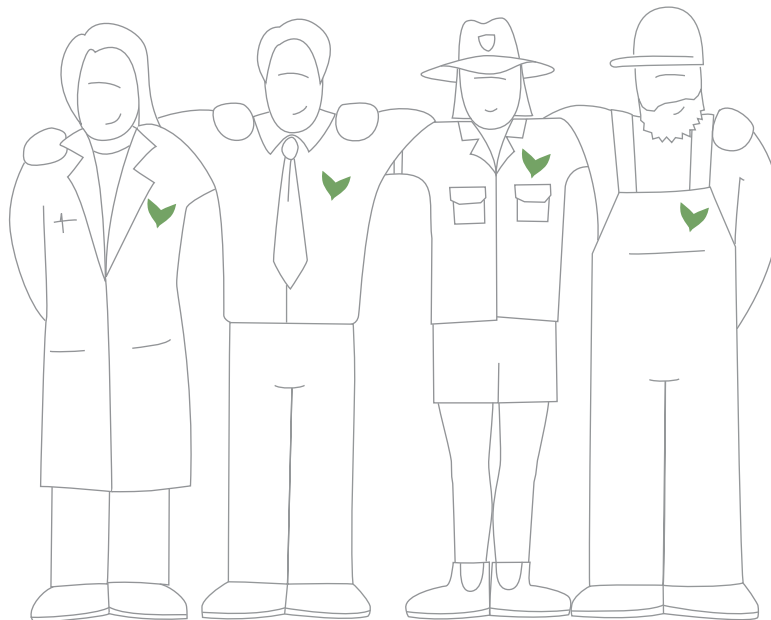


the guide to  **environmental careers**  
in australia



The Environmental Jobs Network (EJN) provides a unique service to job seekers and employers from around Australia.

EJN's principal service is a website, which offers the following great features:

- An easy-to-use job search database, with around 200 environmental jobs online at any one time.
- A weekly jobs e-mail out to over 7000 subscribers.
- Inspiring career profiles.
- Leading advice on career development.
- Information on exciting tertiary education options.
- An events database.

From our base in Melbourne, our team of volunteers and casual staff continue to service the whole of Australia with our innovative website, and to provide an expanding range of other services, including seminars and facilitated panel discussions. Check us out at [www.environmentaljobs.com.au](http://www.environmentaljobs.com.au)

## **The Guide to Environmental Careers in Australia**

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# introduction

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The Environmental Jobs Network (EJN) and RMIT University's School of Social Science and Planning are proud to present *The Guide to Environmental Careers in Australia*. This Guide is a central career-advice resource. It is packed with invaluable information about 12 subsectors of environmental work, with details on necessary education and skills, advice to get your dream environmental job, trends in environmental employment and more.

Environmental careers cover a broad range of occupations. People with all types of backgrounds are working for a better environment and will continue to be required in the future. Ecologists, biologists, oceanographers, geographers, chemists, hydrologists, botanists and other science professionals together with engineers, lawyers, accountants, teachers, journalists and social scientists all work within the field. The aim is to create a sustainable way of living on an over populated planet. Tasks include control and prevention of pollution, the sustainable management of natural resources, and the development and application of intellectual resources for a balanced interaction between human needs and the ecosystems that support life.

*The Guide to Environmental Careers in Australia* was funded by the Australian Government Department of the Environment and Heritage. EJN, in conjunction with the School of Social Science and Planning at RMIT University, has produced this Guide using information gathered through an online survey of more than 600 environmental practitioners. Its aim is facilitate better-informed career decision making.

Below is a chapter outline of the Guide.

**Rational:** This chapter discusses the impetus behind the project. There has been a gap in data regarding environmental employment and the scope of environmental careers. The chapter stresses that the industry is growing and it is therefore necessary to gain better understanding of the work within the environmental sector.

**Environmental employment:** This is a discussion of the jobs of survey respondents under three main sectors: environmental protection, conservation and preservation of natural resources and environmental sustainability. These sectors are broken down into sub-sectors containing an explanation of what each particular sub-sector does, the most common employment activities undertaken, common position titles of employees, typical education and skill requirements, and sources of employment.

**Career advice:** The career advice is based on the results of the survey, interviews with environmental practitioners and background literature. Information provided includes:

education for an environmental career, improving employment prospects, organisational contacts and knowledge, and work experience. This chapter also contains information on other career resources in Australia.

**Future trends:** Information about the future trends of employment within the environment industry is based on interviews with key selected environmental employers and background literature.

**Conclusion:** This chapter summarises the key findings of the study.

## Acknowledgements

We are grateful to the many people who have made this project possible and successful. We would like to say thanks to all those who contributed to what has been an immensely satisfying experience.

Thanks go to members of the Steering Committee: Michael Oke, Ian Thomas, Jacinta Blanch and Ruth Lane for their dedication to this project. Thank you for developing an interesting and much needed research project; it has been an immensely challenging and satisfying project to work on. Special thanks to Michael Oke for his continual guidance and support throughout the project, delivered over a bacon and egg roll at ungodly hours. Thank goodness the coffee was strong!

Thanks go to members of the Advisory Group; your help was invaluable when we developed and distributed the survey questionnaire. Thank you also for providing many contacts and networks, we appreciate the time and commitment you gave.

Thank you to the EJM volunteers who contributed their time on this project. Particular thanks to Michele Bauer, thank-you for your hard work developing the **Future trends** chapter of the Guide.

Special thanks go to the editors, Brigid Brignell and Jenny Oppy, for their time, patience and dedication to making this guide a great piece of writing.

Charley May

I would like to thank my friends and family for their continual support throughout this project. Thank you for always believing in my abilities, especially when I have trouble believing in them.

Thank you to the team at EJM for giving me the opportunity to develop my confidence and career, you have given me a fresh outlook on life and learning. Particular thanks go to Leo; thank you for your support and patience. Working on the project without you would have been a very dull experience. Thanks for having such a generous spirit; it has been good fun to work with you!

Last and by no means least, thanks go to Deb, who has had to listen to my frustrations on numerous occasions; your ability to logically explain the reasons behind my frustrations never ceases to amaze me. You have helped me develop a new confidence in my abilities, for which I am truly grateful.

Leonardo Ribón

I want to thank the EJM crew for being so amazing and for providing me with great opportunities to develop my career. I certainly appreciate so many opening doors. You Rock!

# rationale

---

Today humanity is confronted with global climate change, widespread water and air pollution, mountains of waste dangerous to humans and the environment on which they depend, and sharply diminishing biodiversity. (Renner, 2000.)

This quote is a reminder that the future of the planet relies, in part, on the skills and qualifications of people employed with the aim of preventing and reversing the impact humanity inflicts on the environment. It is therefore essential that extensive information is made available to people wishing to pursue environmental careers. Despite the importance of this information, there is a gap in the understanding of environmental employment in Australia. *The Guide to Environmental Careers in Australia* will bridge that gap by providing an environmental career resource for aspiring environmental practitioners.

From the 1970s, individuals graduating from tertiary courses have been employed in a range of environmental jobs. While these courses have attempted to follow the employment destinations of graduates, there is no overall picture of the types of jobs they have undertaken, or the demand for their capabilities. Similarly there is little information about whether requirements (skills and qualifications) are being met between employer and employee. Such a lack of information in this area limits the amount of advice that can be given to people wishing to gain employment in environmental sectors.

Since 1990 there have been some attempts to gain an understanding of employment in environmental fields. However, studies in Australia have primarily focused on the business characteristics of the environment industry, such as structure, revenue, expenses, economic growth and trade; they provide little information related to employees. (Titles and summaries of these studies can be found in the **Further reading** section of this guide.)

This lack of information about environmental employment in Australia can be contrasted with the great volume of information in both the USA and Canada. The yearly publication *The Complete Guide to Environmental Careers (USA)* has provided a source of employment data for a decade. The Canadian Council for Human Resources in the Environmental Industry (CCHREI) surveys the environment industry every two years. Their survey identifies changes in environmental labour markets, training and employment issues.

It is widely accepted that environmental employment within certain sectors will continue to grow. Such views are consolidated internationally by The Earth Watch Institute, The United Nations Environmental Program (UNEP) and the Australian Conservation Foundation (ACF). In association with this growth, there exists a need for a broadened and ongoing understanding

of what is required, now and in the future, for potential environmental employees to enter and secure employment in the environmental sector.

The House of Representatives Standing Committee on Environment and Heritage (Australia) acknowledges the need for ongoing information about environmental employment directed at employees. The Committee also acknowledged that there is limited data on environmental employment related to employees and concluded:

It has been the view of the Committee that a comprehensive review should be undertaken to assess skill needs and training facilities and a set of actions developed to adequately equip the future workforce to meet the expectations of greater environmental accountability and sustainability. (House of Representatives Standing Committee on Environmental and Heritage, 2003)

The committee has hit the nail on the head! Australia requires a comprehensive review that to date remains incomplete. The Environmental Jobs Network (EJN) has conducted a study of environmental employment following the above identified lack of information. This study intends to close the gap of information about environmental employment and provide a sound environmental career resource for aspiring environmental practitioners. To achieve this broad aim the study specifically questions four areas:

- the range of environmental positions
- what these positions entail
- the skills and qualifications needed for these positions
- the likely trends in the employment fields.

The results will be directly relevant to all those individuals wanting to enter and secure employment in the environmental sectors. In addition the EJN study will contribute to the broader understanding about what may be required now and in the future for potential employees to enter and secure environmental employment. The study will also allow employers to provide information on the skills and qualifications they deem essential for environmental practitioners in a range of environmental positions.



# environmental employment

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General understanding of employment in the environmental field is limited, and the scope of environmental careers poorly understood. Traditionally, environmental work has been exclusively associated with the activities performed by employees in national parks and, if anything beyond that, with activities associated with waste management and pollution control. This misconception is understandable as there is a lack of information regarding the range of environmental occupations. The aim of this chapter is to provide specific information on the wide range of careers that are available in the environmental professions.

In the last 30 to 40 years there has been increasing awareness of the way we interact with the Earth and concern about the impact human activities have on the health of our planet's diverse ecosystems. As a consequence, the number of people working to better understand this interaction and to procure a 'better environment' has increased significantly. It seems likely that the number of people working in an environmentally-related field will continue to increase in the future. Considerable effort has gone into:

- developing policy, legislation, regulation, standards and systems, that aim to control and reduce pollution of water, air and soil
- understanding and mitigating climate change
- managing, conserving and preserving our water, wildlife, and other resources while being able to satisfy our needs
- creating and disseminating a more sustainable way of life in the corporate and civil arenas.

Environmental practitioners are employed in all of these areas.

According to the Environmental Careers Organization, more than US\$400 billion a year is spent worldwide on environmental protection and conservation, supporting hundreds of thousands of environmental jobs (Doyle, Heizmann, Stubbs, 1999). People of all backgrounds are working for a better environment.

## Definition and classification

Environmental employment is broad and diverse, which makes its definition and classification very complex. For the purposes of this Guide an internationally recognised definition has been adopted. This definition was initially developed in 1994 by the Canadian Council for Human Resources in the Environmental Industry (CCHREI):

Environmental employment is the performance of employment activities that seek to manage the use of, impact on, and enhance the sustainability of the environment. These activities, which could relate to the governance of environmental activities, the supply of environmental products and services, or the development and dissemination of environmental knowledge may be categorised in the following sectors: environmental protection, conservation and preservation of the natural resources, and environmental sustainability.

This activity-based definition does not limit employment to the environmental industry – traditionally the supply of environmental goods and services. Instead it encompasses any person whose work is related to the activities above, whether they work for private enterprise, government or not-for-profit organisations.

The framework for classification of environmental employment developed for this guide is based on the information gathered through a survey of more than 600 environmental practitioners across Australia, with the aid of two other internationally recognised models. These were developed by CCHREI and the Environmental Careers Organization (ECO).

The resultant model for classification of environmental employment consists of three sectors – each with four subcategories – of environmental activity. The sectors as well as the subsectors can be considered distinct but interrelated given the complex and integrated nature of environmental issues. The framework for classification of environmental employment is presented below.

1. Environmental protection
  - air quality protection
  - water quality protection
  - land quality protection and site restoration
  - waste management
2. Conservation and preservation of natural resources
  - fisheries and wildlife
  - forestry
  - national parks and protected areas
  - energy and climate protection
3. Environmental sustainability
  - education
  - research and development
  - policy and legislation
  - communications and public awareness

In this chapter, each of the above areas will be described further, including the main activities that constitute the subsector, some position titles associated with those activities, the education and skills associated with that area of work and examples of some of the major employers. This information has been complemented with interviews of selected environmental professionals and background literature. We hope that the results presented in this chapter will be useful and encouraging for anyone seeking to work in an environmental field.

Note: The lists of 'Most common activities' and 'Common position titles' that appear throughout this chapter were compiled from a combination of:

- the Environmental Jobs Network's 2004 survey into Environmental Employment;
- the Canadian Council for Human Resources in the Environment Industry's National Occupations Standards
- the Complete Guide to Environmental Careers in the 21st Century Doyle, Heizmann & Stubbs, 1999.

---

## ***Further information***

For further information on any of the sectors described below, please refer to the Environmental Jobs Network website: [www.environmentaljobs.com.au](http://www.environmentaljobs.com.au).

Note: the qualifications and experience identified for a particular field of environmental employment are not exclusive, ie people with other environmental (and other) qualifications may be working in the field - a lot depends on the interests and initiative of the individual

## **Environmental protection**

Environmental protection refers to actions at international, national and local levels to prevent and, where possible, to reverse environmental degradation (CCHREI NOS, 2004a). Activities in this sector aim to protect human and ecosystem health through the measurement, prevention, control, remediation and rehabilitation of damage to air, water and land. Environmental protection involves the management and provision of a safe and healthy human environment. People working within this sector largely deal with pollution and other related consequences of human activity. As well as involving hands-on protective activities, this sector includes management of environmental impacts through policy and the development of regulation, the implementation of integrated, environmentally responsible operation practices and the research and development of pollution control technologies. (Doyle, Heizmann and Stubbs, 1999; CCHREI NOS, 2004)

Within environmental protection the following subsectors were identified:

- air quality protection
- water quality protection
- land quality protection and site restoration
- waste management.

### ***Air quality protection***

Air pollution comes from different sources including power plants, factories, vehicles and bushfires. Air pollution can threaten the health of human beings and the environment. Australians consider air pollution as one of their main environmental concerns:

The state of the air is an important factor in the quality of life of Australian cities. It affects the health of the community and directly influences the sustainability of our lifestyles and production methods. (Australian Government Department of the Environment and Heritage DEH, 2004)

Protecting air quality is a constant challenge in Australia and a large area of environmental employment. Most governments control air pollution through regulatory processes and voluntary programs. The Air Quality Section of the Australian Government Department of the Environment and Heritage aims to protect and improve urban air quality through national action to reduce emissions of major air pollutants. The main functions of the Air Quality Section include the implementation of relevant national standards and strategies, the development of a common approach for monitoring air quality, and research to inform air quality policy and community education on air quality issues. (DEH, 2004)

The air quality is an issue for both urban centres and regional areas throughout Australia. In the urban centres, pollutants such as ozone and nitrogen dioxide are of major concern. In regional Australia, airborne particles from mining and agricultural work, smoke and agricultural sprays are the main problem. Indoor air quality, in both urban centres and rural areas, has been identified as a growing problem. (SoE Report DEH, 2001) Employment

opportunities exist in a range of different areas including the development of control, remediation and prevention mechanisms, and technology, legislation and standards development.

### **Most common activities**

- research and development of air pollution control equipment, systems and technologies
- development of legislation and regulations
- development of guidelines and standards
- identification of control methods
- development of air emission standards
- risk assessment
- air quality testing and monitoring
- monitoring of air quality compliance
- evaluation, impact assessment and remediation of indoor air quality
- meteorological studies

### **Common position titles**

- Air Quality Engineer
- Air Quality Officer
- Air Quality Modeller
- Environmental Auditor
- Environmental Engineer
- Environmental Manager
- Environmental Officer
- Environment Protection Officer
- Atmospheric Chemist
- Environmental Scientist
- Environmental Policy Officer
- Meteorologist

### **Education and skills**

Practitioners currently employed in air quality control have diverse educational backgrounds. This subsector includes technical and non-technical employment opportunities. The technical jobs require practitioners with science or engineering degrees while the non-technical jobs are open to practitioners with degrees such as social science, business and humanities. However, an environmental component within any of these degrees is considered highly beneficial.

Mathematics, chemistry, physics, atmospheric sciences, civil, chemical and environmental engineering are the most common academic qualifications within this subsector. Professionals from these disciplines are responsible for assuring good air quality through research and development of air pollution control equipment, systems and technologies, development of air emission standards, risk assessment, air quality testing and monitoring, air quality compliance monitoring, and evaluation, impact assessment and remediation of indoor air quality.

Professionals with this background are not limited to the technical side of things and are commonly found working on policy, legislation and regulation development. Practitioners with backgrounds in business administration, economics, political science and communications are also employed in this area.

Employees that responded to the EJM survey recommended that to successfully perform in this sector it is important to develop good written and verbal communication skills, be computer literate, possess good interpersonal skills and to demonstrate the ability and commitment to continuous learning. It is also recognised that good project management skills are necessary for career advancement.

### **Employment**

In Australia, air quality protection is carried out by Australian, State and Local Government, and private companies, such as environmental and engineering consultancy firms and

businesses. The Australian Department of Environment and Heritage incorporates the Air Quality Section and coordinates the National Pollutant Inventory. State Governments in Australia also have agencies dedicated to environmental protection. Such agencies include the Environmental Protection Authority of Victoria, NSW Environment Protection Authority, Department of Environment in WA and the NT Department of Infrastructure Planning and Environment.

Environmental and engineering consultancy firms also hire air quality practitioners. They provide services to industry and government, and carry out monitoring activities as well as assessments and audits. There are many consultancy firms operating in Australia of varying sizes, ranging from 2 to 2000 employees.

Finally, there are a number of employment opportunities within private companies who research and develop clean air technology. As new and tighter regulations are implemented new technology needs to be developed which provides increased employment opportunities for air quality practitioners.

## ***Water quality protection***

Control and prevention of water pollution and the conservation of water resources are at the centre of concern in Australia and around the world. Water is vital for life and plays a central role in the function of the Earth's ecosystems. The availability of clean water is also central to human health, to the agricultural industry and most other activities that sustain our wellbeing and economy. Water pollution poses a severe threat to all living things, and can affect the human use of water for different purposes such as drinking, household needs, agriculture, recreation, fishing, transportation, power production and commerce. (Doyle et al, 1999; EPA, 2004)

The water quality protection sector attracts large numbers of environmental practitioners. There is a powerful need to protect water environments, since they protect and sustain us, our way of living and our future. Water protection involves several management areas according to the purpose for which the water is required. Environmental practitioners are engaged in areas such as drinking water supply and treatment, waste-water treatment, ground water protection, surface water management, estuary management and wetlands protection. (Doyle et al, 1999)

In 1992, Australia's National Water Quality Management Strategy (NWQMS) was introduced by the Australian, State and Territory Governments in response to increasing community concern about the condition of the nation's water bodies. The main policy objective of the NWQMS is, 'to achieve sustainable use of the nation's water resources by protecting and enhancing their quality while maintaining economic and social development.' (DEH, 2004)

This task is certainly extensive and requires the combined effort of environmental practitioners from a wide range of disciplines. Some of the most common activities performed by these practitioners are listed below.

### **Most common activities**

- research and analysis of drinking water, stormwater, ground water, waste water and coastal water quality
- drinking water, stormwater, ground water, waste water and coastal water quality compliance, permit issuing, remediation and reporting
- design and operation of waste-water treatment plants
- biological assessment of rivers and streams
- river health and habitat assessment, river rehabilitation plans, ecosystem monitoring
- impact assessments of waste water in streams
- impact assessments on different water bodies
- research on water governance
- development of legislation and regulations for water quality protection
- development of guidelines and standards for water quality protection
- engagement of civil and corporate communities to improve water quality
- advocacy for river health
- development of stormwater infrastructure and maintenance
- design calculations for stormwater control devices (e.g. sedimentation ponds)
- support for schools and community groups with water quality monitoring
- operation of Environmental Management Systems (EMS) and international certifications like ISO14001

### **Common position titles**

- Water Policy Officer
- Aquatic Scientist
- Biologist
- Chemist
- Civil Engineer
- Education Officer

- Environmental Consultant
- Environmental Engineer
- Environmental Health & Safety Officer
- Environmental Manager
- Environmental Officer
- Environmental Policy Officer
- Environment Protection Officer
- Environmental Scientist
- Freshwater Scientist
- Freshwater Technician
- Healthy Rivers Campaigner
- Hydrogeologist
- Hydrologist
- Recycled Water Officer
- Risk Analyst
- Sustainable Water Program Officer
- Waste water Engineer
- Water Quality Officer
- Watershed Officer

## Education and skills

Common courses that lead to the technical side of the profession include undergraduate degrees in science, hydrology, chemistry and engineering as well technical diplomas in waste water, water quality and water industry operations. These practitioners contribute to water quality protection through water quality research and analysis, water quality monitoring, assessment and remediation, design and operation of waste-water treatment plants and biological assessment of rivers and streams. In addition, some practitioners choose to undertake work on the management side of water quality protection. These types of careers include policy and regulation development. Appropriate qualifications for this area are degrees in policy or communications, preferably combined with a technical degree. (Doyle, 1999)

Of the environmental practitioners surveyed in this area, approximately half had qualifications in either science or engineering. Some of the other common qualifications were: planning, technology and socio-environmental assessment. More than a quarter of the employees surveyed had achieved master's degrees or PhDs. The advice given by these practitioners recommends the development of good communication skills, project management skills, the ability to work with (or a knowledge of) geographical information systems (GIS), the acquisition of a second language and a commitment to continuous learning.

## Employment

The employment opportunities in this area are similar to those in the air protection sector. Water quality protection is one of the principal functions of government environmental protection agencies at Australian and state levels. The Australian Government Department of Environment and Heritage incorporates the Land, Water and Coastal Division and the Policy Coordination and Environment Protection Division. Both of these divisions employ numerous water quality practitioners to implement water quality management.

State Governments in Australia also have agencies dedicated to environmental protection. A few examples are the Environmental Protection Authority of Victoria, NSW Environment Protection Authority, Department of Environment in Western Australia and the NT Department of Infrastructure Planning and Environment. Locally there are also prospects for employment in the area of compliance.

Water authorities employ professionals from a variety of disciplines to conduct water quality protection tasks. Activities include water quality analysis for drinking water supply, analysis and treatment of stormwater, design and operation of waste-water treatment plants, design and construction of wetlands for treatment of waste water, and education activities to reduce water contamination from industry and households.

Environmental and engineering consultancy firms also hire water quality practitioners. Consultants provide services to industry and government. They carry out monitoring activities, including assessments and audits.

Common employers of those surveyed include: Department of Sustainability and Environment, Environmental Protection Agency Victoria, Environment Victoria, City of Sydney, Western Water, City West Water and URS Australia.

### ***Water quality practitioner profile***

**Name:** Susan

**Organisation:** URS Australia

**Position title:** Graduate Environmental Engineer

**Yearly salary:** \$31 000–40 000

**Employment conditions:** Full time, on going

#### **What was your initial motivation for undertaking environmental work?**

Trying to improve environmental management in Australia.

#### **Outline your career path**

Currently working as a graduate in a consulting firm. I have undertaken a range of vacation work positions (e.g. research and consulting) which helped me to define what types and areas of work I was interested in.

#### **What are the main activities of your current position?**

Undertaking design calculations for stormwater management devices, writing reports, environmental management plans and some site work, such as odour monitoring at landfills, landfill management site inspections, and ground water and gas monitoring.

#### **What are the most interesting aspects of the position?**

The variety of work and opportunities to try new tasks.

#### **What are the hours you work and how do you manage the workload?**

Standard 40 hours per week, sometimes more if there are deadlines. I try to leave at a reasonable time and ensure that supervisors know of my workload so that it remains under control.

#### **What do you gain personally from your job?**

Satisfaction in undertaking and completing tasks independently and learning new skills and gaining knowledge.

#### **How much of what you know has been picked up on the job?**

A lot of information and skills have been picked up on the job, most of which builds on what was learnt at university.

#### **What advice would you give to someone wanting to pursue your career?**

Try a range of work types before choosing one to pursue. Be open to learning and trying new things in the work place and don't be afraid to ask questions.



## ***Land quality protection and site restoration***

This sector incorporates jobs related to the protection of land quality and the restoration of contaminated sites. Protecting and securing land quality is necessary not only for agricultural activities but also for healthy water flows and ecosystems. Some of the major environmental issues facing Australia are erosion and dryland salinity. Erosion occurs as a consequence of land clearing and some natural processes. Dryland salinity occurs as a consequence of bush clearing and extensive irrigation practices. A recent assessment of salinity in Australia showed that:

- approximately 5.7 million hectares are at risk or affected by dryland salinity. At the current rate, this could increase to just over 17 million hectares within 50 years.
- dryland salinity affects more than the land. Some 41 300 km of rivers, 20 000 km of major roads, 1600 km of rail, 68 towns and 130 important wetlands are already at risk. (Australian Dryland Salinity Assessment, 2000)

The consequences of these phenomena include loss of vegetation cover, turbidity and increased contamination of waterways, ecosystem malfunction and biodiversity loss. Action is required to research, control and prevent degradation of land quality. There is strong demand for practitioners in this area.

Additionally, there is huge demand for technical practitioners to work on assessment, restoration and reclamation of contaminated sites. According to the guidelines published by the Australian and New Zealand Environment and Conservation Council and the National Health and Medical Research Council a contaminated site is defined as 'a site at which hazardous substances occur at concentrations above background or local levels and which is likely to pose an immediate or long-term hazard to human health or the environment'. (Allens Arthur Robinson, 2004)

Contamination of the land comes primarily from accidents and poor practice at industrial sites. Some land uses that pose a high risk of contamination include: oil refineries, power stations, railways, landfill sites, chemical works, mining, gas works, weapons factories and petrol stations. This hazard to humans and the wider environment make the need for restoration of the sites imperative. (Environment Agency UK, 2004) Assessment, remediation and reclamation of these sites generate many jobs throughout Australia.

### **Most common activities**

- research and development of land pollution and soils contamination control and prevention systems
- development of legislation, regulations, guidelines and standards for land quality protection
- environmental impact assessment
- soil surveys
- Geographic Information Systems (GIS) management
- site and risk assessment
- testing and analysis of soil properties (mechanical, biological and chemical)
- erosion control
- research and analysis of land contamination
- regulatory compliance monitoring
- development of site remediation and reclamation plans
- site restoration and reclamation
- site suitability assessments
- landfill assessments
- landfill rehabilitation plans

## Common position titles

- Agricultural Engineer
- Agronomist
- Biologist
- Chemist
- Civil Engineer
- Decontamination Officer
- Environmental Auditor
- Environmental Consultant
- Environmental Engineer
- Environmental Planner
- Environment Protection Officer
- Environmental Scientist
- Geologist
- Hydrogeologist
- Irrigation Officer
- Risk Analyst
- Remediation Officer
- Soil Systems Analyst
- Toxicologist

## Education and skills

Land quality protection seems to require significant technical ability and knowledge. Qualifications in chemistry, geology or hydrogeology are common for practitioners undertaking environmental impact assessments, site and risk assessment, erosion control, soils surveys and analysis of soil properties. Also, degrees in civil, environmental, agricultural and chemical engineering are well regarded by employers and will provide you with many of the necessary skills for land protection and site restoration. Double degrees in science and engineering or a combination of a technical degree with business or economics are desirable if seeking employment in this sector.

More than a third of the survey respondents had science-based degrees and approximately a quarter engineering degrees. Also notable is that approximately 20% of the respondents in this field had double degrees in science and engineering. Only a small proportion of respondents (less than 10%) had masters degrees.

## Employment

Most of the work undertaken in this sector is carried out by environmental practitioners working for engineering and environmental consultants. Consultants provide technical services to industry and government. They assess polluted land and propose options for restoration and conduct restoration activities.

More than 80% of the respondents to the survey worked for environmental consultancy firms such as GHD, HLA Envirosiences, and Consulting Earth Scientists. Other common workplaces include EPA Victoria and CSIRO.

### ***Land quality practitioner profile***

**Name:** Ross

**Organisation:** CH2M HILL Australia Pty Ltd

**Position title:** Principal Environmental Auditor

**Yearly salary:** more than \$60 000

Employment conditions: Full time, on going

#### **What was your initial motivation for undertaking environmental work?**

I was brought up in the 1960s in a country town near a brickworks. My dad became a campaigner to have the brickworks moved from the housing commission area. He lobbied the then State Pollution Control Commission (SPCC). After a lot of pressure the SPCC installed a dust depositions monitor at our place and at a few others locations in the area. SPCC installed an enormous time lapse video camera in our front room and we watched as the brickworks was monitored. I became very interested in environmental stuff in these early 1960s and this

never changed.

**Outline your career path**

I selected high school subjects relating to environmental stuff, including chemistry. I then selected a university course that met my environmental needs – there were no Environmental Engineering courses in those days so I created one. While at university I volunteered to help with water sampling and chemical analysis projects in Canberra and this turned into a part-time job in my later university training. On graduation I was offered a full-time position in the Water Chemistry Labs. After two years I applied and won a job in the Canberra Water Quality Labs, working on Canberra lakes and waste-water system performance. After two years I applied for and won a scholarship with the (then) Australian Environmental Council to undertake research into hazardous waste immobilisation. This scholarship also allowed for the work to go to a Master of Engineering. While doing this research I worked on university consulting projects, as well as working as a live-in tutor at a residential college. After two years I applied for and won a job in an environmental consulting firm where I worked as their only environmental scientist. After 6 years I applied for and won a position in the State Environment Agency. While in the EPA I became the head of the contaminated sites group and I worked on national guidelines development. After three years I was recruited by CH2M HILL to develop the contaminated land practice in Australia and the Pacific region. I have been working with CH2M HILL for over two years now, enjoying it still!

**What are the main activities of your current position?**

Everything associated with contaminated site assessment, remediation, validation and regulatory signoff across the Asia Pacific region. I am also required to roll out innovative technologies into our environmental consulting and remediation activities

**What are the most interesting aspects of the position?**

Working on contaminated land that has been built over by innocent residents, and resolving these complex problems. Also, using intranet online training to roll out technology across the Asia Pacific region from my office in Sydney.

**What are the hours you work and how do you manage the workload?**

I don't manage my workload very well. I work long hours but don't notice.

**What do you gain personally from your job?**

Recognition, kudos, a feeling of helping to make a difference for our fragile environment

**How much of what you know has been picked up on the job?**

Probably about half is technically developed and half is from on-the-job learning.

**What advice would you give to someone wanting to pursue your career?**

Demonstrate your skills by your delivery. Stay motivated and strive to develop good working relationships with people that you'd like to work closely with.

## ***Waste management***

Waste management includes two main areas: solid waste and hazardous waste. Solid waste management involves the reduction, collation, treatment, recycling and disposing of general waste produced in households and businesses. Hazardous waste management deals with ignitable, corrosive, reactive or toxic wastes resulting mainly from industrial processes. (Doyle et al, 1999) There is an increasing demand for environmental practitioners in both of these areas. Such practitioners might be involved in the classification, tracking, disposal and treatment of waste, as well as in the promotion and implementation of waste reduction, reuse and recycling. (CCHREI, 2004)

Solid waste management activities range from prevention of waste creation to disposal of industrial and municipal waste in landfills. Solid waste represents a major environmental concern. The Australian Government acknowledges that 'action to reduce waste, either by encouraging material efficiency, reducing the generation of waste, or enabling the recovery and reuse of discarded material is a critical element of sustainable development'. (DEH, 2004) In Victoria more than 800 kg per capita are sent annually to licensed landfills. Construction and demolition activities account for 40% of the general waste to landfill while domestic waste accounts for 25%. Other sources include commercial and industrial activities.

Hazardous waste management practices are relatively new. Traditionally chemicals and other hazardous wastes were treated as general waste and discarded directly into streams or sent to landfills. (Doyle et al, 1999) Today, however, this is not permitted. Some of the major contributors to hazardous waste generation are the chemical and metal industries. The Australian Government is working collaboratively with industry sectors for better management of hazardous waste. Industries include construction, automotive waste, oil recycling, plastics, recycled organics and electrical. (DEH, 2004)

In solid and toxic waste management there is a growing need for well-trained, creative environmental practitioners. Some of the common activities in the field are presented below.

### **Most common activities**

- waste management planning
- waste stream audits
- landfill design
- leachate control
- design of collection systems
- development of management protocols
- waste handling
- programs for management of waste
- development of legislation and regulations for waste management
- coordination of reduction and reuse programs
- life cycle assessment
- monitoring and reduction of environmental impacts
- materials research
- recycling research and implementation
- development of strategies to effectively promote avoidance, recycling and recovery of wastes
- educating the community on recycling, reducing, reusing, composting and worm farming
- development and implementation of waste reduction projects with businesses
- identification and characterization of hazardous wastes
- control of production, transport treatment and storage of hazardous wastes
- reduction of the use and toxicity of hazardous wastes
- development of innovative treatment technology

- disposal regulation enforcement

### Common position titles

- Chemist
- Civil Engineer
- Chemical Engineer
- Environmental Engineer
- Environmental Health Officer
- Environmental Officer
- Environmental Planner
- Environmental Policy Officer
- Environmental Technician
- Geologist
- Geotechnical Engineer
- Hazardous Waste Engineer
- Hydrogeologist
- Industrial Engineer
- Landfill Manager
- Mechanical Engineer
- Operations Manager
- Process Engineer
- Recycling Coordinator
- Solid Waste Manager
- Risk Analyst

### Education and skills

Environmental practitioners in the waste management sector come from diverse backgrounds, many with a technical focus. Science degrees were held by 80% of the respondents to the survey and 20% held engineering degrees. The hazardous waste management area requires practitioners with more technical and specific qualifications than the solid waste management area. Mainly, degrees in mechanical, chemical, industrial and civil engineering together with science degrees in hydrogeology, chemistry, earth sciences and environment are useful in both divisions. The latter one also requires practitioners with business administration and economics qualifications. For the more technical hazardous waste management area, degrees in chemistry, toxicology, chemical and environmental engineering are appropriate.

Work experience is highly regarded in this sector. Respondents to the survey suggested that the vast majority of what they know has been learnt on the job. They strongly advise doing work experience while at university. This experience would be instrumental for developing project management and people skills, writing skills and understanding of environmental health and safety issues.

### Employment

Work for the waste management sector is carried out by practitioners in the public and private sectors. Local Governments hire environmental practitioners to deal with coordination of solid waste collection and liaison with private collecting and recycling firms. There are also State Government organisations that focus on waste management. An example is EcoRecycle Victoria. This organisation aims to protect the environment by minimising the creation of waste, promoting the sustainable use of resources, and better managing the disposal of material that cannot be diverted from the waste stream for productive use. (EcoRecycle, 2004)

Private companies carry out most of the operational work in the field. Their activities include landfill ownership, development, and management; recycling and resource recovery; waste collection services; integrated waste management systems and waste and waste water treatment, operations and maintenance. Environmental and engineering consultancies also play a significant role, especially in the hazardous waste area.

Some of the organisations that employ waste management practitioners that responded to the survey include Consulting Environmental Engineers, NSW Department of Environment and Conservation, CityWide, Australian Government Department of the Environment and Heritage and Environment Protection Authority Victoria.

## ***Waste management practitioner profile***

**Name:** Gary

**Organisation:** Environment Protection Authority Victoria

**Position title:** Project Manager

**Yearly salary:** \$41 000–50 000

Employment conditions: Full time, on going

### **What was your initial motivation for undertaking environmental work?**

Passion for the environment

### **Outline your career path**

BSc Chemistry Ballarat 1986

Farmer Western Victoria 1988–1996 (Involvement with local land care groups and Glenelg Region Salinity Forum during this time.)

House demolition labourer Melbourne 1996–1998

Environmental Consultant, Egis Consulting 1998–2000

EPA Project Manager 2001–present

### **What are the main activities of your current position?**

Policy development and implementation, in particular better hazardous waste management initiatives for Victoria.

### **What are the most interesting aspects of the position?**

Interacting with a diverse range of stakeholders and implementing highly emotive strategies.

### **What are the hours you work and how do you manage the workload?**

Usually 9 am to 6 pm (38 hour week) but arrangements are flexible. I manage the workload by saying no when appropriate and delegating where practical.

### **What do you gain personally from your job?**

Satisfaction of improved waste management arrangements for Victoria.

### **How much of what you know has been picked up on the job?**

Significant amount relating to government process as this is my first public service role.

### **What advice would you give to someone wanting to pursue your career?**

Rome wasn't built in a day!

# Conservation and preservation of natural resources

This sector refers to the sustainable use of natural resources. Sustainability is defined as the considerate use of resources without compromising the capacity of future generations to meet their own needs. Most practitioners within this sector deal with biological and ecological factors of the environment including biological communities, ecosystems and biodiversity. The integration of economic and environmental aspects of natural resources stewardship is central of the work performed in this sector. Activities include preservation and conservation of wildlife and fisheries, forest resources and natural resources in agricultural lands, and the environmental management of mining and energy operations, parks and outdoor recreational areas. (CCHREI, 2004)

The following subsectors have been identified in this study:

- fisheries and wildlife
- forestry
- energy and climate protection
- national parks and protected areas.

## *Fisheries and wildlife*

This sector deals with the protection and sustainable management of fisheries and wildlife. The activities of the profession are broad, and encompass the management of ecosystems that support fish and wildlife. 'Fishery and wildlife management are two nearly identical professions in their basic approach to resource management that differ mainly in the type of environment they are concerned with'. (Doyle et al, 1999) Work undertaken in this subsector is vital as the protection and sustainable management of such ecosystems underpins the sustainability of our own economies and societies.

The Australian Fisheries Management Authority (AFMA) is in charge of the day-to-day management of fisheries. The Australian Department of Agriculture, Fisheries and Forestry administers broader fisheries policy, international negotiations and strategic issues. Both organisations hire environmental practitioners, as do commercial fishing corporations, consultancy firms, and the various State Government natural resources management agencies. Wildlife management is dispersed throughout the government structure in Australia. Organisations that deal with biodiversity issues have threatened species, native fauna, migratory species and pest control units. They all recruit practitioners to undertake wildlife management activities

The Australian gives special recognition to the value of native species of Australia, recognising the need to ensure their continued survival. Among the main threats to wildlife are international trade and habitat disruption. Regulation of international trade of wildlife and wildlife products is high in the list of wildlife management activities. Such regulation of this international movement is an important element of effective nature conservation. The Australian Government is a signatory to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Environmental practitioners are hired for the development, implementation and enforcement of policy and regulations. In addition, environmental practitioners are hired by not-for-profit organisations that work for fisheries and wildlife conservation.

- populations research and modelling (aquatic and terrestrial)

- habitat preservation and conservation
- education related to ecosystems
- development, implementation and enforcement of regulation for conservation
- development, implementation and enforcement of policy and legislation for conservation
- technical and analytical support
- assessment of potential impacts of development upon fisheries resources
- government lobbying
- management of fisheries (commercial and recreational)
- management of fish habitat protection areas
- development and implementation of policy pertaining to fisheries
- field work
- development and implementation of land and wildlife management plans
- diagnosis and treatment of disease in native animals under veterinary supervision
- response to public queries on native wildlife issues
- field surveys for threatened fauna
- assessment of the ecologically sustainable management of fisheries
- marine conservation management
- assessment of nominations of threatened species
- assessment of key threatening processes (KTP) under the Australian Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- research into the impact of human activities on biodiversity
- implementation and evaluation of environmental management systems in the seafood industry
- monitoring of pests and diseases
- implementation of marine parks
- field trials for new pest animal management products
- technical advice to government, non-government and general public on best practice pest animal management
- impact assessment relating to nationally listed threatened species, ecological communities, and marine and migratory species under the Environment Protection and Biodiversity Conservation Act 1999
- conservation measures relating to cetaceans in Australia

### **Common position titles**

- Animal Control Officer
- Aquaculture Development Officer
- Aquaculturist
- Biologist
- Botanist
- Computer Modeller
- Conservation Officer
- Ecologist
- Endangered Species Biologist
- Environmental Impact Analyst
- Environmental Officer
- Field or Laboratory Technician
- Fish and Game Warden
- Fisheries Assessment Officer
- Fisheries Biologist
- Fisheries Management Officer
- Fisheries Manager
- Limnologist
- Marine Biologist
- Marine Ecologist
- Naturalist
- Policy Officer
- Professor
- Public Aquarium Director
- Research Assistant
- Research Officer
- Research Scientist
- Toxicologist
- Wildlife Impact and Protection Officer
- Wildlife Biologist
- Wildlife Consultant
- Quarantine Inspector
- Zoo Director



## Education and skills

Practitioners enter the field of fisheries and wildlife management mainly through tertiary science qualifications (70% of the survey respondents). Biology and ecology are the most straightforward disciplines since they provide broad-based knowledge and good fieldwork skills. These skills are regarded as essential at the entry level of a career in this area. Recently developed qualifications like conservation biology are very attractive to employers. They provide an interesting balance between classic biology and conservation, biodiversity and ecosystem issues. (Doyle et al, 1999) Degrees in applied science such as wildlife biology or parks and recreation areas are also commonly found in this subsector, as well as degrees in zoology and marine biology.

Survey respondents in this category consistently stressed the need to acquire fieldwork skills and varied work experience before graduating from university. Volunteering, vacation work and part-time project work are the key to expanding skills, making contacts within the industry, and identifying potential employers. Also important are good communication skills and an ability to use basic computer applications, as is the capacity to carry out interdisciplinary teamwork especially for positions beyond entry level.

## Employment

Private, public and not-for-profit sectors all deal with the management of fisheries and wildlife. In Australia, the Department of Agriculture, Fisheries and Forestry deals with strategic policy development of fisheries management and the Australian Fisheries Management Authority deals with daily management operations. State Government conservation and primary industry authorities also deal with fisheries within their jurisdiction.

In the private sector, practitioners are hired by commercial fishing companies and consultancy firms. University research units and government scientific organisations hire professionals to assess and advise on the management of wildlife and fish populations and ecosystems. Government agencies like the Fisheries Research and Development Corporation, ABARE and CSIRO employ practitioners for identifying and conducting research activities concerned with the sustainable management of Australia's fisheries.

## ***Fisheries and wildlife practitioner profile***

**Name:** Alice

**Organisation:** Australian Government Department of the Environment and Heritage

**Position title:** Fisheries Assessment Officer

**Yearly salary:** \$51 000–60 000

Employment conditions: Full time, on going

### **What was your initial motivation for undertaking environmental work?**

An interest in improving the management of our environmental resources so that we can conserve them into the future.

### **Outline your career path**

I entered the Department as a graduate, having completed a BSc, and am now at a middle level with a number of representation and management responsibilities as well as assessment requirements. I plan to utilise my environmental resource management skills in a future career in development.

### **What are the main activities of your current position?**

I assess Australian fisheries and develop recommendations to improve their ecologically sustainable management. I negotiate with fisheries agencies a set of actions to ensure measures for improved ecological management can be implemented practically. I provide advice on ways to improve the ecologically sustainable management of fisheries, ranging from sea cucumber to pilchard and prawn trawl fisheries.

### **What are the most interesting aspects of the position?**

I enjoy learning about each different type of fishery, its key environmental issues and working with fisheries management agencies to improve management. I enjoy talking to fishery operators about their fisheries and discussing practical and appropriate ways in which their fishery may be managed better. I enjoy learning about the different species that are commercially fished and their associated environment. I enjoy the challenge of considering all the competing factors within fisheries management that sometimes inhibit the sustainable management of a fishery.

### **What are the hours you work and how do you manage the workload?**

Generally the basic 37.5 hours a week. In periods of high workload or when travel is required, I may need to work extra hours to get the work done.

### **What do you gain personally from your job?**

A sense of achievement when recommendations that I have developed are implemented in commercial fisheries and I know that there is a genuine benefit to the environment as a result of those actions.

### **How much of what you know has been picked up on the job?**

There has been a considerable amount of learning about the government processes and relevant legislation learnt on the job. I have also needed to learn about each of the commercial fisheries that come in to me for assessment; however my marine science background has assisted this process.

### **What advice would you give to someone wanting to pursue your career?**

Undertake studies relevant to natural resource management or marine science. Then endeavour to enter the fisheries management field, perhaps even at a lower level and work your way up the ranks. Once you're in the public service (both Australian and state) it is quite easy to move around.

## ***Forestry***

Traditionally, forestry management has mostly dealt with the productivity of timber harvesting. Recently a new understanding of forest ecology has emerged. Forests provide habitat for a diverse range of flora and fauna; hold and provide a steady supply of water and prevent floods, mudslides and soil runoff. Forests play a vital role in the modern economy by providing wood and non-wood products and services including medicines, tourism and other recreation activities. They play an important role in global climate change by helping to balance carbon dioxide levels in the atmosphere and help to balance fire regime cycles. Incorporating this broad understanding to the implementation of forest management practices is the focus of contemporary forest management. (Doyle et al, 1999)

There is a large amount of work to be undertaken in this area. Issues include regeneration and regrowth of forests, old-growth forests, woodchips, management on and off reserves, private land, plantations, fire, and regulation of forest operations, endangered, threatened, vulnerable and rare species and ecological communities. (The Australian Department of Agriculture, Fisheries and Forestry AFFA, 2004) Sustainable forest management should include consideration of biodiversity, productive capacity, ecosystem health, soil & water resources, contribution to global carbon, socio-economic benefits and legal, institutional and economic frameworks. (State of the Forests Report, 2003)

Some of the most relevant policy regarding forest management in Australia is compiled in the Regional Forest Agreements (RFAs). 'RFAs are 20-year plans for the conservation and sustainable management of Australia's native forests. There are 10 RFAs in four States: Western Australia, Victoria, Tasmania and New South Wales. The Agreements provide certainty for forest-based industries, forest-dependent communities and conversation. They are the result of years of scientific study, consultation and negotiation covering a diverse range of interests'. (AFFA, 2004)

Environmental practitioners are hired by government, forestry companies, consultancy firms and not-for-profit organisations and NGO's concerned with the conservation and/or sustainable management of forest resources.

### **Most common activities**

- planning the sustainable use of forest resources
- protection of forest resources and biodiversity
- management of productivity of commercial forests
- implementing forestry and habitat restorative practices
- development, implementation and enforcement of forestry regulation
- development, implementation and enforcement of forestry policy and legislation
- natural areas restoration
- bush regeneration
- weed control, weed mapping and planning
- rainforest restoration
- land management advice
- plant identification
- rainforest nursery management
- development and implementation of an EMS
- development and implementation of a forest certification scheme for sustainable forest management
- strategic planning for sustainability
- forest inventory and supervision
- advising and informing landholders about farm forestry

- promotion of farm forestry within the community, industry, government and within the Department of Primary Industries (DPI) as a sustainable and viable land use
- systematic surveys and pre-harvest surveys for state forests
- advising on current issues related to national forest policy, including native forests plantations, re-forestation and natural resource management (NRM)
- management of the auditing of forest practices on public land

### Common position titles

- Arborist
- Biodiversity Officer
- Biologist
- Botanist
- Bushland Regenerator
- Civil Engineer
- Consulting Forester
- Ecologist
- Environment Protection Officer
- Environmental Resource Manager
- Farm Forestry Officer
- Forest Entomologist
- Forest Hydrologist
- Forest Officer
- Forest Policy Officer
- Forest Standards Coordinator
- Forest Worker
- Forester
- Forestry Technician
- Horticulturalist
- Native Forest Officer
- Natural Resource Officer
- Nursery Officer
- Soil Conservationist
- Vegetation Management Officer
- Wildlife Biologist

### Education and skills

Given the holistic and multidisciplinary approach required in contemporary forest management, people with a combination of technical and non-technical knowledge are highly sought after. The basic scientific knowledge acquired in the areas of forestry and botany is essential, but the combination of this knowledge with an understanding of broader issues of ecology, biodiversity, economics, tourism, education, social science or policy provides a good entry point to a job in the field.

Forestry practitioners that responded the survey typically possessed a degree in science, forestry science or applied science (65%). Some universities that offer undergraduate forestry courses include the Australian National University, The University of Tasmania, Southern Cross University and The University of Melbourne.

Approximately 15% of the survey respondents in the area complemented their undergraduate degrees with postgraduate studies in the areas of natural resource management, development, education, and parks and outdoor recreation.

### Employment

A wide variety of employment opportunities exist in this sector including government agencies, government-owned enterprises, education and research institutions, private companies and not-for-profit organisations.

Environmental practitioners that responded to the survey worked for organisations including: Forest NSW, Big Scrub Land Management Services, VicForests, Snowy River Shire Council, Forest Data, Department of Primary Industries, Mount Alexander Shire, Western Plains Flora, Queensland Murray Darling Committee Inc, Department of the Environment and Heritage and EPA Victoria.

The Australian and State Departments of Environment, Sustainability and Primary Industries all deal with forestry issues and strategic planning of sustainable forest use. Government

owned enterprises like VicForests and Forests NSW are responsible for sustainable and commercial timber harvesting and sales.

Education and research institutions work to further develop an understanding of forests and their sustainable management. ABARE, CSIRO and universities within Australia employ practitioners to carry out this work.

Private firms manage extensive land properties where timber is harvested. Sustainable management is also a priority of these organisations. Environmental not-for-profit organisations hire practitioners to research, communicate and raise awareness of forests issues in the general public.

### ***Forestry practitioner profile***

**Name:** Mike

**Organisation:** Forest NSW

**Position title:** Bushland Regenerator

**Yearly salary:** \$31 000–40 000

**Employment conditions:** Casual, on going

#### **What was your initial motivation for undertaking environmental work?**

Love of the outdoors and everything natural. I enjoy being involved and working towards something very important. I also love plants!

#### **Outline your career path**

I worked in a large casino after university. After travelling, I worked for a Health, Safety and Environment consulting firm and learnt how things worked. I changed my career path from a consultant to a conservation student and started a new career journey!

#### **What are the main activities of your current position?**

I assess and restore natural areas by supporting natural processes, including bush regeneration, weed control, weed mapping and planning. I propagate local provenance plants and supervise bush care volunteers.

#### **What are the most interesting aspects of the position?**

I enjoy working in the bush with like-minded people and improving my plant identification skills.

#### **What are the hours you work and how do you manage the workload?**

Only casual, 12 hours per week, plus full time study.

#### **What do you gain personally from your job?**

I find it rewarding to see the bush bounce back after you intervene. I enjoy seeing the animals come back and help the process along.

#### **How much of what you know has been picked up on the job?**

My studies provide the foundations of my knowledge; however I have learnt a lot through the job and improved my knowledge of plants.

#### **What advice would you give to someone wanting to pursue your career?**

It would be beneficial to learn about the native plants and weed species in your region.

## ***National parks and protected areas***

National parks and other protected areas are created by legislation with the objective of securing the conservation of Australia's natural resources. These areas are dedicated to the protection and maintenance of biological diversity and of natural and cultural resources. In 2000, there were 5251 protected areas in Australia, occupying 61.4 million hectares and accounting for 7.8% of the total land area. (Australian Bureau of Statistics, 2004)

Work performed in national parks and other protected areas is varied and includes natural resource management, interpretation, research, administration, site operations and maintenance. (Doyle et al, 1999) Parks Australia is the Australian Government organisation that leads the establishment of a comprehensive, adequate and representative reserve system to protect and conserve biodiversity. (DEH, 2004) The Australian reserve system includes seven land-based national parks and thirteen marine protected areas. Additionally, each Australian State and Territory Government has their own protected area management agencies.

All of these organisations employ environmental practitioners to undertake jobs in the conservation reserve system. Personnel in natural reserves commonly perform a number of varied tasks that include vigilance, rules enforcement, planning and development of infrastructure, education and maintenance.

### **Most common activities**

- planning, development and maintenance of infrastructure
- planning and managing park operations
- ecotourism activities
- protection of park's ecosystems
- conservation of park's resources
- compliance with park regulation
- monitoring and enforcement of rules
- management of emergencies
- undertaking administrative duties, including phones, finance, stores, reception, ticket sales, filing, library
- coordination of risk management for the Director of National Parks (DNP) and further developing the DNP risk management system
- development of marine management plans
- development of community education programs
- facilitating junior ranger programs
- curate of zoological collection
- support and foster collaborative research effort
- follow principles of population genetics
- implementing recreation programs for visitors

### **Common position titles**

- Administrator
- Biologist
- Botanist
- Bush Regenerator
- Curator
- Customer Service Ranger
- District Program Manager
- Ecosystem Restoration Officer
- Ecotour Guide
- Education Programs Manager
- Environmental Educator
- Environmental Officer
- Geologist
- Heritage Officer
- Historian
- Landscape Architect
- Maintenance Officer
- Marine Ranger
- Museum Officer
- Natural Resources Manager

- Naturalist
- Outdoor Recreation Officer
- Park Assistant
- Park Planner
- Planning Officer
- Ranger
- Risk Management Coordinator
- Team Leader
- Warden
- Wildlife Biologist

## Education and skills

Parks and protected areas is a difficult industry to find employment at entry level. A broad skills base and practical experience are paramount. The most significant advice received from the respondents to the survey is that initial education should be broad based and specialisation should come with time, usually on the job. TAFE and university courses in natural resource management, science (biology, ecology), and applied science are a good start. Combining these degrees with public relations, education, politics, communication, tourism, planning and/or computing is very desirable for parks and outdoor recreation positions. Common qualifications among national parks practitioners who responded the survey include: a diploma or bachelor in natural resource management, degree in science (biological science or zoology), diplomas in environmental studies or education.

The acquisition of practical skills is essential to obtaining employment in this sector. Advice from the survey respondents indicates that these skills can be obtained through voluntary and seasonal work during the undergraduate degree. Communication skills are very important, especially the ability to talk to groups of people of varying ages and different cultural backgrounds. Similarly significant are writing and negotiation skills and the capacity to raise funds.

Additionally, there are other skills that could prove beneficial for the national parks environmental practitioner. These include mapping, first aid, handling of chemicals, vehicles operation and maintenance, four-wheel driving, farming equipment, boats operation and maintenance, and outdoor skills like hiking, climbing and canoeing.

## Employment

Most employment opportunities within natural parks are found in the public sector. The Australian Government Department of the Environment and Heritage, through the Director of National Parks manages the Australian Government reserve system. Hundreds of environmental practitioners are hired to carry out the daily operation of national parks, marine parks and botanical gardens. Additionally, State and Territory Governments have Parks Authorities: Environment ACT, NSW National Parks and Wildlife Service, Parks Victoria, Tasmania Parks and Wildlife Service, National Parks and Wildlife SA, Department of Conservation and Land Management WA, Parks and Wildlife Commission of the Northern Territory, and Queensland Parks and Wildlife Service.

Survey respondents typically worked for organisations including Parks Victoria, Heritage Victoria, McNaught Family Trust, Great Barrier Reef Marine Park Authority, Department of Conservation and Land Management (WA), Broome Bird Observatory, Mareeba Wetland Foundation, Northern Territory Parks and Wildlife Service, Department of Environment and Conservation (NSW), Parks Australia, Royal Botanic Gardens Melbourne and Alice Springs Desert Park.

There are also a number of environmental organisations dedicated to the protection and conservation of Australian ecosystems through the implementation of protected areas. Some of them are: Australian Wildlife Conservancy, Birds Australia, Bush Heritage Trust and Earth Sanctuaries Limited. Among them more than one million hectares are owned and administered, creating the employment opportunities for environmental practitioners.

### ***National parks and protected areas practitioner profile***

**Name:** Julie

**Organisation:** Mareeba Wetland Foundation

**Position title:** Warden (Ranger)

**Yearly salary:** less than 30000 Dollars

**Employment conditions:** Full time, on going

#### **What was your initial motivation for undertaking environmental work?**

I always had a fascination with wildlife and passion for birds.

#### **Outline your career path**

Bachelor of Science.

#### **What are the main activities of your current position?**

I manage 2000 hectares of tropical savannah woodlands and wetlands. I work on several conservation research projects including wildlife reintroductions, habitat enhancement for threatened species and grassland restoration. The majority of my work involves tour guiding, a bit of environmental education, managing volunteers and writing funding applications.

#### **What are the most interesting aspects of the position?**

I enjoy making decisions about conservation projects undertaken on the reserve. I enjoy the interactions I have with wildlife and meeting tourists who share my passion for conservation and wildlife.

#### **What are the hours you work and how do you manage the workload?**

The job is a live-in warden position (similar to park ranger). It is a seven day week, sixteen-hour-a-day job.

#### **What do you gain personally from your job?**

I am personally satisfied that I am working in an area I am passionate about.

#### **How much of what you know has been picked up on the job?**

Quite a lot, particularly relating to local natural history.

#### **What advice would you give to someone wanting to pursue your career?**

Find your passion in life and do all you can to pursue it! I think volunteer work is invaluable in the environmental field.



## ***Energy and climate protection***

In Australia, coal combustion for electricity generation and fuel combustion for transport are the most significant contributors to human-induced global climate change. Coal combustion alone is responsible for about 50% of Australia's carbon emissions. (Energy Information Administration, 2004) In 2002, coal represented approximately 44% of total primary energy use, followed by oil (35%) and natural gas (17%).

Environmental careers in the energy field present diverse alternatives. Practitioners are involved in the development of alternatives for energy production that are less polluting; the development of technologies that use energy with increased efficiency; the development and implementation of energy conservation strategies and programs; and the development of pollution prevention, control and abatement technologies. (Doyle et al, 1999)

### **Most common activities**

- research and development of new alternative technologies
- research and development of renewable energy alternatives
- research into increased energy efficiency
- development and implementation of energy conservation programs
- environmental protection associated with energy generation and transmission
- provision of technical analysis and policy advice of new fuels and technologies
- environmental management for established energy operations
- management of waste and environmental hazards
- analysis and reporting of historic data and project future emission levels
- building partnerships with government and private organisations to seek to build sustainable energy principles into government policy and programs
- development of policy and legislation related to sustainable energy
- development of regulations and standards related to sustainable energy
- development of regulations, legislation and policy on the management of ozone depleting substances and synthetic greenhouse gases
- coordination of programs to build capabilities associated with managing greenhouse gas emissions
- policy development for community greenhouse initiatives
- coordination of programs to encourage landowners to plant carbon sinks on their properties to offset greenhouse gas emissions
- campaigning to stop the development and/or expansion of coal-fired power stations
- campaigning to switch Australia's electric fuel source from coal to cleaner sources

### **Common position titles**

- |                             |                             |
|-----------------------------|-----------------------------|
| • Analyst                   | • Electrical Engineer       |
| • Chemist                   | • Energy Efficiency Analyst |
| • Climate Change Campaigner | • Industry Adviser          |
| • Climatologist             | • Modeller                  |
| • Communicator              | • Planner                   |
| • Civil Engineer            | • Policy Officer            |
| • Efficiency Officer        | • Research Associate        |
| • Efficiency Designer       | • Technical Advisor         |

## Education and skills

The academic qualifications necessary for a career in the energy field can be diverse. Basic science and engineering provide a good basis. A large percentage of the survey respondents, more than 70%, had degrees in either engineering or science. Gaining an initial broad qualification was suggested. Also recommended was an understanding of the science behind energy and the greenhouse gas effect in combination with an understanding of politics, law, regulatory frameworks and the energy market.

Postgraduate qualifications seem to be important for career advancement but not for entry into the field generally. Approximately half of the respondents to the survey had achieved masters degrees or PhDs in either environmental science or engineering before commencing their current employment.

## Employment

Practitioners involved in this sector work for government, private and not-for-profit organisations. The more common workplaces for the surveyed practitioners are the Australian Government Department of the Environment and Heritage, which incorporates the the Australian Greenhouse Gas Office, the Sustainable Energy Authority of Victoria, the Department of Sustainability and Environment in Victoria and the World Watch Fund Australia.

Other organisations and associations that undertake work in the field are the Department of Energy, Utilities and Sustainability in NSW, the South Australian Office for Energy Policy, the Office of Energy of Western Australia, the Queensland Environmental Protection Agency and the Australian Business Council for Sustainable Energy. Private industries, especially the automotive industry, are also engaged in developing new technologies for more sustainable transport and hires practitioners for this purpose.

Practitioners are also employed by research institutes and private industries to develop systems and devices to increase the energy efficiency of generating, transporting and use our valuable energy resources. Environmental NGOs, local governments and energy utilities employ professionals for the purposes of developing and implementing programs to foster the uptake of these new technologies and of energy conservation practices.

## ***Energy and climate protection practitioner profile***

**Name:** (not given)

**Organisation:** Sustainable Energy Authority Victoria

**Position title:** Project Manager

**Yearly salary:** \$51 000–60 000

Employment conditions: Part time, on going

### **What was your initial motivation for undertaking environmental work?**

A sense of purpose and value to what I do.

### **Outline your career path**

One year of work experience with EPA undertaking environmental investigations as part of my degree. Five years with EPA in a range of positions within Operations. I gained good exposure to a range of environmental issues (e.g. waste management and catchment management). Time out travelling two plus years in Cambridge, UK as advisor in a Sustainable Transport program assisting local employers prepare Green Travel Plans. Maternity leave. One and a half years with SEAV (part-time) as Project Manager establishing council-based TravelSmart Better Ways to Work Program in partnership with other Government departments and Local Government. One year maternity leave. One year with SEAV in same role. Oversaw TravelSmart's incorporation into whole of government EMS process. Six months secondment to DOI in strategic planning for TravelSmart schools and workplace congestion precinct project. Presently working on incorporating sustainable energy principles into metropolitan growth planning within government's Melbourne 2030 strategy.

### **What are the main activities of your current position?**

I work on incorporating sustainable energy principles into metropolitan growth planning within the Government's Melbourne 2030 strategy. This involves working in partnership with other government departments and with consultants to map out a process for building energy into the M2030 planning process.

### **What are the most interesting aspects of the position?**

Exposure to sustainability links to urban planning and the urban villages approach.

### **What are the hours you work and how do you manage the workload?**

Two days per week, but worked as one long day at the office and 5 hours from home on another day. SEAV is certainly a very flexible employer. Ideally, I'd prefer to be in the office for the 2 days as this is less isolating and better for project management, but the flexibility is better for family balance. Working part time certainly has its challenges and is not as easy as some people may assume it to be! Having a satisfying work and family life is the holy grail and I'm not sure that I'm there yet!

### **What do you gain personally from your job?**

The ability to make a contribution to an area that I feel is important.

### **How much of what you know has been picked up on the job?**

All of it – although some additional training I've attended has also been useful.

### **What advice would you give to someone wanting to pursue your career?**

Go for it, sustainable transport in particular is an area expanding so there should be more opportunities continuing to open up, particularly in local government.

# Environmental sustainability

Environmental sustainability refers to activities oriented towards the development, dissemination and application of knowledge to sustain the other two sectors: environmental protection, and use and conservation and preservation of natural resources. Activities include environmental education and training, communications, scientific and corporate research and development, and legislation. The final aim of this sector is to extend the application of intellectual resources, innovation and creativity, communication tools, and public policy to balance human needs and the sustainability of the biosphere. (CCHREI, 2004)

The following subsectors were identified:

- education
- research and development
- policy and legislation
- communications and public awareness

## *Environmental Education*

Environmental education is a broad-based, interdisciplinary, holistic process for fostering environmental awareness and ecological understanding. It also promotes and encourages behaviour consistent with the principles of ESD. Environmental education occurs in school classrooms, national parks and reserves, zoos, community centres and corporate headquarters. The final aim of environmental educators is to 'help people appreciate, understand, [and respect] the natural world around them'. (Doyle et al, 1993)

Environmental educators develop and implement environmental education and training programs. Education programs might be part of traditional disciplines such as geography or biology, or they might be part of new emerging areas such as climate change, treatment of waste water or environmental protection technology. Training may be carried out on the job, through community awareness programs or via corporate training. (DEH, 2004) Raising community awareness includes work done by interpreters in national parks, zoos and aquaria.

The Australian Government recognises that: environmental education is an essential tool for achieving effective resource management and sustainable development. Environmental education in its broadest sense encompasses awareness raising, acquiring new perspectives, values, knowledge and skills, and both the formal and informal processes that lead to changed behaviour in support of a sustainable environment. Environmental education seeks to incorporate environmental goals into mainstream society while valuing and linking other legitimate social and economic objectives and informing and empowering citizens. (DEH, 2004)

## **Most common activities**

- assessment of needs for new environmental education programs
- assessment, review and development of environmental education curricula
- design, delivery and evaluation of environmental education programs
- measurement of outcomes of environmental education
- marketing of educational courses
- planning and delivery of modules, courses, seminars and lectures
- ensuring curriculum standards are met
- research
- development of working relationships with industry and government
- consultation sessions with community groups
- development of education materials

- preparation of communication and marketing briefs
- design and implementation of industry training boards' programs
- education with school students including bush walks and other sensorial experiences
- writing of activity-based curriculum
- facilitation of workshops for primary and secondary teachers (and teachers in training) at subject conferences, networks and individual schools
- development of resources for teachers
- strategic direction and delivery of zoo and aquaria education programs

### Common position titles

- Catchment Education Officer
- Coastal Educator
- Community Affairs Officer
- Community Education Program Officer
- Education for Sustainability Officer
- Education Officer
- Environmental Affairs Officer
- Environmental Education Consultant
- Environmental Education Officer
- University Lecturer
- Park Ranger
- Professor
- Primary or Secondary School Teacher
- Teaching Technician

### Education and skills

Work as an environmental educator encompasses a broad range of possibilities. Primary and secondary school teachers, university lecturers, park rangers, zoo and aquarium interpreters, education and community officers in government, private and not-for profit organisations can all play a role as environmental educators. All those involved in the design and delivery of programs aimed at increasing environmental awareness and ecological understanding and promoting environmentally friendly behaviour and action fall into this subsector.

The options for education and career paths are also broad. The alternatives can be mainly grouped in two sets. First there is the option of starting a career with an education background and moving on to specialisation through work experience or postgraduate studies. School teachers are compelled to take this path as they are subject to teaching certification requirements. The second option involves starting with a general qualification in science, applied science, engineering, environment or resource management and getting the specialised education skills through postgraduate studies and/or work experience.

The latter is the most common alternative among the practitioners who responded to the survey. More than 35% of respondents started with technical backgrounds and followed up with postgraduate studies in education. In comparison, only 4% began with the education degrees. The most common undergraduate qualifications among these practitioners include degrees in science and applied science, natural resource management and engineering. Common postgraduate education qualifications include graduate diplomas and masters in education, adult education, environmental education and teaching.

Excellent written and verbal communication skills are essential for working in this area. Responses to the survey pointed highlighted the benefits of volunteering and getting involved in extracurricular activities while at university for developing these skills and developing networks within the industry. The advice received from an Education Officer at the Department of Primary Industries summarises this view:

*Develop a portfolio that shows written and presentation skills. Take opportunities to be involved in a wide range of activities and be willing to take on leadership of projects. Focus on organisations that are aligned with your values. Present a balanced view of environmental issues.*

## Employment

Employment in the environmental education area occurs in many different places. Practitioners are hired within the formal education system from primary school all the way up to graduate school. Environmental education within primary and secondary schools is mainly delivered by science teachers. At tertiary institutions, the delivery of environmental education is spread across disciplines, but is more significantly represented in schools related to earth sciences, biology, ecology, geography and natural resource management.

Environmental practitioners are also employed as educators by government, industry, not-for-profit organisations and consultancy firms. Practitioners within these institutions design and deliver education programs for better environmental outcomes in areas including water and energy conservation, waste management, resource use and biodiversity.

National parks, zoos, aquaria and private reserves also employ environmental education practitioners, mainly as interpreters. Interpretation is aimed at creating opportunities for appreciation, understanding and enjoyment of the environment to make a contribution to the conservation of natural, cultural and social heritage. (Interpretation Australia, 2004)

### ***Environmental Education practitioner profile***

**Name:** Tess

**Organisation:** EnviroCom Australia

**Position title:** Environmental Education Consultant

**Yearly salary:** \$51 000–60 000

**Employment conditions:** Full time, fixed term contract of less than 2 years

#### **What was your initial motivation for undertaking environmental work?**

I had an inspiring year 12 geography teacher and I felt that by becoming an environmental educator I could perhaps change attitudes, behaviour and somehow make a difference in the world!

#### **Outline your career path**

Environmental science student, Communications and Education Officer (Southern Sydney Waste Board), Primary School Teacher (Auburn West Public School), Camp Counsellor (Agawak Summer Camp Wisconsin, USA), Primary School Teacher Green Corps Team Leader (Greening Australia NSW), Environmental Education Consultant (EnviroCom Australia).

#### **What are the main activities of your current position?**

I am involved in program management. I implement waste and recycling auditing and develop and deliver environmental education activities (school presentations, community workshops, public place displays).

#### **What are the most interesting aspects of the position?**

A change of scenery every day; always something different to do; working with a greater network of people who are enthusiastic and love their work.

#### **What are the hours you work and how do you manage the workload?**

About 40 hours a week. But sometimes there is evening or weekend work in which case we get time off in lieu.

#### **What do you gain personally from your job?**

I have increased my computer skills and I get to work with like-minded passionate people.

**How much of what you know has been picked up on the job?**

About 30%.

**What advice would you give to someone wanting to pursue your career?**

Research the format of the environmental degree you are looking at pursuing and ask past students – the degree can often look good on paper but be totally irrelevant to what you want to do. You may miss out on jobs – it is a highly competitive industry – but stick with it. Do volunteer work and be persistent! Have a crack at a similar role if you are struggling to get a position that you desire and, you never know, you may end up liking it! Job skills are transferable and things like team work, leadership, communication skills, working under pressure, adapting to change are pertinent to a lot of jobs. So don't think you are wasting your time with one job because it may lead to bigger and better things in the future. And you can learn a lot about yourself through the job search process. GOOD LUCK!

## ***Research and development***

This sector refers to the work undertaken by practitioners that support and promote scientific research and industrial research and development that advances the knowledge of the environment, assists in the prevention, improvement or solution of environmental problems, and facilitates the development of technologies that produce long-term environmental, and/or economic benefits. (CCHREI, 2004)

Research and development activities are carried out in public and private research centres, government departments and agencies, academic institutions, consultancy firms and private companies.

The scope of environmental research is wide and broad. It encompasses environmental protection and remediation, sustainable management of natural resources and sustainability.

### **Most common activities**

General:

- identification and design of environmental research projects
- identification and procurement of research or development funding
- conducting research and technology development
- communicating findings
- technical and analytical support activities

Specific examples of research projects from survey respondents:

- water governance, contextual issues and development assistance
- economic valuation, market-based instruments, water quality, sustainability and economics of disease incursion
- waste management and water, communications
- spatial development, analysis and management
- the measurement and the effect of contaminants in the environment
- the sustainability performance of companies on the ASX200
- corporate governance of social and environmental issues
- social policy
- development of policy on biodiversity conservation in Australia's rangelands,
- developing mechanisms to assess the biodiversity benefits of vegetation enhancement
- economic research and analysis of water policy
- mapping and survey of native vegetation
- policy research and advice on energy market reform issues
- making sustainable living programs effective
- soil nutrient issues
- sustainability issues impacting on business and monitoring of global and national trends and developments

### **Common position titles**

- |   |                             |
|---|-----------------------------|
| • Community Involvement Officer                   | • Research Associate        |
| • Environmental Scientist                         | • Research Economist        |
| • Geographic Information Systems Research Officer | • Research Geographer       |
| • Lecturer  | • Research Scientist        |
| • Research Analyst                                | • Research Officer          |
| • Research Fellow                                 | • Senior Policy Officer     |
| • Research Assistant                              | • Senior Research Scientist |
| •   | • Soil Systems Analyst      |
| •   |                             |



## Education and skills

There is no subject-specific training required to be an environmental researcher. Research is conducted into all areas for which environmental work is undertaken. Practitioners conducting environmental research come from a wide range of backgrounds. Survey respondents held degrees in science (chemistry, biology, ecology, geology), environmental science, economics, environmental and resource management, environmental studies, arts, landscape architecture, IT, law, engineering and geography.

Most important to this field of work is to acquire research skills. These skills can be obtained through academic qualifications including honours, masters and PhDs. More than 60% of the survey respondents working in environmental research had postgraduate qualifications.

Key advice from survey respondents in relation to skills required for undertaking work in this field is presented below:

- identification of new sources of information including stakeholders, databases and publications
- analysis and integration of multiple sources of information
- fundraising
- project management (including budget and tight timelines)
- stakeholder engagement
- excellent writing and presentation skills
- analytical skills including qualitative and quantitative methods
- understanding and application of statistical concepts and use statistical software
- facilitation skills.

## Employment

In Australia there exist several environmental research bodies. Mainly, universities, government departments and agencies, consultancy firms and private companies and research centres employ practitioners to undertake research into all areas of environmental work including protection, conservation and sustainability.

Examples of research centres in Australia from the survey respondents include the Australian Government Department of the Environment and Heritage, CSIRO, the Department of Primary Industries, the Social Policy Research Centre, ARRB Transport Research, the Department of Natural Resources and Mines, Supervising Scientist Division, Monash Sustainability Enterprises, the University of Sydney, the University of Wollongong, the Centre for Appropriate Technology, the Department of Environment and Conservation (NSW), Central Queensland University, Earth Systems, the Australian Mekong Resource Centre.

### ***Research practitioner profile***

**Name:** Diana

**Organisation:** Monash Sustainability Enterprises (MSE)

**Position title:** Research Analyst

**Yearly salary:** More than \$60 000

**Employment Conditions:** Full time, fixed term contract of less than 2 years

**What was your initial motivation for undertaking environmental work?**

I was concerned with the environmental degradation occurring in Colombia. I wanted to encourage implementation of better environmental management practices.

**Outline your career path**

Academic: Masters of Environmental Science (Monash University, Clayton)  
Masters of Industrial Engineering (Universidad de Los Andes, Bogotá, Colombia)  
Bachelors of Industrial Engineering (Universidad de Los Andes, Bogotá, Colombia)  
Additional Minor in Economics (Universidad de Los Andes, Bogotá, Colombia)  
Work Experience: Analysis and rating of sustainability performance of ASX200 companies for clients in the financial industry for application in best-of-sector funds.  
Research and capacity building on economic instruments for environmental policy in the Latin American region. Work focused on the Clean Development Mechanism of the Kyoto Protocol and water pollution charges.  
Community planning and capacity building (Cauca, Colombia)  
Environmental education and ecotourism – Voluntary Ranger (Cauca, Colombia)

**What are the main activities of your current position?**

Identify and analyse sustainability drivers.  
Identification of sustainability exposures of publicly listed companies in various industrial sectors.  
Analyse sustainability risk management policies, processes and performance.  
Engage publicly listed companies and other stakeholders as part of the research process.  
Benchmarking of sustainability performance of ASX200 companies.  
Reporting to clients in the financial industry.  
Input in continuous improvement of research and analysis methods.

**What are the most interesting aspects of the position?**

Analysis of sustainability drivers at the general, sector specific and company level.  
Engagement with stakeholders and publicly listed companies.  
Identification and analysis of best practice in sustainability management.

**What are the hours you work and how do you manage the workload?**

Between 40 and 45 hours per week according to workload. Sporadic work on the weekends.

**What do you gain personally from your job?**

Continuous improvement of my understanding of corporate sustainability.  
Rewards of working towards encouraging more sustainable practices in the corporate sector.  
Enhanced research, time management, teamwork and interpersonal skills.

**How much of what you know has been picked up on the job?**

The methodologies used to analyse sustainability exposures and drivers, and benchmark the sustainability performance of publicly listed companies are proprietary of Monash Sustainability Enterprises (MSE). Understanding of specific sustainability drivers in the Australian market has also been acquired through my work at MSE.

**What advice would you give to someone wanting to pursue your career?**

Monitor developments on sustainability through seminars, publications and the media.  
Obtain an understanding of business either through training or work experience.  
Develop an understanding of financial and economic concepts.

## ***Policy and legislation***

This subsector deals with the preparation, development and enforcement of policy and legislation with the aim of achieving better environmental outcomes. It includes bringing forward environmental issues and the collection of data and analysis of information. It encompasses work carried out by practitioners in the public, private and not-for-profit sectors.

In Australia, several government organisations at all levels are concerned with environmental policy and legislation development. The Australian Government Department of the Environment and Heritage deals with the development of environmental research, policy and legislation at the national level on issues related to environmental protection, resource management and sustainability. At the State level, the departments and agencies within the environment portfolio develop, implement and enforce policy and legislation.

The environmental policy field covers all areas discussed in this guide. Practitioners with expertise in all these different areas are required to advise, influence, formulate and implement policy and legislation that is current to the breadth of human activity. (Oke and Oke, 2003)

### **Most common activities**

General:

- policy development and implementation
- consultation with industry, government and other stakeholders
- provision of research support for analyses of policies and regulations
- administration of databases of resources and environmental evaluation
- research of primary information mainly through literature and internet searches
- writing policy papers and correspondence
- attending government policy meetings
- administering expenditure programs that fund research and development

Specific examples from survey respondents:

- policy advice and coordination across the Department of the Environment and Heritage and within the environment portfolio
- provision of policy advice and analysis on economic aspects of environmental issues
- analysing policy content and developing economic related advice to feed into policy processes
- administration of national heritage legislation
- policy advisory services to government on sustainability issues
- provision of policy advice on natural resource management issues
- policy development and listing of ecological communities under the Environmental Protection and Biodiversity Conservation Act 1999
- development of regulations, legislation and policy on the management of ozone depleting substances and synthetic greenhouse gases
- investigation of alleged or potential contraventions of Australian Government environment legislation
- development and implementation of policies and programs to improve and protect coastal water quality
- work in partnership with government organisations to build sustainable energy principles into government policy and programs
- writing of environment and waste policy
- provision of technical analysis and policy advice of new fuels and technologies
- research for and advise councils on waste policy

- development of national environmental education policy
- development of environmental policy relating to native vegetation management
- advice on current issues related to national forest policy, including native forests, plantations, re-forestation and natural resources management
- development of domestic and international marine environment, fishing and governance policy
- management of the implementation of marine parks
- policy development with the oil recycling program
- water policy development and implementation
- provision of scientific and policy advice and programs on protection of the environment from risks from genetically modified organisms and other biological agents
- policy development in relation to community greenhouse initiatives
- develop and implement marine policy
- economic analysis of water policy
- implement the State Environment Protection Policy (Waters of Victoria)
- policy research and advice on energy market reform issues
- strategic, technical and policy advice on the presentation and management of tourism at natural and cultural heritage places
- development and implementation of strategies and policies to ensure proper management of industrial and municipal wastes including strategies to effectively promote avoidance, recycling and recovery of wastes
- development of policies and management of a range of programs that aim to improve the environmental performance of business and industry through the promotion of eco-efficiency and cleaner production tools and concepts

### Common position titles

- Biodiversity Trends Officer
- Compliance and Enforcement Officer
- Conservation Officer
- Environment Protection Officer
- Environmental Liaison Officer
- Forest Policy Officer
- Freshwater Scientist
- Greenhouse Officer
- Inland Waters Officer
- Legal Officer
- Marine Biologist
- Marine Environment Policy Officer
- Ozone and Synthetic Gas Officer
- Policy and Economic Analyst
- Policy Officer
- Project Manager (water and catchment)
- Project Officer
- Rangelands Scientist
- Recycled Water Advisor
- Regulatory Affairs Officer
- Research Analyst
- Research Economist
- Research Fellow
- Research Officer
- Technical Advisor
- Threatened Species Officer
- Urban and Coastal Campaigner
- Water Policy Officer

### Education and skills

Education for a career in environmental policy should be related to the specific area in which the practitioner intends to work. A broad-based education is also a good starting point. This could be technical (e.g. science or engineering) or non-technical (political science, law, arts). Also, understanding of legislative practices and processes, research and analytical skills and strong facilitation and communication skills will be instrumental.

More than half of the survey respondents had qualifications in engineering and science. The technical understanding of the issues related to the area of work assists successful careers in policy. Other common qualifications are law, economics and town planning. Less than 5% of the respondents had qualification in policy and/or regulation. Postgraduate qualifications were also very common amongst the survey respondents within the policy development field –

more than 60% had qualifications beyond the bachelor degree, including 25% of practitioners with masters degrees.

## **Employment**

Employment in policy development occurs mainly in the public sector. Major employers within this sector include the Australian Government Department of the Environment and Heritage, Department of Environment and Conservation, Department of Natural Resource and Mines (Qld), Environment Protection Authority Victoria, Department of Agriculture, Fisheries and Forestry, Department of Sustainability and Environment (VIC), and the Australian Greenhouse Office.

Not-for-profit organisations and professional and industry associations also play a significant role in influencing policy formation. These organisations conduct research, prepare reports, implement public awareness campaigns and lobby governments through submissions. (Oke and Oke, 2003) Some of the major environmental not-for-profit organisations in Australia include the Australian Conservation Foundation, the Sustainable Living Foundation, Nature Conservation Council of NSW, Environment Victoria and the Wilderness Society.

## ***Policy and legislation practitioner profile***

**Name:** Sarah

**Organisation:** Australian Government Department of the Environment and Heritage

**Position title:** Project Officer, Environmental Education

**Yearly salary:** \$41 000–50 000

Employment conditions: Full time, on going

### **What was your initial motivation for undertaking environmental work?**

I went to an agricultural high school where I studied geography and this sparked my interest in ecologically sustainable development.

### **Outline your career path**

I completed a Bachelor of Environmental Science at UNSW with Honours in Geography in 2002. While undertaking my thesis I applied and was selected for the graduate program with the Australian Government Department of the Environment and Heritage. After spending a year in four different positions, including a stint in Kakadu, I returned to Canberra to work in policy related to Environmental Education.

### **What are the main activities of your current position?**

I work in the development and implementation of national environmental education policy and programs.

### **What are the most interesting aspects of the position?**

I have gained a good overview of the Government's education activities, and I am able to network with stakeholders across schools, further and higher education, industry and community to coordinate national initiatives.

### **What are the hours you work and how do you manage the workload?**

I work full time and have found the working arrangements flexible enough to accommodate many recreational activities.

### **What do you gain personally from your job?**

I believe that education for sustainability, in addition to resourcing actions, is the key to ameliorating and preventing our environmental dilemmas.

### **How much of what you know has been picked up on the job?**

I have brought an environmental perspective, liaison and organisational skills to the job but learnt almost all my environmental education knowledge in the role.

### **What advice would you give to someone wanting to pursue your career?**

While a degree in the environment is viewed favourably, the best selling point is to have demonstrated your practical abilities in the field. Any work, including unpaid positions, where you have demonstrated dedication and initiative will boost your employability. Also, think laterally, because you can contribute to the environment in many non-traditional roles!

## ***Communications and public awareness***

Environmental communication encompasses all of the many forms of communication including interpersonal, group, public and mass media that are engaged with the social debate about environmental issues and problems. (Meisner, 2004) Practitioners in this sector use different communication methods to exchange information about environmental issues and responsibilities, conservation practices, corporate environmental performance and community initiatives. (CCHREI, 2004) Work in this sector, as defined for this Guide, includes environmental journalism, environmental advocacy and environmental communication consultancy work.

Environmental journalism aims to advance public understanding of environmental issues and better informed decision making through high quality, accurate and visible environmental reporting through all media including audiovisual, written and electronic formats. (Society of Environmental Journalists, 2004 and Centre for Environmental Journalism, 2004)

Environmental advocacy describes the social action occurring when members of the community notice a tension between desired and actual environmental management. Widespread awareness and concerted, strategic action lie behind the proclamation of national parks, the enactment of environmental legislation and shifts in public consciousness. Effective advocacy incorporates a range of strategies, tactics and roles. (Environmental Advocacy, 2004)

### **Most common activities**

- preparation of written, audiovisual and electronic communications
- organisation and coordination of conferences and presentations on environmental matters
- development of environmental awareness and action programs
- implementation of public relations and communication strategies on environmental issues
- development, implementation and evaluation of communication plans including media and advertising
- development of environmental business communications through television advertising campaigns, brochures and media promotions
- plan and delivery of awareness programs
- liaison with local government and primary schools to promote sustainable transport
- development and implementation of programs for landowners to plant carbon sinks on their properties to offset greenhouse gas emissions
- development and implementation of tour guides and information sessions at schools
- coordination and facilitation of awareness programs of coastal and marine restoration
- promotion and encouragement of behavioural change
- coordination of environmental advocates for river health

### **Common position titles**

- Campaigner
- Communications Officer
- Community Affairs Officer
- Community Involvement Officer
- Education Officer
- Environmental Advocate
- Environmental Campaigner
- Environmental Journalist
- Environmental Officer
- Filmmaker
- Information Officer
- Interpretation Ranger
- Liaison Officer
- Nature Journalist
- Natural Resource Officer
- Media Advisor
- Photographer
- Program Delivery Officer
- Project Officer

## Education and skills

The most popular career path amongst survey respondents is a degree on the subject matter of interest (e.g. science, environmental management, business, law, politics, etc.) followed by postgraduate studies and/or work experience in journalism or communications. The reason for this is quite simple – an undergraduate degree on the subject matter of interest provides future communication practitioners with specialised knowledge and therefore something to write and communicate about.

The undergraduate degrees held by practitioners in the survey are wide and varied. Some of the most representative include: environmental science, environmental management, forestry, ecotourism, public policy, natural resource management and parks and recreation.

Communication skills can be developed through volunteering, postgraduate studies or on the job. Advice received from survey respondents states that activities such as writing for student publications or getting involved in media projects would add journalism skills to the undergraduate degree and prepare the student for postgraduate studies in communications.

## Employment

Environmental communication practitioners work for publishing houses, audiovisual production companies, government organisations, private companies and consultancy firms. Environmental journalists and reporters work in specialised sections of newspapers, nature magazines, and television and radio shows and news programs. Practitioners engaged in communication activities other than journalism work for government organisations, private companies and consultancy firms to develop and deliver community and corporate environmental awareness programs. The majority of respondents to the survey belong to the latter category.

More than 60% of the respondents in the field work for Local, State and Australian Government. Some of the most common government employers include: the Australian Government Department of the Environment and Heritage, the Department of Primary Industries, Department of Sustainability and Environment (Victoria), Department of Environment (WA), Department of Infrastructure, Planning and Natural Resources (NSW) and the Department of Environment and Conservation (NSW) as well as local councils and water authorities.

Not-for-profit organisations account for 25% of employment of communication practitioners in the survey. Some of these organisations are: the Sustainable Living Foundation, Greening Australia, Clean Up Australia, the Nature Conservation Council of NSW and Environment Victoria.

Consultancy firms provide environmental communication services to government, not-for-profit and private organisations.

### ***Communications and public awareness practitioner profile***

**Name:** Amber

**Organisation:** Burdekin Dry Tropics Board

**Position title:** Coastal and Marine Coordinator

**Yearly salary:** \$31 000–40 000

**Employment conditions:** Full time, fixed term contract of less than 6 months

**What was your initial motivation for undertaking environmental work?**

Year 10 marine science gave me a love for the marine/coastal environment.



**Outline your career path**

In year 10 we studied marine science at high school. I subsequently learnt to scuba dive and my appreciation for the environment grew. After leaving high school, I was accepted into a Bachelor of Science majoring Marine Biology at James Cook University. After graduating from James Cook University I returned to Melbourne to seek out a marine biology related position. I found this difficult so wanted to use my knowledge in a different way. I considered environmental law or patent law as a way to use my knowledge. I also commenced volunteering at Museum Victoria in the marine invertebrate section. This enabled me to make contacts with real scientists out there in the field and get some hands on experience with real research. At the same time I was enrolled in a Master of Environmental Management by correspondence with the University of New South Wales. I completed this degree in August 2003 and also completed a minor project/thesis as part of this. After obtaining this qualification I decided to commence looking for some work in my field. I was offered my current position in January 2004 and took it up in February 2004

**What are the main activities of your current position?**

To coordinate and facilitate awareness of coastal and marine restoration and marine management activities and communicate with the community; to assist Landcare groups and community based groups in the Burdekin Dry Tropics to understand and become involved in coastal and marine issues; to coordinate and develop a regional community based network dealing with coastal and marine issues and natural resource management in the Burdekin Dry Tropics; and to support development of relevant community partnerships. I also provide general natural resource management planning support to the local community. Part of my role is also to facilitate information sharing and create learning opportunities to assist people, groups and communities to develop and improve their knowledge in regards to coastal and marine issues in the Burdekin Dry Tropics.

**What are the most interesting aspects of the position?**

The most interesting parts are dealing with the community members who have lived in the area for a number of years and listening to their stories about how the environment has changed. I also enjoy getting out of the office and actually visiting sites which have been degraded for a particular reason, and working with community and local government authorities to try and rectify environmental damage.

**What are the hours you work and how do you manage the workload?**

Generally I work 8 am–5 pm, although there is also night and weekend work which is required at times. When we have a lot of night/weekend work we are able to adjust our day time hours so that we do not accrue too much overtime. We are supposed to work 7.2 days in ten days.

**What do you gain personally from your job?**

I am able to see that a difference can be made to the way we are dealing with the environment.

**How much of what you know has been picked up on the job?**

I use some of my formal education, but a lot of the information from university is not required in day-to-day operations.

**What advice would you give to someone wanting to pursue your career?**

Give it a go; you never know where it might lead. Even if the job is in different state, consider it if it's in your field, you never know, it might be the perfect job for you, or at least a good stepping stone towards the dream job.

# career advice

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This chapter includes advice on education for your environmental career, increasing your employability and work experience programs. The advice is compiled from the results of the Environmental Jobs Network (EJN) survey, background literature and comments from environmental professionals.

Securing environmental employment can be a difficult process as the job market is highly competitive. Some positions attract thousands of applications and securing a job in the environmental sector can take up to twelve months (sometimes longer). It is important to remain positive, be proactive and good humoured. Few people get the first job they apply for, and persistence and commitment will pay off. Survey respondents have identified the difficulties and challenges of securing an environmental job. Listed below are some of their comments and advice.

**'It's hard to get a job but something may come up. Everyone wants three years experience, but no one is willing to give people experience. Keep trying, hassle organisations!' *Environmental Scientist***

**'Keep true to yourself; don't lose sight of the bigger picture.' *Finance Officer***

**'Believe in the environment and have a sense of humour.' *Environmental team leader***

International research papers (Renner, 2000), environmental careers guides, (Doyle et al, 1999) and Australian surveys (Annandale and Morrison-Saunders, 2002) acknowledge that some environmental sectors are growing annually. Opportunities to successfully enter the environmental industry are increasing. Developing a plan of action that details the areas you wish to work in, the skills you have and the skills you need will help you make the most of these opportunities. This chapter aims to provide you with the advice needed to get the plan started.

## Education for your environmental career

While it may be encouraging to hear about the psychology graduate who is now the director of a land trust, it is not a good idea to select a course of study that is of no relevance to the career you want to pursue. (Doyle et al, 1999) It is important to select a course of study or degree as a strategic decision, part of a general development plan, that will act as a gateway to your desired career. Specialisation and postgraduate study may be pursued at a later stage of your education depending on your personal or career interests. However, it is important to lay the foundations for your career by choosing an appropriate undergraduate degree or educational diploma.

### *An undergraduate degree*

Your undergraduate education is about growing as a person; it exposes you to new ideas, gives you the chance to try new things and teaches you 'how to learn'. (Doyle et al, 1999) The undergraduate degree can create a path for many environmental careers. Many undergraduate degrees are broad-based, include interdisciplinary programs, and involve learning many new subjects. By the end of your undergraduate degree you will have gained knowledge in a broad range of subjects within a particular area. One advantage is that your degree does not lock you into one particular career path. Instead, it teaches you a range of skills and gives you sound knowledge of a variety of subjects. You should have the ability to pick up new ideas or skills quickly and apply them. Many jobs are open to undergraduates because they have a broad base of knowledge that can be built upon throughout their career.

Although an undergraduate degree doesn't lock you into a specific career path, you need to make sure that the course content is relevant to the area you are interested in. It wouldn't be wise, for example, to do a humanities course if you were interested in animal physiology. Other factors to consider are:

- the structure of the course. Is it a theory or practical based course? Which one most interests you, and will be most beneficial for your area of interest?
- the teaching environment. Is the course taught mainly in a classroom, laboratory or outdoor environment? Would work experience in these environments be useful for your potential career?
- the course content. Does the course content interest you? Are you well equipped to handle the course content? For example, if the course has a large mathematics component would you enjoy this or be able to cope with the content based on your existing abilities? Be realistic. You don't want to undertake a course that bores you or that is beyond your capability.

Most survey respondents have an undergraduate degree. (See Appendix 3, Graph 5.) Below are some survey respondent's comments on undergraduate degrees.

**'Do a well-rounded undergraduate degree, rather than a specific one.'**  
*Environmental Engineer and Ecologist*

**'Don't specialise too much at university as most jobs require a broad range of skills and knowledge. The more specialised stuff can be learnt on the job.'**  
*Graduate Trainee*

**'An environmental qualification is often not required in environmental work, but the general skills from a bachelor degree (e.g. humanities, science or social science) are crucial.'** *Senior Policy Officer*

A broad undergraduate degree can be suitable for a range of environmental positions that allow you to learn specific skills on the job, however, a small percentage of environmental positions require applicants who have undertaken an honours year of study or who have postgraduate qualifications. An honours year of study and postgraduate study builds upon the foundations of an undergraduate degree, teaching specialist skills and increasing knowledge in specific areas. The EJN survey found that 71% of survey respondent's positions required bachelors degree as a minimum qualification. The survey also showed that approximately 10% required an honours degree and 2% required a masters degree as a minimum qualification. A further 2% of survey respondent positions required a PhD as a minimum qualification. (See Appendix 3, Graph 4.)

It is important to remember that entry into the environmental sector is highly competitive and any work experience (paid or unpaid) you can do will enhance your employability. Throughout your undergraduate degree use spare time and holiday periods to secure intern or volunteer work experience. It will improve your employment prospects once you graduate, as it will demonstrate to employers that you have a relevant degree, working knowledge and experience in the specified area. Intern and volunteer work experience are invaluable ways of getting the experience all environmental employers demand. Below are some respondent's comments on the benefits of volunteering and interning.

**'Lots of experience, even if it's volunteer or paying under what you think you are worth. Just getting in to the field can go a long way!'** *Senior Project Officer.*

**'Undertake a relevant degree or further study but keep in mind that volunteer/paid work with government agencies or NGOs will often be the deciding factor because you need to demonstrate how you have applied your environmental knowledge to solve problems.'** *Project Officer*

**'Volunteer work! Make your own opportunities to gain experience.'** *Self-employed*

**'You must have excellent communication skills. The rest is really learnt on the job. Volunteer work is the only way to do that, to get your foot in the door.'** *Water-use Efficiency Officer*

The benefits of work experience are discussed in greater detail in the **Improving Employment Prospects** section of this chapter.

## ***Honours***

Most undergraduate courses offer an honours year. In some courses such as engineering (single degree) you graduate with honours automatically provided you have completed the four year course and have achieved a grade of 65% or above. In most cases however, honours will be an extra year that you must complete after finishing your degree. The year is often structured to include a large research thesis as well as some final year subjects. Entrance into honours is based on your undergraduate marks and you may have to find a topic and supervisor. In a number of courses honours topics and supervisors are allocated to students.

Completing honours can help give you a point of difference in the eyes of employers. It shows that you are able to run a large project, usually independently. An honours year can allow you to gain greater knowledge in a specialised area, gain practice at supervising others, and develop both written and oral communication skills. The greater depth of subject knowledge gained, as well as the discipline required to complete a research project, makes graduates with an honours degree in science particularly valued by the consulting industry. If you are thinking about doing a PhD you will also need to have completed further study, either honours or a Masters.

## ***Postgraduate studies***

Most people undertake study at a postgraduate level because they either wish to enhance their knowledge of, and training in, a particular field of study or have decided to broaden their education by studying a new discipline. Postgraduate study has the benefit of enhancing your career and employment prospects. (Gradlink, 2004)

Postgraduate study is a term that covers the range of courses and research opportunities available to students who have completed an undergraduate degree at university. Postgraduate study is also available to people who do not have an undergraduate degree but want to formalise the skills they have gained in the workplace. Courses defined as postgraduate are explained below.

### **Graduate diploma**

A graduate diploma is vocationally specific, and will allow you to learn some fundamental skills that are important to enter certain careers. Generally a course leading to this qualification is one year full time and does not assume any previous knowledge of the area of study. (Oke and Oke, 2003) The graduate diploma is suitable for entry into broad-based environmental careers, for example community engagement officer.

### **Postgraduate diploma**

This qualification usually takes one year full time and does require a specific degree background. The course is intended to build upon the foundation degree and to develop existing skills and knowledge to a greater depth. (Oke and Oke, 2003) The postgraduate diploma can help prepare the individual for a specific, technically orientated environmental career, for example a soil scientist or aquatic biologist.

### **Masters and PhD programs**

Masters are of 2 types There are coursework programs that can either provide more detailed studies into a specific discipline (and require the disciplinary background for entry) or are designed to be interdisciplinary and which usually encourage applicants from a range of disciplinary backgrounds. The other Masters programs are based on a major research thesis, like a PhD.

Undertaking either a masters or PhD usually requires a strong background in a relevant discipline. Some candidates bring with them significant work experiences and in some cases might be sponsored by their employers to undertake these studies. (Oke and Oke, 2003)

At the masters level you are able to undertake a coursework degree, with the option to undertake a minor research project or go on work placement. You are also able to undertake a masters solely by research.

A PhD is exclusively a research program and a relevant degree is always required. Masters and PhDs usually take a minimum of two years, but can take up to four or five years depending on the topic, the type of research and whether you study full or part time.

There are several factors that should be considered before applying for postgraduate studies. (Gradlink, 2004)

- Will the postgraduate course you are considering be useful to you, either as personal enrichment or as a marketable qualification? Your careers service can assist you with this issue, as can a study of job advertisements in the newspapers and on the Internet.
- Are you strong enough academically to undertake a higher degree? Some self-analysis and discussion with academic staff can help here.
- Is the course you're interested in the right one? Talking to people who have done a similar course and to the people supervising it can clarify this.
- Is it better to undertake postgraduate study immediately after your first degree or to wait until you have some work experience? For some higher degrees, particularly Master of Business Administration, work experience may be a prerequisite.
- Why do you want to do postgraduate study? Is there a valid reason or does it just postpone the moment when you have to make an employment decision?

These can be difficult questions to answer before embarking on postgraduate study. Career research will indicate whether a postgraduate qualification is going to give you a competitive edge. A graduate diploma will teach the fundamental skills required to enter a certain career and in some cases it may be wise to complete postgraduate studies if you are looking for a career change. For example, if you hold an undergraduate degree in finance you might have to complete a graduate diploma in environmental studies.

Self-assessment and discussion is also invaluable. For advice it is best to contact your course coordinator or the university careers office. Talking to academic staff and to environmental practitioners within the industry you want to enter could help you answer question four. Don't be afraid to ask – if you want to know if a masters is required to become a wetlands biologist, who better to clarify your question than a practitioner within the industry. It is best to get information early on, rather than wasting time by completing a masters which is not required for a specific career.

The results of EJN's survey show that 26% of survey respondents have postgraduate qualifications. The majority of respondents have Bachelor degree (47%) or an honours degree (19%). (See Appendix 3, Graph 5.)

These results indicate that a postgraduate qualification may not be essential for entry into certain environmental careers. It may be that an undergraduate degree or diploma will give you the technical knowledge required for certain careers.

Keep in mind some environmental careers will require postgraduate qualifications but for others work experience may prove more useful. For many environmental careers you may simply lack the practical experience and the associated skills in the field you want to enter. You can improve your skills base, experience and employability by completing an internship, vacation work, volunteering or entering a graduate program.

For more information about typical educational requirements for different areas of environmental employment refer to the **Environmental employment** chapter of this guide. Another source of information is the Environmental Jobs Network website. EJN lists career profiles of environmental practitioners working in varied positions. Information includes what their position entails on a day-to-day basis, the education required to fill their position and the experience needed to secure employment.

# Improving employment prospects

Many graduates with new degrees find themselves in a catch-22 situation: you can't get a job because you lack experience and can't get experience because you can't get a job. This can be avoided by sensible decision making, planning and making the most of the summer holidays and spare time. Planning for your environmental career should be treated like studying for a subject. It would be difficult to pass an exam had you not researched and prepared for the subject. The same is true for an environmental career (or any career for that matter). If you have not researched and prepared, you will discover it is difficult to find a job. Undertaking paid or unpaid work experience is a great way to develop general skills, organisational knowledge and networks, all of which are very important for environmental employment.

## *Skills*

The environmental job market is extremely competitive, and it is important to be prepared, well skilled and have some experience in the area you are applying for. Your education may provide you with sound theoretical and technical environmental knowledge but may not equip you with all the general skills needed to be successful in environmental employment. Some general skills identified in the EJN survey are listed below.

- effective communication skills (written and oral)
- an ability to use common software packages (word processing, spreadsheets, email, Internet, etc)
- an ability to undertake team work
- critical thinking and judgement
- lateral thinking and ability to think creatively
- an ability to plan and organise work and projects
- leadership skills
- facilitation skills
- a good work ethic

Some of these skills will need to be more advanced than others depending on the particular position. All of these general skills are important and should be developed in order to gain environmental employment.

The Complete Guide to Environmental Careers in the 21st Century (Doyle et al, 1999) identifies that employers foremost want people with good written and verbal communication skills, project management and scheduling skills. Experience with computer applications is also highly desirable. Creative problem solving skills are considered to be the most desirable skills required by potential employers. Creative problem solving involves the ability to find alternative solutions to existing problems through lateral thinking. Dr Robyn Leeson (formally Manager of Environmental Sustainability Development, The City of Melbourne) believes that creative problem solving should be further developed at the graduate level. When asked what skills current environmental practitioners are lacking at this present time, Dr Lesson replied: 'I would like to see more graduates with at least 1st year philosophy training – they are good at knowing **what** to think but need to know more about **how** to think.'

Survey respondents were asked to rank the level of critical thinking and judgement required to perform their job. (See Appendix 3, Graph 6.) 58% of the respondents said that a high level of critical thinking and judgement was required to perform their job.

These survey results indicate that for many environmental positions, critical thinking and judgement is a very important skill to have. A comprehensive investigation of this observation

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has not been conducted, but it may be an area educational institutions need to develop within their existing programs. Not enough employer responses were collected to make statistically significant inferences about skills that are lacking.

In addition to the importance of critical thinking and judgement skills, results indicate that many respondents believe it is necessary to be highly competent in the range of general skills. This suggests that in order to gain employment, or be successful in many environmental positions, well-developed general skills are required in addition to academic qualifications. Undertaking work experience is the best way to develop these skills and gain organisational knowledge. Applying for employment without undertaking work experience can be very challenging as you may lack the necessary industry experience.

The survey respondents identified the following benefits of work experience.

**'Work experience in local government = demonstrated interest in and ability to implement environmental policy. Departmental graduate program = learning many new skills from working in 3-4 diverse areas and significant training which boosts your employability.'** *Project Officer, Environmental Education*

**'Volunteer work provided practical experience to complement university theoretical knowledge.'** *Seasonal interpretation ranger*

**'Volunteer work with national park organisations taught me practical trapping and fauna identification techniques that were not covered adequately during my undergraduate degree.'** *Senior Ecologist*

## ***Organisational knowledge and contacts***

'You can't learn how to be an environmental professional in the classroom'. (Doyle et al, 1999) One way of learning about professional environmental employment is through work experience programs. By the end of the program you should have knowledge on the principles and processes that drive the organisation, the kind of work the organisation undertakes and what working full time for an environmental organisation entails. All of this information will allow you to decide whether an organisation's working structure and projects suit you.

A good work experience program should also increase your knowledge base. You may emerge from the experience with greater knowledge of how toxins migrate in ground water or how to create educational materials for environmental awareness or whatever area the work experience program addresses. At the beginning of the program you may have little knowledge of a subject but try to get more involved in projects and ask for direction if you feel lost. You should try and demonstrate initiative and a good work ethic as this is something employers want to see. Approaching a work experience program with commitment and enthusiasm will yield the greatest benefit. Remember that for every action there is an equal and opposite reaction; people will respond to you better if you show an interest and are grateful for whatever help and experience they give you.

Networking is useful as it creates contact base of people with similar interests and concerns. These people can help and support you in many ways and, given the opportunity, you should be ready to do the same in return. Developing a network of contacts is extremely important for improving employment prospects. 'Do heaps of volunteer work! The saying is true, it's not what you know but who you know' *Water Policy Officer (Oke and Oke 2004)*.



Undertaking work experience and attending environmental events are also ways to establish networks. Networking provides an opportunity for you to demonstrate your skills to environmental practitioners and to regularly communicate with people working in the industry. Networks and contacts can provide information on employment opportunities. Networks can also inform other organisations about your skills and capabilities, giving you an advantage over a person without established networks. Networking to improve employment prospects has been identified as very important by survey respondents.

**Networking is the key! The more volunteer work you do the more people you meet. You might need to call on these people later for help and advice.**

*Environmental Officer*

**Networks are your way in to many positions that are never advertised.**

*Environmental Scientist*

**Volunteer with a government department and establish a good network of contacts, get your name known.** *Community Involvement Officer*

**Get work experience as a student, do internships, make contacts and put yourself out there.** *Natural Resource Consultant*

**Keep talking to everyone you can. Get as much contact established with various organisations as you can.** *Education Consultant (Fire Management)*

A comprehensive survey on the benefits of networking to improve employment prospects has not been undertaken. However our survey allows us to draw some conclusions about networking based on the data collected. The comments above are a small sample of the survey submissions by survey respondents on the benefits of networking made. The general consensus amongst survey respondents is that networking greatly improves employment prospects.

## ***Work experience***

Work experience encompasses volunteer work, internships, cadetships, vacation work and graduate programs. The data recorded for this survey identified that 92% of the survey respondents, took part in some form of work experience (either paid or unpaid). The data collected from the 2004 EJM survey also suggests that the reason for undertaking work experience is to develop general skills, establish networks and improve content or organisational knowledge, all of which can improve environmental employment prospects. (For a break down of the types of work experience undertaken, see Appendix 3, Graph 3.)

Volunteer work experience is unpaid; other work experience programs explained below are generally paid positions. Information about each program is listed below.

## **Volunteer work**

Volunteering involves offering your skills and time to an organisation, usually free of charge. Many environmental organisations offer volunteer positions, some advertise these positions but it is usually best to take a proactive approach and get in contact with organisations you are interested in. The EJM website lists organisations that offer volunteer work.

Once you have researched organisations and found one suitable for you, contact them and find out if you can volunteer. Although volunteer work is unpaid you never know where it

could lead. Unpaid work will still help you develop general skills, establish networks and improve organisational knowledge. It may take time to feel like you are contributing to the organisation but the more you get involved, the more rewarding the experience will be. Approaching volunteer work in a professional manner will reap the best results. Volunteer work was undertaken as a form of work experience by 59% of survey respondents.

## **Vacation work**

Vacation work refers to organisations taking on students over the summer, usually between your penultimate and final years. In most cases, this will be paid work and you will be working on set projects. This means that by the end of the placement you should have established some contacts, developed new skills and have an idea of working life within an environmental organisation.

## **Internship**

An internship usually refers to a work placement undertaken as part of a university degree, and is usually less than a year. The placement may involve working on a specific project within an organisation and then being tested on project subjects. An internship is an excellent way of getting practical industry experience through a structured program and demonstrating your skills to potential employers.

## **Cadetship**

A cadetship usually refers to work experience undertaken whilst studying but it does not count towards a university degree. A cadetship offers similar benefits to an internship as it gives you the chance to gain practical experience and knowledge through a structured program. It will also allow you to develop contacts within the industry as you will be regularly communicating with practitioners.

## **Graduate programs**

Graduate programs are offered by larger organisations in the environmental sectors, and are open to recent graduates. Once recruited, graduates are encouraged to develop and achieve within the ranks of the organisation.

Organisations usually start advertising program places in March, for positions beginning the following year. The applications take place in stages. The first stage of the process usually consists of answering a number of general questions, responding to the selection criteria and sending a copy of your academic transcript and resume. Based on answers given in stage one, an invitation may be given to attend an interview. The interview is usually in a group format where interactions with fellow graduates will be observed. Stage three commonly involves an individual interview with a member of the unit you may be working with and a coordinator of the graduate program.

Undertaking a graduate program means entering a one to two year structured program, depending on the organisation. It involves completing duties associated with your position, as well as receiving training in many different areas of the organisation. A mentor is usually allocated for graduates to provide guidance. The major benefit of undertaking a graduate program is that it is a structured program, it provides broad knowledge in different areas of the organisation, it offers a salary and it offers ongoing employment upon completion of the program. It can also 'fast track' you through the organisation. Competition for places is extremely high (Oke and Oke, 2004) and there may be thousands of applications for only 20 places! A graduate program is therefore a less accessible form of work experience for developing your skills, establishing networks and improving organisational knowledge.

More information on work experience programs can be found on the EJV and Gradlink websites. Both websites list organisations that offer different work experience programs and provide information on the benefits of undertaking work experience.

The final point is one you may hear many times, and be frequently frustrated by, but persistence and commitment will result in environmental employment.

## Other sources of career information currently available in Australia

In Australia there are limited resources containing environmental career advice. One notable resource has been the RMIT annual Environmental Careers Expo. This gives aspiring environmental professionals access to information on the growing range of environmental jobs. This Expo provides career advice specific to certain environmental occupations, but the information is limited because it does not provide comprehensive advice about environmental careers across the public, private and non-profit sectors. Such events can be beneficial for increasing an individual's knowledge base about what specific environmental occupations require and entail. They also provide a networking opportunity for interested individuals.

Gradlink produces *A Guide to Environmental Careers* specifically for tertiary students and recent graduates. The guide is a starting point for information on environmental careers in Australia. The guide acknowledges that environmental careers 'can be very broad, with many different possibilities' and because of this 'there are no definitive main areas of work which can be identified'.

The Gradlink guide manages the problem of occupation classification by describing what sort of work and background is required for the public and private sectors. Within the public sector, careers described include: natural resource management, environmental research and careers in local government. Within the private sector careers described include: manufacturing, environmental consulting and careers in resource industries. All career options are briefly described in terms of what the jobs entail and the academic background required.

The Gradlink guide makes the career advice more personal by having a section of career case studies. It also covers topics such as maximising your career potential through work experience and how to stand out from the crowd with a full resume. Although this guide does provide career advice specific to environmental careers, it doesn't provide comprehensive advice across a broad range of environmental careers.

***The Guide to Environmental Careers in Australia*** builds on Gradlink's information, classifying more environmental occupations and describing in detail what the positions entail, the skills and qualifications required and future employment trends within certain environmental sectors.

This Guide can be used together with the EJV website, which provides a comprehensive environmental career resource. There are other websites in Australia that advertise environmental jobs, but EJV is a pioneer, providing information for people wanting to gain employment in the environmental sectors within Australia, as well as advertising environmental jobs. EJV's career advice page allows users to access some excellent on-line papers. These include Gradlink's *Careers in the Environment* booklet, and a series of papers produced by Kes McCormick on environmental jobs, which cover the following topics:

- getting your foot in the door
- growth of employment opportunities in environmental sectors
- where to find more environment related information.

The careers advice page also has information on where to find jobs (with links to various organisations), joining NGOs, volunteering, environmental employers, events, graduate programs and environmental courses in all states.

To access the Environmental Jobs Network log on to [www.environmentaljobs.com.au](http://www.environmentaljobs.com.au)

In 2004, EJN's dedication to providing focus on environmental career information manifested in the production of a television series. The aim of this production was to deliver practical advice for young people who are passionate about working in environmental sectors, and to promote the benefits to industry and business of employing young people with sound environmental education backgrounds. The program was supported by many key Australian environmental organisations and has been turned into a DVD resource for educational purposes. The show consisted of eight episodes covering a variety of topics ranging from the different types of environmental careers available now and in the future across the public, private and non-profit sectors, the importance of volunteer work and networking, job searching, resume, cover letter writing and interview tips, environmentally-friendly gadgets for sustainable living and much more. EJN interviewed experts from government departments, environmental NGOs and industry to get the inside story on how to land an environmental job. EJN hopes the program will inform young people about what is needed for an environmental career, and inspire them to pursue it.

# future trends

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## Background

This chapter aims to present current and future environmental practitioners with a view of where the industry is likely to be in the next five years. It is important when selecting a career to consider the employment opportunities after graduation. To acquire and present a vision of the likely trends of the environmental industry EJN conducted interviews with a cross section of people in the industry. This cross section illustrates that environmental practitioners span many fields and often have interdisciplinary roles. The represented fields included: international and national non-government organisations, government branches, business consultancies, sustainable energy, research, law and academia.

The environment industry is a young and rapidly developing one. What practitioners think about current and future trends – whether in terms of areas of growth or decline, or constructive criticism – is an important contribution to the continual evolution of this industry.

## Summary

The results of this chapter are divided into the following categories:

- definitions
- public interest
- economics
- areas of growth
- areas of decline
- education
- accomplishments.

**Definitions** of the environment industry are both changing and diverse. No single respondent held the same definition of the environment industry. Within each respondent's discussions, many different terms were used to represent or define the industry. This will be explored further in the discussion.

All respondents viewed **public interest** as very important to the industry. It was viewed as a significant motivator for companies and government to engage with environmental issues. However, the majority of respondents felt that public interest in environmental issues had waned in recent history.

Respondents identified **economics** (including market forces and consumption) as key stimulants to the growth of the environment industry. Respondents also identified that the goal of economic growth was increasingly but controversially being seen as compatible with sustainability. It was commented that a growing number of companies are implementing some form of environmental reporting – a practice that encourages, and is encouraged by, a growth in socially responsible investment.

The main areas of **growth** were seen to be: water, air quality, issues arising from climate change, legislation, waste disposal and reuse, land management (including general agriculture, organics, and solutions to degradation and salinity), and sustainable energy.

Most respondents believed that conservation was one area that was likely to stay the same or to **decline** in funding, legislative development and employment.

Through discussion with respondents, **education** was divided into the categories of public, government and industry. It was felt by most respondents that legislators and the general public need to have a better understanding of environmental issues and sustainability and, in particular, that society as a whole needs to take a longer term perspective in decision making. There was a perceived lack of practical skills among graduates entering the field and it was perceived as difficult for graduates to get into the environment industry. Many respondents believed that university environmental programs needed to be re-examined for their structure, content and appeal. Importantly, in the views of all respondents, sustainability practices and/or environmental classes needed to be incorporated into all fields of tertiary study.

The **accomplishments** foreseen in the next five to ten years include: changes in transportation; progress in water issues; technological development and innovation in industry; and improved education in sustainability for younger people.

## Discussion

The central themes of this research report are jobs and training. All of the results of the interviews fit into these categories with the exception of two: definitions and public interest. These two categories may not fit squarely into the overall themes, but the industry would not exist in any cohesive form without them.

A specific definition of the environment industry was neither requested from nor imposed upon respondents, but was mentioned or discussed in every interview to varying degrees. A single, specific definition was not agreed upon. Nonetheless, it was a category that was accepted readily. The word 'sustainable' consistently arose in the discussions, and tended to be used interchangeably with the word 'environmental'. It was not perceived that there was a sustainability industry, but rather that the environment industry's overall focus was on sustainability. Some respondents seemed less inclined to use the word 'environmental'. Further research would be useful to determine if some people in the sector are deliberately distancing themselves from the 'environmental' tag and if so the reasons that influence this. The incorporation of broader sustainability concerns into the environment industry reveals that, as the industry grows, its definition is evolving.

Public interest was seen as arguably the most important factor affecting the development and direction of the environment industry. Most respondents believed the industry would not exist if it were not for public interest. Government and industry have been held accountable for their actions by the power of the public's awakened interest in and awareness of resource depletion. Unfortunately our respondents indicated that they thought the overall interest in the environment or environmental issues seems to be declining. This understanding is

supported by the Australian Bureau of Statistics' March 2004 Report entitled *Environmental Issues: People's Views and Practices*. The question of why interest is declining doubtless needs to be addressed, but whatever the reason, our respondents viewed re-engagement of the public as critically important to the ongoing vitality of the industry.

Market forces and consumption were viewed as the main drivers of change within the environment industry. However, the proposition that we would solve environmental problems with economic or market solutions alone was viewed by most industry respondents as flawed. Nonetheless, it was the consensus that the problems would not be solved without the backing of market forces. An economic paradigm is emerging that emphasises the interdependence of healthy economic development and sustainability.

An example of a market force that was seen as significantly effecting growth in the industry was socially responsible investing, which was seen to encourage responsible corporate citizenship. Yet probably the most significant force was believed to be consumers. The consensus was that we will not become sustainable if we do not change the daily consumption habits of our society. Additional information supporting this statement can be found in the United Nations Action for Sustainable Development publication entitled *Sustainable Production and Consumption: Fact Sheet*.

There is little doubt that the environment industry will grow in Australia, as an Environmental Industry Action Agenda has been in place since 2001. This active effort by industry and government to increase it to a \$40 billion a year industry for Australia is a positive indicator for those already involved in or wanting to get into some form of environmental work. The main areas of growth were seen to be: water, air quality, issues arising from climate change, legislation, waste disposal and reuse, land management (including general agriculture, organics, and solutions to degradation and salinity), and sustainable energy.

As the condition of the environment goes into critical decline, public awareness tends to increase, along with the need for solutions, and people to devise and implement them. This process belies the increasing growth in fields of water, land, and air quality in particular. It was thought that the issues of water and land, in relation to salinity, would not get the attention they require, though most expected there to be some growth in this area. Some respondents perceived a general lack of understanding of these issues. In particular, they pointed to the common but mistaken belief that if some water issues were solved, land salinity issues would be also be solved. Most respondents believed that the issues that currently exist and will further arise from climate change will create new areas in the industry thus increasing industry growth.

The general consensus among respondents was that more legislation was required in all areas to support the continuation and extension of environmentally progressive market and economic mechanisms. The environmental legal profession was expected to increase in proportion to this change. Legislative change is also expected to have a significant impact upon the waste management sector. Industry discussion suggested that there was the opportunity for new legislation with regard to extended producer responsibility, where the producer of an item is obliged to take it back at the end of its useful life, thus forcing producers to take into account the full lifecycle costs of the product.

The main area of growth for sustainable energy was foreseen to be wind energy. Europe was seen as utilising this technology most readily with many respondents predicting that Asia would also be quick to embrace wind technology. One respondent stated that production and use of this technology in Australia is limited, but that potential incentives for it exist. The subsidies that are given to coal mines and coal power plants were seen to be a major hindrance to wind energy's potential in Australia.

Most respondents believed conservation to be an area unlikely to grow in the near term. It was believed that employment in the conservation of national parks or general resources



would either stagnate or decline. Suggested reasons included that conservation was not a high priority for government, which is primarily responsible for funding and employment in this area. It was also suggested that there is a common belief that conservation issues have been resolved, so they are not getting the maintenance they require.

Education was a topic that generated much discussion from all respondents. As stated earlier, we have divided education into three categories: public, government and industry. Public education has the potential to be a field of growth as the need and desire for sustainability becomes a funding priority. It was seen as important for public education to focus both on corporate and individual responsibility. According to one respondent, in conjunction with education, some form of personal cost needed to be placed on the individual. This could, in some sense, be achieved through education, since this cost did not necessarily have to come in the form of money, but could be in some form of social pressure instead.

Another form of public education discussed was the education of primary and secondary age children. Some respondents viewed this area as already successful. The common perception was positive about what children know about environmental issues, as compared to what respondents knew as children. Today's youth were viewed as future drivers of the industry partly because it would be an integral part of normal life. As one respondent stated:  
*Governments have become an institutional barrier to development ... they no longer lead on sustainability issues, and instead maintain management of old paradigms ... We need to quicken the change of generation, since it is too late, too expensive, and too inefficient to retrain the old timers.*

All respondents believed that sustainability and/or environmental classes should be taught as core parts of all university programs. Being sustainable involves everyone after all – not just those in the environmental industry or in technical positions. Therefore, respondents believed the principles of sustainability should be learnt by all. It was suggested that the environment industry, despite the need for some specialisation, would become an industry that was essentially interdisciplinary.

It was generally agreed that people in government need high quality environmental education. Local governments are major employers of environmental practitioners, and were perceived by our respondents as the innovators and true drivers of sustainability and environmental issues at the government level. Local government environmental employment is thus likely to expand in the future.

We consider industry education as involving not only those who were already in the industry, but also those in tertiary education attempting to enter it. The overwhelming consensus was that graduates were entering the workplace with a lack of practical skills. Respondents also felt that it was difficult to break into the field. Employers tended not to want to hire people straight out of university, as they were concerned about losing their investment a couple of years later.

There were many recommendations about how to gain practical experience in the environment industry. One recommendation was to become involved in the industry in any capacity before graduation. Ways to become involved could include an internship, volunteering or work experience. Another recommendation was to split university environmental programs into sections. For example, a student may attend university for two years and graduate with a diploma. They could then take two years to intern, volunteer or gain some work experience, and then return for the final two years for their complete degree. A further recommendation was to obtain a bachelor degree in a core subject – biology, geology, engineering, etc. and then gain a postgraduate degree in environmental studies. The final recommendation was for graduates to be motivated not only by money, but also by the environmental outcomes they may achieve.

It was observed that, since the environment industry is a young industry, there are many people who have shifted from non-environmental positions into environmental positions. It was considered important for these people to update their skills and knowledge to maximise their effectiveness and continued employability.

The final issue for discussion was the area of anticipated accomplishments. The answers on this topic varied, but one subject clearly stood out: the future impact of technological innovation.

Several respondents discussed the slow adoption of good existing technology, and an under-investment in innovation, but expressed a belief that these technologies will be taken up over time. Another area mentioned by one respondent was the potential for developing nations to advance ahead of developed nations in environmental outcomes due to their ability (and willingness) to implement new technologies. It would require great vision on the part of developed nations, who have established technologies in place, to achieve similar outcomes. From water to transportation to paper, technology that would enable us to use all of our resources more efficiently was seen as our main anticipated achievement in the next five to ten years.

This series of interviews suggested that the environmental industry would continue to grow. Not only because our environmental problems would increase, but because overall awareness would increase as well. The views held by most people interviewed and the results of the survey of more than 600 environmental employees make it possible to foresee the environmental industry becoming central to all industrial practice in Australia. Issues raised by respondents in all areas need to be addressed to alter the occupational landscape and change the focus of organisational and personal responsibility, ensuring that current and future environmental issues may be met by society as a whole.

# conclusion

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This survey has confirmed the fact that environmental employment is diverse and is not limited to national parks or natural resources. As environmental employment enters the mainstream, a growing number of organisations are seeing the benefits of including sustainability considerations within their operation.

Growth in environmental employment has been identified over the last three decades and is predicted to continue. This should provide an increased number of employment opportunities for environmental practitioners.

The amount and variety of work for environmental employment is vast. The main areas of environmental work included in this Guide are:

- air quality protection
- water quality protection
- land and site restoration
- waste management
- fisheries and wildlife
- forestry
- energy and greenhouse gas
- national parks
- education
- research,
- policy
- sustainability.

Other significant areas of environmental employment identified through the study include:

- climate protection
- agriculture
- mining
- ecotourism.

The representation of these subsectors in the survey respondents was limited, therefore, further research is recommended to explore these areas in detail.

Environmental jobs can and often cut across the different areas. The classification model for environmental employment presented in the Guide is a way to break down the work within each sector, and give some direction to job seekers. It should be seen as a flexible not rigid structure.

Any job can be transformed into an environmental job. All it takes is for a company or government to implement an environment or sustainability strategy and immediately employees are tracking performance indicators on emissions and impacts. This is what corporate social responsibility (CSR) and triple bottom line (TBL) are all about.

Environmental practitioners have a diverse range of academic backgrounds. From almost any undergraduate training there is potential to become an environmental practitioner. Most employers view undergraduate degrees as a foundation on which to build skills and knowledge. Advice received through the survey pointed out that undergraduate training be broad and that specific knowledge and skills be acquired through postgraduate training and work experience.

Although opportunities are great, competition is large. It is important to increase employability while studying by getting hands-on experience and networking. Volunteer and internship programs offer great opportunities for students to ultimately acquire new skills and contacts.

Some of the specific areas that were expected to grow in the minds of respondents were:

- water
- air quality
- issues arising from climate change
- legislation
- legal profession
- waste (both disposal and usage)
- land use, including general agriculture, organics, degradation and salinity solutions
- sustainable energy

# appendices

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## Appendix 1: Members of the Steering Committee and Advisory Group

### Steering Committee

- Dr Ian Thomas – Associate Professor, School of Social Science and Planning, RMIT University
- Jacinta Blanch – Vice President, Environmental Jobs Network
- Michael Oke – Cities for Climate Protection Rural Victoria and Green Purchasing Manager, International Council for Local Environmental Initiatives (ICLEI); Executive, Environmental Jobs Network
- Dr Ruth Lane – Lecturer, School of Social Science and Planning, RMIT University

### Advisory Group

- Michael Pitcher – President, Environment Institute of Australia and New Zealand
- Dr David Dunkerley – Associate Professor, School of Geography and Environmental Science, Monash University
- Teresa Day – Education and development officer, Victorian Association of Environmental Education
- Amy Hubbard – Community Development, GHD
- Matt Amstead – Environment Monitoring Officer, Brisbane City Council
- Nathaniel Muller – Water Projects Officer, Municipality Association of Victoria
- Jenny Hoysted – Interpretation Coordinator (former), Zoos Victoria
- Jonathan Shankar–Noble – Senior Environmental Education Officer, Department of Environment and Heritage South Australia
- Scott Perkins – Project Manager, Parks Victoria
- Julie Kirkwood – Australia's Threatened Species Network (TSN) Coordinator – Victoria, WWF
- Frank Mitchell – Environmental Education Coordinator (former), Environmental Protection Authority VIC
- Marie Waschka – Knowledge Communicator, Murray–Darling Basin Commission
- Dr. Robyn Leeson – Manager Environmentally Sustainable Development (former), Melbourne City Council
- Mitzi Wotton – Coordinator Learning and Development, Department of Sustainability and the Environment

- Scott White – Principal Director, Principal Consulting
- Marcus Godinho – Executive Director, Environment Victoria
- Kerry Schrank – Commercial sustainability manager, BP
- Jennifer Manefield – Project Manager, Division of Environmental and Life Sciences Macquarie University
- Sarah Holdsworth – Research Coordinator, Global Sustainability, RMIT University
- Gael Hansen – Learning and Development Unit, Australian Government Department of the Environment and Heritage
- Dugald McNaughtan – Manager, Publications and Communications, Graduate Careers Council of Australia

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## Appendix 2: List of distribution networks and interviewees

Employer networks used to distribute the employer questionnaire.

- Australian Bankers' Association
- Plastics and Chemicals Industries Association
- Minerals Council of Australia
- Australian Local Government Association
- Australian Petroleum Production and Exploration Association
- Australian Water Association
- Environment Business Association
- Graduate Careers Council of Australia
- Green Building Council Australia
- Principal Consulting
- Victorian Association of Environmental Education
- Victoria Planning and Environmental Law Association
- Global Sustainability, RMIT University
- The Environmental Jobs Network
- The Environment Institute of Australia and New Zealand
- The Australian Association of Environmental Education
- Principal Consulting
- The Sustainable Living Foundation
- Envirodrinks
- Greenleap

Position titles and employers of individuals interviewed for the Future Trends section of the guide.

- Advanced Wind Technologies (QLD), owner of company
- Environmental Protection Agency (QLD), Communications Team Leader
- Murray-Darling Basin Commission (NSW), Knowledge Communicator
- International Council for Local Environmental Initiatives (ICLEI), Green Purchasing State Manager (VIC)
- PMJ Fisher Pty Ltd (QLD), Professor Central Queensland University
- Australian Environmental Labelling Association (VIC), President
- UN Department of Sustainable Development (New York), Policy Development Analyst
- Principal Consulting Group Pty Ltd (VIC), Principal Director
- Environmental Business Association (VIC), National Chairman
- Earth Systems, Director
- Environmental Defenders Office, Principal Solicitor

## Appendix 3: A snapshot of results

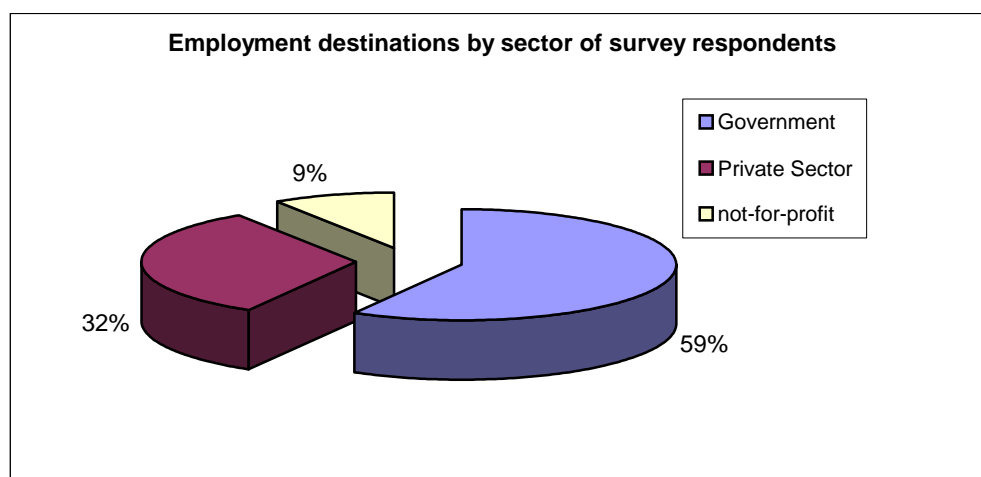
The Environmental Jobs Network (EJN) conducted a study on environmental employment in response to the lack of information about environmental employment related to employees. The EJN study has contributed to the broader understanding about what may be required now and in the future for potential employees to secure environmental employment. The study achieved this broad aim by specifically questioning four areas:

- the range of environmental positions
- what these positions entail
- the skills and qualifications needed for these positions
- the likely trends in the employment fields.

This information was collected through two on-line survey questionnaires. Over 600 environmental practitioners responded to the survey, providing valuable qualitative and quantitative data. This snapshot of the results of this survey is compiled from the quantitative data collected from the EJN survey. It is designed to give you a quick overview of the results gained from the survey and includes:

- employment destinations of survey respondents
- survey respondents' employment areas by subsector
- work experience profiles of survey respondents
- minimum qualifications for positions
- qualifications of survey respondents
- general skills required for positions
- age profiles of survey respondents
- salary profiles of respondents.

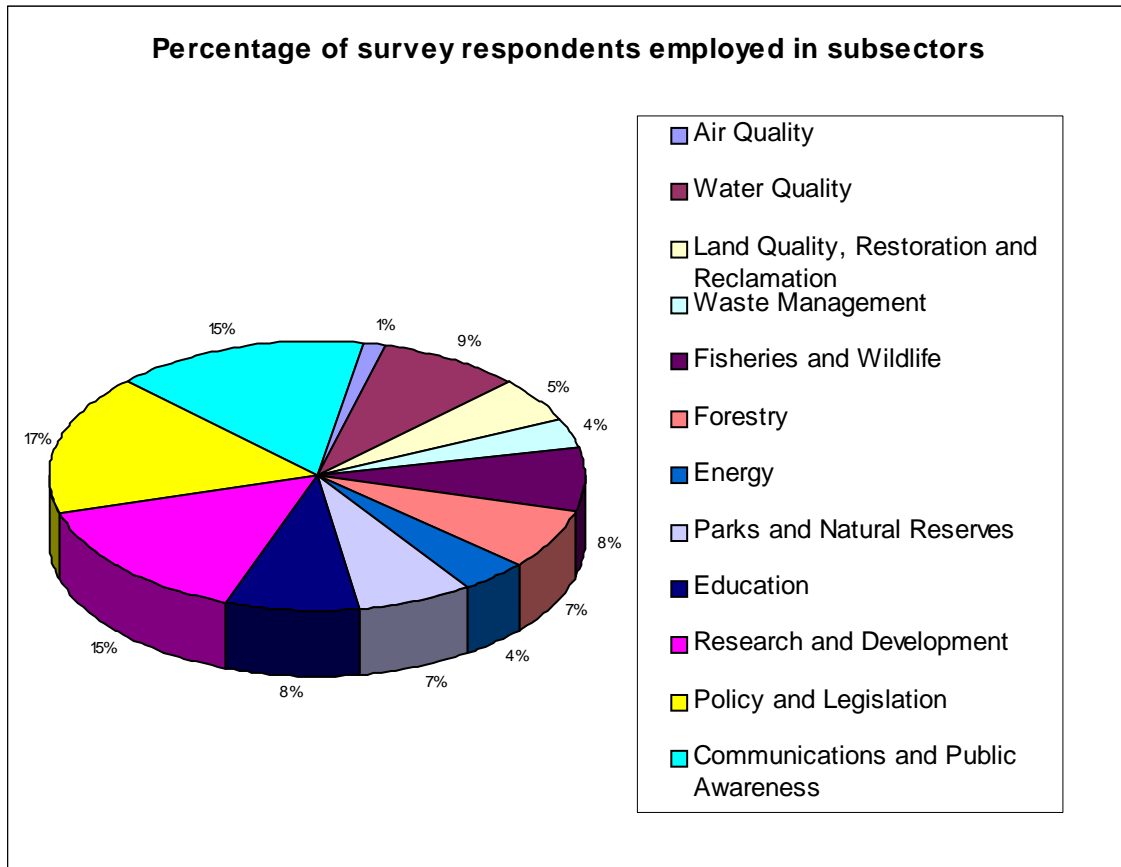
**Graph 1: Employment destinations of survey respondents**



59% of survey respondents were employed in government (Local, State and Australian). 32% of survey respondents were employed in private organisations and 9% were employed in not-for-profit organisations.

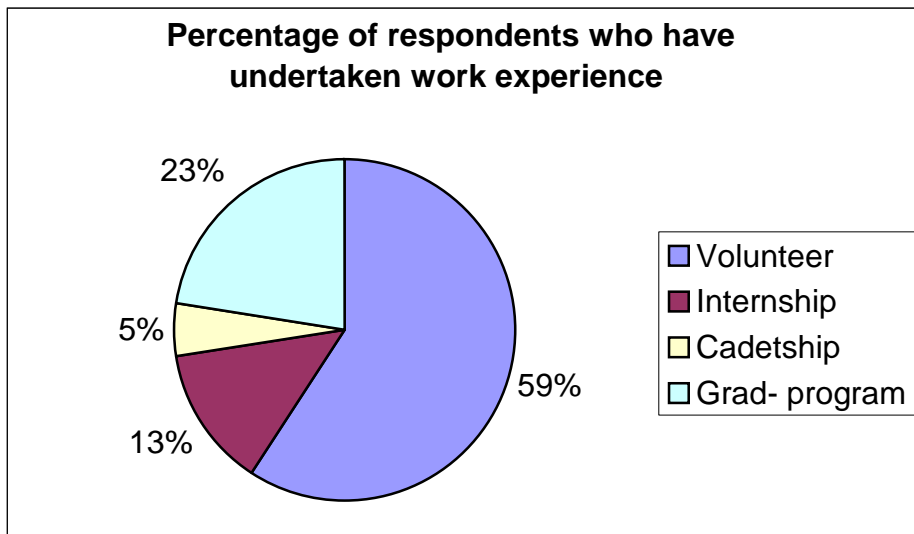


**Graph 2: Percentage of survey respondents employed in various subsectors**



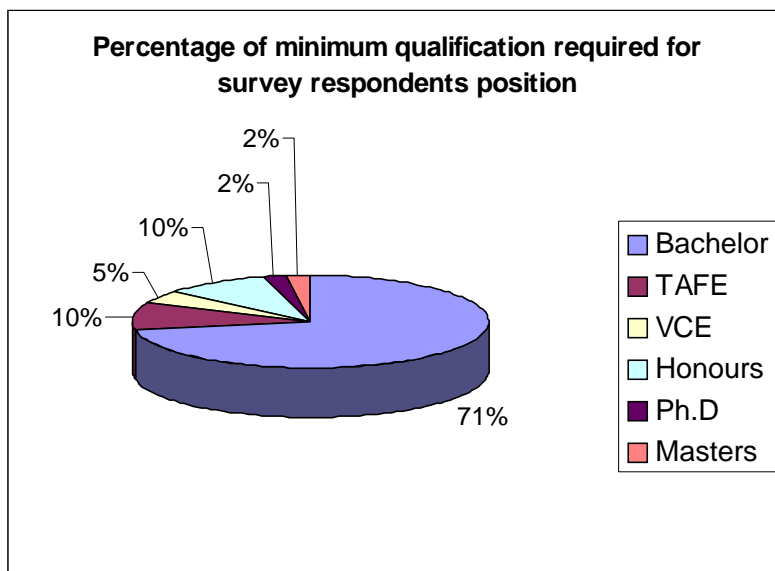
Graph 2 identifies the main sub-sectors that the survey respondents are involved in across the government, private and not-for-profit organisations. The main subsectors are: communications and public awareness, policy and legislation, and research and development.

**Graph 3: Percentage of respondents who have undertaken work experience**

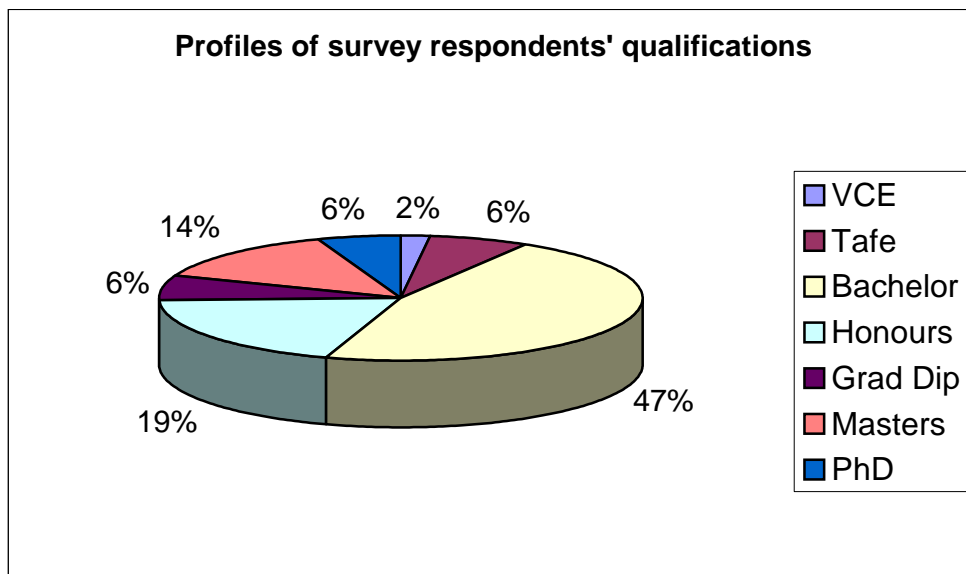


Graph 3 identifies volunteer work as the form of work experience most (59%) survey respondents undertook. 23% of survey respondents undertook graduate programs, 13% of survey respondents undertook cadetship programs, and 5% of survey respondents undertook internship programs. The results indicate that volunteering is the most common form of work experience among survey respondents. For more information on work experience see the **Career advice** chapter.

**Graph 4: Percentage of minimum qualification required for survey respondents positions**



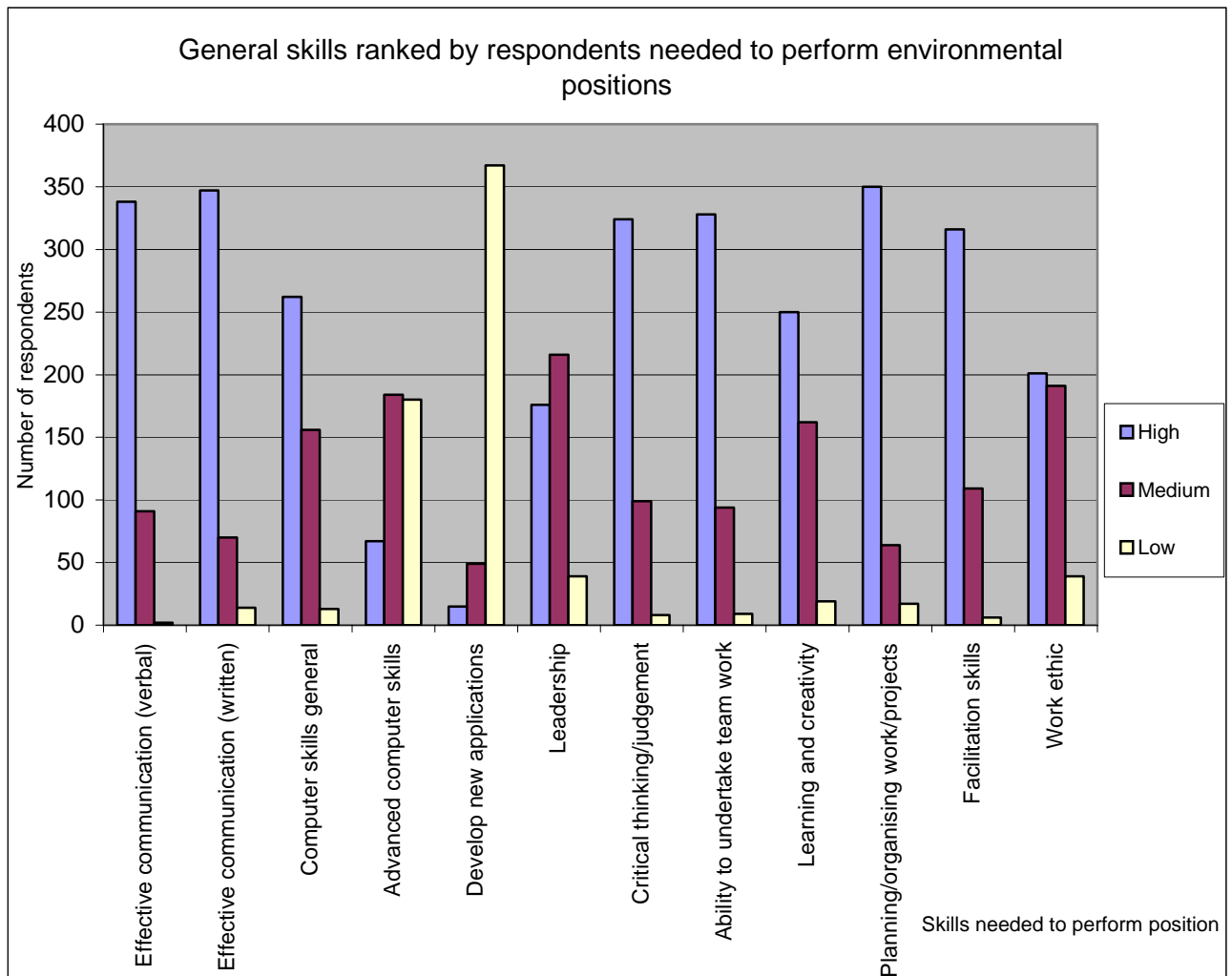
Graph 4 identifies that 71% of survey respondents' positions require a bachelor degree as a minimum qualification. Very few positions identified require postgraduate qualifications as a minimum qualification.

**Graph 5: Profiles of survey respondents' qualifications**

Graph 5 shows that 26% of survey respondents have postgraduate qualifications. The majority of respondents have bachelor degree (47%) or an honours degree (19%).

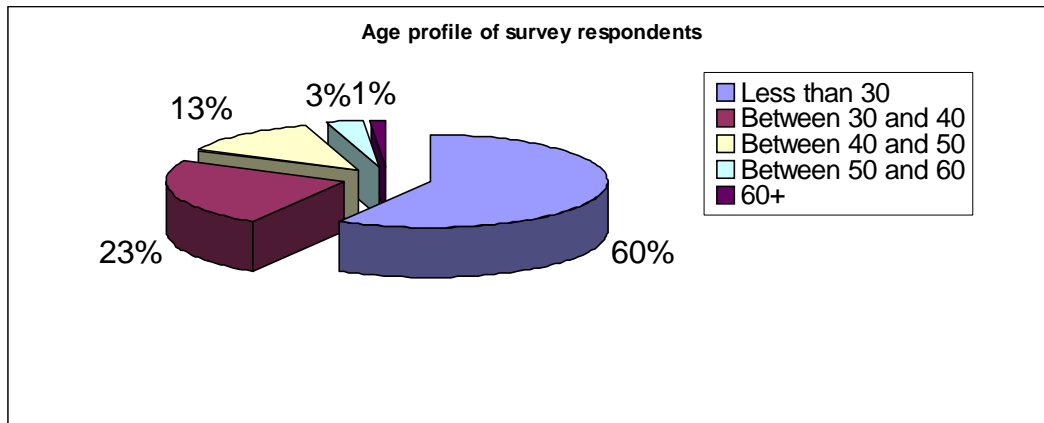
These results, coupled with results in graph 4, indicate that postgraduate qualifications may not be essential for entry into certain environmental careers. It may be that an undergraduate degree or educational diploma gives the technical knowledge required for certain careers. You may still lack practical experience and the associated skills in the field you want to enter. Keep in mind some environmental careers will require postgraduate qualifications as specialist knowledge and training, but other will value work experience more highly.

**Graph 6: General skills ranked by respondents**



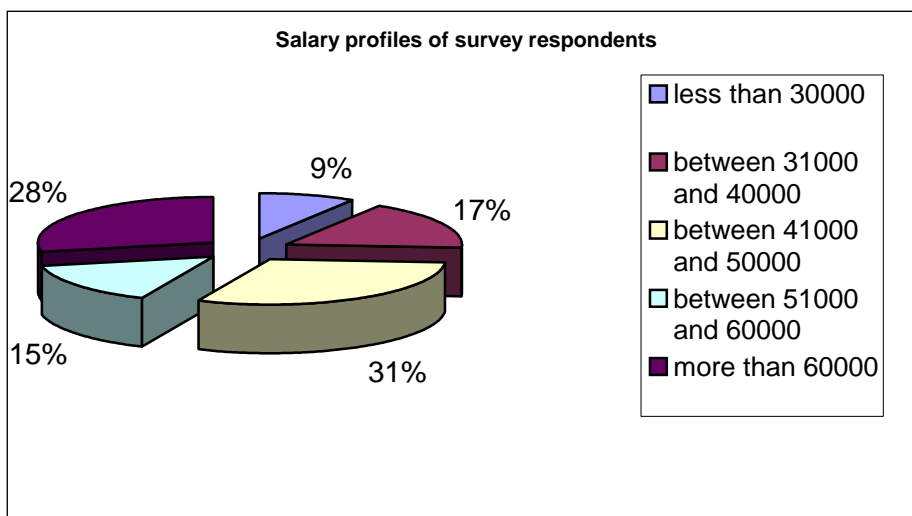
The results on general skill levels illustrate that the majority of survey respondents' believe it is necessary to be highly competent in the range of general skills. This indicates that in order to gain employment, or be successful in many environmental positions, well-developed general skills are required in addition to academic qualifications. Undertaking work experience, paid or unpaid is the best way to develop these skills.

**Graph 7: Age profile of survey respondents**



The results above indicate that two thirds of the survey respondents are less than 30 years of age (60%). The second largest age demographic that responded to the survey is respondents between the ages of 30 and 40 years. Only a small percentage of respondents are over 40 years of age. No definitive conclusions about age can be made from these results; however, the results suggest that the environment industry surveyed employs a large number of young people.

**Graph 8: Salary profiles of survey respondents**



The results in Graph 8 indicate that a high percentage of survey respondents receive salaries between \$41 000 and \$50 000 (31%) and more than \$60 000 (28%). A lower percentage of survey respondents receive salaries of less than \$30 000 (9%) and between 31000 and 40000 (17%). More information is needed to make statistical inferences about average salaries of environmental practitioners. However, these results are encouraging as only a small percentage of respondents are receiving lower salaries. Results in this survey indicate that most practitioners are being suitably remunerated.

## Appendix 4: Further reading – studies in environmental employment

Studies in Australia have primarily focused on the business characteristics of the environment industry, such as structure, revenue, expenses, economic growth and trade.

Victoria's Environmental Management and Renewable Energy Industries (Victorian State Government, 2001).

This report was conducted to identify development strategies for industries with growth potential. Environmental management and renewable energy are identified as areas for growth. The research method was based on submissions rather than on a comprehensive survey of the industries. A research method based on submissions does not provide accurate results across a broad spectrum of industries. The report contains a small section on education and training related to employees, summarising that all businesses interviewed regarded graduates from Australian universities as 'highly capable and of sufficient quantity that there is no shortage'. Such findings do not adequately contribute to research about environmental employees and are outdated given the rapid growth in the environment industry.

A national survey of the environment industry: proposal for discussion (ABS, 2001).

The survey design was drafted in May 2002, if conducted it would collect macroeconomic data on the environment industry at regular intervals for trend analysis. The survey has not proceeded as it has lower priority for funding than other work (Meadows 2002). The ABS has limited data collection and analysis about environmental employment related to employees.

*Environmental Jobs in WA Employer Survey* (Annandale and Morrison-Saunders, 2002).

A questionnaire was asked of environmental employers and general businesses about the following areas: the rate of growth in green jobs over the past five years; emerging jobs in new categories; training needs; identification of current and projected skill shortages; and impediments to growth in the environment sector. A major benefit of this report was that it investigated the training needs and skills required across a range of environmental occupations an area neglected in previous studies.

Specifically, the research asked some fundamental questions about whether graduates are fully equipped with the skills and qualifications needed to enter certain environmental occupations. (These occupations were environmental health officers, environmental planners, hydrogeologists, environmental engineers and land care coordinators.) A key finding of the report was that there was a shortage of skilled or qualified individuals within the environmental sector. Whilst university and TAFE courses produce graduates for these occupations, the extent to which there are sufficient graduates (in number and experience) remains questionable. Moreover, it was beyond the scope of the research, which was 'deliberately brief to gain an overview of green job trends and needs and did not capture enough information to make this judgement' (Annandale and Morrison-Saunders, 2002) to identify such questions. Our guide, *The Guide to Environmental Careers in Australia* aims to investigate environmental employment more thoroughly and specifically address the skills and qualifications required for environmental positions and what the positions entail.

Practical experience is widely recognised as invaluable and required for most environmental careers. The *Environmental Jobs in WA Employer Survey* suggests, 'equipping students with practical experience is essential for successful employment placement'. This suggestion is found in other career resources such as Gradlink's *Guide to Environmental Careers 2003* and the Environmental Careers Organisation's *Environmental Careers in the 21<sup>st</sup> Century, 1999*. The *Environmental Jobs in WA Employer Survey* provides quantitative evidence that this

message is being absorbed. Figures from TAFE entry pathways indicate that more university students are re-entering environmental education through TAFE level training because of the more practical nature of the training.

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