

WHY STUDY FORESTRY?

Information sources for and influences on
those who chose to study for an undergraduate
Forestry degree at The Australian National University
in 1997 and 1998

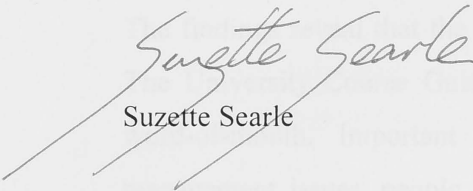
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Declaration

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text



Suzette Searle

Abstract

This study is concerned with aspects of communication – the sources of information and influences – that led students to choose to study either Forestry or Resource and Environmental Management (REM) at The Australian National University. It is based on a written survey answered by first and second year students. Interviews were conducted with five key informants to determine if student expectations of employment in the forestry profession were justified.

The findings reveal that the most frequently-used, first sources of information were The University Course Guide for NSW and the ACT (UAC¹ Guide) followed by word-of-mouth. Important influences upon degree choice were forestry and management issues, people in the forestry profession, work experience in resource management and a love of the forest/bush or a desire to work outdoors. Forestry student expectations of good job prospects were justified in the current economic and political environment; although what foresters may do and how they do it is changing.

¹ The UAC Guide A comprehensive guide to undergraduate university courses in NSW and the ACT
Published by the Universities Admissions Centre (NSW & ACT) Pty Ltd.

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TABLE OF CONTENTS

1. CHAPTER ONE: INTRODUCTION	1
Background to the problem	1
Statement of the problem.....	1
Purpose of the study	2
Research questions	2
Method.....	2
Significance of the study	3
Limitations of the study.....	3
Overview of the study.....	3
2. CHAPTER TWO: REVIEW OF RELATED LITERATURE	4
Forestry and forests in Australia	4
The Forestry profession in Australia.....	7
2.1.1 Employment opportunities	8
2.1.2 The nature of the Australian forestry profession	12
2.1.3 Communication and the forestry profession	17
Forestry education in Australia	21
ANU Forestry and declining enrolments.....	24
ANU student surveys.....	28
Declining enrolments in science at ANU	29
Summary of the chapter.....	34
3. CHAPTER THREE: RESEARCH METHODOLOGY	36
Introduction	36
Methodology.....	36
The questionnaire design.....	37
The interview designs.....	39
Sample and population	40
Data collection procedures	42
Data processing and analyses	43
Assumptions and limitations	43
Summary of the chapter.....	44

4. CHAPTER FOUR: THE RESEARCH FINDINGS	45
Description of the survey population	45
Why students were studying for a university degree.....	48
Reasons for choosing ANU	50
How did students first find out about their degrees/units?.....	50
Were students satisfied with the way that they received information?.....	56
How to encourage people to enrol in Forestry or REM degrees/units at ANU.....	56
The influence of relevant work experience	58
The influence of people in the forestry profession.....	62
Influence of environment or forestry management issues.....	66
Other influences on degree choice	71
Why REM students did not study for a Forestry degree	73
Why Forestry students did not study for a REM degree	74
Why students studied neither REM or Forestry	82
Are student expectations being met?.....	84
Summary of the survey findings.....	88
Comparison of results with other surveys	90
4.1.1 National university survey	90
4.1.2 Unpublished ANU surveys.....	91
4.1.3 Follow-up surveys	94
4.1.4 Comparison of this study with other survey findings	95
Interviews – Are Forestry students' expectations of good job prospects justified?	96
5. CHAPTER FIVE: CONCLUSIONS, DISCUSSION & RECOMMENDATIONS	106
Conclusions	106
Limitations of outcomes	107
Discussion.....	108
Recommendations for further study	108
Recommendations for practice	108
Note	110
6. REFERENCES	111
7. APPENDICES	115
7.1. Survey questionnaire	115
7.2. Transcript of interview with Peter Yuile (AFFA).....	121

CHAPTER ONE: INTRODUCTION

LIST OF TABLES

Table 1. Employment opportunities for foresters (Cremer, 1977).....	9
Table 2. Students enrolled in 1 st Year Forestry at three Australian universities 1996–2000.....	22
Table 3. Number of students surveyed in three ANU Forestry classes – grouped by degree.....	42
Table 4. No. of surveyed students studying single or combined Science degrees.....	46
Table 5. Demographics of 119 ANU students surveyed in three Forestry classes – 1998.....	47
Table 6. Why do people study for a university degree?.....	49
Table 7.1. Reasons for choosing ANU – first year students.....	52
Table 7.2. Reasons for choosing ANU–second years students.....	53
Table 8.1. How 1 st Year students first found out about Forestry/REM degree or units at ANU.....	54
Table 8.2. How 2 nd year students first found out about Forestry/REM degree or units at ANU.....	55
Table 9.1. Other ways 1 st Year students would have liked to receive information.....	59
Table 9.2. Other ways 2 nd Year students would have liked to receive information.....	60
Table 10. The influence of work experience on degree choice.....	61
Table 11.1. The influence of people in the forestry profession on first year students.....	64
Table 11.2. The influence people in the forestry profession on second year students.....	65
Table 12.1. Influence of environment/forestry management issues on 1 st Years' degree choice.....	68
Table 12.2. Influence of environment/forestry management issues on 2 nd Years' degree choice.....	69
Table 13. Which students specifically mentioned forestry issues?.....	70
Table 14. Other influences on degree choice.....	76
Table 15. Why REM students did not choose Forestry.....	78
Table 16. Why Forestry students did not choose a REM degree.....	80
Table 17. Why students chose neither Forestry or REM degrees.....	83
Table 18. Are student expectations being met?.....	87
Table 19. Applicants' sources of information and the extent of their influence (Extract from James et al. 1999).....	91

LIST OF FIGURES

Figure 1. Annual undergraduate enrolments in single & combined ANU Forestry and REM degrees 1966–99.....	26
Figure 2. Enrolments in undergraduate Science (single degrees) at ANU 1966–99.....	31
Figure 3. Enrolments in undergraduate Science degrees (combined) at ANU 1966–99.....	32
Figure 4. Enrolments in undergraduate Science (single & combined) degrees at ANU 1966–99.....	33
Figure 5. First and second year students surveyed – by degree.....	41

1. CHAPTER ONE: INTRODUCTION

BACKGROUND TO THE PROBLEM

Forestry is an important industry for Australia. For example, in 1997 it was estimated that Australian native forests and plantations generated 82,500 jobs and over \$10 billion of wealth a year from wood products (DPIE, 1997). Professional forest managers have been trained in Australian universities since 1911, and until 1996, all Australian foresters were either graduates from The Australian National University or The University of Melbourne. Today four Australian universities offer four-year science degrees specialising in Forestry, and about 80 students begin Forestry degrees (single or combined) each year.

STATEMENT OF THE PROBLEM

There are foresters who believe that their profession has failed to communicate effectively with the Australian public. Foresters have also expressed their concerns about the effect of such failure on the future of the profession and more specifically, on those who may want to join it. As stated by Jerry Vanclay (1996):

The future of forestry education is inescapably linked with community attitudes toward forestry...

Undergraduate enrolments in Forestry have generally declined at ANU since 1976. In 1999 they reached an all time low in the 34-year history of the degree (see Figure 1). What has led to this decline? Is this a symptom of decline in demand for science graduates in general or Forestry graduates in particular, or conversely a decline in student awareness or desire for a qualification in forestry? Have the forestry debates of the last 30 years negatively affected people's perception of forestry and the role of foresters, and is this linked to a decline in those wishing to become professional foresters? Or is this a result of the forestry profession's failure to effectively communicate with the public?

PURPOSE OF THE STUDY

To help examine the influence of communication between the forestry profession and the general public, this study focussed on enrolment decline in undergraduate degrees in Forestry at ANU. It is concerned with the sources of information and influences that led college/high school students to choose particular undergraduate degrees at The Australian National University (ANU). It attempts to understand why students have chosen to study either Forestry or Resource and Environmental Management (REM) to gain insight into the causes for decreasing enrolments in Forestry. This study also addresses the question of whether Forestry students' expectations of good employment prospects are justified.

The understanding gained from this study will ideally lead to the development of effective communication strategies to reach potential undergraduate Forestry students. It will also indicate where currently scarce recruitment funding could best be allocated.

RESEARCH QUESTIONS

This study addressed the following research questions that arose from concerns about the general decline in Forestry enrolments at ANU:

1. Where did high school/college students find information that led them to choose or not choose to study Forestry at ANU?
2. 'What influenced high school/college students to choose their degree?'

A third question emerged during the study:

3. Are Forestry students' expectations of good job prospects justified?

METHOD

The research questions were addressed through a survey and interviews. A written questionnaire was used to survey first and second year ANU undergraduate students studying Forestry units. Five senior forestry professionals were interviewed in person or over the telephone following an interview protocol designed to examine whether Australia needed more foresters.

SIGNIFICANCE OF THE STUDY

The decline in enrolments in the Bachelor of Science (Forestry) at ANU is of concern to the ANU Department of Forestry. This study addresses where high school college students are finding information about, and what influenced them to study Forestry at ANU. This will be useful information to guide communication strategies for Forestry educators and the forestry profession as a whole.

LIMITATIONS OF THE STUDY

The wider view held by Australians about the forestry profession is still to be determined, as this study does not look beyond ANU university students and a small number of senior forestry professionals. This study does not comment on aspects of forestry education beyond ANU. It was restricted to a self-selected group of first and second year students – those who chose to study Forestry units as part of a Forestry, Resource and Environmental Management (REM), Science or combined Science degree course at ANU. It does not survey ANU students who chose other units or degrees, or people who did not choose to study for a tertiary qualification.

This study does not attempt directly to examine all the influences that affect students' degree choices at ANU such as the increasing financial cost of tertiary education to the student. Nor does it examine reasons for the general decline in enrolments in science degrees that has occurred in Australia.

OVERVIEW OF THE STUDY

In this chapter, the background to the problem was described and the purpose of the study explained. The research questions leading to the choice of survey and interview methods were stated. In the next chapter, related literature is reviewed. In Chapter Three the research methodology is described and discussed.

Chapter Four presents the findings from the survey and the interviews. The conclusions, limitations and recommendations of this study are presented in Chapter Five.

2. CHAPTER TWO: REVIEW OF RELATED LITERATURE

FORESTRY AND FORESTS IN AUSTRALIA

The many definitions of forestry all relate, in one way or another, to the wise and sustained fostering, production and use by people of the many values, benefits, services and products of forests (Carron, 1985).

Over the last one hundred years the focus of the forestry profession, along with that of Australian society has changed. After the indiscriminate forest cutting of the first one hundred years after British settlement, forestry began in the 1870s and was first concerned with conservation. From the 1930s this focus changed to development, despite strong lobbying efforts by foresters. A Royal Commission in 1931, concerned with development in northern Queensland, expressed forest policy at that time:

The productive wealth of the country currently suffers from the fact that there are too many rather than too few trees.

It was not until the 1970s that the emphasis changed again, in response to increasing scarcity of natural forest and the values associated with them, and a balance was sought between timber production and environmental considerations.

Until the 1960s however, few people outside forestry or the forest-based industries appear to have had much interest in forestry in this country (Carron, 1985). Then the concern for the 'conservation of the environment' focussed attention on the forest estate of Australia, its management and its managers (Carron, 1985).

Jerry Vanclay wrote in 1996 that:

We are in the midst of a revolution in forestry. There is an increasing emphasis on holistic and non-wood aspects reflected in the term 'ecosystem management'. Some pressure groups are seeking to divert all timber production from native forests to plantations. Forest services have been restructured, amalgamated, and may be turned into timber corporations (Vanclay, 1996, p. 2).

Today there are a number of recognised stakeholders beyond the State and Commonwealth governments and forest industry, with a wide range of opinions about how the forest resource should best be managed.

Since 1995, the Commonwealth, States, stakeholder groups and regional communities have committed considerable funding and resources to resolve decades of conflict over the way Australians use native forests. Investment in forest-based industries is encouraged, as is the development of an internationally competitive and sustainable timber industry. Plantation forestry is also being developed as a 'sink' for greenhouse gas emissions. An information base for forest areas was established (1995–1999) under the Comprehensive Regional Assessment (CRA) and Regional Forest Agreements (RFA) have been finalised with at least three State governments. These RFAs are intended to establish world class conservation reserves, provide certainty for jobs and investment in industry, and ensure that native forests are managed in an ecologically sustainable way (AFFA, 2000).

The total area of Australia's native forests, including non-commercial forest and woodlands, is about 157 million hectares (or about 20% of the continent). This represents about 60% of the forest cover that was present before the arrival of Europeans in 1788. Most of this (116 million hectares) is woodland and mallee. The most common forest types are those dominated by Eucalyptus and related species. Acacia forests (7.8%) are important in drier parts while *Callitris* forests are Australia's largest stands of native softwood species (0.6% – 0.9 million hectares). Rainforests account for only 2% of our forests (3.6 million hectares). Most of the forest is owned privately (27% – 42 million hectares) or under private leasehold (42% – 66 million hectares) (DPIE Forests Branch, 1997).

Australia also has over one million hectares of plantations of which about 86% are exotic pines and 14% are natives, mostly eucalypts. Plantations currently supply 40% of domestic demand for wood and paper products and this is expected to increase as the current plantation estates grow older and larger. Commonwealth State and Territory governments and industry now aim to treble the plantation area to three million hectares by the year 2020 (Plantations for Australia - The 2020 Vision). This partnership was launched in October 1997 to build a sustainable, commercially oriented and internationally competitive industry by attracting private investment.

To achieve this target, it is estimated planting will need to increase from about 32,000 hectares per annum in 1990–95 to 80,000 hectares a year (DPIE Forests Branch, 1997). The rate of plantation establishment increased to almost 60,000 hectares in 1998–99 (AFFA, 2000).

The Commonwealth and State Governments are also implementing the 'Farm Forestry Program' to promote commercial wood and non-wood production and to integrate commercial tree growing with other agricultural land uses (DPIE Forests Branch, 1997). It is believed farm forestry and plantation expansion has the potential to create up to 40,000 jobs in rural areas and flow-on industries such as transport (AFFA, 2000).

Australia has a trade deficit in wood and paper products approaching \$2 billion/annum (AFFA, 2000). Federal government policies and programs developed, in part, to address this deficit are having a significant impact on what and how forestry is practised in Australia today.

In 1997 it was reported by DPIE that Australian native forests and plantations generated 82,500 jobs and over \$10 billion of wealth a year from wood products (sawn timber, plywood, boards, paper products and export woodchips). Significant community benefits are derived from wood production and subsequent processing of wood into sawn timber, wood panels and paper products, which contribute about two and a half percent of Australia's Gross Domestic Product (GDP). In recent years there has also been a dramatic increase in value-adding to timber from native forests. For

instance, 60% of all sawn material from jarrah forests is now being value added (DPIE, 1997).

THE FORESTRY PROFESSION IN AUSTRALIA

Professional foresters have a science degree majoring in Forestry. The task of trained foresters, as described by the Institute of Foresters of Australia in 1996 in a careers brochure is:

To protect and manage [Australia's] forests and plantations for the community or for private companies or investors. In recent years foresters have also been increasingly involved in assisting farmers to reverse land degradation by establishment of plantations on farmland, or by using agroforestry techniques to reduce soil erosion or land and stream salinity.

Forestry is described by the Institute of Foresters of Australia (Cremer, 1977, p. 2) as:

The science, business and art of managing forested lands for the maximum long-term benefit of the community. It is more like farming than any other economic activity, but requires strategies which are more long-range and complex in scope because trees take longer to grow and management activities provide not only for the tangible forest products but also for recreation, protection of soils and watersheds, and preservation of habitats for flora and fauna.

According to Carron (1985) forestry in Australia began in 1871 when the colonial view of forests as an impediment to development began to change. Public efforts led to the gazetting of permanent reserves for continuous wood production in New South Wales. It was in 1875 that special officers, including the 'inspector of forests and forestry ranger for the Clarence River district' were appointed to supervise the reserves.

Between the 1870s and the 1920s there was a rising awareness of the need for forest reservation and regeneration to maintain wood supplies. In this period the forest services were created and the paradigm of Australian forestry ('the entire constellation of beliefs, values and techniques and so on shared by the members of a [particular

scientific] community') originated (Dargavel, 1980). However, the forest services struggled through the 1930s and 1940s in which they battled against public apathy, restricted budgets and obstructive Lands Departments, to protect the forests from fire and encroachment, and delineate parks and reserves (Dargavel, 1980). There was a great expansion of Australian forestry and significant industrial changes in the 1950s–1970s that increased the scale of the industry. There was a flood of federal money into the States for planting pines, major expansions of the pulp and paper industry, the start of the particle-board industry, and the establishment of the large woodchip export projects (Dargavel, 1980).

2.1.1 Employment opportunities

Employment opportunities for Forestry graduates have expanded over the last 30 years. For example, in 1977, in a booklet written for the Institute of Foresters of Australia (IFA), to 'assist high school students in choosing careers as professional foresters in Australia', employment opportunities (see Table 1) were presented in terms of the variety and relative size of employment opportunities for professional foresters

Table 1. Employment opportunities for foresters (Cremer, 1977)

Employers	Estimates of employment distribution	Total
State & local governments:		
Forest services	670	
National Park services	40	
Land use and environmental agencies	15	
Water catchments	5	
Parks and Gardens	10	740
Federal Government & Bodies:		
Forestry	30	
City Parks	5	
Other departments	30	
CSIRO	60	
Universities	25	150
Private enterprise:		
Pulp and paper companies	50	
Other industries (sawmilling, building materials, etc.)	45	
Self-employed, consultants	15	110
		1000

Cremer (1977, p. 6) also wrote about the need for foresters and increasing competition from graduates in related fields:

Foresters are being employed in an increasing range of jobs, but at the same time are meeting increasing competition from graduates in related fields.

The annual need for new foresters varies with economic conditions, and with changes such as major forestry ventures. The State forest services, including Victoria, take on about 40 to 60 new foresters a year, making the total annual need perhaps 60 to 70. The number of foresters graduating in Canberra and Melbourne is about 70 to 100. In addition up to 300 students graduate annually from courses in land and resource management at the University of New England, Griffith University and Canberra College of Advanced Education. The competition for openings is thus intense, and graduates have to be flexible in the type of job they seek and accept.

In 1977 most Forestry graduates were employed by State and Commonwealth government agencies, as they had been since forestry education began in Australia. This trend appears to have continued but unfortunately there is not a more recent breakdown of employment distribution for comparison. However the range of employers has broadened as forestry expertise has been required for extension and consultancy, as is evidenced by a 1996 brochure printed by the Institute of Foresters of Australia:

Almost all publicly owned native forests are owned by the States, so many foresters are employed by State forest services or national park and wildlife agencies. In recent years an increasing number of foresters have been employed by private companies, especially in connection with plantation management. There are many independent consultant foresters who work with farmers on plantation establishment or management, or in Landcare activities, with mining companies and catchment agencies.

The promotional brochures produced by Australia's forestry universities also describe a wider range of employers than existed thirty years ago. For example, in a brochure 'Careers in Forest Science' produced in 1995 by the Faculty of Agriculture, Forestry

and Horticulture, The University of Melbourne, employment opportunities for forestry graduates were described:

In Australia most forest scientists are employed in government services, principally with State forest services, but also with soil conservation, national parks, wildlife, water supply and country fire authorities. There are also opportunities for employment in private forestry, mainly with pulp and paper companies, and in the larger wood-based industry.

In a 1999 recruitment brochure, ANU Forestry described employment and career prospects as diverse:

Our graduates work in all aspects of the resource sciences and management for a wide range of employers in Australia and overseas: government, private companies, community groups and non-government organisations.

In 2000, Southern Cross University described career opportunities for Forestry graduates in a promotional brochure by listing employers in government State and Commonwealth agencies, the private sector, community organisations and international government and non-government organisations. Examples of available career paths were described in operational forest management, land use planning, forest research, extension and consultancy and Park and Reserve management.

Anecdotal information from recent ANU Forestry graduates suggests they have little trouble finding employment within the profession and in fact had a choice of jobs soon after graduation. This follows on from a survey (August 1998) of graduates of The University of Melbourne and The Australian National University during 1987-1995 that reported 85% of respondents found relevant professional employment either before completing their studies or within three months of searching (87% ANU; 83% University of Melbourne) (Sheehan, 1998).

2.1.2 The nature of the Australian forestry profession

Irrespective of all the changes in the focus and practice of forestry in Australia over the last century, Dargavel (1980, p. 8) pointed out that there was no tradition of social and political questioning in the close-knit community of Australian forestry, although:

The exclusion of the social sciences and humanities from the explicit curricula does not mean that political and social attitudes are not taught, rather it means that they are carried implicitly and unquestioned in the paradigm itself – transmitted unknown in a myriad of ways through notions such as the 'professional role', 'the common good' and so forth.

In 1980 he described the community of Australian forestry, as consisting almost entirely of officers of eight states and territory forest services, academics in three tertiary institutions, forest scientists in the Commonwealth Scientific and Industrial Organisation (CSIRO), and forest managers in the larger wood-using industries. Dargavel (1980, p. 7) wrote:

The members [of the community of Australian forestry] are thus nearly all employed as staff in large hierarchical organisations... They are firmly 'Management' rather than 'Labour' and are provided with high salaries, security of employment, cars, comfortable offices, and for many, lavish superannuation schemes that maintain their life-style in retirement far above that of the majority of citizens... Foresters have been particularly privileged in the way they have been able to work, at least until the environmental movement commenced, free of outside interest or interference between the conception and execution of their ideas... The community ... is also a conservative and restrained one in which the views of its members conform, at least in public, to the policies of their organisation. This conformity of views arises easily as the great majority of Australian foresters are trained within the same institutions...

Dargavel (1980, p. 10) also commented that:

...the vocationally oriented, scientifically and technically weighted, bureaucratically connected traditions of Australian forestry have insulated the community from a wider intellectual, more academic, treatment of values and social policies.

Jerry Vanclay (1996, p. 3) who is Chair for Sustainable Forestry at Southern Cross University, Lismore NSW, commented on the consequence of this insulation:

Many foresters seem to have coped rather well with many of the technical advances during the past few decades, but seem to have found social and cultural changes more difficult to deal with.

Peter Yuile (Agriculture, Fisheries and Forestry–Australia) gave an example when interviewed for this study, of the difficulty some foresters have found in adapting to social and cultural change and commented on the need for training to incorporate 'the community dimension':

I went to a major meeting on regional forest agreements a week after I began in the job – a fairly difficult meeting – got heated and at one point we raised the question of social assessment which was something that this department has been sponsoring as part of the overall process - and a forester from a State agency just about went through the roof, and basically said about social assessment and community interests and all the rest of it: 'I have forgotten more about these forests than these people will ever know. Why don't they just let me get on and do my job'.

And I thought in a nutshell that captured both the past and the challenge for the future because what he said was dead right. He knew those forests backward; he had a much better understanding – and as I say, if you re-image him, he's actually a person who understood and was concerned about the ecology and concerned about the animals and remnant vegetation etc. etc. But from his point of view he was an expert – a professional expert whose judgement was being questioned and he was defensive about it.

And whether foresters like it or not, the community has taken an increasing interest in the forests - some of it's of passing interest and probably a bit shallow, as this forester would obviously feel, but in those regional communities where people are living; where they have got an interest in the aesthetics of the landscape, where they've got an interest in ecotourism, where they've got an interest in conservation; they've got an interest in just having general amenity access – you know the community has to be part of the process and the decision making and not in token way. I think we all know when we are being patronised and we all know when tokenism is being practised.

So that whole question of both maintaining that expertise and the professional integrity and at the same time, recognising that there is a community dimension that is fundamentally important, are the things that are going to need to characterise and run through the training and the culture of forestry in the future.

Since the 1970s, the forestry profession, forest management policies and practises in Australia have been attacked by the environmental movement. According to Patrick Moore (1997), an advocate for environmental protection and Director of Greenpeace International for seven years:

The environmental movement's opposition to forestry is squarely based on their contentions that it is the main cause of forest loss (deforestation) and of biodiversity loss (species extinction). They are wrong on the facts on both these charges. ... The movement is entrenched in their position, partly because they are very shallow in forest science, and partly because it has proven so effective as a fund-raiser. A major effort is needed to give the public and our political leaders a more logical, internally consistent, science-based perspective on the issue of forests.

Public conflict between foresters and conservationists continued at such a level and for so long that in 1993, Carron and Bachelard (ANU Forestry Department) wrote:

For twenty years the [foresters] have been the focus of concerted and orchestrated criticism and have received negligible public support from their

government. ... The professional identity of the public forestry agencies ... has also suffered in recent years (Carron & Bachelard, 1993, p. 39 & 40).

Criticism of the forestry profession over the last three decades has been an international phenomenon. President of the Society of American Foresters, Harry Wiant wrote in 1999 that:

The application of scientifically based management practice, especially during the present century, has established foresters as the most successful conservationists in history. However, an unrelenting campaign by so-called environmentalists, based mainly on promotion of doomsday scare tactics, poor science, and blatant lies, has convinced much of the world's population that we are poor stewards of the forest (Wyant, 1999, p. 1).

In 1995 Peter Kanowski (current Head of ANU Forestry) wrote of the effects of this criticism on foresters:

A quick survey of contemporary foresters suggests that forest life has become anything but romantic, unless you're a masochist; we hear rather more of conflict and confrontation, of stress and tension, than of some romantic sylvan existence (Kanowski, 1995, p. 17).

But Jerry Vanclay (1996, p. 4) made this comment about the criticism:

Some of my colleagues are concerned that forestry is no longer universally recognised as an honourable profession. If that is so, we should not blame our critics, but should criticise ourselves.

In response to criticism, the forestry profession is changing, and Kentish and Fawns (1995, p. 110) described the changes:

Forestry is moving from a restricted professionalism, identified with the traditional characteristics of a technical elite serving powerful interests in government and industry, to an extended professionalism, engaging community education through participation in deliberation on policy in forestry management.

Commenting on the need for change, Eric Bachelard (1994, p. 95), then Head of ANU Forestry, said that foresters required:

A greater appreciation of the social and cultural environment in which they work, a willingness to modify their practices to meet changing community demands and a greater ability to communicate with the public they serve.

Six years later, Evan Rolley (Head of Forestry Tasmania) also commented on the need for the forestry profession to respond to community concerns:

It is impossible to imagine a time when there will be complete consensus about how forests should be managed.... There will continue to be a tension between seeing trees for their intrinsic value in a landscape and valuing them for the utility of the products they can supply to the community. In this context the debate about how forests are used will always be robust. Forest managers will need both the courage to weather these challenges and the sensitivity to respond to reasonable community concerns (Rolley 1999, p. 6).

Commenting on the need for forestry education to equip graduates for participatory decision-making, Peter Kanowski (1995, p. 19), who followed on from Eric Bachelard to head ANU Forestry, wrote that:

... One implication [of the need to develop workable participatory processes for making decisions about forest use] for forestry education is that we as foresters require awareness of the perspectives of the social sciences and the terminology of those disciplines, if we are to understand the terms in which others engage in debate and decision-making.

One of the responses ANU Forestry made to the forestry debate is the recent introduction of Forestry subjects beyond the scientific, technical and political to include the social dimensions of resource use. These are the Masters unit called Social Forestry (FSTY8037); available since 1996, and an undergraduate unit – Participatory Resource Management (FSTY 3059) that became available in 1997.

2.1.3 Communication and the forestry profession

According to Ciancio & Nocentini (2000) foresters have preferred to look to forest science for the resolution of practical forestry problems. The current debate, however, is demonstrating the inadequacy of a solely technocratic approach.

In fact, poor or inadequate communication between foresters and the community has been associated with the development of a professional elitism within forestry, according to Kentish and Fawns (1995). Several earlier authors (1975–1985) also criticised the profession for its lack of effective communication with the public and felt their criticism had been ignored (Kentish & Fawns, 1995).

For example, it is ironic to recall the possibly prophetic writing of A.O.P Lawrence (Chairman of the Forests Commission of Victoria) in 1969:

Australian foresters will inevitably find themselves involved in the developing popularity of the movement for conservation of natural resources. The establishment of reserves for public recreation, the preservation of native fauna and flora, the preparation of special management prescriptions to protect sources of water supply and the management of national parks are all features for which the forester is better equipped by his training than any other professional type at the moment; but that situation will not remain, and unless the forester reveals his awareness of, concern for, and dedication to these aspects, he will find himself overstepped by a new profession. I can see no reason why this should be allowed to happen; but it will happen unless we equip ourselves to meet the challenge and perform the task (Lawrence, 1969, p. 98).

Kentish and Fawns (1995, p. 112) believe that:

The forester's failure to educate the public, and to effectively communicate the fundamental nature of problems and proposed solutions and associated value judgements, has weakened rational debate in the public sphere in which professionals need to be seen to establish consensus. This has weakened the community's perception of the standing of the profession.

Science communication is not yet an integral part of the culture of the forestry community. Turner (1996, p. 14) wrote that:

Foresters have never perceived a need until recently to communicate with the general public about professional practices. Neither have doctors but they're changing. Many professions, forestry included, are now finding that the public is demanding to know what is going on.

Communication also requires more than one-way information delivery – ideally any communication process is one of mutual learning (Keen & Stocklmayer, 1999). Initiatives for community consultations by scientists [and foresters are scientists] often fail because they do not have the skills, are unable to or unwilling to commit the necessary time, and/or feel the effort required is not professionally valued (Keen & Stocklmayer, 1999).

Gascoigne and Metcalfe (1997, p. 267) noted that the science community sees science communication as an activity which:

- *is optional and not a basic part of their work;*
- *is neutral or negative to their promotion prospects;*
- *is not, in general, supported by management with any enthusiasm;*
- *requires skills for which they have little training;*
- *can contravene commercial or intellectual property rights agreements; and*
- *is time consuming.*

A significant number of scientists also fear that their science will be misrepresented by those with whom they communicate, most notably the media, or of raising expectations within the community which may not be met (Keen & Stocklmayer, 1999).

According to these authors it will be unlikely that scientists will regard communication as part of their work until university training addresses communication skills, and the promotion criteria of scientists includes the development of such skills beyond [report and] journal writing (Keen & Stocklmayer, 1999).

There are several views about communication – the commonest are the transmission view (getting one's message across), the social interaction view (sharing ideas and relating to people), and the transactional view (negotiating meanings) (Shrensky, 1996). The forestry profession has held a one-sided view of communication for most of its history. This transmission view holds that communication is a technical process and simply a matter of transferring the sender's messages across to the receivers. If the transmission fails, and the messages do not reach their target and are acted upon, then all that is needed is a bit of technical manipulation with the nature of the sender, the mode of transmission or the message itself (Shrensky, 1996).

The transmission view of communication is exemplified by the recent writing of Tom Brabin (2000, p. 14) who believes foresters are an endangered species:

My campaign to have the facts about forestry and the forests industries understood by the community, initially by distribution of brochures, bush visits by politicians and Greens and public meetings, also included, mostly since my retirement, talking to some 40 community clubs and arranging for busloads of people to see the forest for themselves. In addition, I wrote dozens of articles for publication in News Weekly and industry newspapers – and via any other means available, most recently the Internet.

Mr Brabin (2000, p. 14) had been advised of how this transmission view could fail, as he also wrote:

...I realised that the Green Movement was homing in on forest managers (the Victorian Forests Commission) and the forest products industries with an agenda to remove forests from utilisation and to eliminate dependent industries and forests converted to parks status. In reply, we started promoting the positives of employment, etc. resulting from logging and sawmilling and value-added products. Early in this operation a state politician friend suggested that we would get nowhere just publicising our positives if the public believed that we were destroying the forests.

A number of communication researchers have commented on the failure of the transmission view or conduit metaphor to explain inherent miscommunication. Among them, Sless (1996) alternatively suggests that:

...communication is instead a constructive inventive process based on the use and misuse of identifiable rules – people create meanings consistent with their needs and expectations, not necessarily anyone else's.

Those that hold an interaction or transaction view of communication would, by comparison, have more discussion with members of the public whose behaviour and attitudes are meant to be changing. All parties to the communication could equally participate in the discovery of how workable alternatives could be negotiated (Shrensky, 1996).

The technically-based professional training of foresters, developed during the 1930s, has created a professional forestry community that identifies with a scientific/technological, rather than sociological or political, insight. This has predisposed foresters to resist rather than consult with the popularised environmental movement according to Kentish and Fawns (1995).

However 'the forestry profession is not endangered' according to Nielsen and Bartlett (2000, p. 6):

But is changing in line with the views and requirements of Australian society... The changing management of Australia's native forest cannot be blamed only on the success of the Greens' campaigning and the forestry profession's lack of action. The profession must recognise that many factors have been involved, not the least of which has been the changing structure of Australian society. These days, most Australians live in the major cities and they are less concerned (even if poorly informed) about the needs of the timber industries and more concerned about ensuring that forests are well protected and managed. Consequently they take a different view of the appropriate management of public native forests.

Brian Turner (ANU Forestry) wrote in 1996 that:

The future of the forestry profession may depend much more on the education of the general public than anything that goes on in this or other universities. Because of the public perception that forestry is primarily about harvesting of native old-growth forests and this is widely perceived as undesirable, the

profession of forestry has slipped in the public view to just below the level of visiting martians (Turner, 1996, p. 11).

Forestry professionals in the field and industry have begun to demand non-traditional skills in the undergraduate curriculum such as ethics, communication, problem-solving, team-work, involvement and participation, leadership, facilitation and strategic thinking, politics and policy making, social science and decision making (Kentish & Fawns, 1995).

FORESTRY EDUCATION IN AUSTRALIA

There are those that believe that the model of 'scientific forestry' was translated virtually unchanged and unchallenged through the curricula of forestry schools and colleges in the 20th century. The forest as a timber resource is a concept that was exported from Europe to many parts of the world during the colonial era, and left assumptions that persist today (Ciancio & Nocentini, 2000).

Against this background, Forestry training at university level has been available in Australia since 1911 where it was taught at the University of Adelaide. Forestry can now be studied at four Australian universities. A four-year Bachelor of Science (Forestry) degree has been offered at The Australian National University (ANU) since 1965 and The University of Melbourne has offered science degrees to produce professional foresters since 1942 (1942 – Bachelor of Science; 1973 – Bachelor of Forest Science). Within the last five years two other universities have initiated forestry degrees. These have a geographic focus on the sub-tropics and tropics. Southern Cross University (Lismore NSW) has offered a Bachelor of Applied Science (Forestry) since 1996 and The University of Queensland (Brisbane) has offered a Bachelor of Environmental Management (Tropical Forestry) since 1998. Table 2 shows the number of students enrolling in first year Forestry courses (1996–2000).

Table 2. Students enrolled in 1st Year Forestry at three Australian universities 1996–2000

Year	The Australian National University	The University of Melbourne	Southern Cross University	Total
	Canberra ACT (Single & combined degrees)	(Estimates)	Lismore NSW	
1996	50	59	15	124
1997	34	63	15	112
1998	26	53	18	97
1999	13	44	28	85
2000	25	37 +/- 2	17	79
Total	148	256	93	497
Average	24.6	42.6	15.5	82.7

The ANU Forestry degree is linked to the long history of the Australian Forestry School that opened in 1926 at the University of Adelaide (Carron, 1985) and relocated to Yarralumla, Canberra in 1927. The school was incorporated into The Australian National University as a Department of Forestry in 1964–65 (Carron, 1985). In 1998 Jim Davie, Head of the Environmental Management Department at The University of Queensland, described the ANU Forestry program as 'pre-eminent [in Australia] in the provision of a broad scale, temperate approach to forestry' (J. Davie, personal communication, 1998).

Five students enrolled in 1927 (there were 16 students in total at that time representing all the States) and by 1965, the annual enrolment was 50. From 1926 to 1965, 581 students qualified in forestry not only from Australia, but also New Zealand, Asia and the Pacific region (Ovington, 1998).

Annual student intake varied from a low of four in one of the 1939–45 war years (Carron, 1998), between fifteen to thirty-five students from 1946–1960, to more than 50 a few years later (Carron, 1985).

Following the creation of the new Forestry Department at ANU, annual student intake increased from forty to eighty over the next 10 years. Until 1969 the Commonwealth and State governments and a few private forestry organisations, sponsored practically all undergraduates. However, with the general increase in numbers, the percentage of non-sponsored students increased and, by the late 1970s, sponsoring by scholarship specifically for Forestry had itself been gradually phased out (Carron, 1985).

ANU FORESTRY AND DECLINING ENROLMENTS

Turner (1996) wrote of the contraction of resources for the education of foresters in North America and Australia that resulted from a decline in the demand for foresters, 'to the extent that forestry programs are almost disappearing in some major universities (Berkeley for example)'. Turner (1996, p. 13) also describes the trend that:

Most so-called 'forestry schools' in the US now offer forestry as one of several programs or majors offered in the academic unit. Others are commonly wildlife, fisheries, environmental land management or soil or watershed management and sometimes recreation or urban forestry. Most of these have a common core of required units with variable proportions of electives. Typically there are more students in the non-forestry programs than in forestry. In this way forestry departments have been able to maintain their viability despite the contraction of the traditional forestry programs. At ANU we follow a similar tactic with the REM degree.

Bachelor of Science (Forestry)

A four-year Bachelor of Science (Forestry) degree has been offered at the Australian National University (ANU) since 1966 when total enrolments in the four-year Forestry degree were 113 (Australian National University Statistical Handbook 1975). Undergraduate enrolments (full and part-time) peaked in 1976 at 277 (The Australian National University Statistical Handbook 1978), declined through the 1980s to 111 in 1987 (The Australian National University Statistical Handbook 1987), and temporarily peaked to 153 in 1995 (The Australian National University, Statistical Handbook 1995) when the Tertiary Entrance Rank (TER) for BSc (Forestry) was lowered to 50. (It was lowered to 60 for the Bachelor of Science (BSc) and BSc (REM) in the same year).

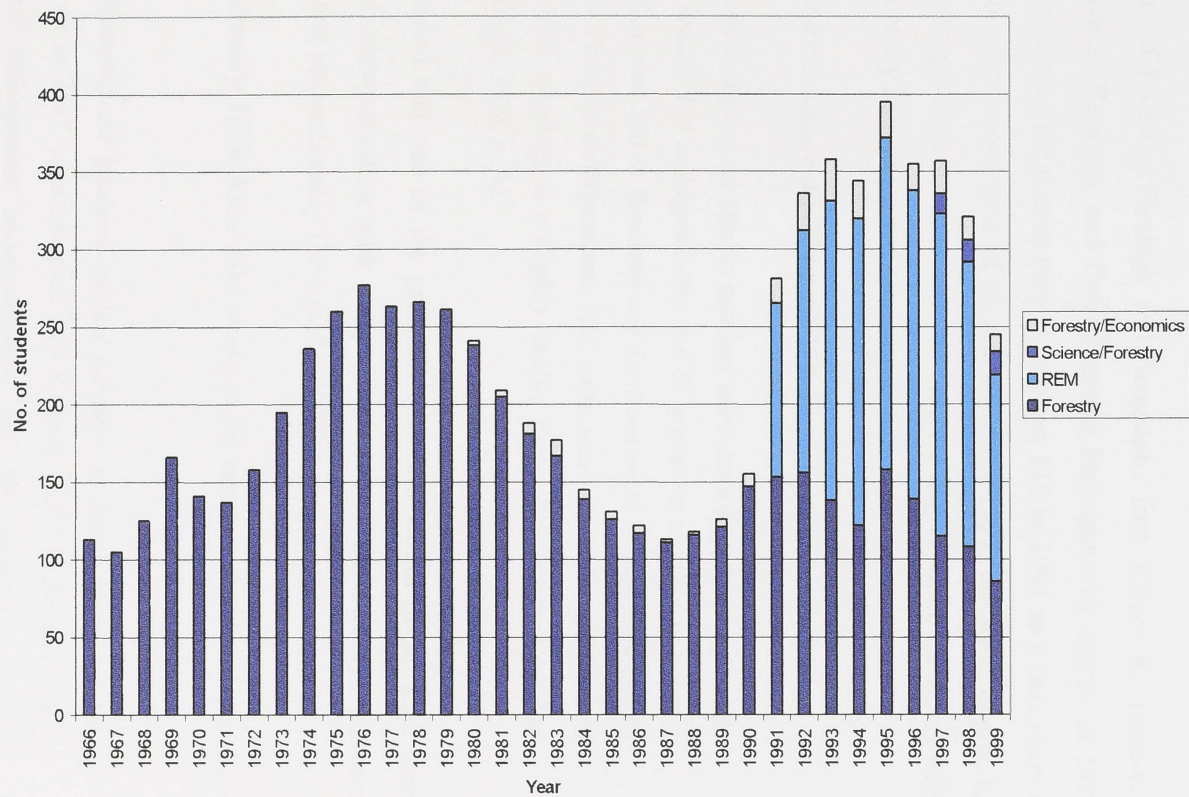
As a result of this low TER, the number of new BSc (Forestry) undergraduates returned to around 40 in 1996 when the total number of undergraduate enrolments in Forestry degrees was 139. The 1996 TER for BSc (Forestry) was raised to 55, and held at 60 for the BSc (REM) degree.

In 1997, 1998 and 1999 the Universities Admission Index (UAI) cut-off for entry to BSc (Forestry) was returned to parity (73) with the Science degree at ANU. Additional five-year combined courses to the Bachelor of Science (Forestry)/B. Economics (which began in 1980), were also created in the late 1990s by the Forestry Department to attract students to the Forestry course or Forestry units.

When the survey for this study was conducted in 1998, undergraduate enrolment (1st–4th Year) in single Forestry degrees was 108. Total undergraduate enrolment in Forestry, including those studying combined Forestry degrees with Science or Economics, was 137. In 1999, enrolment in single Forestry degrees declined to 86; an all time low in the 34-year history of the ANU degree (see Figure 1). The enrolment in single and combined degrees that year declined by c. 18% to 112 (see Figure 1).



Figure 1. Annual undergraduate enrolments in single & combined ANU Forestry and REM degrees 1966–99



Bachelor of Science (Resource and Environmental Management (REM))

The Departments of Forestry, Geology and Geography first offered the three-year Bachelor of Science (Resource and Environmental Management) degree in 1991. Enrolments in this three-year degree ranged between 110 in 1991 to a maximum of 209 in 1995. From the second year of its availability in 1992, the REM degree has attracted more undergraduate students than the Forestry degree, although many REM students study Forestry units as part of their degree.

In 1998 Professor Peter Kanowski (Head ANU Forestry) wrote:

Undergraduate and graduate student numbers were down slightly over previous years, with around 150 undergraduates and 65 graduates enrolled in Forestry degrees and around 200 in Resource and Environmental Management (REM) degrees. The Forestry undergraduate TER entry was returned to parity with Science at ANU, resulting in a slightly smaller first-year class than we had hoped (Kanowski, 1998, p. iv).

Kanowski then stated that one of the priorities for 1998 would be to 'seek more effective ways of communicating with prospective students and research partners, around Australia and internationally' (Kanowski, 1998).

A year later in February 1999, Kanowski wrote of his concern about undergraduate enrolments:

Both undergraduate and graduate student numbers remained at around the same levels as in 1997, approximately 140 Forestry and 200 Resource and Environmental Management undergraduates, and 60 Forestry graduate students... Although the number of undergraduate students taking Forestry units increased as a result of the more attractive unit offerings developed in curriculum revision, the continuing long-term decline in Forestry undergraduate admissions remains of concern...(Kanowski, 1999a, p. iii)

Kanowski (1999a, p.iv) also expressed concern about the increasing localisation of the student body:

Whilst only 15% of our undergraduates are from outside the ACT and local NSW region, and represent all Australian States, the employment our graduates find is principally outside the ACT and local NSW region. This pattern of origin of our undergraduates contrasts with that which has prevailed historically, and reflects the past decade of change in the Australian higher education system as well as the emergence of (variously) competing courses elsewhere. Given the evident employability of our graduates and the contributions they can make to rural and regional Australia, we are keen to reverse this trend, though the best means of doing so remains a matter of investigation and discussion.

In mid-1999 Kanowski (1999b, p. 1) wrote in a newsletter to alumni and friends that:

The decline in undergraduate Forestry (down by half) and Resource and Environmental Management (down by a third) enrolments in 1999 is of great concern to the Department.

Three years earlier, Turner, also from ANU Forestry, (1996, p. 16) wrote:

To generate the student demand, we need a change in the attitude of the public about the forestry profession and increased employment opportunities, which probably depend partly on the improved attitude. The improvement of our image is something that everyone in the profession can work on, as is the education of the public which may be a necessary precursor. ... The alternative is likely to be continuing lack of interest of high-school students in considering forestry as a career and a reduction of its role in resource science programs. While this may not be a national calamity, it would inevitably lead to a loss of the specific knowledge of the culture of forests, a significant loss to those involved in their appreciation and management.

ANU STUDENT SURVEYS

Surveys of students enrolling for the first time (called 'UNDERGRADUATE STUDENT SURVEY') have been conducted by ANU since 1992. They begin with 'If you are enrolling at ANU for the first time, we are interested in discovering why you came to ANU.' This survey asks several questions including why the students chose ANU and what were their sources of information.

The most important reasons for students choosing ANU (1992–98) were consistent across the seven years of the survey. In 1998 students continued to be attracted by a particular degree course (70.4% of respondents), the reputation of the ANU (70% of respondents) and because ANU is close to home (57% of respondents) (Sue Bishop, formerly ANU Promotions Unit, Division of Student Recruitment and International Education, The Australian National University, personal communication, 2000).

Sources of information for students have changed in importance over the seven years of survey. In 1998 the most important sources of information were the ANU Undergraduate Handbook (59.3% of respondents), the UAC Guide¹ (46.6%), Open Days (1997 and 1998) (43.6%), school careers information (43.1%) and talking to students already at ANU (41.3% of respondents). In 1992 and 1993 school careers information and talking to ANU students were the most important sources but then students were finding information for themselves. The UAC Guide has been an extremely important source of information since 1993, as has the ANU Undergraduate handbook in 1997 and 1998) (Sue Bishop, formerly ANU Promotions Unit, Division of Student Recruitment and International Education, The Australian National University, personal communication, 2000).

DECLINING ENROLMENTS IN SCIENCE AT ANU

The decline in enrolments in the ANU Forestry bachelor degree since 1995 may in part be subject to the same factors causing a decline in Science degree enrolments at ANU since 1990. In that year, enrolments in Science degrees (excluding BSc (Forestry) and B. Engineering, and BSc (REM) which did not exist at that time) were 1189; these had declined by 34% to 781 in 1991.

Looking at the total enrolment in all bachelor Science degrees at ANU, including BSc (Forestry), BSc (REM) and B. Engineering, there has been a decline of 23% since enrolments peaked at 1417 in 1991 and declined to 1090 in 1999. Over the same time period (1991-1999) enrolments in single Bachelor degrees in Forestry declined by 44

% from 153 to 86. Enrolments in BSc (REM) declined by c. 38% from a peak of 214 in 1995 (in the fifth year that the three-year course had been offered) to 133 in 1999 (see Figure 2).

Figure 3 shows undergraduate enrolments in combined Science degrees (1979–1999) and these have been steadily increasing, especially after the introduction of Engineering/Science in 1990 and Arts/Science in 1991. However there has been an 11% downturn since they peaked in 1997 at 926 students and declined to 826 in 1999. Figure 4 shows all undergraduate enrolments in Science courses (single and combined) at ANU between 1996–1999. A recent decline is apparent; enrolments peaked in 1995 at 2180 and fell by c. 12% to 1916 in 1999. It would appear that a contributing factor to the decline in enrolments in single science degrees is the popularity of the combined Science degrees (see Figure 4) which in 1999 accounted for 43% of all enrolments in Science courses at ANU.

Figure 2. Enrolments in undergraduate Science (single degrees) at ANU 1966–99

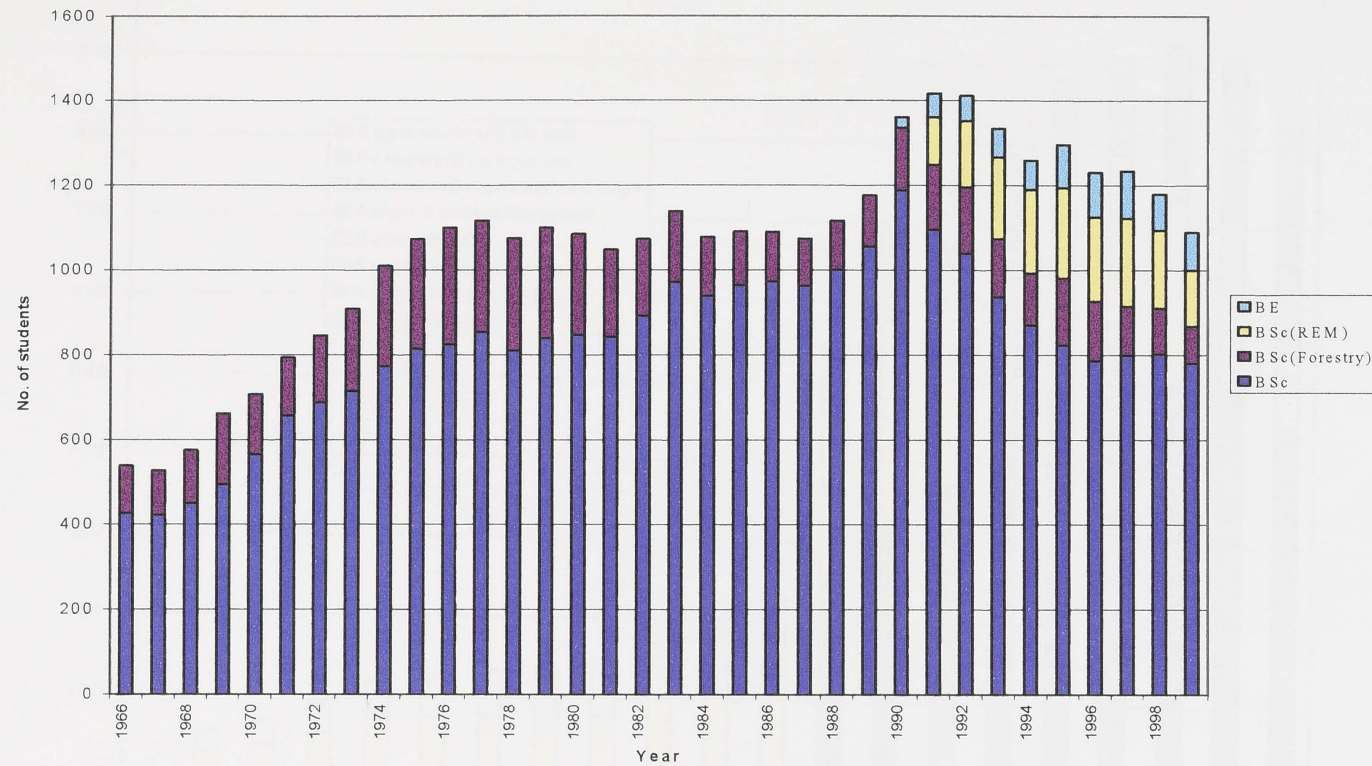


Figure 3. Enrolments in undergraduate Science degrees (combined) at ANU 1966–99

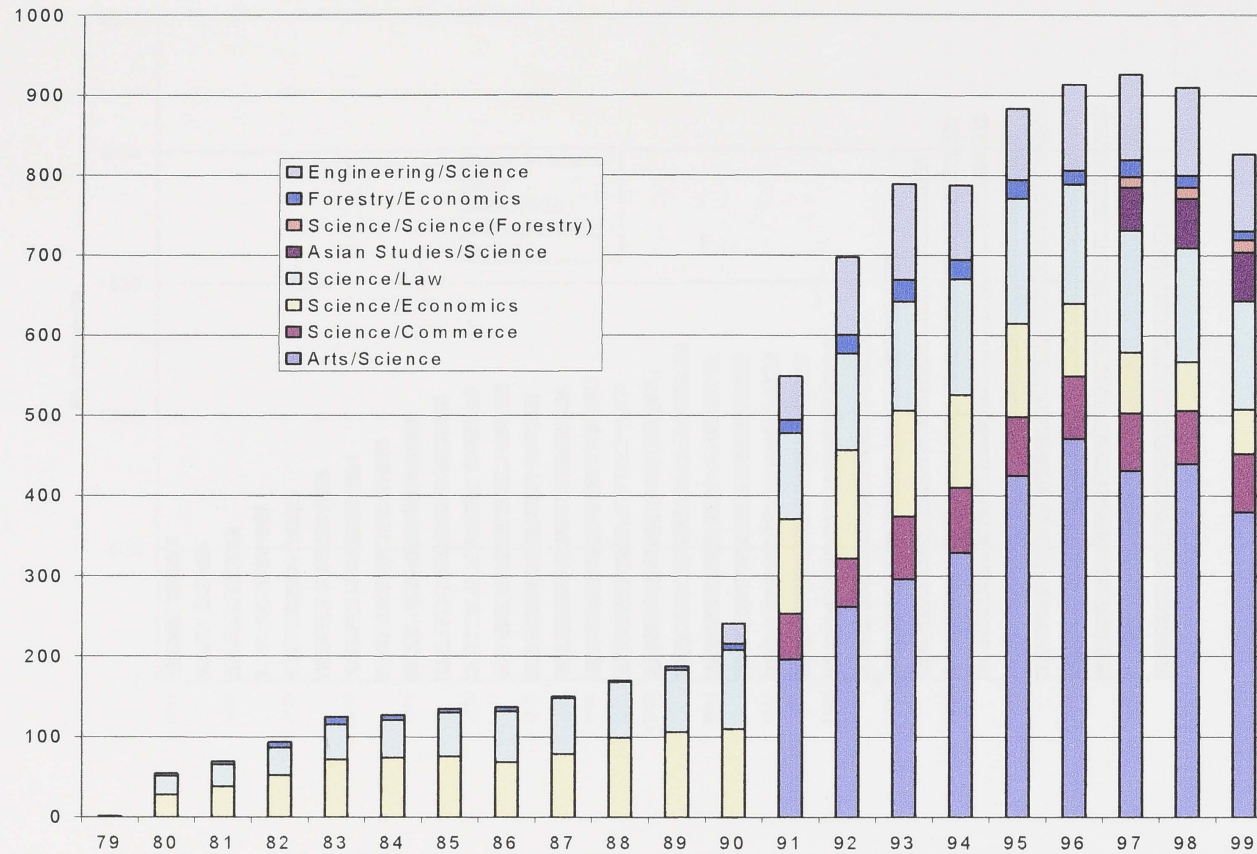
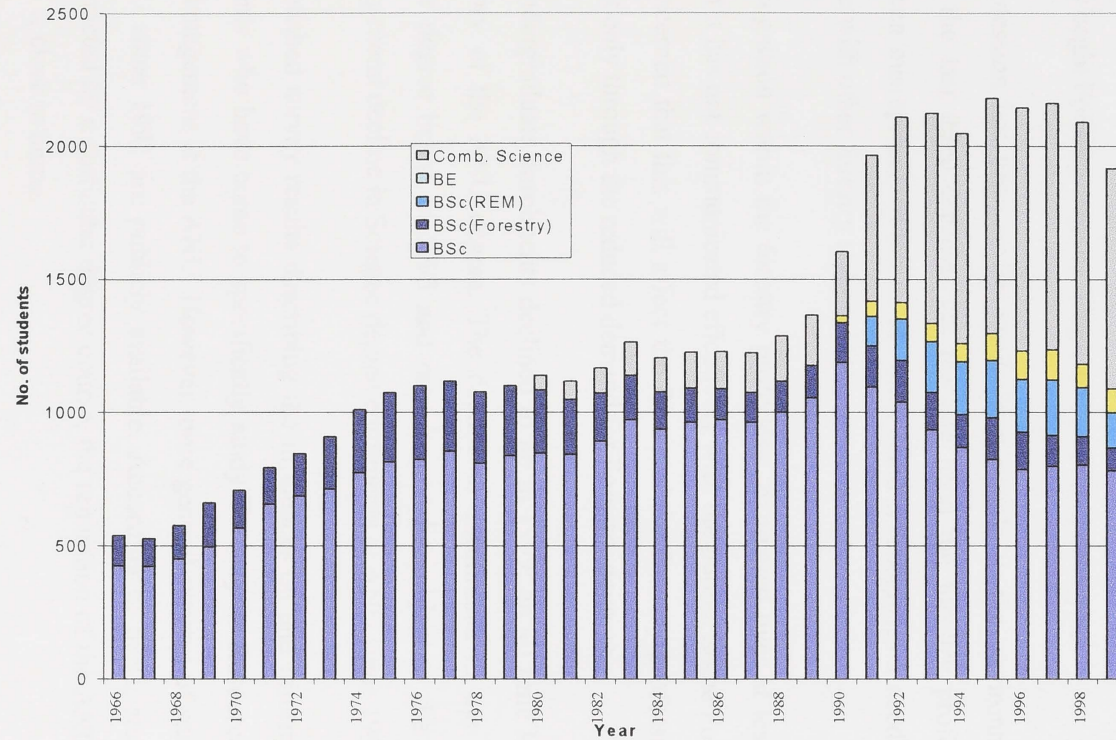


Figure 4. Enrolments in undergraduate Science (single & combined) degrees at ANU 1966–99



SUMMARY OF THE CHAPTER

Forestry is economically and environmentally important to Australia. The practice of forestry in Australia is currently undergoing significant change as the result of Commonwealth government initiatives and funding to resolve decades of conflict over the use of Australia's forests. Foresters are trained at three universities and on average about 80 begin Forestry degrees (single or combined) each year.

The forestry profession has been under attack from people in the environmental movement over the last three decades. On the one hand the forestry profession believes it has been misrepresented but on the other hand it recognises a need to be more consultative with other forestry stakeholders.

There is also recognition within the forestry profession, expressed over at least the last 30 years, that it has not communicated effectively with the public. Some Forestry educators are concerned that this will affect the future of the forestry profession in Australia; and not only through the reduced demand for Forestry degrees.

ANU Forestry undergraduate enrolments declined to 86 in 1999; an all time low in the 34-year history of the ANU degree. The decline in enrolments in the ANU Forestry bachelor degree began in 1995 and may in part be subject to the same factors causing a general decline in Science degree enrolments at ANU since 1990.

There are no published survey results describing the influences on and information sources for students who have come to specifically study Forestry or Resource and Environmental Management at the ANU. However more general surveys of students enrolling at ANU since 1992 are publicly available. According to these, students continue to be attracted by a particular degree course, the reputation of the ANU and because the ANU is close to home.

Sources of information for students have changed in importance over the seven years of survey. In 1998 the most important sources of information were the ANU

Undergraduate Handbook, the UAC Guide¹, Open Days, school careers information and talking to students already at ANU.

The lack of information about influences on Forestry students' degree choice has hampered recruitment and general promotion of forestry as a profession. In the next chapter, the method by which these influences were determined will be described.

This study addressed the following research questions that arose from concerns about the general decline of forestry enrolments at ANU:

1. Where did high school/university students find information that led them to choose or not choose to study Forestry at ANU?
2. What influenced high school/university students to choose their degree?

A third question emerged during the study:

3. Are Forestry students' expressions of goal set proposals justified?

Research was primarily based on a literature review and the responses to a written questionnaire given to 179 first and second year students studying Forestry from 1 October 1998. Interviews with five senior forestry professionals were conducted to ascertain the viability of Forestry at ANU and to identify the reasons for the decline.

METHODOLOGY

This study used qualitative research methodology and more specifically a grounded theory approach that is suitable to explore the area under

¹ The UAC Guide A comprehensive guide to undergraduate university courses in NSW and the AC Published by the Universities Admissions Centre (NSW & ACT) Pty Ltd.

A grounded theory is one that is inductively derived from the study of the phenomena it seeks to explain by using multiple stages of data collection and the subsequent and iterative development of categories of information (Glaser & Strauss, 1967). Two primary characteristics of this method are the sequential comparison of data with emerging categories, and theoretical sampling of different groups to maximize the saturation

3. CHAPTER THREE: RESEARCH METHODOLOGY

INTRODUCTION

This study addressed the following research questions that arose from concerns about the general decline of Forestry enrolments at ANU:

1. Where did high school/college students find information that led them to choose or not choose to study Forestry at ANU?
2. What influenced high school/college students to choose their degree?'

A third question emerged during the study:

3. Are Forestry students' expectations of good job prospects justified?

Research was primarily based on a literature review and the responses to a written questionnaire given to 119 first and second year students studying Forestry units in October 1998. Interviews with five senior forestry professionals were conducted to determine the validity of Forestry student expectations for employment.

METHODOLOGY

This study used qualitative research methodology and more specifically a grounded theory approach—to 'build theory that is faithful to and illuminates the area under study'—as this was the most appropriate to the nature of the research questions (Strauss & Corbin, 1990).

A grounded theory is one that is inductively derived from the study of the phenomena it represents by using multiple stages of data collection and the refinement and interrelationship of categories of information (Strauss & Corbin, 1990). Two primary characteristics of this design are the constant comparison of data with emerging categories, and theoretical sampling of different groups to maximise the similarities

and the differences of information (Creswell, 1994). This was an appropriate research methodology because this study was exploratory – the variables and theory base were unknown – and there was a need to investigate and describe the phenomena and to develop theory (Creswell, 1994). A questionnaire-based survey and interviews were used to gather information, and a literature review was conducted to help develop the theory.

The qualitative methods used in the questionnaire and interviews were appropriate to the exploratory nature of this study. Both the questionnaire and interviews (face-to-face and telephone) were conducted using a fixed-question–open response approach. This was used to systematise the collection of qualitative material and facilitate the quantitative treatment of the material (Weiss, 1995). An active interview approach was adopted although an interview guide was followed (Holstein & Gubrium, 1995).

THE QUESTIONNAIRE DESIGN

In addition to collecting relevant demographic information the questionnaire was designed as a 'fixed-question – open answer' to discover how students had come to be studying for their current degree (see Appendix 1). For example students were first encouraged to 'write the story of how you came to be studying for your current degree.'

The following information was specifically sought if it had not already been covered in their story:

- why they were studying for their particular university degree at ANU
- how they first found out about the Forestry/REM degree or units at ANU

Further questions sought to discover if related work experience, people already working in the profession or environment or forestry management issues influenced their choice.

The students were also asked for their ideas about how else they would have liked to receive information about the Forestry/REM degree or units at ANU and whether

they had any suggestions of how to encourage people to enrol in these degrees or units.

The questionnaire also asked students if there was a reason they had not chosen other degrees.

The final question asked if their degree was meeting their expectations. This question was designed to indicate whether students were making good decisions for themselves based on the available information.

Two experienced communication researchers validated the survey. It was then used in a pilot survey of four students (one woman, three men; two BSc (Forestry), one BSc and one BSc/BSc (Forestry) in the second year Forestry course) conducted on 16 September 1998 to identify any problems in the draft questionnaire. Before the students began answering the written questionnaire, they were asked for their help in sorting out problems with any aspects of the questionnaire. It was suggested it might take about 20 minutes to complete and they should allow about seven minutes to write their 'stories'.

After they had completed their surveys they were individually asked if they had any comments or suggestions about the questionnaire. There were no criticisms of any aspects, including the time it took to complete the questionnaire that was between 18 and 22 minutes. However the students did make suggestions about how enrolments could be improved. As a result an additional question was included: 'Do you have any suggestions of how to encourage people to enrol in Forestry or REM degrees and units at ANU?' (see Appendix 2.)

It was important to obtain the most up-date and therefore relevant comments from students as the survey results could be used to guide student recruitment activities to increase enrolments. It was decided to focus on first and second year Forestry and Resource and Environmental students to compare where they found information about the degrees and why they chose one degree over the other.

Data triangulation was achieved by surveying students from different years (1st and 2nd Year) and students studying for a Forestry degree and those studying for a REM degree, Science or combined degree.

Methodological triangulation was achieved through a survey, six related interviews and review of published and unpublished student surveys.

THE INTERVIEW DESIGNS

Dr Ann Gibson (Student Adviser and Enrolment Sub Dean of Science – ANU Department of Forestry in 1998) was asked for her perception of the information sources and influences on student choice of degree in an unstructured interview.

Five other key informants were asked whether Australia needed more foresters. These interviewees were especially knowledgeable or experienced in aspects Australian forestry (tertiary education, the profession and government policy) and were able to view the topic from different perspectives. More specifically they were four senior foresters who represented the three recognised forestry tertiary education institutions in Australia and the forestry profession in Australia (Institute of Foresters of Australia), and one senior public servant heading the Commonwealth government's Fisheries and Forestry Industries Division.

The interviews (three face-to-face and two telephone interviews) were guided by structured questions that were provided to the interviewees beforehand to engage them and designate the narrative terrain. Active interviewing techniques were employed to encourage the respondents' narrative activity. These included methods described by Holstein and Gubrium (1995) such as encouraging subjective relevancies, prompting interpretive possibilities, facilitating narrative linkages, and suggesting alternative perspectives.

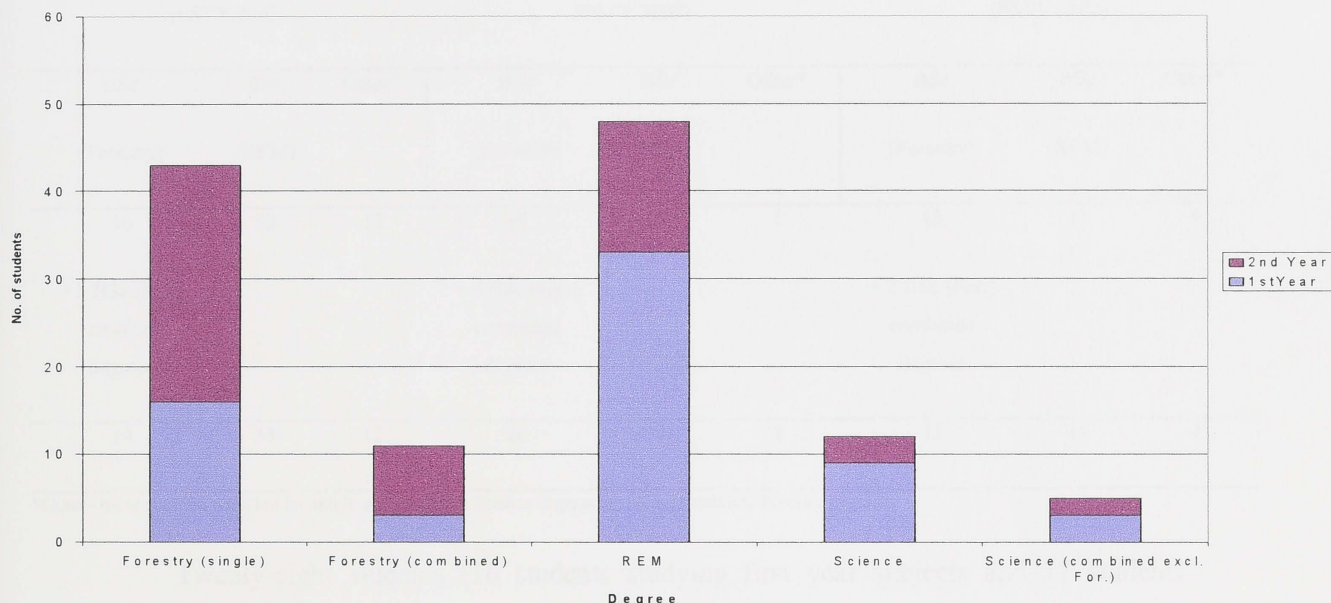
SAMPLE AND POPULATION

The aim was to sample at least half of the first year and second year Forestry and REM students and enable a comparison between students studying the same units but for different degrees.

The first year and two second year classes sampled were all within the Forestry discipline – Ecological Measurement (FSTY 1003), Forest Measurement and Modelling (FSTY 2009), and Natural Resource Economics (FSTY 2102). All three Forestry units are compulsory for students studying for a Bachelor of Science (Forestry).

In total 119 students were surveyed; 63 first year and 56 second year students. The principal focus of the study was the first year students as their experience would be most relevant to that of college/high school students. Most of the Forestry students studying both single and combined degrees in first and second year were surveyed (86% of the first years and 100% of the second years). Eleven students (three first and eight second year students) were studying for Forestry degrees combined with other disciplines (see Figure 5).

Figure 5. First and second year students surveyed – by degree



Most (68%) of the first year REM students and a third (39%) of the second year REM (single and combined degree) students were surveyed. The second year Forestry (27) and REM students (15) were surveyed to see if there was any change in experience between the two years.

It is sometimes difficult to describe the number of students in any one year of the Forestry degree as they do not all proceed through the degree at the same rate. For example, of the 27 Forestry students surveyed in the two second year units, two had enrolled in 1998; 15 began their degrees in 1997; four in 1996; five in 1995 and one in 1994.

Twelve students surveyed were studying for Science (BSc) degrees; nine in first year and three in second year. Sixteen students of the 119 students surveyed were studying for combined degrees and these are listed in Table 3.

Table 3. Number of students surveyed in three ANU Forestry classes – grouped by degree

Ecological Measurement (FSTY 1003)			Forest measurement & Modelling (FSTY 2009)			Natural Resource Economics (FSTY 2102)		
BSc (Forestry)	BSc (REM)	Other*	BSc (Forestry)	BSc (REM)	Other*	BSc (Forestry)	BSc (REM)	Other*
16	33	12	14	4	1	13	11	4
+ 3 BSc (For.) combined degrees			+ 6 BSc (For.) combined degrees			+ 2 BSc (For.) combined degrees		
19	33	12	20	4	1	15	11	4

*Other - those students studying for single and combined Science degrees excluding combined Forestry degrees.

Twenty-eight students (16 students studying first year subjects and 12 students studying second year units) studying for Science or combined Science degrees were also surveyed.

DATA COLLECTION PROCEDURES

It was important to obtain a good response rate as previous experience had shown that giving questionnaires to students to complete and return outside class time had not been effective (Ann Gibson, ANU Forestry, personal communication, 1998). Thus it was decided to survey the students in class time. This was not a trivial request because the questionnaire took 20 minutes to complete on average and would obviously take valuable class time, especially important at the end of the academic year.

It was also important to gain some rapport with the students and so before giving out the questionnaires, the students were asked for their help, and asked to tell their story about how they came to be studying for their degree. The author explained that she

was a student too and that if they did not understand any of the questions to let her know because the mistake was hers for not making it clear enough.

Surveying the Ecological Measurement (FSTY 1003) class was not straight forward as they did not all attend the lecture when the survey was first given out. As this was the only first year class to be surveyed, there was no choice but to follow-up (literally) those who had not attended, during two afternoon practical field classes held at the base of Black Mountain, Canberra – not ideal for the students' concentration.

All interviews with key informants were recorded on tape, after they had been e-mailed some general questions to the interviewee beforehand. These interviews were conducted in person if the interviewee worked in Canberra; otherwise telephone interviews were conducted.

DATA PROCESSING AND ANALYSES

Most of the questionnaire was designed around open questions. Where multiple answers were given, only one answer/student was scored for most questions so that percentages for student responses could be calculated. An assumption was made that the first answer given was the most important reason.

ASSUMPTIONS AND LIMITATIONS

It was assumed for this study that the students surveyed were representative of all first and second Year Forestry and REM students studying at ANU in 1998. It was also assumed that the experiences of first and second year students would be relevant to developing recruitment strategies for high school/college students choosing to study at university in 2000.

The author may have a bias because she is a graduate from ANU Forestry and has been an active member of the forestry profession since 1981.

The author also has a perception that environmental issues and the often-associated negative media and community perception of the forestry profession have affected

Forestry enrolments and led to the relative popularity of the Resource and Environment Management degree. However environment or forestry management issues were not the only influences questioned in the survey.

In processing the questionnaires, it was decided to only score the first answer given by those who gave two or more reasons. This was a difficult decision to make because it was appreciated that the first answer may not have been the most important but just the first one that came to mind, or of equal importance to those that followed.

SUMMARY OF THE CHAPTER

This chapter describes the qualitative methodology chosen and the methods used to explore the research questions. After a small pilot of the survey, a written questionnaire was given in class-time to 119 science students studying three Forestry units at ANU to find out where students found information that led them to choose their degree and what influenced them to make their choice.

The surveyed students represented about three-quarters of both first and second year students enrolled in Forestry, either as a single or double degree. About 68% of the first year and 35% of the second year REM students were surveyed. Twelve students studying single science degrees were also surveyed which provided another interesting comparison with those whom had chosen Forestry or REM.

One unstructured interview was conducted with Dr Ann Gibson, the Enrolment Sub Dean of Science – ANU Department of Forestry in 1998. Gibson was asked for her perception of the influences on student choice of degree in an unstructured interview.

Five interviews using a fixed question-open response approach were conducted with key informants to explore whether Forestry student expectations of good prospects were justified.

The next chapter presents, describes and discusses the research findings.

4. CHAPTER FOUR: THE RESEARCH FINDINGS

The survey of first and second year students using a written questionnaire addressed the following research questions:

1. Where did they find information that led them to choose or not choose to study Forestry at ANU?
2. What influenced high school/college students to choose their degree?'

DESCRIPTION OF THE SURVEY POPULATION

The 119 students surveyed represented 68% of all 133 students in first and second year studying for Forestry and REM degrees in 1998 or 32% of the whole student population (292) studying for these two degrees.

Ninety per cent of the first and second year BSc (Forestry)/Economics and BSc/BSc (Forestry) Science students in 1998 were surveyed. The breakdown of the remaining 18 students who were studying for single or combined degrees in Science is presented in Table 4.

Table 4. No. of surveyed students studying single or combined Science degrees

Science degrees (single & combined)	Ecological Measurement (FSTY 1003)	Forest Measurement & Modelling (FSTY 2009)	Natural Resource Economics (FSTY 2102)	Total
Science	9	1	2	12
Science/Science (Forestry)	2	3	1	6
Science/Science (REM)	-	-	1	1
Science (Forestry)/Science (REM)	-	-	1	1
Science (Forestry)/Economics	1	3	-	4
Science/Asian Studies	-	-	1	1
Science/Arts	2	-	-	2
Science/Economics	1	-	-	1
Total	15	7	6	28

The numbers of men and women surveyed studying Forestry and REM degrees were practically equal (see Table 5). In that year 52% of all ANU students were female.

It is of interest that most of the students were from either the ACT (41%) or NSW (45%). The origin of the less than 10% of students from elsewhere in Australia and overseas is presented in Table 5. Most (94%) of the students were studying full-time; 6% were part-time (see Table 5).

Table 5. Demographics of 119 ANU students surveyed in three Forestry classes – 1998

Degree	Sex		Australian origin				Full time	Part time	No. of students surveyed	No. of students surveyed for each course	No. of students surveyed for each course (%)
	Male	Female	ACT	NSW	OtherAus. States	Overseas					
Forestry (1 st Yr)	8	8	4	7	3	2	15	1	16	Forestry	Forestry
Forestry (2 nd Yr)	16	11	9	13	2	3	25	2	27	43	36.1
REM (1 st Yr)	15	18	12	15	5	1	30	3	33	REM	REM
REM (2 nd Yr)	9	6	10	5	0	0	14	1	15	48	40.3
Science (1 st Yr)	3	6	4	5	0	0	9	0	9	Science	Science
Science (2 nd Yr)	1	2	2	1	0	0	3	0	3	12	10.1
Combined (1 st Yr)	2	3	3	2	0	0	5	0	5	Combined degrees	Combined degrees
Combined (2 nd Yr)	6	5	5	6	0	0	11	0	11	16	13.4
TOTAL	60	59	49	54	10	6	112	7	119		100%
TOTAL (%)	50.4	49.6	41.2	45.4	8.4	5.0	94.1	5.9			

WHY STUDENTS WERE STUDYING FOR A UNIVERSITY DEGREE

The first reason given by first year students (57%) for studying for a university degree was related to employment (see Table 6). They wanted to have a better chance of getting a job in their chosen field. Others spoke about wanting job satisfaction, greater security, to be well-paid and to be able to advance in the work place. Of these, 14% wrote that they specifically wanted to be a forester, ranger or wildlife manager. Amongst the second year students a higher proportion (68%) gave employment as their first reason for studying for a degree.

The second most frequently given answer (about 20%) given by the first year students, was concerned with studying to continue learning, gain knowledge, for personal interest and achievement. A similar number (23%) of students in second year gave these as the primary reasons. Thirteen percent of the first year students wanted to be involved in management, to make a difference; to help save the environment while none of the second years listed this as a primary reason.

Many students gave more than one reason for studying for a university degree. For example three Forestry students in second year replied:

To expand the limited knowledge that is obtained in high school and as a way of gaining qualifications for employment later.

To learn, increase job opportunities, experience.

To acquire knowledge about something that I like and to be able to get a job in that same field.

All three replies were scored on the basis of the first reason given: a desire to learn.

Table 6. Why do people study for a university degree?

1 st Year students– 63 students	Forestry	REM	Comb. For.	Science	nb. Science (excl. Forestr	Total no. of responses
Related to employment – to have a better chance of getting a job in a chosen field; that is interesting, has job satisfaction, is well-paid, will lead to advancement in the workplace, greater security, lifestyle	5	17	1	3	1	27
I specifically to be a forester, ranger or wildlife manager	4	3	-	2	-	9
To be involved in management; to be in a position to make a difference; to help save the environment	-	5	1	-	2	8
To continue learning/gain knowledge, personal interest/personal achievement	5	6	-	3	-	14
Always wanted to go to university or imagined they would; want to experience university life	-	2	-	1	-	3
Selected to study Forestry as part of country's institution building	2	-	-	-	-	2
Total	16	33	2	9	3	63
2nd year students–56 students						
Related to employment – to have a better chance of getting a job in a chosen field; that is interesting, has job satisfaction, is well-paid, will lead to advancement in the workplace, greater security, lifestyle	18	13	5	1	1	38
I specifically to be a forester, ranger or wildlife manager	1	-	-	-	-	1
To be involved in management; to be in a position to make a difference; to help save the environment	-	-	-	-	-	-
To continue learning/gain knowledge, personal interest/personal achievement	6	2	2	2	1	13
Always wanted to go to university or imagined they would; want to experience university life	-	-	-	-	-	-
Selected to study Forestry as part of country's institution building	2	-	-	-	-	2
Filling in time while deciding what to do	-	-	2	-	-	2
Total	27	15	9	3	2	56

REASONS FOR CHOOSING ANU

ANU student surveys (1992–1998) showed that the degree course, the reputation of ANU and closeness of ANU to home were among the most important reasons for more than half the students surveyed. Two of these factors dominated both first and second year student responses. It is of interest to note that 41% of first year and 37% of second year students wrote 'location to home' down first (see Tables 7.1 & 7.2). The second consideration was that ANU offered the course they wanted (33% of first year and 26% of second year students). This was particularly important for the Forestry students (44% of first year and 31% of second year students) compared to the REM students (27% of first year and 7% of second year students) (see Tables 7.1 & 7.2). Reputation of the course/degree/school/faculty was the third most frequently given answer but by a much smaller number of students; 11% of first year and 17% of second year students, and certainly less than the 51–70% of students who scored this as a reason in the years 1992–1998.

HOW DID STUDENTS FIRST FIND OUT ABOUT THEIR DEGREES/UNITS?

The aim of this question was to learn how and when students found out about the Forestry or REM degree or units at ANU.

Most students appear to have first heard about the degree/units when they were studying in their final year at college. Most students (34%) first found about the degree they chose from the UAC guide. This is provided free-of-charge to all NSW and ACT Year 12 students through their school/TAFE (see Tables 8.1 & 8.2).

Word-of-mouth was the second most frequent source of information for those students hearing about their degree for the first time. One in five (22%) first year students and one in seven (14%) second year students first heard about their

degree/units through word-of-mouth (family, friends, neighbours and those already enrolled in the course).

The ANU Undergraduate Handbook, information through their college/school and career nights/ANU Open Days were important for one in seven of both first and second year students.

Dr Gibson (Student Adviser and Enrolment Sub Dean of Science - ANU Department of Forestry in 1998) commented on the importance of the UAC Guide but observed that those who found out about the ANU Forestry degree through this guide had done so by accident because the degree is not listed under 'Science'. Instead Forestry is listed in the index of the 2000 The University Course Guide for NSW and the ACT under 'Agricultural and Rural Studies.' Mahen S. Mahendrarajah (Senior Lecturer ANU Forestry, personal communication, 1999) suggested that not only should Forestry be removed from under this listing but it should be given a separate and more prominent heading. Similarly, the grouping of Forestry under Agriculture by 'The Good Universities Guide to Australian Universities courses & campuses in 1999' is very confusing. (The author assumed Forestry is listed under Agriculture, as there are various ratings for the ANU under 'Agriculture' headings although there is no agriculture course at ANU. 'Environmental studies' is listed as a field of study at ANU; the author assumed this included ratings for the REM degree).

Table 7.1. Reasons for choosing ANU – first year students

1 st Year students -63 students	Degree					Total no. of responses
	Forestry	REM	Combined Forestry	Science	Combined science excl. Forestry	
a. It's close(r) to home, can't afford to or don't want to move interstate, easier to study at home/with relatives/free accommodation	4	17		3	1	26
b. ANU offer the course they want	7	9	2	4	1	21
c. The course/degree/school/faculty has a good or the best reputation	3	-		1	1	7
d. Liked Canberra or ANU campus compared to Melbourne/Sydney/Newcastle; it was a good transition between country and city; it was a smaller city, smaller university; nice environment away from home; cheaper than Sydney	-	3		1	-	4
e. No choice - overseas student	1	-		-	-	1
f. ANU has a good reputation (in the science disciplines); better regarded than University of Canberra, national, international	1	1		-	-	2
g. Scholarship linked to the ANU	-	1		-	-	1
h. Relatives/friends recommended it	-	1		-	-	1
Total	16	33	2	9	3	63

Table 7.2. Reasons for choosing ANU—second years students

	Forestry	REM	Combined Forestry degree	Science	Combined science degrees excl. Forestry	Total responses
2 nd year students - 56 students						
a. It's close(r) to home, can't afford to or don't want to move interstate, easier to study at home/with relatives/free accommodation	8	11	2	-	-	20
b. ANU offer the course they want	8	1	3	-	1	14
c. The course/degree/school/faculty has a good or the best reputation	7	-	1	1	-	9
d. Liked Canberra or ANU campus compared to Melbourne/Sydney/Newcastle; because it was a good transition between country and city; it was a smaller city, smaller university; nice environment away from home; cheaper than Sydney	1	-	2	-	-	3
e. No choice - overseas student	-	-	-	-	-	-
f. ANU has a good reputation (in the science disciplines); better regarded than University of Canberra, national, international	1	3	1	1	1	7
g. Scholarship linked to the ANU	-	-	-	-	-	-
h. Relatives/friends recommended it	-	-	-	-	-	-
i. ANU sent more information about course, campus, and accommodation. Melbourne Uni sent very little.	1	-	-	-	-	1
Totals	26	15	9	2	2	54

Table 8.1. How 1st Year students first found out about Forestry/REM degree or units at ANU

1 st Year students-63 students	Degree					Total no. of responses
	Forestry	REM	Combined Forestry degree	Science	Combined Science degrees excl. Forestry	
a. Universities Admissions Centre (UAC) Guide/'Universities degree guide'	3	13	1	3	-	20
b. ANU Undergraduate Handbook/Course handbook	-	6	-	2	1	9
c. High school /college	3	6	-	-	-	9
d. Careers nights/Bruce CIT careers night/ Careers Market AIS/ANU Open Day/careers fair	2	1	-	2	1	6
e. Others, including relatives, in the profession, NSW State Forests	1	-	1	-	-	2
f. Friends, neighbours, relatives and those already enrolled in the course, word of mouth	4	7	-	2	1	14
g. Work experience at ANU/ Yr 10 work experience at ANU Forestry	-	-	-	-	-	-
h. Informed/ selected by Government	2	-	-	-	-	2
i. Careers Advisory Service (George St Sydney)	1	-	-	-	-	1
j. Careers book (?)/study guide/job description	-	-	-	-	-	-
Total	16	33	2	9	3	63

Table 8.2. How 2nd year students first found out about Forestry/REM degree or units at ANU

2 nd year students - 56 students	Forestry	REM	Combined Forestry degree	Science	Combined science degrees excl. Forestry	Total no. of responses
a. Universities Admissions Centre (UAC) Guide/ 'Universities degree guide'	10	5	4	1	-	20
b. ANU Undergraduate Handbook/Course handbook	2	2	2	-	-	6
c. High school /college	3	3	2	-	-	8
d. Careers nights/Bruce CIT careers night/ Careers Market AIS/ANU Open Day/careers fair	3	2		1	-	6
e. Others, including relatives, in the profession, NSW State Forests	2	-		-	-	2
f. Friends, neighbours, relatives and those already enrolled in the course, word of mouth	3	2	1	-	2	8
g. Work experience at ANU/ Yr 10 work experience at ANU Forestry	1	-		-	-	1
h. Informed/ selected by Government	2	-		-	-	2
i. Careers Advisory Service (George St Sydney)	1	-		-	-	1
j. Careers book (?)/study guide/job description	-	1		-	-	1
Total	27	15	9	2	2	55

1 student did not answer

WERE STUDENTS SATISFIED WITH THE WAY THAT THEY RECEIVED INFORMATION?

All multiple answers were scored for this question. The aim of this question was to gather ideas and gain an indication of whether the current methods were effective.

Most (63%) first and second year students were satisfied with the way they found out about their degree/units. However of those who suggested other ways they would have liked to receive information, the large majority (23% of all students) suggested they receive more, and more detailed information at college/high school and suggested school visits by ANU staff, students and graduates (see Table 9).

HOW TO ENCOURAGE PEOPLE TO ENROL IN FORESTRY OR REM DEGREES/UNITS AT ANU

Most answers focussed on making information available to students at college and high school. The most frequent suggestion, made by 22 people, was for enthusiastic students, graduates or professionals to go back to high schools and colleges to talk to Year 10, 11 and 12 classes. The second most frequent suggestion, made by 13 people, was to advertise the benefits of the course and future career prospects (see).

Other suggestions included more promotion at Open Days and visits to the Forestry Department; more pamphlets with information and a wide variety of detailed information that is easily accessible and better information on the range of subjects and the types of topics covered in units such as global warming and population growth (see Tables 9.1 & 9.2).

A small number suggested providing information to people about what the degree involves with an emphasis on the outside and practical work and field-trip orientation of the degrees. A few mentioned that fees could be a problem and they should be

reduced or people should be reassured they 'shouldn't be that concerned'. One person suggested arranging 'for schools or biology classes to go on surveys etc with foresters'. Other suggestions included emphasising the relevance of the Forestry or REM degree to other degrees or areas of study, and the good linkages between subjects; emphasising the practical expertise of the lecturers or offering summer short courses (part-time).

One second year Forestry student observed:

I think people are either interested in these subjects or they're not – environmental degrees seem to attract passionate people to the courses.

Some suggestions and comments focussed on the general public:

Promote the ecological and conservation aspects of the degree and environmental benefits of forestry

Talk to community groups, Landcare groups, nurseries

Advertise through 'green groups'

Present the Landcare problems and the huge consequences of land degradation

Environmental degrees seem to attract passionate people to the degrees.

Promotional videos/ads on TV/the radio advertisement about ANU seems like a good idea.

Raise the profile of environmental education

I guess I used to think that all foresters did was cut down trees, so perhaps people need to be made more aware of what's involved.

Make people aware that studying a Forestry degree doesn't mean you are interested in destroying forests.

THE INFLUENCE OF RELEVANT WORK EXPERIENCE

Similar percentages of first and second year students had work experience (36%) in some kind of resource management and, with one exception, most (77%) were positively influenced to choose their degree. Similar numbers of REM and Forestry students had work experience in some kind of resource management (excluding the family farm); 39 % first year and 36% second year Forestry students versus 42% first year and 40% of second year REM students. One of the 12 Science students had this kind of work experience (see Table 10).

Table 9.1. Other ways 1st Year students would have liked to receive information

1 st Year students-63 students	Degree					Total no. of responses
	Forestry	REM	Combined Forestry degree	Science	Combined science degrees excl. Forestry	
a. No	14	17	1	4	2	38
b. More information at college/high school/school visits by graduates/university staff/lecturers/more specific information about pre-requisites and what is involved in the courses/units, what units would be appropriate for the degree, not publicised at rural schools where most people in the course come from.	1	7	1	4	1	14
c. Newspapers/ advertisements/brochures sent out in mail on request/better advertisement, related magazines such as 'The Land'	-	4	-	-	1	5
d. The WEB site now available would have been good back then; as much information as possible should be available on the ANU web site	-	1	-	-	-	1
e. Career days at State forest agency offices	-	-	-	-	-	-
f. Uni Open Days (maybe two - one at beginning of year) and one at the end/talk to graduates and current students, would have been useful to come to a Open Day	1	1	-	-	-	2
g. A faculty handbook would be useful	-	-	-	1	-	1
h. Yes, I'm not sure how, but I did have to go searching initially. I imagine that there are many people (mature age) who would like to study but don't know where or how to start.	-	1	-	-	-	1
i. Maybe staff from various schools can have a careers night with graduates of University Preparation Scheme (No. 46).	-	1	-	-	-	1
j. I would like less bitty leaflets and tricky information + booklets for units, courses, schools, degrees etc. Something which gives straight, useful + appropriate info.	-	1	-	-	-	1
Total no. of responses	16	33	2	9	4	64
Total no of students	16	33	2	9	3	63

Table 9.2. Other ways 2nd Year students would have liked to receive information

2 nd year students—56 students	Forestry	REM	Combined Forestry degree	Science	Combined science degrees excl. Forestry	Total responses
a. No	17	10	7	3	-	37
b. More information at college/high school/school visits by graduates/university staff/lecturers/more specific information about pre-requisites and what is involved in the courses/units, what units would be appropriate for the degree, not publicised at rural schools where most people in the course come from.	7	4	2	-	1	14
c. Newspapers/ advertisements/brochures sent out in mail on request/better advertisement, related magazines such as 'The Land'	1	-	-	-	2	3
d. The WEB site now available would have been good back then; as much information as possible should be available on the ANU web site	1	1	-	-	-	2
e. Career days at State forest agency offices	1	-	-	-	-	1
f. Uni Open Days (maybe two - one at beginning of year) and one at the end/talk to graduates and current students, would have been useful to come to an Open Day	2	-	-	-	-	2
g. A faculty handbook would be useful	-	-	-	-	-	-
Total no. of responses	29	15	9	3	3	59
Total no of students	27	15	9	3	2	56

Table 10. The influence of work experience on degree choice

1 st Year students	Degree								Total no. students
	Forestry single & combined degrees		REM		Science		Combined degrees excl. Forestry		
Did you have any work experience in resource management (apart from working on the family farm)?	yes	no	yes	no	yes	no	yes	no	
	7	11	14	19	1	8	1	2	63
Did they influence your decision?	y	n	y	n	y	n	y	n	
	4	3	12	2	1	0	0	1	17/23
2 nd Year students	Forestry single & combined degrees		REM		Science		Combined degrees excl. Forestry		Total no. students
Did you have any work experience in resource management (apart from working on the family farm)?	yes	no	yes	no	yes	no	yes	no	
	13	23	6	9	0	3	1	1	56
Did they influence your decision?	y	n	y	n	y	n	y	n	
	12	1	4	2	0	0	0	1	16/20

THE INFLUENCE OF PEOPLE IN THE FORESTRY PROFESSION

Half of the students knew someone in the forestry profession; 49% of the first year and 52% of the second year students. This positively influenced one quarter of all first year and one third of all second year students surveyed in their choice of degree.

The 52 Forestry (single and double degrees) students were more influenced by professional foresters (38% of the 16 first year Forestry and 39% of the 36 second year Forestry students) compared with 23% of REM students (27% of first year REM and 13% of second year REM students) (see Tables 11.1 & 11.2).

The following comments are examples of the influence that people in the forestry profession had on prospective undergraduates. One REM student commented about a forester he knew:

He loves his work and works for the forestry service [in the forests] that surround our property. A good friend of the family (1st Year REM male).

Knowledge of a forester's work activities influenced this student to choose a REM degree because a Forestry degree was 'Too constricting. I do not want to be a forester'.

They explained to me that it wasn't all just going in and chopping trees down all over the shop (1st Year Science female).

This 1st Year Science student did not study for a REM degree because 'With the Forestry degree it is still an environmental science so my job options are broad. I am able to be a professional forester or a park ranger but with the REM degree this is not possible'.

After spending much of the day in the forest talking to contractors and foresters I decided that forestry was an extremely important job with an excellent cause (2nd Year Forestry male).

This 2nd Year Forestry student did not study for a REM degree because 'Forestry is more specialised'.

They seemed to enjoy the work and make it appear an interesting profession with plenty of options (1st Year REM male).

This 1st Year REM student did not study for a Forestry degree because, 'I still haven't decided exactly where I would like to focus my study and I felt REM probably offered a wider range of directions I could take'.

The lifestyle they lead, but times have since changed. So things will be totally different for me (2nd Year Forestry male).

This 2nd Forestry student chose not to study REM because: 'Too broad, not enough detail, also competition far larger from other Uni. degrees. Also Forestry pretty much covers the whole REM degree'.

A final example of the influence that people in the forestry profession had on prospective undergraduates was given by a 2nd Year Combined Forestry/Economics student:

A friend of the family has been a forester his entire working life and recommended ANU as an institution to do REM. But said forestry had more opportunities (2nd Year Combined Forestry/Economics female).

Table 11.1. The influence of people in the forestry profession on first year students

1 st Year students	Degree								Total no. students
	Forestry		REM		Science		Combined		
	single & combined degrees								
Know anyone who has worked in the forestry profession	yes	no	yes	no	yes	no	yes	no	
	10	6	16	17	4	5	1	4	63
Did they influence your decision	y	n	y	n	y	n	y	n	
	6	4	9	7	1	3	0	1	16 yes/31

Table 11.2. The influence people in the forestry profession on second year students

2 nd Year	Degree								Total no. students
	Forestry single & combined degrees		REM		Science		Combined excl. BSc. (For)		
Know anyone who has worked in the forestry profession?	yes	no	yes	no	yes	no	yes	no	
	23	13	3	12	1	2	2	-	56
Did they influence your decision?	y	n	y	n	y	n	y	n	
	14	9	2	1	1	0	1	1	18 yes/29

Summary 1 st & 2 nd Year students	Degree								Total no. students
	Forestry single & combined degrees		REM		Science		Combined degrees excl. Forestry		
Know anyone who has worked in the forestry profession?	yes	no	yes	no	yes	no	yes	no	
	33	19	19	29	5	7	3	4	119
Did they influence your decision?	y	n	y	n	y	n	y	n	
	2	13	11	8	2	3	1	2	34 yes/60

50% (60/119) of students knew someone on the forestry profession

29% (34/119) of all first and second years were influenced by someone in the forestry profession

38% (20/52) of students studying Forestry as a single or combined degree were influenced by someone in the forestry profession

23% (11/48) of the REM students were influenced by someone in the forestry profession

INFLUENCE OF ENVIRONMENT OR FORESTRY MANAGEMENT ISSUES

Forestry and management issues had a big influence on the degree choice on nearly three-quarters of the students (71% of first year and 77% of second year students) (see Tables 12.1 & 12.2). Two thirds of both first and second year students (67%) studying Forestry as a single or double degree and 73% of first year and 93% of second year REM students were influenced.

Of those influenced, two-fifths of the REM students (42%) and one-quarter (25%) of the Forestry students, wanted to do something for the environment. They wanted to better manage/protect/prevent/do something about/contribute/affect or were concerned about policy regarding environmental problems, degradation, the impact of humans on the natural environment, deforestation, tree harvesting, land degradation caused by farming, conservation issues and pollution. One first year Forestry and one second year REM student wanted to reduce the conflict between the timber industry/woodchipping, and conservation of the forests.

Then there were students who mentioned specific environmental issues that had affected their degree choice. 42% of first year foresters and 25% of second years compared with 12% of first year REM students and 7% of second years. These ranged from agriculture to forestry:

agroforestry solutions for more efficient land use

farming land degradation

salinity on farms

environmentally friendly farm management

soil erosion

water resources especially on the Monaro/Darling Basin

severe deforestation in Namibia

tropical rainforest degradation

*logging of natural forest, logging of State forests at home (NSW)
clearing our old growth forests and forcing so much fauna into extinction,
management problems with logging and plantations, logging practices
native title – Wik*

About 12–14 per cent of the first year and second year REM students found environmental issues interesting and wanted a better understanding or the hard facts compared with 17% of first year and 8% of second year Forestry students.

The answers were further examined to see who specifically mentioned forestry issues. Half of the Forestry students who were influenced by environment or forestry management issues specifically mentioned forestry issues, compared with 8% of the first and second year REM students (see Table 13).

Of the 23% of students who specifically mentioned forestry issues, 18% were studying for a single or double Forestry degree; 3% were REM students. Typical answers, given by three female foresters (one 1st Year and two 2nd Year students) were:

Being from Eden I am interested in the conflicts between woodchipping and the conservation movement. I have seen how the timber industry has suffered in my town where the large sawmill closed. I wanted to do something to stop this happening.

I know a lot of older foresters who are in the mindset that trees grow to be chopped down. I disagree with this, but the only way to change things is to do it yourself.

I've also previously attended protest rallies at various forests in Australia but never really felt comfortable with my lack of knowledge or information regarding the actual 'reasons' behind various logging operations. I guess I've always wanted to know the 'why' behind various forestry policies, 'how' they are implemented and 'who' follows them through.

Table 12.1. Influence of environment/forestry management issues on 1st Years' degree choice

	Degree								Total no.. students
	Forestry		REM		Science		Combined		
	single & combined						(excl. Forestry)		
1 st Year students	yes	no	yes	no	yes	no	yes	no	
	12	6	24	9	6	3	3	0	63
a. Want to do something	-	-	13	-	5	-	2	-	23
b. Want to reduce conflict	-	-	0	-	-	-	-	-	1
c. Concerned about specific issues	-	-	3	-	-	-	-	-	8
d. Wanted to know more	-	-	5	-	-	-	-	-	7
e.i. These issues will create more jobs	-	-	2	-	-	-	-	-	2
e.ii. Will show importance of forestry profession & industry	-	-	-	-	-	-	-	-	-
f. Have a lifetime love of nature	-	-	1	-	-	-	-	-	2
g. Preferred Forestry's approach to solving environ. problems	-	-	0	-	-	-	-	-	-
h. Concerned about environment, sustainable development	-	-	0	-	1	-	1	-	2

Table 12.2. Influence of environment/forestry management issues on 2nd Years' degree choice

	Degree								Total no. students
	Forestry		REM		Science		Combined		
	single	comb.	yes	no	yes	no	yes	no	
2 nd Year students	24	12	14	1	3	0	2	-	56
a. Want to do something	10	-	9	-	-	-	2	-	21
b. Want to reduce conflict	0	-	1	-	-	-	-	-	1
c. Concerned about specific issues	6	-	1	-	-	-	-	-	7
d. Wanted to know more	2	-	2	-	1	-	-	-	5
e.i. These issues will create more jobs	1	-	1	-	-	-	-	-	2
e.ii. Will show importance of forestry profession & industry	2	-	-	-	2	-	-	-	4
f. Have a lifetime love of nature	-	-	-	-	-	-	-	-	-
g. Preferred Forestry's approach to solving environment. probs	2	-	-	-	-	-	-	-	2
h. Concerned about environmentally sustainable development	1	-	-	-	-	-	-	-	1

a. Want to better manage /protect/prevent/do something about/ contribute/ affect or are concerned about policy regarding environmental problems, degradation, impact of humans on the natural environment, deforestation, tree harvesting, land degradation through farming, conservation issues/pollution.

b. Want to reduce conflict between the timber industry/woodchipping and conservation of the forests

c. Specific issues— solutions for more efficient land use, water resources especially on the Monaro/Darling Basin, severe deforestation in Namibia, tropical rainforest degradation, soil erosion, native title - Wik, logging of natural forest, logging of State forests at home (NSW), farming land degradation, salinity on farms, environmentally friendly farm management, clearing our old growth forests and forcing so much fauna into extinction, management problems with logging and plantations, logging practices

d. Environmental issues are interesting/wanted better understanding/wanted hard facts/media coverage of problems encountered with forestry & environment made me want to learn more about their real problems.

e.i This issue will cause a great call/a growth industry/ a great career opportunities

e.ii. These issues show how important the forestry profession is to help/how important the industry is/the forestry industry has some major issues to deal with every day

f. Have a lifetime love of nature/love of the bush/affinity with nature

g. Change from SREM because forestry accounts for environmental concerns and produces a resource at the same time/environmental concerns raised in REM often excessive/ Forestry teaches how to manage REM issues while production can still go on (REM issues depressed me because I thought it was so hard to manage them).

h. These issues show the need for environmentally sustainable development/ issues worldwide concern me as I find the earth important to conserve/Australian use of resources is unsustainable

Table 13. Which students specifically mentioned forestry issues?

1 st Year students	Degree				Total no. students
	Forestry	REM	Science	Combined	
a. Want to do something for the environment	2	0			2
b. Want to reduce conflict between forestry and conservation	1	1			2
c. Concerned about specific environmental issues	2	0			2
d. Wanted to know more about environmental issues	1	1			2
e. These issues will create more jobs	0	1			1
f. Have a lifetime love of nature	0	0			0
g. Preferred Forestry's approach to solving environmental problems to REM's.	2	0			2
Total	8/16	3/33	0/9	0/5	11/63
2 nd Year students	Forestry	REM	Science	Combined	
a. Want to do something for the environment	1				1
b. Want to reduce conflict between forestry and conservation	0	1			1
c. Concerned about specific environmental issues	5			1	5
d. Wanted to know more about environmental issues	4				4
e.i. These issues will create more jobs	3				3
e.ii. These issues will show importance of the forestry profession and industry	1				1
f. Have a lifetime love of nature	1				1
Total	14/27	1/15	0/3	1/11	16/56
1 st & 2 nd Year students	22/43 (51%)	4/48 (8%)	0/12 (0%)	1/16 (6%)	27/119 (23%)
% of 1 st & 2 nd Year students who specifically mentioned forestry issue	18%	3%	0%	1%	23%

OTHER INFLUENCES ON DEGREE CHOICE

After being specifically asked about the influences of work experience, knowing somebody in the forestry profession and environmental and forestry management issues, the students were then asked what else influenced their decision. Of the 92 (77%) who gave an answer, by far the most frequent influence (41%) was word-of-mouth; the encouragement and support and information provided by parents, relatives/spouses, work mates and friends, past and current students (see Table 14). Of these sources of information, family had the biggest influence – 26% of those 92 students. The next most frequent influence in answer to this question was an enjoyment of the bush/forest/outdoors and practical/outside work (15%). Eleven per cent (10 students) of those who answered this question said the ability to study in Canberra was an important influence. Job prospects and school careers advisers were influences for four students each.

Dr Ann Gibson (Student Adviser and Enrolment Sub Dean of Science – ANU Department of Forestry in 1998) also commented in her interview for this study on the influence of the perceived outdoors forestry lifestyle on degree choice and the problems this has caused some students:

You know what they think forestry is about...why they love it...and they'll tell you this...because it's outdoors and they get absolutely furious when they discover they've got to do Stats and Chemistry and stuff... and they're withdrawing from the core subjects and therefore wrecking their whole [degree]. They don't realise it's significant that they've got to keep their core [units].

In the interview for this study with Professor Jerry Vanclay (Chair for Sustainable Forestry, Southern Cross University), he also stated the outdoor aspects of a forester's job is an important influence for high school students:

We haven't done a formal survey as such but as I said, I think you need to stratify between the mature age students and the school leavers and if I were to

draw a stereotype of our school leavers – its because they want to work outdoors – they think a Forestry degree is a good pathway to a job in State Forests or in National Parks and often they think it's a pathway to a rangers job. They haven't really given it enough thought but they've got good enough grades to go to University and they want a job outdoors and really the model they have in mind is more that of a ranger or a field worker of some sort rather than as a university-qualified professional.

Our mature age students generally know enough about the world, they've done enough research about what they're going to be doing and so on, and I think they've got a much more realistic vision of what employment prospects are going to be after qualification and what kind of work they are going to be doing. I think with the school leavers, they're not always that well informed and I think it's often a lifestyle decision that leads them to the course.

Jerry Vanclay also commented on the difficulties some undergraduates have with some of the more mathematical units:

All our students do the same first year and they go into specialist streams from second year onwards. One of the first courses that our Forestry students do is mensuration and we get a little bit of attrition from that. Students think 'oh I didn't realise forestry involved that much mathematics' and so on, and after struggling with mensuration and thinking 'oh there's another two and half years to go', a number of them defect to the general environmental management course. But by the same token, in the first year all together, they do a general subject called Resource Assessment Techniques where they get an overview of the kind of resource assessment techniques in all of these biological sciences that are in the applied science stream, and I've had a couple of students this year that have switched from coastal management into Forestry because they thought the Forestry course sounded more interesting and specific than what they got in the coastal management stream. So we win some and we lose some.

And I think as they start to undertake these studies they get a better picture of what's involved and what their employment prospects will be and it's usually the students that come straight from school that switch from one course to another. The mature age students don't switch. Their mind is made up.

Professor Ian Ferguson (Head of the School of Forestry, The University of Melbourne) made this observation during the interview for this study about the influence of an outdoor career and gave a further insight:

I guess my perception of it, and there is some backing in the surveys that have been done, suggest that it's an outdoor career in the type of environment that interests them and there's a small proportion of them that actually take it a step further - that see the bush as a way of escaping from people. All incoming students - you know, if they think they're going to get away from people - that's just not the case.

In this study an examination of the personal stories together with other answers given by the students confirmed the influence of lifestyle. Almost equal numbers (c. 37%) of first and second year Forestry students were influenced by a love of the forest or a desire to work outdoors. For example, four of the 16 first year Forestry students enjoyed bushwalking or being in the forest and two wanted 'a job oriented toward outdoor work'. Thirty-seven per cent (10/27) of the second year students mentioned they had a love of or wanted to work outdoors/did not want to have a job sitting behind a desk (eight students) or wanted to study parks and wildlife courses or be a park ranger (two students).

WHY REM STUDENTS DID NOT STUDY FOR A FORESTRY DEGREE

More than a third (38%) of the 47 REM students who answered this question did not choose Forestry because they wanted a broader choice of subjects – they did not want to specialise; 19% were more interested in focussing on wildlife, mining, water resources/geography/soils), while 8% specifically said they did not want to study Forestry, become a forester or work in the forestry industry or thought forestry was exploitative. Two students (4%) equated forestry with cutting down trees. Another two students mentioned that the Forestry degree took four years – a negative factor – and two believed they would be more employable with a REM degree (see Table 15).

WHY FORESTRY STUDENTS DID NOT STUDY FOR A REM DEGREE

Conversely, a quarter of the 54 Forestry students who answered this question were attracted by its specialisation – they wanted structure (26%). An almost equal number (25%) were concerned about job prospects; 17% (nine students) believed Forestry had better job prospects while 8% (four students) believed a REM degree had poor job prospects (see Table 16). For example:

Forestry more specialised (1st Year Forestry female).

I want to specialise in Forestry rather than generalising in a REM degree (2nd Year Forestry male).

I could have done something like REM in WA but I think Forestry is more specialised and I am hoping to have more employment opportunities (2nd Year Forestry female).

I would rather not have the diversity offered by the REM degree (2nd Year Forestry male).

I've been told by my father [who has a Forestry degree] & Park Rangers the most versatile degree for any conservation work is a Forestry degree (1st Year Forestry male).

Minimal job prospects, more competition for jobs (1st Year Forestry male).

The job prospects are apparently dismal ...unless you are extremely well experienced (2nd Year Forestry male).

Foresters can do a SREMer's job, but a SREMer can't do a Forester's job! No, that's a bit harsh but something I heard in my first year (2nd Year Forestry female).

Was told that job prospects were minimal compared to that of Forestry (2nd Year Forestry male).

I know people who have REM degrees and none of them have jobs (2nd Year Forestry male).

I did start in SREM as it was a shorter degree & the extra year put me off, but I have now transferred as I have seen the benefits (2nd Year Forestry female).

Apparently employers like people with Forestry degrees better, so employment (1st Year Forestry male).

I like the professional status of the degree. I have the impression that the REM degree is not as valued (1st Year Forestry male).

Forestry is a four year 'professional degree', SREM is not. SREM is a scientific Arts degree that I feel doesn't equip you for work after graduation unless you major, and I'm not that decisive (4th Year Forestry male).

Table 14. Other influences on degree choice

Influence*	Forestry		REM		Science		Combined		Total
	single & combined degrees						(excl. Forestry)		
	1 st Yr	2 nd Yr	1 st Yr	2 nd Yr	1 st Yr	2 nd Yr	1 st Yr	2 nd Yr	
Encouragement + support from parents/relatives/wife	3	1	11	4	1	-	-	3	23
Family member in same field	1	-	-	-	-	-	-	-	1
Work mates/friends	-	2	4	2	1	-	-	1	10
Past + current students	-	2	-	1	1	-	-	-	4
Able to study in Canberra	1	1	3	1	1	1	1	1	10
A degree that involves practical work/outside work	2	-	3	2	-	-	1	-	8
Really enjoy/respect/love the bush/forest/outdoors	1	1	1	2	-	-	-	1	6
Job prospects - ANU Forestry degree is highly recognised - I can get employed anywhere	1	2	1	-	-	-	-	-	4
Teacher/councillor at college	1	-	1	-	-	-	-	2	4
Course sounded interesting and useful	-	1	1	-	-	1	-	-	3
Shortage of nationals trained as foresters/All our forestry is run by expatriates (Namibia)	-	2	-	-	-	-	-	-	2

Influence	Forestry		REM		Science		Combined		
	single & combined degrees						(excl. Forestry)		
	1 st Yr	2 nd Yr	1 st Yr	2 nd Yr	1 st Yr	2 nd Yr	1 st r	2 nd Yr	Total
Liked the topics taught - biology/geology + geography/	-	-	1	-	-	-	-	1	2
Political/media lack of awareness + problems for future	-	-	1	-	-	-	-	-	1
Academic/Tim Marples recommended ecological measurement course to me on enrolment day	-	1	-	-	-	-	-	-	1
Meeting person in Laos who was involved in non-timber forestry products project	1	-	-	-	-	-	-	-	1
Wanted to leave the country - did not want to work on a farm for the rest of life	-	1	-	-	-	-	-	-	1
Where I lived - in the middle of a pine forest	1	-	-	-	-	-	-	-	1
Want to have impact on decision-making processes affecting native forests	-	1	-	-	-	-	-	-	1
Wide variety of subject in course	-	-	1	-	-	-	-	-	1
Want to do good for the planet	-	-	-	-	-	-	-	1	1
Observing differences between our biodynamically-run property and other conventionally, sometimes badly managed places	-	-	1	-	-	-	-	-	1
Book 'The unified theory of existence'	-	-	1	-	-	-	-	-	1
U.S. anti-nuclear protestor who explained scientific evolution in spiritual terms. Friends of Durras - botanists, zoologists, ecologists, foresters	-	-	-	-	-	-	-	1	1
Public awareness campaign of environmental problems	-	-	-	-	-	-	-	1	1
To study something I always wanted to	-	-	1	-	-	-	-	-	1
Many trips to Mt Kosciusko National Park inspired desire to learn more about environment + how to manage	-	-	1	-	-	-	-	-	1
From a farm - land + water quality are a big deal	-	-	1	-	-	-	-	-	1
Total	12	15	33	12	4	2	2	12	92

*All reasons given by any particular students were listed.

Table 15. Why REM students did not choose Forestry

REM student responses*	REM		
	1 st Year	2 nd Year	Total no. responses
More choice/broader scope in a REM degree/ the Forestry degree is fairly structured, rigid/too specialist/too limited + scientific/too specific/too focussed/ more interested in a wider range of issues/topics than just forestry issues/REM allows a bit more flexibility to try things out.	15	3	18 (38%)
More interested in wildlife, mining, water resources/geography/soils/	3	6	9 (19%)
I don't want to study forestry/want to be a forester/'work in the (pure) forestry industry'	2	1	3 (6%)
Didn't want to specialise when I wasn't sure about the subject/not really sure of where I'll end up but didn't want to spend 4 years doing the wrong thing	1	1	2
To be more employable/ more job opportunities	2		2
I thought I could swap over if need be or study Forestry within my SREM degree because I do not know any foresters or what future forestry would give me/ Not sure if forestry is the exact road I want to take - I really need more info. on possible career options	2		2
It is a four year course and...I am more interested in the way humans manage and interact with not just forests/Forestry is 4 years not three	1	1	2
Foresters cut trees - REM clean up after them! I see forestry as more of a 'cutting down trees' degree than one with the interest of the conservation of ecosystems	1	1	2

Table continued ...

Table 15. Why REM students did not choose Forestry

Continued...Table 15. REM student responses*	REM		
	1 st Year	2 nd Year	Total no. responses
<i>Because I want to focus on the regeneration of land instead of managing forests for their use of timber.</i>	1		1
<i>I still see Forestry as largely exploitative rather than nourishing or contributing to Australia's environmental outcomes. The \$ may be in forestry but the future is not unless the industry changes a lot more than it has to this point'</i>	1		1
<i>More variety in jobs with A REM degree.</i>	1		1
<i>You can't study both REM and Forestry as a double degree.</i>		1	1
<i>Career openings in Canberra.</i>	1		1
<i>The info. I had for park rangers recommended REM. However I am now thinking of changing to Forestry due to the wider range of jobs and range of units.</i>	1		1
<i>'My differing value system at the time' This SREM student also wrote, 'SREM was disorganised and incongruent with what I wanted. I have since followed a degree matching or similar to that of Forestry'</i>		1	1
	32/33	15	47/48
	answered		answered

*All reasons given by any particular students were listed.

Table 16. Why Forestry students did not choose a REM degree

Forestry degree student responses	Forestry single degrees		Forestry combined degrees		Total no. responses
	1 st Year	2 nd Year	1 st Year	2 nd Year	
	<i>I wanted to specialise in forest management/forestry rather than generalise in a REM degree/Forestry is more specialised/REM course was too broad/I would rather not have the diversity offered by the REM degree/I needed structure in my degree.</i>	2	10	-	
<i>Better job prospects/More/broader employment options/ I know people who have REM degrees and none of them have jobs/I've been told by my father (a forester) and Park Rangers, the most versatile degree for any conservation work is a forestry degree/Apparently employers like people with Forestry degrees better, so employment/I believe Forestry gives you more options; you could be a forester or a resource manager in another field besides forests/Foresters can do a SREM'ers job, but a SREM'er can't do a forester's job/job security.</i>	4	3	1	1	9 (17%)
<i>A REM degree has minimal job prospects, more/too much competition for jobs/the job prospects [with a REM degree] are apparently dismal - unless you are extremely well experienced.</i>	1	3	-	-	4 (8%)
<i>Forestry offered more units that were of interest to me/the REM degree does not seem to cover as many necessary issues which I was interested in/Started with BSc (REM), became more interested in forestry side throughout Uni years and changed to BSc (Forestry).</i>	1	3	-	-	4 (8%)
<i>No choice was sent to ANU to study Forestry/ My choice and the choice of our directorate (Namibia)/My government.</i>	2	2	-	-	4 (8%)
<i>I like the professional status of the degree/Forestry is a four year 'professional degree', REM is not/Forestry is a more refined degree.</i>	2	1	-	-	3 (6%)
<i>I did start in SREM as it was a shorter degree and the extra year put me off, but I have now transferred as I have seen the benefits/thought it would be 'better'/I started doing SREM and then changed to Forestry when I realised REM wouldn't get me where I wanted to go.</i>	-	2	-	1	3 (6%)
<i>I didn't know the REM degree existed.</i>	-	1	-	1	2 (4%)

Table 16. Why Forestry students did not choose a REM degree

Continued...Table 16. Why Forestry students did not choose a REM degree	Forestry		Forestry		Total no. responses
	single degrees		combined degrees		
	1 st Year	2 nd Year	1 st Year	2 nd Year	
Forestry student responses	1 st Year	2 nd Year	1 st Year	2 nd Year	Total no. responses
<i>Most interested in broader environmental subjects rather than specialise in one/I thought Forestry was a more broad degree.</i>	-	1	-	1	2 (4%)
<i>A Forestry degree is more specific but can also relate to REM issues in the workforce.</i>	1	-	-	-	1 (2%)
<i>Basically there is no BSc/BSc (REM).</i>	-	-	-	1	1 (2%)
<i>Forestry sounded better to me as there is more hands-on work involved</i>	1	-	-	-	1 (2%)
<i>I've been interested in forestry since Year 10.</i>	1	-	-	-	1 (2%)
<i>I see there is a great need to manage our forests sustainably and I want to become involved in the process.</i>	1	-	-	-	1 (2%)
<i>Because I have completed an Associate degree in Resource Management.</i>	-	1	-	-	1 (2%)
<i>Liked the options of Forestry better.</i>	-	-	1	-	1(2%)
<i>Because only the Forestry degree can be combined with Science to make a double degree.</i>	-	-	-	1	1 (2%)
No answer	-	-	-	1	1 (2%)
Total	16	27	2	9	54
	1 st Year	2 nd Year	1 st Year	2 nd Year	

WHY STUDENTS STUDIED NEITHER REM OR FORESTRY

Generally students decided against a Forestry degree either because their interests were elsewhere or they wanted a greater freedom of choice in their units (35%) (see Table 17). Seventeen students answered this question and two of these seemed to be anti-Forestry. For example one first year student (BA/BSc) wrote, 'Forestry has negative aspects I don't agree with, want a job dealing with more than trees and profit'. A second Year (BSc/REM) student wrote that he was studying for a REM degree, not Forestry because of 'conflicting philosophies'.

Six students (four REM, one BSc/BA and one BSc/REM) wrote that they equated forestry as exploitative, cutting down trees, using forests only for timber or differing with their philosophies. Another three REM students wrote they did not want to study Forestry or be part of the profession but did not say why. Most (74%) students were influenced by environment and forestry management issues and a half of these (50%) wanted to do something about it. Seventeen per cent of these were concerned about specific issues and fourteen per cent of students wanted to know more about environmental issues.

Table 17. Why students chose neither Forestry or REM degrees

Science degree student responses	Science		BSc Combined degrees (excl. Forestry)		Total no. responses
	1 st Year	2 nd Year	1 st Year	2 nd Year	
	<i>Forestry did not especially interest me. I wanted to be more involved in research than management/Just more interested in Biology/Computer science... is where my interests lie/Wanted to specialise more in geology... more interested in fauna management of it all/wanted to do Asian Studies as well.</i>	5	1	-	
<i>I want to be able to choose my units - not be told exactly what I must do/lack of choice in deciding subjects/More freedom of choice because no subject is compulsory/Forestry seemed to specialise. I haven't decided on what, if anything, I wish to specialise in.</i>	3	1	2	-	6 (33%)
<i>I'm studying Arts/Science so don't get sick of science & get broader skills.</i>	-	-	1	-	1 (6%)
<i>Wanted a broad & general degree which left my options open, rather than a specific degree which may limit me</i>	-	1	-	-	1 (6%)
<i>I was put off studying a REM degree through the course GEOG1006- it is very opinionated & one-sided. I am still interested in studying a few Forestry units though.</i>	1	-	-	-	1 (6%)
<i>Forestry has negative aspects I don't agree with, want a job dealing with more than trees & profit.</i>	-	-	1	-	1 (6%)
<i>Am studying for a REM degree, not Forestry because of conflicting philosophies.</i>	-	-	-	1	1 (6%)
Total	9	3	4	2	18

The first reason written was taken as the most important and was the only one scored for each student

ARE STUDENT EXPECTATIONS BEING MET?

The last question was designed to find out if students were choosing the right courses for themselves or there was a mismatch between their expectations and experience once they started their degree.

More than three quarters of the students said their degree had met their expectations (see Table 18). One second year Forestry student said the degree had met his expectations but then made the comment:

They still can't truly justify logging native forests, when there is potential in plantations. Australian Conservation Foundation 1998 - Forest Policies

Three other second year foresters who felt the degree had met their expectations commented very positively:

Even more so, as it has created options that I was originally unaware of.

It has given me an insight and understanding of environmental issues and ways to correct them

I didn't really know what to expect but am enjoying it so far. It is structured well and encourages work experience which I feel is essential for future job opportunities.

Three students did not answer this question because it was not included in the pilot survey they completed. The twenty-two students (nine Forestry; four first and five second year students, nine REM; four first and five second year students, and four Science first year students) who said their expectations had not been met gave many different reasons.

Only one student commented that the course was different from what they had expected:

I did not expect to have to do geology and biological subjects. I was more looking forward to doing more Geography-based subjects (1st Year REM).

Another first year student would have appreciated some mentoring:

I had to do Statistics. I was also advised to do another unit this semester which was unnecessary. It would help to have more people to talk to e.g. other students maybe (1st Year Science).

Two students were dissatisfied with studying 'the basics':

I am at early stage and I don't think it has met my expectations so far. All we are doing so far are the basics which I think will lead me to my expectations (1st Year Forestry).

Two first year Forestry students did not want to study Statistics or Economics, and one (BSc Forestry/BEc) wanted to be able to do 'more load than currently doing, five years for a double degree is a long time'.

Three second year Forestry students made similar comments:

I realise the degree is aimed at producing foresters for big companies - but I'd like to see some kind of direction at revegetation and rehabilitation work for tropical forests.

I thought there would be more emphasis on 'green' issues and forest products than there has been so far. A bit disappointing.

I had expected the degree to focus not just on harvesting, and maintaining, native and plantation forests.

One mature age 1st Year REM student commented on the difficulties for part-timers:

No real effort made by REM school to accommodate part-timers. e.g. every single lab I've attended has been during business hours. Try negotiating with your manager for 3 x 1 lectures and 1 x 3-hour lab per week and travel time. Worse trying to do your job in the time left at work. Aaahh, I am being a bit negative here - after all it's only about half the year we need to deal with this. However if Uni opens itself to part-timers then it has an obligation to make some organisational concessions to these students. e.g. videotape all lectures - always offer at least 1 lab session after hours.

Seven REM (two first year and five second year) students made the following comments:

It's not quite as structured as I expected

Yes. However more information about requirements regarding points from the various categories would be helpful. There is a lot of confusion.

A less complicated system in terms of unit structure, so that all units from different departments (within Science Faculty) can tie in better (i.e. pre-requisite requirements).

There has been a lot of duplication between different units. Also one unit was badly presented and organised.

REM was disorganised and incongruent with what I wanted. I have since followed a degree matching or similar to that of Forestry.

No, I feel that I am still learning the basics of everything. I only have one year to go and don't feel I will have enough knowledge to get a job.

Yes, it has been a great course so far. Its broadness has caused a few problems but other than that I look forward to next year.

Table 18. Are student expectations being met?

Responses	Forestry		Combined Forestry degree		REM		Science		Combined degrees excl. Forestry		Total
	1st Yr	2 nd Yr	1 st Yr	2 nd Yr	1 st Yr	2 nd Yr	1 st Yr	2 nd Yr	1 st Yr	2 nd Yr	
Yes	12	21	1	7	29	11	6	2	3	1	93 (78%)
No	4	4	1	1	4	4	3	-	-	1	22 (18%)
Question not asked in prelim. survey	-	2	-	1	-	-	-	1	-	-	4 (3%)
Total	16	27	2	9	33	15	9	3	3	2	119

SUMMARY OF THE SURVEY FINDINGS

The survey population was typical of ANU student populations. Most students were from the ACT or NSW, the numbers of men and women were almost equal. They chose ANU because of the closeness of ANU to home, the particular degree and the reputation of the ANU.

In answer to the research question 'Where did high school/college students find information that led them to choose or not choose Forestry at ANU?', this study found that most students first found about their ANU degree/units while in their final year of college. Reading the UAC Guide was the way most students (34%) first found about their degree, followed by word-of-mouth (family, friends, neighbours and those already enrolled in the course). The ANU Undergraduate Handbook, information through their college/school and careers nights/Open Days were important for one in seven of the students surveyed.

Most students (63%) were satisfied with the way they received information about their degree/units. Of those who were not, the large majority suggested that additional, and more detailed information be made available at college/high school, and suggested visits by ANU staff, students and graduates. The second most frequent suggestions were to advertise the benefits of the course and future career prospects.

In answer to the second research question 'What influenced high school/college students choose their degree?' half of the students knew someone in the forestry profession and this influenced one quarter of all first years and one third of all second years in their degree choice. About a third of the students had some work experience in resource management and said this influenced them to choose their degree. Forestry and management issues had a big influence on the degree choice of nearly three-quarters of the students. There were those who wanted to do something for the environment (mostly REM students) and those who were concerned about specific agricultural and forestry issues (mostly Forestry students). More forestry students

mentioned specific forestry issues such as logging and woodchipping than students studying REM or Science degrees.

Word-of-mouth, and particularly family, most frequently influenced student's degree choice in general, followed by an enjoyment of the outdoors and practical/outside work, studying in Canberra, job prospects and school careers advisers.

There were differences in responses from students studying different degrees. Students choosing the REM generally (38%) liked the broader choice of subjects in that degree and either did not want to specialise or were interested in other subjects (wildlife, mining, water resources/geography/soils. There were three students (6%) who specifically did not want to study forestry, become a forester or work in the forestry industry and four (8%) who thought forestry was exploitative; two of these students (4%) equated forestry with cutting down trees. Only two students mentioned that the Forestry degree took four years, implying that was a negative factor.

Those who chose Forestry were either attracted by it's specialisation and structure, while an almost equal number believed they had better job prospects with a Forestry degree. Their expectations seem justified at this point in time as those responsible for educating foresters, representing the profession or government forestry policy believe that although the forest industry is changing, it is buoyant.

Those who chose neither Forestry nor REM degree had interests elsewhere or wanted a greater choice of subjects.

More than three-quarters of the students said their degree had met their expectations so far. Comments to the contrary varied among REM students who wanted to study different subjects, were dissatisfied with units being more basic than they expected and or wanted more laboratory sessions outside business hours for part-timers. Some REM students also commented that there was duplication between different units, poor organisation and confusion about course prerequisites. Three Forestry students in second year were disappointed with the industry and harvesting focus and wanted a greater emphasis on revegetation and rehabilitation of tropical forests, 'green' issues and forest products.

COMPARISON OF RESULTS WITH OTHER SURVEYS

4.1.1 National university survey

A national survey of prospective undergraduates (James, R., Baldwin, G. & McInnis, C., 1999), published after this study was completed, revealed that 56% of applicants only came to a decision about a preferred field of study within the year leading up to the application. Forty-three per cent of respondents had settled on a field of study several or more years ago. This study did not ask the same question but it can probably be assumed that the 46 % of first year and 47% of second year students who first found out about their degrees from the UAC Guide and the ANU Undergraduate Handbook did so in their final year at school/college.

Tertiary Admission Centre guides, University Open Days, material distributed by careers teachers and school visits to universities had considerably more influence than other sources of information (Table 19). This national university survey supports the findings of this study, with one exception – the importance of materials distributed by careers teachers. This source of information was not a major one in this study.

Table 19. Applicants' sources of information and the extent of their influence (Extract from James et al. 1999)

Information source	Respondents who used the source (%)	Extent of influence on users	
		Reasonably strong influence (%)*	Small influence or no influence (%)
Materials distributed by careers teachers (school-leavers only)	84	69	8
Tertiary Admission Centre guides	81	74	9
University Open Days	71	71	12
School visits to universities (school leavers only)	45	59	19
University web sites	44	32	42

Note * 5 point scale

5= strong influence to 1= little or no influence at all

'Reasonably strong influence' represents % of respondents of points 5 or 4 on the scale, 'small influence or no influence' is % of respondents at points 2 or 1.

4.1.2 Unpublished ANU surveys

Some findings of this survey can be compared with three unpublished surveys (1996 – 'Why choose SRMES and ANU', FSTY 1001- Botany and Dendrology 1996', 'SRMES Questionnaire 1998') that were made available to the author just as the 1998 survey was about to be distributed. These survey findings support those of this study where the questions can be directly compared.

Prior to this study ANU surveys of Forestry and REM students generally focussed on sources of information available within the college and university education systems (school careers information, school teachers, Careers Markets, Open Days, Good Universities Guide, ANU Undergraduate Handbook, academics, ANU students, friends or family at ANU).

This study's questionnaire differed from those given to similar ANU students because it encouraged students to write down their own ideas and experiences rather than

anticipate all the possible influences on student choice and then ask the students to select or rank the most appropriate one(s).

The 'FSTY 1001 1996' questionnaire specifically asked Forestry students if foresters had been a source of information. This questionnaire was prepared by Dr Ann Gibson (Visiting Fellow Department of Forestry and Student Adviser and Enrolment Sub Dean of Science – ANU Department of Forestry in 1998) and was given to 91 students in their first practical class for Botany and Dendrology (FSTY 1001) (see Appendix 2). The students were also asked if Forestry was their first preference, when did they consider Forestry and how did they find out about Forestry?

The findings of Dr Gibson's 1996 survey were similar to those of this 1998 survey. For example, most students appear to have first heard about their degree/units in the final year of college/high school. Of the 70 students who answered 'When did you consider Forestry?' in 1996, 53% replied Senior High and 27% wrote at UAC registration time. Most of the students surveyed in 1996 found out about Forestry from the UAC Book (c. 40%); 26% from foresters and friends and 17% from careers advisers. The figures were of the same order in 1998: most students first found out about their degree/units from the UAC Book (c. 34 %); 22% from foresters, friends neighbours and relatives and 14% from college/high school.

Dr Gibson discussed the findings of this and the other survey she gave in 1998 in collaboration with Tim Munson (ANU Department of Geology) during her interview for this study:

By and large we are drawing only local students. For most of them, Forestry was a first preference. But for some of the REMs...extraordinary choices... hadn't got a clue where they were going or what they were doing. And then we asked them when did you begin to consider Forestry, and Senior High came out the most, but unfortunately not a lot until UAC registration time.

How did you find out about Forestry? UAC book... unfortunate. Foresters and friends; not very many from careers advisers who in fact aren't taught to look at specific careers.... What careers advisers do, is get the students to look at their

own values and then they go away and look. That's what is done in Year 10. It's awareness raising. It's not very helpful, obviously... and very few from Open Days and brochures.

Dr Ken Johnson conducted other unpublished surveys of students studying a first year subject (Ecological Measurement - SREM 1003). This is a compulsory unit for both Forestry and REM students and was the same 1st Year class surveyed for this study in October 1998.

Dr Johnson conducted a survey of 98 students in the last week of classes in 1996 to find out how they came to know about the university and the course. Of these 12 (12%) were Forestry students. Of the 98 students surveyed in 1996, 62% were from the ACT & region, 5% from Sydney and 22% from elsewhere in NSW. Thus 89% of the students were from NSW or the ACT. This result is very similar to the c. 87% (41.2% from the ACT and 45.4% from NSW) surveyed in this study.

Friends were an important information source for many first year students (40% of Canberra & region students – word of mouth; 31% or 8 of the NSW students). These findings support those of this study; 41% of first and second years said word-of-mouth influenced their degree choice.

The UAC and the Good Universities Guide were important sources of information (39% of Canberra & region, 77% of students from elsewhere in NSW) in Dr Johnson's survey. In this study, most (34%) students first found out about their degree from the UAC Guide.

Johnson also compared responses from those students from the local region with those from elsewhere in NSW and found that Careers & Open Days were sources of information for more important for the non-locals (23% of locals used Careers & Open Days compared with 42% from NSW). This study found about 10% of first and second year students first found out about their degrees from Career nights/Bruce CIT careers night/Careers Market AIS/ANU Open Day/careers fairs.

Similar surveys were conducted in subsequent years. In 1998 a survey was given to 156 Earth Systems (SREM1002) students and 99 Resource Biology (SREM1004) students). The number of respondents was low – 12% (30 students out of 255). Once again most (17/30–57%) students found out about SRMES through the UAC Guide. Family or friends were sources of information for 30% of respondents and careers advisers, brochures and the ANU Undergraduate Handbook were sources for 20% of the students.

4.1.3 Follow-up surveys

The questionnaire designed for this survey in October 1998 influenced the design of the subsequent SRMES Questionnaire; it was expanded in April 1999 by John Field (ANU Forestry) and Tim Munson (ANU Geology Department) to include two questions that asked for the student's help:

How could we have improved the information available to students like yourself who were trying to select a course?

Can you suggest ways that may improve our student enrolment?

This study also influenced an examination and presentation of the differences in responses between students studying for a BSc (Forestry), BSc (REM) and 'Others'. The 'SRMES Questionnaire, 99' survey found there were 'considerable differences' between students studying for different degrees, even though, as in this study, the UAC Guide continued to be a source of information for most students, followed by family and friends for the BSc (Forestry) and BSc (REM) students, and ANU Open Day for the 'Others'.

This survey was given to about 100 Earth Systems (SREM 1002) students and the return rate was about 60% (John Field, ANU Forestry, personal communication, 2000).

In another subsequent survey (May 2000) of 85 ANU first year Forestry and REM students, the most frequent responses indicate that the ANU Undergraduate Handbook, word-of-mouth and the UAC Guide were the most commonly-used first

source of information and the biggest influence upon students' choice of degree or units (Searle, 2000).

4.1.4 Comparison of this study with other survey findings

It is not possible to directly compare many results between this study and other published and unpublished surveys because the questions and answer choices were not the same. However, where comparable, findings from previous surveys do generally support the findings of this study. There are also general trends that are common to all the surveys reviewed. For example, most students appear to have first heard about their degree in their final year at college (Year 12). The Tertiary Admissions Guides such as the UAC Guide were the major first source of information about their degree. In all other surveys (national, ANU and SREM) the UAC guide was either the most or second most frequently used source of information and one that had a reasonably strong influence.

In this survey and the unpublished SREM surveys, word-of-mouth was the second most frequent source of information for those students hearing about their degree for the first time.

The results from this survey differs from those of a national survey and the ANU surveys where it was found materials distributed by careers teachers were a commonly used source of information that had a reasonably strong influence. Although this survey did not directly ask about the influence of information provided at college/high school, it did ask how students first found out about the Forestry/REM degree or units at ANU. Only 14% of all students surveyed first found out about the Forestry or REM degree or units through information given at college/high school.

INTERVIEWS – ARE FORESTRY STUDENTS' EXPECTATIONS OF GOOD JOB PROSPECTS JUSTIFIED?

The third research question 'Are Forestry students' expectations of good job prospects justified?' arose from students' responses to the questionnaire.

Nearly a quarter of respondents (24%) studying Forestry (single and combined degrees) principally chose the degree because they believed they would have better job prospects than would people with a REM degree. (Only 4% of the REM respondents said they did not choose Forestry because they would be more employable). Examples of this belief were given by two female second year Forestry students:

Wanted to do environmental science. Started a REM degree. Found it too much into conservation for me & was worried about job prospects after degree. I changed to forestry in my first year.

Too much competition for a job at the end of the [REM] degree & you're not necessarily employable when you finish.

To explore whether this expectation would be met in the foreseeable future, interviews were conducted with the three heads of the forestry schools in Australia (Professors Ian Ferguson, Peter Kanowski and Jerry Vanclay), a senior executive officer in the federal government department responsible for forestry (Peter Yuile Agriculture, Fisheries and Forestry–Australia) and the President of the Institute of Foresters of Australia (Heather Crompton). A full transcript of the interview with Peter Yuile is attached (see Appendix 2).

The interviews revolved around the issue of 'Does Australia need more foresters?' Questions included the following:

How do you think forestry will change in the future?

What impact will that have on the demand for foresters?

Does Australia have enough forestry graduates for the jobs available?

Do you think that will change and how?

Do you think forestry graduates are or will be competing with resource/environmental management graduates for jobs?

Do you think the debates over forest management over the last 30 years have had an impact on the number of people choosing to study Forestry degrees?

In terms of whether forestry will change in Australia in the foreseeable future, all five key informants saw changes resulting from federal and State government initiatives.

Comments were made about the:

- increasing commercialisation of forestry activity,
- increased private sector investment,
- a forest industry that will increasingly be driven by the private sector,
- greater diversity of organisations involved in forestry,
- increased plantations for pulp, revegetation of recharge areas, carbon sequestration, salinity credits and ecological services,
- increased extension work associated with increase in farm forestry,
- increased management of native forests for conservation values rather than production values,
- increased production of non-wood forest products (leaf oils) and,
- improvements in the solid wood processing industry and more value-adding timber operations.

Employment prospects were generally seen as good for foresters at the moment as the result of a buoyant forest industry in a buoyant economy. None of the five saw any long-term decline in demand for foresters but believe that what foresters do and how they do it will change:

I don't think we're going to have a huge explosion in demand for foresters but I think there's scope for a steady growth. I think employment prospects for

forestry graduates are probably a lot more buoyant than that of a lot of other disciplines (Jerry Vanclay, Chair of Sustainable Forestry, Southern Cross University).

On the demand side [it all] looks pretty rosy ... [but] there's a job to be done in re-positioning and re-imaging foresters (Peter Yuile, First Assistant Secretary, Fisheries and Forestry Industries Division, Agriculture, Fisheries and Forestry–Australia).

Probably much the same as numbers go but I think what they do is going to change markedly... there will be different opportunities (Heather Crompton, President of the Institute of Foresters of Australia).

There are swings and roundabouts - it's not all a big growth curve ... I'm cautiously optimistic about future job markets... There are a lot of opportunities for foresters that might not be traditional forestry roles and we are trying to position ourselves to produce graduates who will be able to take advantage of that (Peter Kanowski, Head of ANU Forestry).

It's a cyclical world and ... [at the moment] the industry at large, and it doesn't matter what component of it you look at, is pretty buoyant. But that will change (Ian Ferguson, Head of School of Forestry, The University of Melbourne).

In terms of whether there are enough foresters to meet demand, Jerry Vanclay commented:

I believe in the supply and demand a little bit - that if we don't supply the foresters, then employers will recruit from overseas and they'll employ people trained in other disciplines and give them in-service training and so on. But I think if students choose to take Forestry as a course of study, I think that the employment outlook for them over the next twenty years looks good. Having said that, I think they need to be flexible in where they wish to work, both in Australia and abroad and the subject area they wish to work in but if our graduates are prepared to travel and be broad-minded about the area in which

they work, I think the employment prospects are good and I think there will be growth in demand for foresters.

Jerry Vanclay also commented on the number of students graduating with Australian Forestry degrees:

I think I indicated before that I think the prospects for Australian Forestry graduates are fairly buoyant in the longer term. In the medium term I think it's realistic that they can expect to get a job, particularly if we've got three forestry schools with numbers in the teens somewhere between 10 and 20 or so, I think Australia can easily absorb that number of Forestry graduates. If we finish up with four forestry schools and our numbers all pick up because we're doing such a good job promoting ourselves - I think in the heady days at ANU the initial intake got up to about 80 - well if we've got four forestry schools with an intake of 80 then clearly we can't employ that many in traditional mainstream forestry. But given the numbers that we've got at the moment I think it's realistic that all of our graduates will be able have a kind of job of their choosing soon after graduation.

Peter Kanowski said that the current high rate of employment of young Forestry graduates might suggest there were not enough foresters:

I think it's been a very strong employment market for say the last three or four years and if you think about what's been happening then - the Regional Forest Agreements have been soaking up a lot of people into basic forestry work - inventory and surveys and that sort of thing. There's been a big boom in eucalypt plantation planting which has also been a good hunting ground for young foresters and there's been an expansion of farm forestry/bush care activities and often its been young graduates who have taken on roles there, whether or not they were all that well equipped for them.

So we've had a positive part of the cycle in the last couple of years, counterbalanced a bit by, the declining employment in state forestry agencies and many of the companies. The people who have been displaced from those downsizings have been people at the middle level (people with 5-20 years experience) and they've tended to go into consultancy or moved sideways into

something else but the work on the ground has still got to be done and it's being done by more entry level graduates.

He then commented that the market would determine the 'right' number:

The question of 'are there enough Forestry graduates' is a bit like the question of is the world running short of wood. You read innumerable articles about the world wood supply/demand balance as if there's going to be this wood shortage but from an economic point of view that's never the case. Always supply and demand intersect somewhere - and it's at what price. That's the way I see the question of whether there are too many foresters or not enough. What's the right number? There is no answer to that question. The right number is determined by the market in the sense that the opportunities for employment are the ones that the market provides. The caveat I'd put on that goes back to the sorts of issues I was talking about before. There are a lot of opportunities for foresters that might not be traditional forestry roles and we are trying to position ourselves to produce graduates who will be able to take advantage of that.

Peter Kanowski also believes that the current high rate of employment of Forestry graduates will not be maintained by traditional sources of employment:

...If you look at the ebbs and flows in student numbers over the years, in the last decade or something, it's been roughly 30-40 students coming in each year and maybe 20-30 graduating each year I guess, and if you look at the very high rate of employment of those graduates into a free market, not a market where they're cadets or some other sort of indentured labour, you'd have to say it seems like we haven't got too many, but it's not likely the traditional sources of employment are going to grow enormously. However the associated areas or areas which combine Forestry and other skills – commerce, information technology – are going to expand.

Peter Kanowski expressed cautious optimism about the future job market for Forestry graduates but believes they will have to design their degree to remain competitive:

So I guess I'm cautiously optimistic about the future job market but I think the key is to find ways of keeping our degree relevant to the sorts of changes we see

in employment and in how employment is offered and the sorts of combinations of skills that people are looking for...and I think we'll probably find in forestry as we already do in environmental science that your 'straight down the line' forestry degree where people are good general purpose resource managers but they don't have any arrows in their quiver, unless they hit the exact right job, because there will be jobs for people like that, that unless they specialise they will be less competitive for some of the specialist or innovative roles, where people who've thought about combining their Forestry degree with let's say, some strength in say forest measurement or environmental modelling are of course well placed to pick up on a whole range of things that are coming up in that area. That's a very long way around of saying that I don't see why the job market shouldn't remain good as long as we help our students to remain competitive in the job market.

It was believed by the Heads of Australia's forestry schools that Forestry graduates do compete with resource and environmental management graduates, although foresters have had an historical advantage because of linkages with national park services and State Forests. For example, Ian Ferguson (Head of School of Forestry, The University of Melbourne) said:

I think in the forest services we clearly have an advantage of history. In terms of national park services we have an advantage in relation to fire management and field management but that's not an exclusive one by any means. I think in resource management in the sense of the Murray Darling Basin - that's very much a matter of conjecture at this stage because the organisations that are going to do that work aren't clearly defined yet.

Jerry Vanclay (Southern Cross University) made a similar comment about the traditional employers of Forestry graduates:

I think of course they do. I think that we've got three or four, depending on how you count, universities where we're teaching forestry in some complexion or another - I think there are another ten universities that are teach some flavour of environmental science and there's no reason why those students with a Bachelor of Environmental Science can't apply for a forester or a national

parks or some other sort of job for which Forestry graduates might also apply for but I think that if you look at our track record there's an awful lot of people within National Parks that have Forestry qualifications. Someone once told me that 30% of bachelor's degree National Park employees had Forestry degrees. Now I haven't checked that but certainly I know a lot of foresters who work for national Parks, just by way of example.

Jerry Vanclay also commented that the breadth of training, and focus on management issues during their degree makes Forestry graduates strongly competitive with other environmental science graduates:

So even though it's an open market place and students with other kinds of training will apply for forestry or forestry-related jobs, I think that the kind of education that we give our students is a good education, it's fairly broad, it covers a number of specific issues about management and I think that the graduates from any of those – the Southern Cross, ANU, Melbourne it doesn't matter, I think that they are all pretty well placed to compete strongly against graduates trained in the general environmental sciences.

Peter Kanowski commented on the overlap in training and interests between Forestry and REM graduates when asked if they competed against each other:

Well more strongly for some jobs than others is the best answer to that. Yes. Clearly the two subject areas or disciplines or areas of activity are closely related and more closely related in some cases than others. A REM student who specialised in ecology is much more like a forester, than a REM student who specialised in GIS or soils or rangeland management or marine biology. It's like intersecting VENN diagrams – the extent of intersection depends not just on the degree structures but the individual students and their interests and how they've chosen to put those degrees together and so what they come out with at the end looking like.

Peter Kanowski also commented on the need for graduates with more general environmental science training than just Forestry:

I don't think it's a bad thing that there is that competition. We are trying to take advantage of what the people who set up the REM degree, David Griffin et al. were recognising that there was a strong need for a more general environmental science and a more diverse set of environmental sciences that just that associated with Forestry.

Related comments were made about the value of a four-year Forestry degree versus a three-year environmental management degree, the increased field work/practical experience within the Forestry degree and the competitive edge that Forestry students have because they spend an extra year learning management skills and addressing management issues.

The debates over forest management were seen to have a negative impact upon the public perception of forestry as a profession by the one non-forester interviewed.

*It would be hard to think otherwise... I'm always struck by that sense of responsibility for the environment and the resources that foresters have but I don't think that would be a general perception. ... There is an image issue – that would be my guess – and its one that is completely at odds with I observe to be the training, capacity, skills that people leave university with, and people have a sense of moral responsibility and a sense of applying their technical knowledge and their other knowledge in order to get good environmental outcomes and good resource and production outcomes...(Peter Yuile, Agriculture, Fisheries and Forestry–Australia)*The four foresters interviewed felt that the impact was difficult to determine:

I think it's turned some people off. It's probably attracted other people too.... I think those kind of issues tend to impact more on school leavers rather than our mature-age students – our mature age students have thought a bit more about what they want to do... and have a better understanding of what the options are and what the employment prospects will be (Jerry Vanclay, Southern Cross University).

It's hard to imagine they haven't but then on the other hand, we don't have a lot of clear evidence that they have. So I think that it's an open question and a fruitful topic for research (Peter Kanowski, ANU Forestry).

I think that is quite a difficult one to evaluate. My own impression, for what it's worth, in the 80s and, I guess in the first half of the 90's, was that the publicity attached to it didn't matter. In fact any publicity was good publicity in terms of student interest. It seems as though there has been a shift in the last five years and I'm not clear on the reasons for that. It could be that the unfavourable publicity is playing a part now because of other alternatives [degrees] being available. But certainly in the height of some of the worst periods, we had extremely good demand (Ian Ferguson, The University of Melbourne).

No, I'm not sure I can answer the question. I would assume that if you grew up in a place like Bombala or some other major forestry centre around Australia, that it had to have an impact on whether you chose or didn't choose to do Forestry. If you came from a family where timber was really important, I'm sure it had to have an impact and either it was, 'No, I'm not going to have anything to do with it because it's just going to be trouble and there aren't going to be any jobs because the conservationists are causing so many problems that they are going to close up the forests and there won't be anything for me to do' or the alternative is 'this is a really good business and I'm going to get in there and do my bit for it' so I think you've probably got the whole spectrum of views (Heather Crompton, The Institute of Foresters of Australia).

The President of The Institute of Foresters of Australia, Heather Crompton, was asked if the decline in enrolments over the last four years at ANU Forestry was cause for concern to the forestry profession beyond the ANU campus. Crompton replied:

I think the question requires a yes/no answer. So, the answer is No. There have been shortages of many professionals at various times; for example currently in information technology. Sometimes this has an impact on remuneration and we see numbers of students increase. I understand there is an oversupply of law graduates at present. These events are often cyclical.

What does concern me is what is happening with the number and quality of science graduates in Australia. I understand that as a result of a general decline in the number of enrolling science students, some universities have lowered their entrance requirements to attract more students. Ultimately this is not good for Australia.

In summary these key informants thought that Australian forestry was changing as a result of federal and state government initiatives. They envisaged there would be increased commercialisation, private sector investment, diversity of organisations involved in forestry, area of plantations, farm forestry, extension work, management of native forests for conservation values, production of non-wood forest products and improvements in the solid wood processing industry. These changes were seen as part of a forest industry that was buoyant at the moment and as such would continue to employ foresters in at least similar numbers; but that what foresters do and how they do it will change. It was believed that Forestry graduates do compete with graduates with more general resource management degrees and that the extra year, management training skills and increased work/practical experience gained by foresters during their degree gave them a competitive advantage.

Therefore this study found in answer to the third research question 'Are Forestry students' expectations of good job prospects justified?' that such expectations are justified, although what foresters may do and how they do it is changing. When interviewed, the forestry-trained key informants did not express concern about the current decline in ANU Forestry undergraduate enrolments in terms of possible impacts on the forestry profession – they regarded this decline as part of a cyclical process of supply and demand.

The next and final chapter presents the conclusion, limitations, discussion and recommendations of this study.

5. CHAPTER FIVE: CONCLUSIONS, DISCUSSION & RECOMMENDATIONS

CONCLUSIONS

The findings of this study are supported by and in turn support findings from other university student surveys:

Most students first found about their ANU degree/units while in their final year of college.

Reading the UAC Guide was the way most students first found about their degree, followed by word-of-mouth (family, friends, neighbours and those already enrolled in the course).

Word-of-mouth, and particularly family, most frequently influenced student's degree choice in general, followed by an enjoyment of the outdoors and practical/outside work, studying in Canberra, job prospects and school careers advisers.

Almost equal numbers (c. 37%) of first and second year Forestry students were influenced by a love of the forest /bush or a desire to work outdoors.

Forestry and management issues had a big influence on the degree choice of nearly three-quarters of the students. There were those who wanted to do something for the environment (mostly REM students) and those who were concerned about specific agricultural and forestry issues (mostly Forestry students). More Forestry students mentioned specific forestry issues such as logging and woodchipping than students studying for REM or Science degrees.

People in the forestry profession had an important influence on prospective students: half of the students knew someone in the forestry profession and this influenced one

quarter of all first years and one third of all second years in their degree choice. Work experience in resource management was also an important influence: about a third of students wrote this influenced them to choose their degree.

Forestry students' expectations of good job prospects – 25% of first and second year Forestry students specifically mentioned this as a reason for not choosing to study REM – were an important influence on their degree choice. These expectations were justified in the current economic and political environment, although what foresters may do and how they do it is changing.

The decline in undergraduate enrolments in Forestry at ANU is not a symptom of a general decline in demand for Forestry graduates nor does it appear to have resulted from a strong negative perception of forestry and the role of foresters among the surveyed first and second year students. Those students who have met and talked with foresters, often choose to study Forestry as a result. Therefore the decline in enrolments may be more likely due to a lack of student awareness of the Forestry degree and the forestry profession. The forestry profession's failure to effectively communicate with the public has contributed to this lack of awareness.

LIMITATIONS OF OUTCOMES

The composition of the survey populations limits the representativeness of the findings. For example, these results represent the views of those who chose to study for Science, Forestry or Resource and Environmental Management degrees at The Australian National University (ANU). It does not represent the views of those ANU students who chose other units or degrees, or people who did not choose to study for a tertiary qualification.

The wider view held by Australians about the Forestry profession is still to be determined, as this study does not look beyond ANU students and a small numbers of senior forestry professionals.

DISCUSSION

The author's expectation that people rejected Forestry as a degree or a profession because of decades of negative media coverage of forest management debates was not strongly supported. Only six students (none of them Forestry; five of them REM students) wrote that they equated forestry as exploitative, cutting down trees, using forests only for timber or differing with their philosophies. Another three REM students wrote they did not want to study Forestry or be part of the profession but did not say why. Nearly three-quarters of the surveyed students were influenced by environment and forestry management issues and a half of these wanted to do something about it. Seventeen per cent of these were concerned about specific issues and 14% of students wanted to know more about environmental issues.

RECOMMENDATIONS FOR FURTHER STUDY

As this study represents the views of students already studying at The Australian National University, it is not known whether college/high school students who choose not to study at university are uninterested or dissuaded by those around them or media coverage of forestry and the forestry profession. A further study based on interviews and focus groups with high school students would give a more representative view of whether students are rejecting Forestry or are simply unaware the degree exists. It would also be useful to have an up-to-date understanding of the nature of the Australian forestry profession. For example the survey planned by The Institute of Foresters of Australia Inc. to document which sectors employ what number of Forestry graduates, or foresters in general will be an important reference for those describing the career paths available to Forestry graduates.

RECOMMENDATIONS FOR PRACTICE

The university course guide published annually by the Universities Admissions Centre (NSW & ACT) Pty Ltd is a very important source of information for prospective undergraduates. Therefore the ease with which students can find

information about the Forestry degree in the index and the wording of that information is critical and should be reviewed by ANU Forestry annually.

Given the importance of word-of-mouth as a source of information and influence upon students' degree choices, ANU Forestry staff and students should take every opportunity to speak with prospective undergraduate students and their families. Informal and formal discussions should emphasise the importance of forestry in Australia, the experience of studying for a Forestry degree at The Australian National University, the technical, social and management skills they will learn and the opportunities for jobs and working outdoors that await them. Relevant work experience is also an effective influence upon prospective students and should be arranged by ANU Forestry at every opportunity, for both prospective and undergraduate Forestry students as one of the 'services' offered by the Department.

The literature review found there are members of the forestry profession who believe it has generally failed to effectively communicate about forestry issues, and what foresters are and what they do. The forestry profession's traditional one-way delivery of technical knowledge was criticised as insufficient to effectively engage in the environmental debates of the last thirty years. However this study shows that individual foresters have an important influence on prospective Forestry students and should be encouraged to continue to give work experience opportunities to high school/college students.

NOTE

Although it was not an initial expectation from this study that action would occur, ANU Forestry approached the author to devise and lead an undergraduate recruitment program in 1999. The findings from this study were a critical source of information for the development of a four-month recruitment strategy. Recruitment activities included updating and increased availability of promotional material, colleges/high school visits in the ACT and regional NSW, participation in career fairs and Open Days, and training with the science communication programme at the ANU. As a direct result of the recruitment activities under this strategy, enrolments in ANU Forestry single and combined degrees increased significantly in 2000. A subsequent survey of current first year students commissioned by ANU Forestry and conducted by the author in May 2000 concluded:

ANU Forestry publications and recruitment activities in 1999 increased undergraduate enrolments in Forestry and REM degrees in 2000 by at least twelve – the number of students who said the ANU Forestry school visits and the ANU Forestry Undergraduate Handbook had the biggest influence on their degree choice. However no single activity stood out as being the most effective and as a consequence a range of activities are recommended for 2000. These focus on increasing personal contact between prospective undergraduates and ANU Forestry/REM staff and students, and maintaining the quality of the ANU Forestry and REM Undergraduate Handbooks and entries in the ANU Undergraduate Handbook and the 2001 UAC and VTAC guides.

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7. APPENDICES

7.1. SURVEY QUESTIONNAIRE

The Australian National University

Centre for the Public Awareness of Science

Questionnaire to ask students how they have come to study a degree or units in Forestry or Resource and Environmental Management (REM).

I am interested in how you have come to study for your degree, so that in future we can reach those who may wish to enrol.

* Your identity will be kept confidential

(Where there is a choice such as Yes/No, please circle your answer)

1. Name

Gender Male / Female

2. Date of birth

3. a. Are you Australian? Yes/No

If you are, in which State were you principally schooled?.....

3. b. If you're not Australian, which country/province/State do you come from?

.....

4. Do you have other university or tertiary qualifications? Yes/No

If you have, what are they?

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5. Please write the story of how you came to be studying for your current degree. Use as much or as little space as you need.

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I need some information that you might not have covered in your story. (If you have already answered any of the following questions, just say so or give them a tick \checkmark).

6. Why are you studying for a university degree?

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7. Why are you studying at ANU?

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.....

8. What degree are you studying? (Please circle your course)

Bachelor of Science (Forestry)

Bachelor of Science (Resource and Environmental Management)

Other? Please describe.....

9. What year did you start your current degree?

10. Are you studying full-time or part-time? Full-time/Part-time

11. How did you first find out about the Forestry/REM degree or units at ANU?

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12. Are there other ways you would have liked to receive information about the Forestry/REM degree or units at ANU? Yes/No If so, please explain.

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13. Do you have any suggestions of how to encourage people to enrol in Forestry or REM degrees and units at ANU?

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14. a. Did you have work experience in any kind of resource management before deciding to enrol in your current degree? Yes/No
If you did, please explain briefly what you did, for how long (e.g. months or years), and what organisation/who employed you?

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14. b. Did this work in any way affect your choice of degree? Yes/No
If so, please explain.

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15. a. Do you know anyone who has worked in the forestry profession? Yes/No

15. b. Did they influence your decision? Yes/No

15. c. If so, in what way?

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16. a. Have environment or forestry management issues influenced your choice of a degree course? Yes/No

16. b. If so, please explain

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17. Who or what else influenced your decision?

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18.a. If you are studying for a REM degree, is there any reason why you didn't study for a Forestry degree?

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18. b. If you are studying for a Forestry degree, is there any reason why you didn't study for a REM degree?

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PTO →

18. c. If you are studying for some other degree, is there any reason why you didn't study for a Forestry or REM degree?

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19. Has the degree you are studying met your expectations so far? Yes/No
If not, please explain.

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Thank you very much.

Suzette Searle – Master's student

Centre for the Public Awareness of Science

The Australian National University

tel./fax.: 6249 7661

7.2. TRANSCRIPT OF INTERVIEW WITH PETER YUILE (AFFA)

First Assistant Secretary Fisheries and Forestry Industries Division

Agriculture, Fisheries and Forestry - Australia (AFFA)

Edmund Barton Building, Barton ACT

Tel. 6272 5931 (w) Fax 61-2-6272 4875

9 February 2000 at AFFA

Does Australia need more foresters?

What are your views or thoughts about where and how forestry will change in the future and when I say the future you can define that? Some people have felt comfortable speaking about twenty years - other people have felt it impossible to predict beyond five.

That's a big question and I don't want to be presumptuous in my response. I've been in this job now for two years and I think I've said to you before that I'm not a trained forester myself and I hadn't had really any contact much with the forestry profession or industries before this.

In terms of what is happening in forestry, forests have been a major political football for a number of the years. The conclusion of the National Forest Policy Statement and then the implementation of the Regional Forest Agreements were clearly the response of governments, State and Commonwealth, to the ongoing disputes between environmental groups and other groups with respect to native forests and native forest harvesting and they are an endeavour as you know, to put some certainty around the future, so that people know what the rules of the game are and where the lines are on the maps in terms of what's conservation forest and what's available for production. Now we can have a debate about whether that's a smart thing to do but that's the way the debate has gone. There are a lot of people who have expended a huge amount of resources to put a platform in place that gives

certainty for the future and if you were to go to Tasmania and parts of Victoria, you can see where the outcomes of the RFA's have done just that.

People mightn't have liked the outcomes but having been put in place they're prepared to move on and live with them, at least that's the industry position. I suspect there are some, probably on the environmental side, who would argue they are inadequate and there are those who are philosophically opposed to native forest harvesting so it doesn't really matter what you do short of a complete halt to that harvesting.

But what it means is that you are seeing in those states increased investment and you'll see, obviously I think, as a result of the reduced acreage available for forestry then more intensive management becomes axiomatic and that's going to require at least the number of foresters that those agencies or private companies have, although again I guess the pressure on employment and cost reductions is true for forest companies as it is for any other company – so that will continue to be a pressure point.

The growth in planted forests as a result of the direction that the Commonwealth, State and industry gave through the Plantations 2020 Vision, which is really about removing the impediments to forestry and to reforestation...I think that, combined with the ongoing negotiations through the Climate Change Convention and the Kyoto Protocol which are dealing with the whole question of green house gas emissions and carbon sequestration, has meant that it's bolstered the business of forestry.

And so that's what you see for example, when you go to forest conferences. Just in my short period in this job, increasingly at forest conferences I see people there in black pin-striped suits from finance companies and accounting firms as well as the guys who're running the sawmills or the pulp mills. And that's reflected in the growth in plantings – significant increases in plantings in the last few years – compared to five years back and that's been driven by prospectus companies as well as by restructuring of public agencies and so on.

So as far as I can see, and I say, how far out, well let's say five years for the moment and who knows what will happen about carbon sequestration and Kyoto protocols, but environmental concern internationally with global warming and measures to mitigate that warming and measures to address sequestration, it seems to me, will continue to be on the agenda irrespective of whether Kyoto Protocol as such gets up ... and you are also seeing in this country for example that concerns about salinity are driving people to think about

so-called salinity credits and salinity insurance so that tree planting to lower the water table, to address erosion and soil degradation and the like. So I can only see a future where forestry will be a very important part of the natural resource management agenda. I think you'll continue to see forestry interest from the point of view of forest and wood products.

There's a whole new area of what is being called ecological services which hasn't even been tapped yet, which will mean that forestry expertise and forests will continue to be an important part of the policy debate and programs that are introduced by governments. And so all of that leads me to believe, and of course that's not withstanding the fact that when you continue to see the growth in the use of paper, when you continue to see the preference that many people have for timber over other building materials, particularly in terms of the aesthetics, I can see a real future for value added timber operations – peeling, veneer plants – moving into that top end of the market whether it be for flooring or joinery and furniture and so on and so forth so all those traditional things - and we are also seeing, of course, increasing use of forests for non-forest wood products - the oils and the like. So I think all of that – if I can put it on the demand side – looks pretty rosy.

Now the supply side – what does that mean. I think that probably, if you went out and surveyed the general public – I don't know what they'd think. I think I said to you earlier, for my part I had no background dealing with foresters. I saw them as probably 'I'm a lumber jack and I'm O.K.' I mean I didn't really have an in-depth understanding of the training that goes on and the appreciation that a forester has to have, of a whole gamut of ecological information, water hydrology issues, the climate issues, soils, etc ecosystem management, you name it – I've been staggered at the sheer complexity of the work, if its done well and done properly, and the breadth of knowledge and understanding that we're looking for from foresters. So there's a job to be done in re-positioning and re-imagining foresters.

The other impression I have and I'd say would need to be part of the training and the understanding that a forester has, is that...and I can best illustrate it with an example: I went to a major meeting on regional forest agreements a week after I began in the job – a fairly difficult meeting – got heated and at one point we raised the question of social assessment which was something that this department has been sponsoring as part of the overall process – and a forester from a State agency just about went through the roof, and basically said about social assessment and community interests and all the rest of it: 'I have

forgotten more about these forests than these people will ever know. Why don't they just let me get on and do my job'.

And I thought in a nutshell that captured both the past and the challenge for the future because what he said was dead right. He knew those forests backward, he had a much better understanding – and as I say, if you re-image him, he's actually a person who understood and was concerned about the ecology and concerned about the animals and remnant vegetation etc etc. But from his point of view he was an expert – a professional expert whose judgement was being questioned and he was defensive about it.

And whether foresters like it or not, the community has taken an increasing interest in the forests - some of it's of passing interest and probably a bit shallow, as this forester would obviously feel, but in those regional communities where people are living; where they have got an interest in the aesthetics of the landscape, where they've got an interest in ecotourism, where they've got an interest in conservation; they've got an interest in just having general amenity access – you know the community has to be part of the process and the decision making and not in token way. I think we all know when we are being patronised and we all know when tokenism is being practised.

So that whole question of both maintaining that expertise and the professional integrity and at the same time, recognising that there is a community dimension that is fundamentally important are the things that are going to need to characterise and run through the training and the culture of forestry in the future...that's my sense.

You've talked about what foresters are and the fact that a lot of the community doesn't appreciate that. Do you think that employers are prepared to pay for foresters and the skills that they have, rather than more general resource management graduates? Do you think there's a perception in the forestry scene in Australia that foresters are the only ones who can do forestry jobs or do you think there's going to be competition with other more general resource graduates?

I'm probably not in a good position to answer that question for you. I think that specific companies who are harvesting or producing or building plantation estates will want that sort of technical expertise that a forester would bring but there might be jobs in environmental services whether it be the mining industries, whether it might be in

agricultural-related companies and others, who might think about a student who has general science.

I think that goes with the business of how the profession and the universities and those who are training graduates, project the image and sell a different picture. There's no doubt that the depth of knowledge and understanding, combined with a good, socio-cultural understanding of what's happening in the forests so that people recognise that there are a number of angles and a number of values for which forests are being managed, has to be part and parcel of that training and any kind of professional assessment.

If they can demonstrate they've a better technical base and an understanding of the other factors I would have thought that a forester would well, certainly not be passed over but if there's a sense in which well they're narrow and they're great at telling you how to grow the tree faster and how you can do that better but they'd rather have a fight than a feed, in terms of the public out there, then I think you are not going to be as attractive as an employee.

So you were talking about the future of forestry in Australia and you seemed to be painting a pretty buoyant picture.

Yes I think it is buoyant. The whole question of land management and the whole question of salinity management, our resource for the future... I think there's increasing understanding and concern about how we try to turn back the clock or at least address the problems that have been created by the last 200 years of European settlement. Now there's just absolutely no doubt that good forestry - particularly, you know, the programs we're running at the moment and through the NHT program in those low rainfall areas, marginal country, vulnerable country, how do you get it revegetated, how do you make it pay... and part of the trick for governments has to be, how do you make it commercially attractive so that you can get the sort of land management that's required without drawing on the public purse.

Because the other reality is, for all the noise that's made about the environment and the importance of the environment - I don't mean noise in a negative sense but I just mean all the publicity - if there's any hard polling done about what the top priorities are for government expenditure - health, education, police - those sort of things are always at the top of the list. Environment - my understanding of one poll in last NSW election - forests

and environment was way down below 10 in terms of the pecking order. In terms of order of priorities there were nine before it. So when you have a quick look at what discretionary spending is available to governments and you take out your health budget, you take out your social security budget you take out your education portion and in the Commonwealth's circumstances, you take out a defence component, the amount to play with is very little. And so for major revegetation projects for example the money is not going to be there, and arguably to be driven by governments may not be the best thing anyway. And so if you can run community programs or work with the land managers and give them an incentive. i.e. the growing of oil mallee in some of the marginal country in western Australia.

Or another one which I heard about yesterday, which is, I think, a very exciting project involving camphor laurel on the northern NSW coast and combining the sugar industry's need for biomass fuel and the forestry's interests in plantations and the community interest in getting rid of a noxious weed and the fourth component is the power company's interest in so-called green power and if you can put those four bits of the jigsaw together then you might actually have a self sustaining commercial program that can get rid of the noxious weed, provide a biomass fuel, provide a new timber source for maybe some furniture and other manufacture, help in terms of the economics of the sugar industry and provide the circumstance to allow you revegetate with productive plantations. So there are all sorts of things like that.

.....Discussion of which power company Peter Yuile meant

So yeah, I guess I am buoyant. There will be a lot more happening and people can see that tree growing provides all sorts of pluses, and for farmers, the whole thrust of the form forestry program about providing shelter belts, environmental positives for your farm and at the same time potentially providing you with an alternate income stream – I mean that sort of stuff makes sense.

People have expressed concern that while we may be going into plantations, we're pulling resources out of native forest management and therefore there may be a decline in jobs there unfortunately because there's not going to be money for the fire control, the weed control, the sort of money that was available when harvesting went on. And in fact you

mentioned right at the beginning of our interview that you saw increased investment. Was that from private or government sources?

There's been some government investment, there's no doubt about that but the bulk of investment driving the plantings at the moment is private sector. Although in a couple of States there's been a higher proportion of public money although that's being managed in conjunction with private companies so you don't get a repeat of some of the mistakes of the past. But no, it'll be private sector driven.

People have a right to be concerned about the resources available. I mean we put more forest into conservation reserve but then we get back to the question of is there money in the public purse to pay for that. And those budgets will continue to come under pressure and its going to become problematic. And I mean, people visiting National Parks may not mind paying a fee but I'm not quite sure what the cut off point is where people start to find that a net negative. And you could then have a discussion about multiple use forests and whether you're better off to have them being worked anyway in a way that gives you some of the disturbance that has perhaps been there as part of the natural processes but at the same time, conserve or takes account of the soil issues, the water catchment issues, the biodiversity/plant/animal issues but that's another story.

It is, and one as you say, that has already been decided at a government level.

Yes.

Do you think that debates over forest management over the last thirty years in Australia and overseas has had an impact on the public perception of forestry as a profession?

I think it would be hard to think otherwise than it would have. The thing that has struck me in this job, and again as I say, coming from a zero base, is that as I've met foresters around Australia and internationally, and this is purely my perception and I've got no kind of quantitative evidence or anything like that, and I certainly don't know how it actually has occurred – but it doesn't matter where the forester has come from or where they have trained – whether it be in Russia or in other parts of Europe, in north America, the sub-

continent or Australia – there's a sense of moral responsibility that runs through conversations and not in a preaching kind of sense but as you spend some time with people and maybe have a meal together and just talk some more generally, I'm always struck by that sense of responsibility for the environment and the resources that foresters have and I don't think that would be a general perception. And I'm sure there are exceptions to that as there are to every rule, but that's my impression.

The debate in this country and elsewhere has no doubt heightened the whole issue of environmental concern – it's been part and parcel of a general push of course in that regard, but I think it's unfortunately for the bulk of the public, it's a pretty shallow sort of understanding – they think 'all the trees are being cut down - we should stop cutting the trees down', without thinking through all the consequences of what that view might be – and you'd find a cohort of graduates probably from the 70s and 80s who went into environmental science for crusader-type reasons – to protect the environment and forests are a big part of that – and whether they've actually delivered in terms of later doing things which have contributed to real environmental development and advances I don't know.

Whereas when people think of foresters they think of cutting forests down – they don't automatically think of foresters being the ones who are concerned with the preservation, good management, conservation, future development of those forests to deliver on the values that the community is increasingly placing on those forests. So it's trying to reinvent the profession in terms of nomenclature and the image, and as I say, backed up by the kind of cultural shift which I suspect is happening and I don't know enough about it to be truthful – I haven't spoken with Ian Ferguson or Peter Kanowski or others who are involved in the training so I don't know enough about what's in the curricula and these things may be being covered but I think that training combined with that reinventing and the image of foresters in the community, you may have to think of a new name, I don't know, depending on what your survey work tells you.

You mean a new name for forestry?

Yes. You had that push in the 60s when everything got called a science. So government departments suddenly became political science departments because somehow that gave it an aura of respectability and quantitative rigour that wasn't there when it was called

government department or the social sciences as opposed to sociology. You know, I'm not saying that in our day and age, now its time to call it forestry science or something else.

Well they do at the University of Melbourne

Well that's understandable... I haven't thought a lot about it. There is an image issue – that would be my guess – and its one that is completely at odds with I observe to be the training, capacity, skills that people leave university with, and people have a sense of moral responsibility and a sense of applying their technical knowledge and their other knowledge in order to get good environmental outcomes and good resource and production outcomes and I don't believe the two are mutually exclusive.