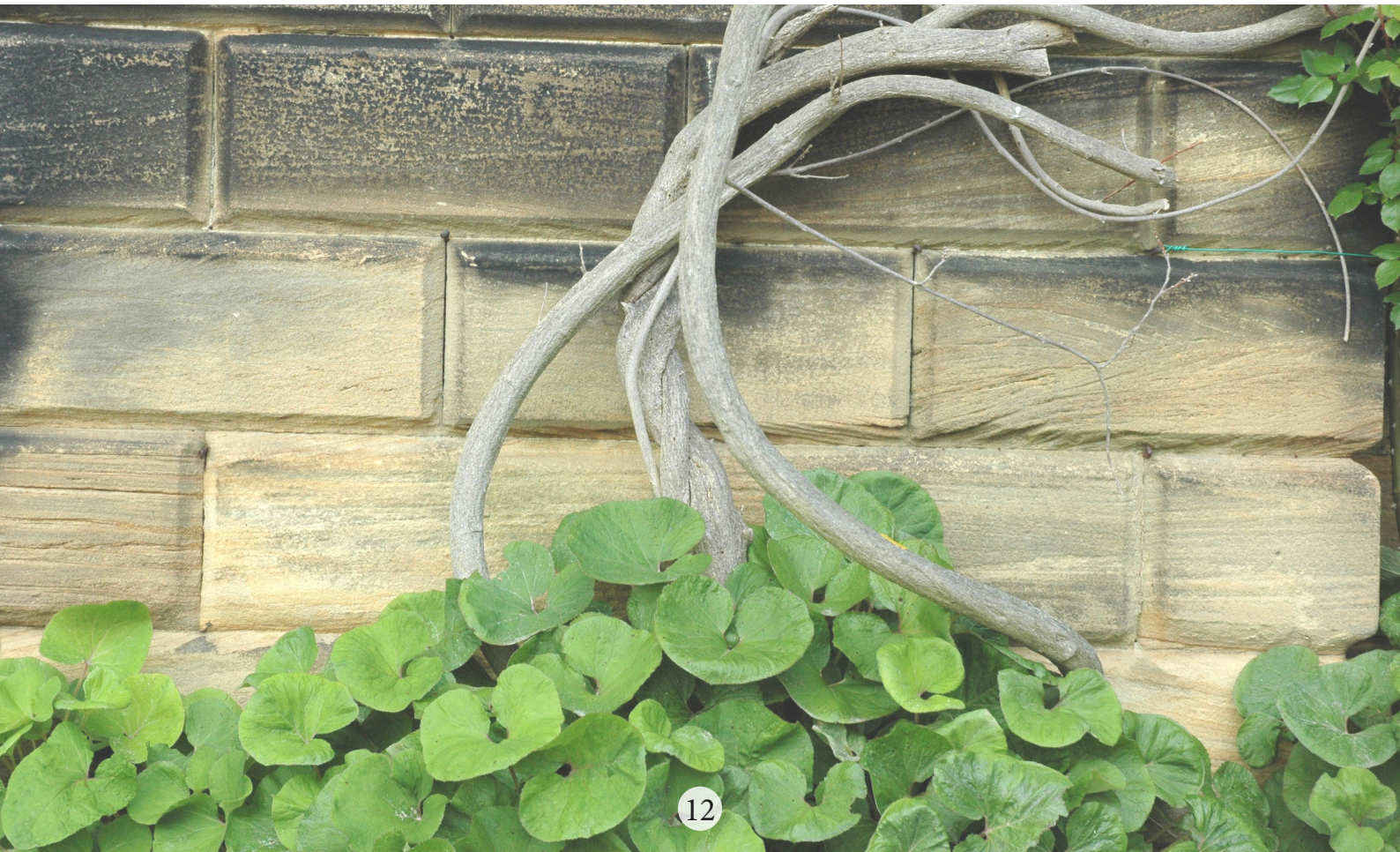
If a single, named minor subject does not appeal to you, it is possible under the requirements for the degree to assemble a set of papers from more than one subject that equate to the structure of a minor (typically two at 100 level, two at 200 level, one at 300 level) but that still make sense in developing the toolkit for environmental managers. For example, some people may find it more useful to take papers in economics, multivariate statistics, and remote sensing, to develop a broad set of useful, practical skills, rather than taking a minor in, for example, Economics and taking five papers all in that one subject. Others may have an interest in environmental management in developing countries, so may look at papers in Geography (Arts), Economics, Politics, etc.

If you decide to take a suite of papers rather than a subject-specific minor, they have to accord with the requirements of the degree: "a selection of papers worth at least 90 points, including at least 18 points at 300-level and at least 54 points above 100-level". The requirement to have at least one 300-level paper means you will need to plan carefully, to ensure you have the necessary pre-requisites that allow you to take a particular 300-level paper. And, of course, the papers need to make sense for the degree, so are subject to Course Coordinator approval. This will appear on your academic record as "meeting the requirements for the degree", but on completion of the degree there will not be a named minor on your academic transcript.

Some indicative pathways

The following selection of indicative pathways suggests which papers might be added to the core requirements of the degree to help build an overall programme. For many pathways there are formal minors (e.g. Applied Geology is a minor in the BAppSc programme). The others have been given a label purely for the purposes of this guide, but one that tries to give a sense of a specialism that can be developed within the Environmental Management degree. In each case, some of the key papers from 100-300 level are listed to give some idea of what is available; it is not implied that you should necessarily take all or even most of them.

Note that just because a paper is listed below does not mean you can take it: pre- and co-requisites need checking. Also, despite our best efforts and intentions, it is likely that the information given here is not always the most up to date, so you must always double check the Guide to Enrolment for specific information on the papers (especially whether it is being offered in a given year, which semester, etc.), with a final check on the web for the latest information if you decide to include a paper in your programme. Finally, check the points for each paper: most undergraduate papers are 18 points, but occasionally you may come across papers with other point loadings.



Applied geology/mining

100	200	300	400
EAOS 111 GEOL 112	GEOL 251 GEOL 252 GEOL 262	GEOL 302 GEOL 344 GEOL 362	

There is also a formal BAppSc minor in Applied Geology: see the Guide to Enrolment

Ecology

100	200	300	400
ECOL 111	ECOL 211 ECOL 212	ECOL 313	

There is also a formal BSc minor in Ecology: see the Guide to Enrolment

Environment and society

100	200	300	400
ENVI 111	ENVI 211	ENVI 311 ENVI 312	

There is also a formal BA minor in Environment and society: see the Guide to Enrolment

Environmental economics

100	200	300	400
BSNS 104 ECON 112	ECON 207 (ECON 201)		

There is also a formal BCom minor in Economics: see the Guide to Enrolment

Energy management

100	200	300	400
PHSI 191 *or* PHSI 131 *or* PHSI 132 MATH 160	EMAN 204 PHSI 243		EMAN 410

There is also a formal BAppSc minor in Energy Management: see the Guide to Enrolment

*Environmental systems**

100	200	300	400
GEOG 101 EAOS 111 GEOL 112 ECOL 111 BIOL 112, 123	GEOG 281-289 GEOL 261,262, 272,273 PHSI 243 ECOL 211, BTNY 201	GEOG 387-395 BTNY 301 ZOOL 315,318,319 GEOL 361,362, 372,373	GEOG 454,459-461 GEOL 422 BTNY 465,467 ZOOL 411,416

** Indicative: not intended to be an exhaustive list of possibilities*

Environmental chemistry

100	200	300	400
CHEM 111 *and/or* CHEM 191		CHEM 304	

Geographic information systems (GIS)

100	200	300	400
SURV 101 SURV 102	SURV 208	SURV 309 SURV 319	SURV 410,411 SURV 412,413

There is also a formal BAppSc minor in GIS: see the Guide to Enrolment

Health issues

100	200	300	400
PUBH 192 POPH 192	PUBH 202 PUBH 203 PUBH 211	PUBH 303	

There is also a formal BSc minor in Public Health: see the Guide to Enrolment

Maori

100	200	300	400
MAOR 102 MAOR 103	MAOR 202 MAOR 203 MAOR 204	MAOR 303 MAOR 304 MAOR 307	

There is also a formal BA minor in Maori Studies: see the Guide to Enrolment

Marine issues

100	200	300	400
MARI 112 EAOS 111	MARI 202 BTNY 203	MARI 301,302	

There is also a formal BSc minor in Marine Science: see the Guide to Enrolment

Remote sensing

100	200	300	400
		SURV 309	SURV 413

Statistics

100	200	300	400
STAT 110 (or 115)	STAT 210	STAT 341 STAT 342 STAT 352	

There is also a formal BSc minor in Statistics: see the Guide to Enrolment

Some other interesting papers

POLS 207 - Environmental Politics
SOCI 208 - Environmental Sociology
PHIL 235 - Environmental Philosophy
MANT 337 - Organisations and Sustainability
SCOM 301 - Science and the Public
TOUR 306 - Ecotourism and Sustainable Devlopment

Things to remember...

- Teaching arrangements can change until the paper starts: check the relevant web sites for updates, changes, etc. Do NOT just rely on the Guide to Enrolment. In particular, be alert to semester changes.

- Be aware of full year papers versus semester papers (especially if you plan to go on exchange!); for example, GEOG 290 and GEOG 380 are full year papers (though still 18 points: the workload is spread across two semesters).

- If you fail one or more papers in semester 1, we may need to revise your intentions for semester 2. eVision will not allow you to stay in semester 2 papers if you fail a pre-requisite paper in semester 1.

- Many geography papers at 200 and 300-level operate on a two year cycle. Apart from GEOG 216/397, GEOG 290 and GEOG 380, generally something taught in one year will not be taught again until the year after next; an alternate set of papers will be taught in the intervening year.

- Most Geography papers at 200 and 300 level are coded so that they can be taken as either the 200 or 300 level version (apart from the methods papers 290 and 380, and some specialist papers). Generally second year students are expected to take the 200 level version: although lectures are shared with third years, the internal assessment programmes will normally vary, the expectations of the standard of work produced is higher for 300 level students, and they have separate exam papers (again with higher expectations for 300 level students). Similarly, third year students would take the papers under the 300 level code to meet degree requirements. Additional papers could be taken as either 200 or 300 level.

Careers in environmental management

Otago graduates have found employment in many fields of environmental management: from environmental consultancies to local government planning departments, from central government agencies to private sector companies. In the box below are job titles for a selection of graduates from 2007-2017:

Assistant Parks and Reserves Officer
Biomonitoring Assistant
Consent and compliance monitoring officer
Consents Planner Natural Resources
Environmental permits and approvals
Energy Management
Engineering Geologist
Environmental Advisor
Environmental Consultant
Environmental Education Specialist
Environmental Officer
Environmental Policy Advisor
Environmental Protection Officer
Environmental Scientist
Exploration Field Assistant
Geotechnician
GIS Analyst
Monitoring Officer
Natural Hazards Analyst
Parks and Open Space Specialist
Planning Consultant
Policy Planner
Ranger, Biodiversity
Regional Environmental Manager
Regulatory Project Officer
Resource Advisor- Environmental Regulation
Resource management planner
Risk/Project Manager
Scientific Officer - Surface Water Resources
Senior Hydrogeologist
Spatial Information Officer
Sustainability Analyst
Sustainability Programme Coordinator
Sustainable Agriculture Advisor

Here are a few examples of graduates and their career paths to date:

Rachael (BAppSc 2011) joined a major New Zealand construction company as a graduate environmental advisor, and is now a regional environment manager for the company.

Hamish (BAppSc 2009) was a Ranger with the Department of Conservation for a short time, then moved to a regional council as a technician. After a short period with a forestry company, he moved back to the regional council to work on surface water quality.

Ants (BAppSc 2013) started as an environmental engineer and environmental advisor with a major construction company in the North Island. He is now an environmental consultant, advising on erosion control, sediment plans, etc.

Morgan (BAppSc 2016) started as a biodiversity assistant with a regional council, and is currently an enforcement officer with a district council.

Kate (BAppSc 2014) included a minor on GIS in her degree, and has been employed since graduating as a GIS analyst with a regional council.

Matt (BAppSc 2014) Except for a year working for a pest control company on possum control, Matt has been working as a Ranger at the Department of Conservation since graduating. His current position involves biodiversity monitoring, across the North Island.

The New Zealand government identifies "Environmental scientists", which covers our science-based environmental management graduates, as a sector with strong growth prospects.

This message was echoed by the US Bureau of Labour Statistics in their similar analysis of employment prospects for environmental scientists in 2016.

(http://www.bls.gov/ooh/life-physical-and-social-science/environmental-scientists-and-specialists.htm)

Some graduate opinions...

[T]he Environmental Management degree at Otago provided a great mix of skills and knowledge, while giving you the flexibility to follow your interests. The staff and teaching is high calibre and the informal open-door policy of many lecturers ensures you can get the right advice when you need it. My time at Otago has enabled me to put a solid foot forward, however as with anything, you get out what you put in.

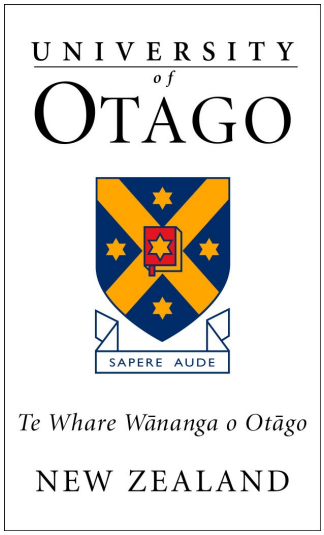
- Sam

All I know that is my degree from Otago definitely stacks up, it is recognised internationally and it is flexible. Without my degree I would not have been able to commence my role … and I am excited to think of the other opportunities it may bring me. The corporation I am employed by are very prominent all around the world and I will have the option to work in many different continents, should I choose.

- Megan

The BAppSc Environmental Management course has been pivotal in the success of my career so far. The course taught me to think holistically and rationally, and this is particularly crucial in terms of impact assessment, both from an environmental and human health perspective. Through the course my knowledge and understanding of the interaction of physical systems, human systems, and science was greatly developed and has significantly helped me throughout my career.

- Mark



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