Environmental Research Ethics

1998

ENVIRONMENTAL RESEARCH ETHICS

NATIONAL PRINCIPLES AND GUIDELINES FOR THE ETHICAL CONDUCT OF RESEARCH IN PROTECTED AND ENVIRONMENTALLY SENSITIVE AREAS

A Report by

THE AUSTRALIAN SCIENCE, TECHNOLOGY AND ENGINEERING COUNCIL

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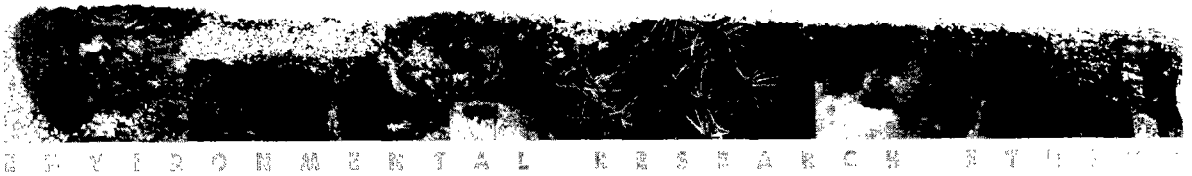


LETTER OF TRANSMITTAL

The Hon John Moore, MP
Minister for Industry, Science and Tourism
Parliament House
CANBERRA ACT 2600

Dear Minister

We have the honour of submitting to you a report: *Environmental Research Ethics: National Principles and Guidelines for the Ethical Conduct of Research in Protected and Environmentally Sensitive Areas.*

In this study, ASTEC has addressed an area of growing world importance: the need to ensure that research in environmentally sensitive areas takes into account ethical values in manipulating or affecting the environment, ecosystems and species it studies, and the interests of indigenous peoples with connections to the lands and seas.

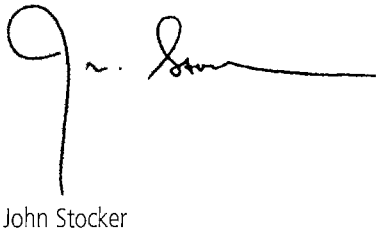
Many groups in the Australian community have been consulted during the conduct of this study. Australia is in a privileged position in having an indigenous population with close associations with the land, the environment and its species. Consultation with indigenous Australian representatives has been maintained throughout the study.

Other groups also have a clear and articulated interest in these matters. These include the animal welfare groups, the ethics community, ecologists and the environmental groups. The science community has a strong interest in the outcomes of the study. Perhaps key to the subsequent actions arising form this report, government management authorities have also been closely involved in the study. All these groups have been reflected in the membership of the Study Group that the Council set up to conduct the investigation. The views and interests of all these groups have been taken into account in preparing this report.

As part of the process of reaching its conclusions, ASTEC part-sponsored and participated in a Fenner Conference on the Environment at the Australian Academy of Science in November 1997. A draft of the ASTEC study report was considered in detail by the conference delegates, representing a broad range of members of the Australian community. Their comments and feedback then and since the conference have proven invaluable in developing this final report.

I commend the report to you as an example of Australia taking a leading role in an area that is of growing interest around the world.

Yours sincerely



John Stocker
Chairman
May 1998

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BACKGROUND TO THE STUDY

The Australian Science, Technology and Engineering Council (ASTEC) was established in 1978 to provide the Commonwealth Government with independent advice on a wide range of science and technology matters. The Council operates by conducting inquiries, gathering information, engaging consultants, appointing study groups and committees and producing reports.

In May 1997, ASTEC decided to conduct a study into Ethics and the Conduct of Research in Protected and Environmentally Sensitive Areas. This report is the outcome of that study.

The report proposes mechanisms for the assessment and approval of research projects, to ensure the research meets suitable ethical standards. The mechanisms have been developed after extensive consultation with regulatory bodies, the research community and other interested groups, so they are likely to provide a sound basis for implementing effective guidelines.

To direct the ASTEC study, an expert study group was established, including three members of the Council. Other members of the group were appointed to achieve a balanced representation from the various interest groups - indigenous peoples, environmental groups, the research community, regulatory authorities and agencies and environmental ethicists. The Chair, an ASTEC member, was intentionally chosen from an unrelated field of science to provide an independent perspective on what was likely to be a contentious debate.

In conducting the study, ASTEC sought advice from interested groups and organisations and the public. This was achieved through newspaper advertisements, direct approaches to interested parties, publication of the drafts of the report on the Internet.

A Fenner Conference on the Environment was held at the Australian Academy of Science in November 1997 to focus on these issues. A preliminary version of this report was considered by participants at that Conference. ASTEC acknowledges the significant contribution made by Conference participants to the development of these ethical guidelines and principles. The guidelines have been refined in the light of their comments, and those received from other organisations and contributors since the conference.

In the interest of achieving a common goal - one that all study group members agree is important - compromise has been necessary on some matters of content or expression. Consequently, this report may not reflect exactly the way each member would have chosen to present matters from their individual perspective.

ASTEC wishes to thank the members of the study group for their determination to achieve an outcome for a purpose they deemed to be important for Australia as a nation.

MEMBERSHIP OF THE ASTEC ETHICS STUDY GROUP

Dr Carolyn Mountford (University of Sydney, Chair, member, ASTEC)
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ACKNOWLEDGEMENTS

ASTEC would like particularly to thank the individuals who have assisted the study group in its deliberations:

Dr Denis Daly, CSIRO
Commissioner Ian Delaney, Aboriginal and Torres Strait Islander Commission
Dr Mary Edmunds, Australian Institute for Aboriginal and Torres Strait Islander Studies
Dr Deborah Edward, University of Sydney
Dr Laila Haglund, Australian Association of Consulting Archaeologists
Dr Gary Morgan, Australian Museum
Professor Margaret Rose, University of New South Wales
Dr Dermot Smyth, James Cook University
Dr Cindy Wong, National Health and Medical Research Council Secretariat
Mr Glen Woods, Southern Cross University

ASTEC also wishes to acknowledge the contributions of the participants at the 1997 Fenner Conference on the Environment, and all others who responded to ASTEC's requests for public input.

EXECUTIVE SUMMARY

As societal values have changed in recent decades, we have come to recognise the value of environmentally special areas. Many of these have been given formal protection under legislation. In the last few years, there has been some controversy over research that appears to jeopardise the environment in these areas through its own action.

This report examines the ethical principles behind these concerns. It looks at ways in which research may be assessed to identify any unethical impact on the environment. It suggests guidelines that may be used in appraising and regulating research in these areas. It proposes mechanisms that can be adopted to implement these guidelines.

In preparing the report, ASTEC has drawn on the views of a broad range of community groups to ensure that the mechanisms reflect the current community perceptions of ethics and the value of the environment.

The principles, guidelines and mechanisms presented here are intended as models for adoption by Commonwealth, State, Territory and/or Local governments, as appropriate, to ensure research carried out in such areas pays due heed to the need for ethical considerations. They are intended for application both in areas with formal legislative protection and in other areas of environmental importance that do not have formal protection.

The guidelines are intended to augment existing ethics guidelines relating to human and animal research, which do not readily extend to plants, ecosystems or cultural landscapes.

(See also the explanation of the origins and philosophy underlying the report and an outline of its structure in the Introduction and Rationale, following).

LIST OF RECOMMENDATIONS

To achieve the objectives set out in this report, ASTEC recommends that:

1. *These Guidelines be adopted by the Australian and New Zealand Environment and Conservation Council (ANZECC) as a basis for nationally consistent Commonwealth, State and Territory legislation;*

2. *Management agencies use an Environmental Research Ethics Advisory Committee (EREAC) or similar arrangement as the deliberative process to advise them on the ethical issues raised by specific research proposals;*

3. *Individual EREACs customise these Guidelines to meet their specialised needs; and*

4. *A national resource centre be developed to provide information on best scientific practice and distribute information on ethical issues relating to research.*

Detailed recommendations relating to aspects of the principles and guidelines are contained in the body of the report.

INTRODUCTION AND RATIONALE

1. JUSTIFICATION FOR THE STUDY

Australians are the custodians of a rich and extensive natural and cultural heritage. In some areas, this heritage is threatened with decline, mostly as a result of human activities. To maintain biological diversity and protect the integrity of our ecosystems, we have established extensive systems of terrestrial and marine protected areas. There is also increasing recognition of the need for conservation initiatives beyond these areas, in locales which may lay claim to being environmentally sensitive.

Research in protected and environmentally sensitive areas is a legitimate activity, and if we consider understanding these areas important, it is also a duty. The importance of such research is explicitly acknowledged in Australian legislation for protected areas, and in international conventions such as the World Heritage Convention and the Convention on Biological Diversity. Protected areas provide us with benchmarks for the measurement of environmental change and the rate of resource consumption. Several national policies, for example the National Strategy for the Conservation of Australia's Biodiversity, recognise the importance of research into protected and environmentally sensitive areas.

However, the responsibility to understand and study protected and environmentally sensitive areas must not take precedence over our primary obligation: to protect and care for them.

The guardianship implicit in our ethical responsibility to care for natural areas demands high standards of care and protection from harm. The powers of the guardian and their potential for abuse are great, so there must be public oversight of the guardian role.

A wide variety of research is carried out in protected and environmentally sensitive areas. Many field studies involve some degree of intervention by the researcher. Some of these activities, such as the collection and identification of specimens for laboratory examination, raise important ethical questions. Should specimens be taken? If so, how many specimens should be taken? Will they constitute a significant proportion of the population? Will collecting such specimens affect the population's viability?

One of the most poorly understood and contentious categories of field research is the conduct of manipulative experiments. Such experiments are now widely advocated by scientists as a means of directly comparing management options in multiple-use protected areas They help in resolving basic uncertainties about the response of managed ecological systems to human disturbance. For example, fishing is one of the multiple uses of the Great Barrier Reef Region. Individual reefs in this Region are being opened and closed to fishing in a controlled way to allow scientists to measure the effects of different fishing regimes on target fish populations and reef communities. (Not all community groups agree with the permitted multiple uses, but this is a matter for legislative debate.)

Although most countries have ethical guidelines for research involving human subjects and other sentient animals, ethical issues concerning field research have received much less attention, despite evidence of community concern. As a result of public controversies over issues such as the manipulative fisheries research in the Great Barrier Reef, ASTEC decided to undertake a study, with the aim of developing a framework of principles and guidelines to assist in the management of field research in protected and environmentally sensitive areas.

The different types of research carried out in protected and environmentally sensitive areas have differing impacts and raise a range of concerns. In many, and particularly the larger, protected areas there are research sites or research stations, which assist continuity and supervision of research. These Guidelines recognise such arrangements.

Most researchers studying protected and environmentally sensitive areas recognise their obligation to conduct research using best practice procedures in accordance with community values, including consultation with indigenous peoples. However, to date, both the researchers and the managers who process research permit applications have operated in the absence of agreed guidelines. This has limited the capacity of researchers and managers to respond constructively to public criticism of some research whilst directing research appropriately.

These National Guidelines aim to fill this vacuum by identifying the issues which should be addressed in establishing effective systems to address the ethical issue involved with research in protected and environmentally sensitive areas. The Guidelines aim to provide a framework which can be adapted by federal, state, territory and local governments responsible for protected and environmentally sensitive areas to:

- promote the conduct of excellent research in the areas under their jurisdiction;
- ensure the benefits of such research to natural or other values outweighs any resultant damage; and
- enable the public to be confident that the research is conducted in a manner which accords with community values.

2. PROTECTED AREAS IN AUSTRALIA

Nature conservation is a multiple land use. Many essential services are provided by species diversity and healthy

ecosystems. These include the regulation of water cycles, the protection of catchments, the provision of clean water, the breakdown of pollutants, nutrient cycling, maintenance of soil fertility, and regulation of climatic systems. There are a number of productive and consumptive uses of protected areas such as recreation, tourism, education, research, and the habitat protection of commercially valuable species.

The principal aim of environmentally protected areas is to maintain biological diversity and protect ecological integrity. This may also include the protection of geophysically unique features. The use of protected areas for scientific research is a human use that must be considered relative to other human (instrumental) and non-human (intrinsic) uses. One of the roles of protected areas in science is the provision of benchmarks for such purposes as the measurement of environmental attributes or the rate of resource consumption.

The definition of protected area generally accepted in Australia is:

> An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.' (IUCN 1994) [1]

The IUCN has identified six categories of protected areas, based on management objectives. In presenting this system, the IUCN's World Commission on Protected Areas identified nine potential management objectives linked to the six categories. It is worth noting that one of the activities identified as a legitimate use of most area categories is research. (The reader is referred to the IUCN paper for further details).

It must be conceded also that of the possible legitimate uses of a protected area, research may have the least impact. The impacts of other uses such as tourism or fisheries are beyond the scope of this document. There is, however, a need to address the ethical pursuit of these other uses in protected areas.

In Australia, protected areas include state reserves, national parks, wilderness reserves, marine parks, and World Heritage Areas. Thus protected areas include areas reserved for the protection of nature and in which other uses are tightly regulated, and multiple use areas in which a wide range of 'reasonable uses' is permitted. Some environmentally sensitive areas are part of this protected area system, others are not currently represented in the system. Of the 92 percent of Australia's land mass not in protected areas, many ecosystems such as wetlands, arid lands or seagrass beds are regarded as 'environmentally sensitive' due to their potential for influence by human intervention or disturbance, or because they comprise habitat for rare or endangered species.

As of June 1997, Australia had approximately 58.6 million hectares of terrestrial protected areas, or about 7.6% of the Australian mainland, and approximately 38.9 million hectares of marine protected areas, or approximately 3.5% of the Exclusive Economic Zone. There are 5,793 protected areas in Australia, more than 97% of which are in terrestrial environments with the remainder marine. A complication of our approach to establishing and managing protected areas is that many different categories of protected areas are used. At present there are 47 different designations of terrestrial protected area, and 11 different designations of marine protected area. These are listed in Attachment 8.

There are nine separate protected area systems in Australia, one in each of the six States and two self-governing Territories, and a Commonwealth system. Areas

[1] International Union for the Conservation of Nature, now the World Conservation Union

may be designated and managed as protected or environmentally significant under Commonwealth, State or Local Government legislation. In addition, owners of private lands may elect to manage them as environmentally sensitive areas. With such a variety of jurisdictions responsible for managing nearly 60 different types of protected areas, there is a range of statutory frameworks to examine when planning and conducting scientific research. The potential use and conduct of research in a particular protected area needs to be considered in the context of the objectives and management purposes of that area, which are specified in the relevant legislation, zoning, or management plan.

The general framework for designation and management of protected areas is provided by the IUCN Guidelines (1994), Natural Heritage Charter (Australian Heritage Commission in Association with IUCN) (1996); for marine areas by the IUCN Marine Protected Area Guidelines (1991) and for cultural heritage by the Burra Charter (Australia ICOMOS) (1992). Scientific research is among the main purposes of management of protected areas defined by IUCN, along with:

- preservation of species diversity and genetic diversity;
- sustainable use of resources from natural ecosystems; and
- maintenance of cultural and traditional attributes.

It follows that agencies responsible for the management of protected and environmentally sensitive areas have a number of responsibilities in relation to research which they should discharge on behalf of the government body or community which establishes them.

- **The first** is commissioning, conducting or facilitating research which establishes, underpins and develops appropriate arrangements for management to achieve the objectives of the protected or environmentally sensitive area.

- **The second** is commissioning, conducting or facilitating monitoring and research which enables the agency to report objectively on the effectiveness with which the management objectives are achieved and to develop and evaluate alternative management approaches.

- **The third** is establishing and operating an efficient system for managing research in the protected area in order to ensure that:

  - its natural, cultural and traditional attributes are not damaged or compromised;

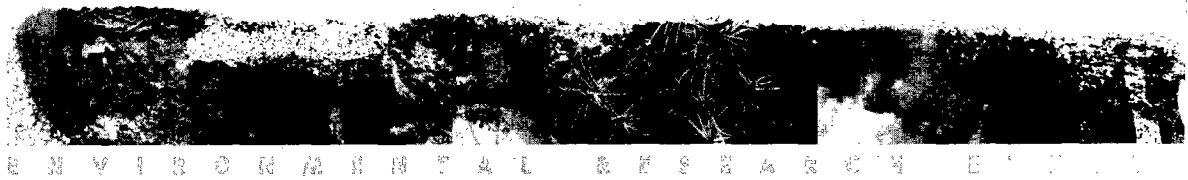
  - the results and implications of the research are quickly known and appropriately reflected in management practices; and

  - the research commissioned by, conducted for, or facilitated by the management agency conforms to best practice standards.

These Guidelines focus mainly on aspects of the third responsibility - management of the ethical aspects of research. They are intended to establish a framework to assist researchers, managers and the broader community to decide on reasonable conditions for granting or refusing permission to conduct research in protected or environmentally sensitive areas. However, they also apply to research commissioned or conducted by the agency itself, in support of its management responsibilities.

3. AN ETHICAL FRAMEWORK

In the context of this study, ethics is about determining what is appropriate and inappropriate behaviour. Thus,



environmental ethics is about judging behaviour towards the environment. Determining standards for this behaviour cannot be achieved solely by scientific and technical measures. Environmental issues are highly complex and based on considerations that extend beyond the realms of science.

Although science provides a base from which to start, it is not the only place to seek a strategic assessment of policies to address the issues. It is not the sole prerogative of science to convert knowledge into wisdom and dictate priorities. What is also needed is an appreciation of the environment and ecological relationships in ways that reflect ethical standards rather than rating their value in purely quantitative terms.

As the Australian historian of ideas and ex-member of ASTEC, John Passmore[2] , points out,

> Ecological problems are social problems, not scientific problems; to solve them satisfactorily is, in most instances, to be faced by a sub-set of problems: scientific, technological, economic, moral, political, administrative and that any proposed solution, to be satisfactory, to be 'operational' must take into account, on a wider scale than has normally been attempted, the costs and the benefits resulting from the use of that, or another, method of control.

For most Australians, the growing appreciation of environmental ethics reflects deep changes in our view of the environment, our connections with the environment, and our immersion in and interconnectedness to our environments. This transition requires more than an increase in scientific knowledge, more than a change in the rate at which we consume resources, and more than a change in the techniques by which we consume them. It requires a re-evaluation of the benefits we ask from our environment, in how much we feel justified in asking for, and in the relative values we assign to the various benefits we seek. We require a re-evaluation of ethics to guide our interactions with our environment as well as our interactions with each other.

Trying to answer such philosophical questions does not, of course, in itself solve any environmental problems. However, it is questionable whether we can solve these problems without discussing them on a philosophical level. Whether we discuss them or not, we have ideas and conceptions which guide our way of thinking, what we see as a problem, what we see as causes of problems and what we see as possible, desirable or necessary solutions.

4. A CULTURAL FRAMEWORK

The Cultural Landscapes Concept

Many approaches to environmental ethics concentrate on the sensitivity of ecosystems, on matters relating to flora, fauna and values sometimes termed "wilderness". There is a risk that little attention will be paid to the "cultural landscapes" aspect. The concept needs to be borne in mind in any ethics considerations in environmentally directed research.

Given that indigenous populations have been present in Australia for at least 60,000 years and possibly twice that time, and have probably lived in or moved across all of Australia, it is commonly accepted that the continent comprises a series of cultural landscapes, shaped to some extent by the activities of past generations or by deliberate restraint (eg decisions to burn or not burn certain areas).

During the last two centuries the activities of additional populations have had considerable and varied impact on some of these landscapes, sometimes obliterating former

[2] See references.

features, sometimes adding to them, often resulting in palimpsests[3] which with careful analysis can inform us about Australia's history.

Researchers who are not involved in cultural heritage management need to be aware that some groups of non-indigenous origin, including Europeans, Chinese, Afghans, Kanakas, have been in Australia for some time and were often active in marginal areas where traces of their past may survive. Present populations (even if no longer living in the locality) may take considerable interest in them.

These traces may be faint and go unobserved except by those who know what to look for. Examples include evidence of early mining ventures, cedar getters, crofts, road and rail systems, and deserted townships. Such features may survive in marginal areas and within sensitive ecosystems. Wilderness advocates may dismiss them as interference with nature, but they form part of the history of human interaction with nature. As such, they need to be taken into account in the evaluation of the impact of research from an ethical perspective.

Another example that illustrates the importance of the cultural landscape is the case of shipwrecks. These can provide valuable information on the history of Australian settlement, but they can also provide a benchmarks for the study of the growth rates and colonisation of marine organisms. Studies which explore them from the latter viewpoint must not damage the site from the former perspective.

5. PERSPECTIVES OF VARIOUS INTEREST GROUPS

The expert Study Group established by ASTEC to conduct this study comprised conservationists, environmental managers, ethicists, indigenous representatives and scientists. Every member of the Group brought different perspectives and values to the study. We have included a summary of the positions of the major interest groups to provide a background to the complexity of the issues that the Study Group had to address. A more comprehensive account of the views of these groups is at Attachments 1, 6 and 7. The following perspectives represent input from members of the Study Group along with contributions from individuals who responded to ASTEC's call for submissions.

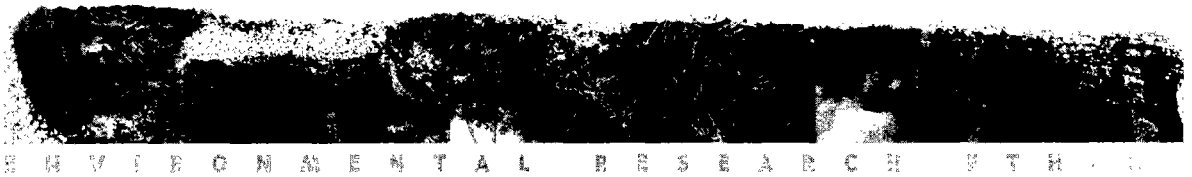
Aboriginals and Torres Strait Islanders

Aboriginal and Torres Strait Islander peoples assert the right to be involved in all activities conducted in protected and environmentally sensitive areas, including research. This stems from their close association and kinship over countless generations with the land and sea in those protected areas. It is the biodiversity they have helped to shape that governments now seek to understand and conserve.

Aboriginal and Torres Strait Islander peoples have a deep understanding of the environments in protected areas. Traditional ecological knowledge, once spurned by academics as anecdotal, is now sought by researchers to assist in understanding ecological processes. Indigenous Australians are suspicious of researchers because, in the past, some researchers have taken knowledge without permission and not returned any benefits to the communities. Research has also been used to the disadvantage of Aboriginal and Torres Strait Islander peoples.

This document sets out principles to guide researchers and seeks to ensure that the interests of Indigenous Australians are protected during research activities in protected and environmentally sensitive areas. Considerations for taking proper account of indigenous peoples' needs and participation are discussed in Section 1.2 and in Attachments 1 and 2.

[3] See glossary definition.



Animal Welfare

Community concern for the welfare of animals needs to be reflected in any consideration of the use of protected areas or environmentally sensitive areas for research. Activities which directly or indirectly impact on animals or animal communities within these areas must take into account the risks or negative impacts the activity may have on the welfare of these animals. Activities which directly affect animals may include observation, recording, surveying, collecting and manipulating animal populations. Indirect effects may occur with pressure on these animals from habitat manipulation and any increase in human activity within these areas. The need here is to ensure that the welfare of all species of animal is considered and that all forms of suffering, harm, cruelty and neglect that might be generated through research activities are avoided.

Community Conservation Movement

The community conservation movement represents the public interest in environmental protection, ecologically sustainable development, and the equitable allocation of rights to use resources sustainably. In the process of developing these principles, the conservation movement has sought to ensure that:

- research activities do not compromise the purpose and integrity of protected areas;
- the survival of rare and endangered species or habitats is not undermined by research activities;
- research is acknowledged as one of a range of human and non-human uses of protected areas;
- the link between research and management is recognised;
- the need for a strong, consistent national system of environmental standards for protected areas is reinforced; and
- public access to information and opportunities for community participation are guaranteed.

Government Agencies

Government agencies recognise the need to clarify issues arising through the management or conduct of research in protected and environmentally sensitive areas. These issues can raise complex ethical, social, cultural and technical considerations. Considerable flexibility in the appropriate procedures is required in view of the range of scales and nature of protected or environmentally sensitive areas and the range and complexity of the associated jurisdictional arrangements. Government agencies recognise the need for National Guidelines to identify and clarify the issues which should be considered and addressed in establishing an effective system. Government agencies want this to be achieved in a way which maximises the opportunities to develop and implement effective solutions for particular sets of circumstances by relevant national, state, territory and local governments.

Research scientists and students

Research is one of the more important uses of protected and environmentally sensitive areas. Most field research leaves little or no perceptible evidence in the landscape. However, some questions that need scientific investigation for management or interpretative purposes can be addressed only by the manipulation of natural systems in carefully designed experiments. While some such manipulative experiments damage natural systems to some degree, the potential benefits from the knowledge gained from them usually far outweigh the harm. The harm can and must be minimised by undertaking experiments in the

smallest possible areas consistent with statistical requirements, which usually represent a tiny proportion of the total area of the ecosystem under study. Carefully designed experimental manipulations are far less perturbing than many other legitimate human uses of an area and natural events such as cyclones, floods and fires.

Scientists have been a major force in improving the reservation and management of natural ecosystems in Australia. Most scientists who work in protected areas are very reluctant to damage natural systems, because their motivation for working in these areas is a desire to assist the conservation of nature. Nevertheless, there have been occasional instances of manipulative experiments in natural systems that most scientists, managers and members of the public would agree are unethical.

Most researchers who conduct manipulative experiments in protected and environmentally sensitive areas are likely to welcome the development of these Guidelines. However, they will not embrace procedures that divert a substantial part of their scarce time from the socially and environmentally beneficial activity of their research. Natural science funding, and especially research funding directed towards the gaining of knowledge for its own sake, or towards the maintenance of natural values, is going through difficult times in Australia today. Thus, loss of research time will be to the net detriment of protected and environmentally sensitive areas.

Scientists regard the clarification provided by these National Guidelines as important. Much scientific research in natural areas is undertaken by honours and postgraduate students, who have timelines that do not permit either protracted approval processes, or truncation of their work in progress. Strong guidelines and time-efficient approval processes will allow such students, and other scientists, to develop projects which are likely to gain approval and can be administered within a reasonable time frame.

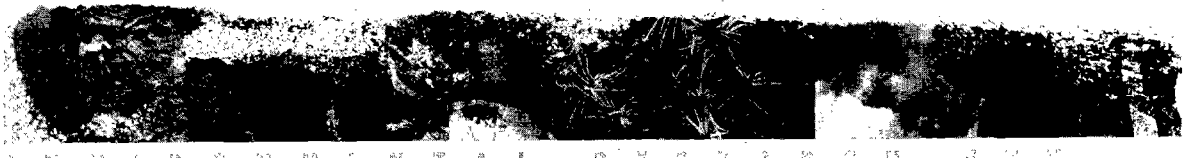
6. THE PURPOSE OF THIS DOCUMENT

This document provides National Guidelines for the assessment and ethical practice of research in environmentally sensitive areas and outlines the responsibilities of management agencies and researchers. Researchers are considered both as principal investigators conducting field studies, senior research managers responsible for research staff who undertake the field work, and the field workers themselves. Research is taken to include the supervision of research students.

These Guidelines are not intended to generate a substantial increase in the bureaucracy required to obtain permits to conduct research in protected areas. The experience of the Great Barrier Reef Marine Park Authority (GBRMPA) in 1997 indicated that less than 5 per cent of research permit applications would require referral to a deliberative process such as an Environmental Research Ethics Advisory Committee using the indicative criteria for referral listed in this report. The remainder would be dealt with through the normal permitting process. To avoid a large number of research projects being unnecessarily subjected to scrutiny, procedures need to be implemented to differentiate between low impact projects and those with evident ethical implications concerning their impact. This is discussed in more detail later in this report (see Appendix 3).

Following the main chapters of the report are four appendices to expand on the ideas in the report body. These are an integral part of the recommendations of the report. They cover:

- indicative criteria for referral of research to an Environmental Research Ethics Advisory Committee (Appendix 1);



- guidelines to be considered when assessing research proposals (Appendix 2);

- guidelines for the operation of Environmental Research Ethics Advisory Committees (Appendix 3); and

- a model approval process (Appendix 4).

Seven attachments are included with this report to expand on the points covered in the main text. Attachments 1, 6, and 7 have been prepared by the ASTEC Study Group members, in consultation with the particular groups whose interests they share. The statements are not intended as definitive or permanent statements of the positions of those groups, but rather to place on record matters of concern to those groups, in the context of a document to be considered by regulatory authorities.

The remaining attachments provide additional information discussing types of research, approaches to interacting with Indigenous Australians, and principles and a discussion on the ethics concepts underlying this report.

The attachments are as follows.

- A statement of concerns expressed by Indigenous Australians is provided in Attachment 1. (The main principles are presented in Section 1.2.)

- An approach to assist researchers in cooperating with Aboriginal and Torres Strait Islander groups in the conduct of research are provided in Attachment 2.

- An analysis of the types of research likely to be conducted in environmentally sensitive areas is provided in Attachment 3.

- The study has also been approached from the viewpoint of the general discipline of ethics. Draft Ethical Principles are included at Attachment 4, and a commentary on the need for an ethical approach at Attachment 5.

- Background to the interests expressed by Animal Welfare groups is provided at Attachment 6.

- A comment from the researcher's perspective is at Attachment 7.

Finally, a reference list of the protected areas in Australia and relevant legislation is given in Attachment 8.

ASTEC acknowledges that this is a living document which will require regular revision to ensure its recommendations remain effective and continue to be relevant in a climate of changing community values. Such revisions are an essential and continuing interactive process between managers of protected and environmentally sensitive areas, researchers, governments and the community. Just as ethical guidelines for experimentation using human subjects or animals have continued to evolve, guidelines for research in protected and environmentally sensitive areas will also change with time. This document provides a basis to guide the current conduct of ethical research in such areas and a framework for the future.

1. PRINCIPLES FOR THE ASSESSMENT AND PRACTICE OF RESEARCH IN PROTECTED AND ENVIRONMENTALLY SENSITIVE AREAS

BASIS

Environmentally sensitive and protected areas provide benchmarks for research. Research in turn provides information for the conservation, management and understanding of these areas. It is important to sustain this interdependent relationship between protected areas and science. At the same time, we must acknowledge community values and the need for the research approval process to be efficient and transparent.

An efficient system of research control and monitoring requires clear objectives, guidelines and criteria. It also requires clear definition of the information on which the decision to grant a research permit is to be based.

This section sets out principles that might be adopted for the assessment and practice of research in sensitive and protected areas.

1.0 CONSERVATION PRINCIPLES

Goal

Excellent research in protected and environmentally sensitive areas, where the benefits to natural and/or cultural values outweigh any resultant damage.

Strategies

To achieve this goal, researchers should use procedures

that will achieve the intended outcomes of their research and:

- accord with the Precautionary Principle[4], and Australia's international obligations under environmental conventions[5], and with national policy instruments[6];
- pay particular heed to the protection and well-being of rare and endangered animal and plant species;
- are compatible with the management purposes of the area in which the research is conducted;
- are reasonably expected to lead to outcomes that are compatible with the management purposes of the area;
- do not compromise the long-term viability of populations, species and ecosystems: introduced species may be an exception;
- whenever possible, do no harm to individual organisms, even if the alternatives are costlier, and more time consuming: this is particularly important in the case of rare and endangered species;
- ensure that the welfare of populations, species or ecosystems is paramount in the event of conflict with research activities in the area;
- in respect of sentient[7] animal species, use humane practices which are approved by an Animal Ethics Committee;[8]
- pay due attention to the cultural values of the landscape, from both an indigenous perspective and that stemming from the activities of more recent settlers; and
- are in accordance with current reasonable perceptions of the social values of the wider community.

1.1 TRANSPARENCY PRINCIPLES

Goal

A public confident that research in protected and environmentally sensitive areas is conducted in a manner which accords with their values.

Strategies

The NHMRC/AVCC Guidelines on Research Practice and Research Misconduct contain a wide range of principles which should be adopted. In order to achieve this goal, and consistent with the NHMRC/AVCC Guidelines, researchers should:

- consider community values in evaluating proposals for research in protected areas;
- enable the public to obtain information on what is being considered for approval by providing a short, plain English summary, for example on the World Wide Web and in hard copy where this is not accessible;
- identify in the summary how the research proposal will impact on the interests of legitimate users of the area;

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4 See glossary definition.

5 *eg* the Convention on Biological Diversity, the World Heritage Convention, and the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention).

6 such as the National Strategy for Ecologically Sustainable Development and the National Strategy for the Conservation of Australia's Biological Diversity.

7 See glossary definition.

8 The Australian Code of Practice for the Care and Use of Animals for Scientific Purposes, 1997, should be followed.

- make reasonable attempts, through bodies such as Land Councils and the Native Title Tribunal, to contact, inform and involve Indigenous Australians with connections to the proposed study sites: these peoples should be informed at all stages of the research and provided with opportunities to be involved with the research[9];

- clearly identify the degree of social and environmental risk associated with the research project together with the assumptions made in the assessment of risk;

- specify the proposed use or potential values of research results;

- establish ownership or research outcomes, intellectual property and accrual of benefits, such as royalties, prior to approval;

- lodge taxonomic materials collected in protected or sensitive areas in relevant state or national institutions; and

- personally subscribe to a code of ethics that clearly defines their responsibilities, which would include clauses specifying Duty of Care, Minimal Impact/Beneficial Impact and Duty of Information: a national code might be promulgated for such a purpose.

1.2 PRINCIPLES PARTICULARLY RELEVANT TO ABORIGINAL AND TORRES STRAIT ISLANDER PEOPLES' CONCERNS

(see also Attachments 1, 2)

Goal

Indigenous Australians confident that research in protected and environmentally sensitive areas:

- respects their values and customary obligations;

- benefits and empowers traditional owners[10];

- respects their need for self determination;

- acknowledges their association with and rights to and in their traditional environments (lands/seas) including the natural and cultural resources therein;

- protects their right to own and control their knowledge and intellectual property; and

- protects their right to receive the full protection afforded them by relevant international instruments ratified by the Australian Government.

Strategies

Researchers must:

- negotiate all aspects of research with traditional owners of protected areas. (Here, the Management Agency may have information or existing mechanisms set up to assist, and the researcher should explore these opportunities and seek the advice of the Management Agency);

- obtain the informed consent[10] of traditional owners before beginning or continuing any research in protected areas;

- disclose to traditional owners all aspects of the research proposal including the objectives and methodology as well as how the results might be used and who will benefit;

[9] Management Agencies have a key role in facilitating this.

[10] See glossary definition.

- conduct themselves with respect and utmost good faith, where they have access to indigenous knowledge;

- acknowledge Aboriginal and Torres Strait Islanders' right to control any use of their knowledge or intellectual property by the researcher; their entitlement to fair remuneration for the use of their knowledge; and their right to exclude from publication and/or keep confidential any of their intellectual property;

- acknowledge Aboriginal and Torres Strait Islander peoples' right to share in any profits derived from the use of their knowledge in the development and subsequent sale of bioproducts or publications;

- make all reasonable endeavours to provide opportunities in education and training for Aboriginal and Torres Strait Islander people, where they use indigenous knowledge for science and humanity;

- provide Aboriginal and Torres Strait Islander people with the opportunity to participate actively in all phases of research from inception to completion, including management decisions;

- acknowledge the traditional owners of the protected areas in any publication of the research results;

- make available research results to the relevant communities;

- ensure that their activities have minimum impact on the Indigenous Australian peoples and their local communities;

- assist Aboriginal and Torres Strait Islander peoples to protect and enhance their relationship with the environment in order to maintain cultural values and biological diversity; and

- acknowledge the right of Aboriginal and Torres Strait Islander peoples to compensation for any adverse impacts on them as a result of research.[11]

1.3 PRINCIPLES RELATING TO THE ROLE OF GOVERNMENTS

Goal

Federal, State, Territory and Local governments taking responsibility for ethical research in the protected and environmentally sensitive areas under their jurisdiction in the interests of:

- Australia's biodiversity;

- Australia's international environmental obligations; and

- the public.

Strategies

To achieve this goal, in relation to research in protected and environmentally sensitive areas, governments should:

- oversee the application of ethical research practices in a nationally consistent manner;

- oversee the application of ethical research practices in a manner consistent with Australia's obligations arising from relevant national and international agreements;

- federally, provide leadership and coordinate the development of a national compendium of consistent and effective research guidelines in conjunction with the

[11] This is a complex matter that needs careful exploration by implementing authorities.

regional and/or state management agencies;

- support management agencies and facilitate information flows to promote awareness and implementation of these guidelines;

- instigate regular reviews of these guidelines to take into account experience of their implementation and relevant international experience;

- define the accountability and responsibilities of persons authorised to the approve research permits of funding agencies, researchers and other participants;

- ensure that research activities do not result in any downgrading of the level of protection afforded by zoning, management plans or legislation, either through their own adverse impacts or by justifying less strict application of protection measures;

- instigate regular audits to determine if the research conducted in protected areas has resulted in or contributed to management decisions for that protected area (where this is relevant);[12]

- encourage educational institutions to teach scientific ethics and to promote these guidelines;

- encourage research agencies and industry to develop codes of ethics for research in protected and sensitive areas;

- adopt a nationally consistent framework of principles and guidelines for ethical research practice across federal, state and territory jurisdictions: such a framework should be enshrined in appropriate legislation; and

- where research funding is provided, ensure that research grant approval is made conditional on ethical considerations being given due consideration in the research proposal.

In respect of Indigenous Australians, Governments should:

- raise the overall awareness of researchers, research institutions, management agencies and the public to the connection between Indigenous Australians and the Australian environment and its biodiversity, and their special place in its management;

- assist Indigenous Australians to protect their culture, knowledge and intellectual property;

- encourage the flow of benefits from the use of indigenous knowledge to Indigenous Australians; and

- encourage Indigenous Australians to build the capacity to conduct research themselves or in collaboration with others.

1.4 ADMINISTRATIVE PRINCIPLES

Goal

Researchers and managers confident that the issues of research ethics and management are addressed fairly and efficiently.

Strategies

To achieve this goal, a permit system should:

- ensure the best available ethical scientific practice is applied;

[12] A register of all research permitted in protected areas should be maintained, preferably by the appropriate Management Agency, and open to the public. The register should assist the public to access the results of research, where appropriate. The merits of a national clearinghouse for such information should be considered.

- guarantee confidentiality of applications and intellectual property. The proposal should not be made public without the consent of the researcher; and

- provide a review and appeal process.

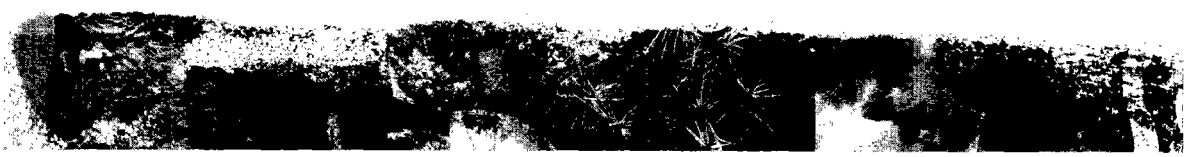
1.5 GUIDING MAXIMS

The overriding principle is the Precautionary Principle[13].

Encapsulated in these principles is the need for scientific activities in protected and environmentally sensitive areas to explore the opportunities for:

Movement of the research, either away from the protected or environmentally sensitive area, or to the use of non-invasive techniques such as computer modelling;
Minimisation of procedures carried out, while ensuring the research has the required statistical power;
Modification of experimental activities to reduce impact on the area; and
Maximisation of the use and benefits of the research results.

[13] See glossary definition



2. RESPONSIBILITIES OF MANAGEMENT AGENCIES

This section addresses public sector agencies, but the same principles can be applied to the private sector. Private sector organisations involved in conducting research of the type dealt with in this report should consider how best to oversee research conducted by their staff to ensure appropriate ethical standards are maintained.

2.0 MANAGEMENT AGENCIES

Management agencies are the federal, state, territory, local government or statutory authorities with responsibility for management of protected areas. They have the power to authorise access to areas or permit the conduct of certain activities in these areas. They are responsible not only for managing the areas, but for managing them in an ethical manner. This task includes raising the awareness of ethical research practices, establishing ethical research guidelines and mechanisms to assess the ethical aspects of research proposed in protected and sensitive areas.

It is important to note that Management Agencies usually undertake their own research in support of their responsibilities for managing protected areas. Such research must be subject to the same ethical considerations and review as that conducted by researchers from other organisations.

2.1 RAISING THE AWARENESS OF ETHICAL RESEARCH PRACTICES

Each management agency with legislative responsibility for protected and environmentally sensitive areas must take responsibility for raising public and researcher awareness of all the issues associated with ethical research practices.

2.2 ESTABLISHING ETHICAL RESEARCH GUIDELINES

Each management agency should adapt current guidelines or develop a set of ethical research guidelines meeting local requirements for researchers seeking to conduct research in protected and environmentally sensitive areas. Development, implementation and oversight of ethical guidelines could be through an Environmental Research Ethics Advisory Committee or other deliberative process. These should include guidelines addressing the need to protect and conserve the cultural heritage of both non-indigenous and indigenous Australians.

The advisory committee would also be responsible for making decisions on the permitting and conduct of research.

2.3 ENSURING ANY DELIBERATIVE PROCESS CONSIDERS ETHICAL ISSUES

Each management agency should ensure that ethical issues are considered in the assessment of a research proposal for the area. A range of deliberative processes may be adopted. The purpose of the deliberative process is to provide a formal mechanism for advising the relevant agency whether the research proposed constitutes reasonable use of the area and is in accordance with Precautionary Principle and the maxims of Movement, Minimisation, Modification and Maximisation. Indicative criteria for referral of a research proposal to a deliberative process on ethical considerations are at Appendix 1, and assessment guidelines which could guide a deliberative process are at Appendix 2. This report suggests referral to a special committee, which it terms an Environmental Research Ethics Advisory Committee (EREAC), as the most appropriate process in most cases, though it acknowledges alternative processes could be used. Accordingly, suggested guidelines for the operation of EREACs are provided as Appendix 3.

If the EREAC is the chosen deliberative process, the management agency should either:

- formally access external EREACs with the expertise required to address the issues raised in this document, or
- establish, in consultation with their day-to-day managers, EREAC(s) directly responsible to the governing body of the agency or its delegate(s).

The form of deliberative process

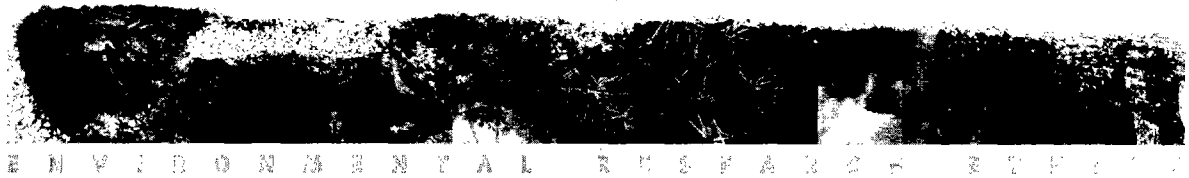
The form of deliberative process will differ in response to the nature and scale of the protected or sensitive area in question. For highly protected areas such as terrestrial national parks and certain areas of marine parks, it is likely that referral of most proposals will be appropriate. For multiple use protected or sensitive areas it is likely that a system with general oversight and provisions which identifies and refers critical applications will be more appropriate.

The key to the proposed process is that it is a means of providing formal and independent advice to the appropriate Minister, CEO or delegated decision maker under the legislation or agreement which addresses management of the protected or environmentally sensitive area.

The operation of such a system should provide means for:

- appeal against, or review of, a decision, or
- for the decision maker to act contrary to advice but with the requirement to provide a statement of reasons for rejecting the advice.

The arrangement must be sufficiently open for there to be general confidence that scrutiny is effective and properly



conducted, and sufficiently efficient that the process of evaluation does not become burdensome and unnecessarily time-consuming for researchers or managers.

Elements which all agencies should address include the following.

- Published or publicly accessible material concerning applications for research permits. This should consist of a short, plain English statement, outlining the purpose, conduct and operational setting of the proposed research.

- Criteria which identify the information which researchers should provide in order for a proposal to be properly considered.

- Criteria covering matters which a decision maker should have regard to in making a decision.

- Published or publicly accessible listing of permits granted with a plain English description of each.

- Published or publicly accessible listing of research publications or accessible data arising from research.

- Published or publicly accessible reports of the progress or outcomes of permitted research.

- Procedures for review or reconsideration of a decision in response to a permit application.

2.4 FACILITATING CONSULTATION WITH INDIGENOUS AUSTRALIANS

The management agency should establish and maintain a record of understanding with the traditional owners[14] of the protected area and should facilitate or conduct all necessary consultation between researchers and traditional owners.

[14] See glossary definition.

3. RESPONSIBILITIES OF RESEARCHERS

Note: In organisations where responsibilities for decisions on conducting research programs are not taken by the person(s) collecting the data or undertaking the field work, the responsibilities of the researcher as described in this report also apply to the research manager(s). Likewise, the supervisor of a research student is also included in the term "researcher" for the purposes of these discussions.

This section, like the previous section, tends to focus on public sector funded research, but the same principles should apply to research conducted by private sector researchers, where there is no specific government regulation in place. Private sector organisations involved in conducting research of the type dealt with in this report should consider how best to oversee research conducted by their staff to ensure appropriate ethical standards are maintained.

3.1 GENERAL

The NHMRC/AVCC Guidelines on Research Practice and Research Misconduct contain a wide range of principles which should be adopted. Principles of particular importance to this topic are incorporated below.

- Researchers[15] are responsible for the ethical conduct and standard of field and analytical procedures of all persons involved in the study. They should ensure that the extent of supervision is compatible with the level of competence of each person and the responsibilities they are given.

- Researchers should consult other persons with knowledge of and responsibilities for the study site.

[15] See glossary definition.

- Before any research activity involving the area begins, researchers should submit a proposal to a relevant management agency which demonstrates that the activity will comply with the conditions of these guidelines and relevant legislation.

- Permits should be retained in a formal records management system in the researcher's agency.

- Researchers should inform themselves of relevant legislation and procedures and must not begin a scientific activity in the area before obtaining any necessary permits or authorisations.

- Researchers should ensure that satisfactory arrange ments are made for contacting responsible persons in the event of unexpected consequences with risks of detrimental impact which affect or involve their field experiments.

- The researcher should promptly notify the management agency of any unexpected or adverse effects which occur during the period of the approved project and which impact on the area.

- Researchers should inform the management agency when an approved project is completed or discontinued.

Researchers should also note that the Australian Code of Practice for the Care and Use of Animals for Scientific Purposes (1997) may apply to research projects likely to impact, directly or indirectly, on fauna in protected and environmentally sensitive areas. Therefore, where relevant, approval must be sought from the appropriate animal ethics committee prior to application to the management agency for approval for a research project.

3.2 PLANNING PROJECTS

In the application to the management agency, the researcher should address the following questions.

- Is the project justified ethically and scientifically; does it satisfy the Precautionary Principle[16] and the maxims of Movement, Minimisation, Modification and Maximisation?

- Has the most appropriate area been selected?

- Can the aims be achieved without accessing the area?

- Is the biological status of the area and the environmental conditions (including weather, time of day/night, time of year) appropriate?

- Are suitable facilities and competent staff available?

- Have all staff concerned with the project been informed of the planned experimental and other procedures?

- Are the studies designed so that statistically valid research results can be obtained and/or the educational objectives achieved, with the minimum necessary impact on the area?

- What will be done to minimise the impact of the research activity on the area?

- What arrangements will be made to monitor the impact on the area?

- Have any similar studies been performed previously? If so, why should they be repeated?

[16] See glossary definition.

- Are there any permits that must be obtained in relation to the project?

- Will the project be located adjacent to or on sites of indigenous significance or cultural heritage? Have the implications of this location been adequately addressed?

- Have the appropriate collections been identified in which specimens can be lodged?

- Have arrangements been made to ensure (and resource) appropriate standards of curation?

- Has a timetable for handing over the specimens been agreed?

3.3 CONDUCT OF STUDIES

The researcher should anticipate and take all possible steps to minimise the impact on the area, including:

- choosing the most appropriate research methods for the conduct of the study;

- ensuring the technical skills and competence of all persons accessing the area;

- ensuring that the area is adequately monitored for evidence of impact;

- conducting studies for a period no longer than necessary to achieve the research goals, to minimise disturbance or impact;

- acting promptly to reduce impact in case of unforeseen outcomes; and

- removing all infrastructure at the completion of the study.

3.4 COOPERATION WITH INDIGENOUS GROUPS

It is important for researchers to establish what indigenous group/s or individual/s to contact with regard to getting permission or information. There may be several stake-holders with good claims to authority. Opinions about what can be done may differ between such stakeholders. Researchers, particularly students, may lack the time and perhaps the life experience required to build up sufficient trust to deal with such complex situations. There is good reason for management agencies to take on a role as brokers and mentors. See the more detailed discussions at Attachments 1, 2 and in Section 1.2.

3.5 CONTACT WITH HERITAGE AUTHORITIES

Historic and/or archaeological sites may be present in a proposed research location but not be known to the indigenous representatives. They may however be seen as culturally significant if/when identified and would be protected by legislation. The researcher needs to inquire from relevant heritage authorities on a number of matters:

- whether there have been surveys for such sites in the project area;

- what their coverage was and what (if any) sites were identified;

- how the authority rates the probability of their presence; and

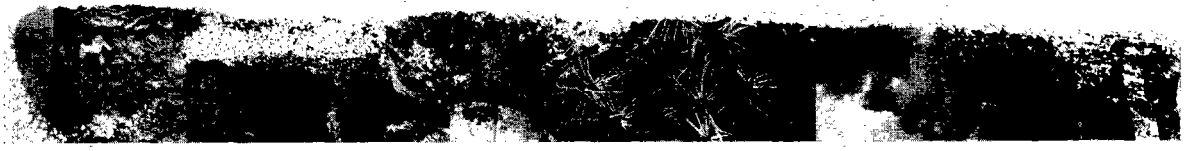
- what should the researcher look out for.

3.6 AWARENESS OF OTHER RESEARCH PROJECTS IN THE AREA

Researchers should establish what other research projects have been or are being carried out in the area or nearby and by whom. Projects in different disciplines may well be found to have some relevance - or may have had some impact that needs to be taken into account. To facilitate this, there is a need for management agencies to keep up to date and accessible registers of projects, researchers, how to find them and how to access their reports.

3.7 AWARENESS OF CULTURAL ASSUMPTIONS

Research will be strongly influenced by concepts underpinning the project and types of interpretation envisaged, aspects which may involve ethical problems. Interpretation may well be seen as a form of manipulation of results. Researchers should be aware of possible ethical implications of the interpretations they bring to situations from their own, perhaps unconscious, cultural or disciplinary perspective.



APPENDIX 1

INDICATIVE CRITERIA FOR REFERRAL OF RESEARCH TO AN ENVIRONMENTAL RESEARCH ETHICS ADVISORY COMMITTEE [OR EQUIVALENT DELIBERATIVE PROCESS]

Note: The procedures and criteria suggested here are not intended to be prescriptive, but rather are provided as models that may be adapted to suit particular circumstances.

A permit to conduct environmental research may take a number of forms. It may be a standard document or a contractual letter which contains or has attached a statement of specific general conditions applying to the conduct and reporting of the research. Appendix 4 provides a decision sequence summarising a possible research approval process, through which these criteria might be applied.

Permit applications received by agencies should be referred to an Environmental Research Ethics Advisory Committee (EREAC) [or equivalent process] if proposals have certain characteristics, as described below. Investigators and environment managers may also elect for their research proposals to be considered by an EREAC.

Applications for research permits would be referred to an EREAC on the basis of answers to the following questions.

- Does the research involve threatened species or populations?

- Does the research involve key habitats or likely habitats of rare, threatened, or commercially important species?

- Is the research likely to involve the introduction into the area of biological material (of a type not already present in the area in question)?

- Does the research involve relocation or release of biological material?

- Does the research involve the introduction or release of genetically modified material?

- Having regard to the relative size of populations and habitats affected, the ecological and geophysical processes applying in the area and other impacts on the area, is the research likely to cause significant harm[17] to:
  - habitats
  - flora and/or fauna (individuals and populations)
  - geological and palaeontological material
  - archaeological and historic material including artefacts?

- Does the research involve the use of toxic/radioactive/cumulative/persistent chemicals?

- Does the research involve the use of techniques which would be likely to intrude on the amenity, privacy, rights and values of other legitimate users?

- Does the proposal require access to areas closed to the public, other than designated scientific areas?

- Would the research require changes to legislation or regulations or the use of special management provisions?

- Is it likely that the research will violate the NHMRC/AVCC Guidelines on Research Practice and Research Misconduct?

- Will the outputs of the proposed research be withheld from the public?

- Has the research failed to gain approval by an Animal Ethics Committee under the NHMRC Code?

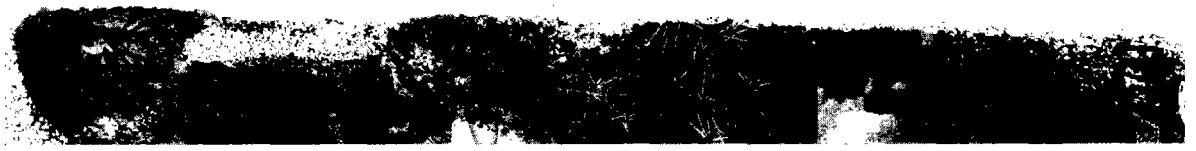
- Are there conditions applied to any approval by an Animal Ethics Committee?

- Will transportation of researchers or equipment to the proposed investigation site(s) impact in a significant way on the environmental values of areas through which transit is required?

A proposal would be referred to an EREAC on the basis of a 'yes' response to any of these questions. In addition, a management agency may wish to refer a randomly selected proportion of otherwise non-referred applications to the EREAC to audit the process.

Proponents will be expected to have considered the option to conduct the research in a less environmentally sensitive area prior to submitting their application, and be able to justify why the research needs to be conducted in the area proposed.

[17] See glossary definition.



APPENDIX 2

ASSESSMENT GUIDELINES

The following questions are intended to guide a deliberative process to determine whether or not the proposed research is justifiable according to the principles outlined above. Management agencies are encouraged to refine the questions below to address issues important to the local conditions. Appendix 4 provides a decision sequence summarising a possible research approval process, through which these guidelines might be applied.

1. Quality of the Research

- Has the research proposal been peer reviewed or approved at a level appropriate to the nature of the project?
- Is the methodology appropriate?
- Does the methodology incorporate sufficient statistical power to establish the answers sought?
- Is the researcher competent to do the work? What standards are necessary to determine this?
- Does the researcher have access to the resources required to conduct the research?
- Will the research, including the availability of results, be likely to lead to commercial gain in any form which may compromise the research?

2. Benefits and risks of the research[18]

[18] These should be considered in the context of other impacts or risks to the area and the expected outcomes of the research.

- What are the potential private, ecological and social benefits, risks or negative impacts associated with the research?

- Are the research and its outcomes compatible with the management objectives of the area?

- What are the potential direct, indirect and cumulative impacts of the research?

- What are the temporal and spatial scales of this impact?

- What is the level of confidence in the impact assessment? How is this judged? The assessment should include all levels of biodiversity, geodiversity, geomorphology, cultural heritage and aesthetic considerations, and potential or actual commercial resources such as fisheries.

- Have reasonable attempts been made to identify the interests of Indigenous Australians, other legitimate users of the area, or the wider community, which may be affected by the research? Will the research and its likely outcomes affect these interests?

- What are the potential consequences/risks of not doing the research?

3. How could the research be changed to reduce any *associated negative impacts or risks and improve the* outcomes?

- Can the research be done in a less sensitive area?

- Can the research outcomes be obtained using alternative and less intrusive or destructive techniques or using a different sampling design? If so, what are the associated benefits, costs and risks?

- Are the results of any previous studies relevant to this area? In the light of any such studies, is this research necessary?

- What, if any, remediation will be required after completing the study? How will this be achieved? Has it been budgeted for?

- Are there adequate compensatory and/or royalty arrangements for researchers and other significant participants in the research (for example the traditional owners[19] of the area)?

- How will specimens and data collected be managed, maintained and monitored?

- How will the information from this study be reported?

- What measures are required to ensure that the research is conducted as proposed?

4. Animal welfare considerations

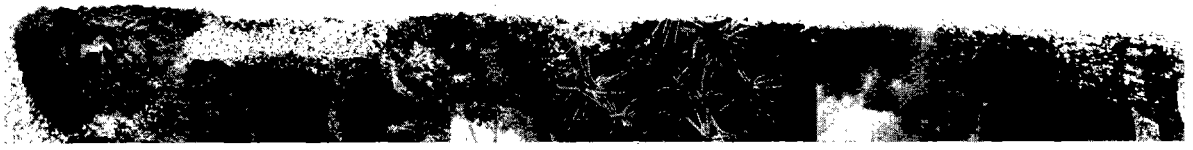
Observational and manipulative studies of free living animals, or habitats, have the potential to cause adverse effects because of interference with the normal behaviour of animals, particularly reproductive behviours and the rearing of young. Information on the potential impact of research on species present in the research site could be presented. This information should include:

- the risk of disease transmission;

- the effects of a series of stressors, *eg* disturbance, trapping, handling, *etc;*

- the effects on non-target animals; and

[19] See glossary definition.



- the effects on resources available to target and non-target species.

It should also be recognised that interference with animals not native to a protected area may be entirely appropriate, as discussed elsewhere in this report.

5. Transportation impact

Access to investigation sites may require the use of off-road vehicles, air or sea transport. These may have impacts in their own right on the protected or sensitive area under study. Such impacts may include, for example, the damage to soil or vegetation by land vehicle, damage from anchors on coral reefs and disturbance to wildlife by vehicular noise. They may also include the inadvertent introduction of seeds, fungal spores or insects into the area on vehicle tyres, or marine larvae in bilge water. The following questions should be addressed.

- What measures have been taken to ensure that transportation of researchers or equipment to the investigation site(s) will have minimum impact on the sensitive or protected area?

- What remedial measures are planned to deal with such effects?

- What measures are planned to avoid inadvertent introduction of seeds, spores, insects or marine larvae into the sensitive area?

APPENDIX 3

GUIDELINES FOR THE OPERATION OF AN ENVIRONMENTAL RESEARCH ETHICS ADVISORY COMMITTEE FOR A PROTECTED OR ENVIRONMENTALLY SENSITIVE AREA

Note: The procedures and structures suggested here are not intended to be prescriptive, but are rather suggested as models that may be adapted to suit particular circumstances.

ASTEC recommends an Environmental Research Ethics Advisory Committee (EREAC) as the deliberative process that could be used to advise on the ethical issues raised by a research proposal. The purpose of the following guidelines is to provide generic criteria that EREACs can use to develop and customise appropriate Terms of Reference for their specific region of interest.

EREACs are intended to act as advisory bodies to management agencies. They should therefore be set up and funded by such agencies to advise on the ethics of research for which the agency has responsibility, either through its direct conduct or the granting of permits. An EREAC's main responsibility should be the assessment of the ethics aspects of a research proposal. However, the committee may also be involved in monitoring and auditing of research as well as advising on operational procedures.

ASTEC recommends that the development of a national resource centre for researchers be investigated. Such a centre might provide information on best scientific practice and distributing information on ethical issues relating to research. This centre could also monitor the process. The relevant government authorities would need to decide on funding for such a centre.

ASTEC suggests that an EREAC would operate according to the following guidelines.

1. ROLE OF AN ENVIRONMENTAL RESEARCH ETHICS ADVISORY COMMITTEE

The EREAC will advise the management agency on:

- establishment and review of ethical research guidelines;
- actions and measures to ensure that the ethical review process provides adequate consideration of relevant issues and does not consider irrelevant issues (see Appendix 2);
- applications for research permits, assessment documentation and assessment reports as determined by the management agency: this includes research funded/conducted by or on behalf of the agency;
- ethical aspects of research activities in the area; and
- criteria for identifying and assessing manipulative/intrusive research which has ethical implications. Sample criteria for identifying such research are at Appendix 1. Assessment guidelines to help determine whether the proposed research constitutes reasonable use of the area are at Appendix 2.

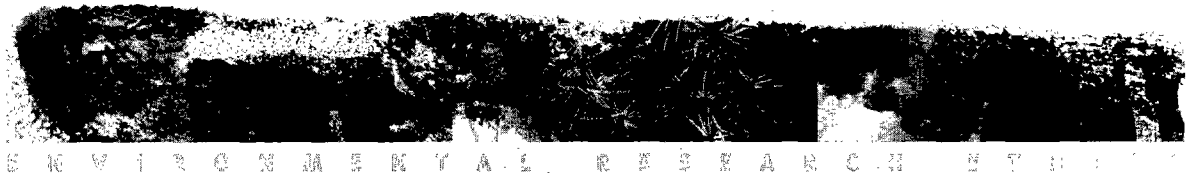
2. ROLE OF MANAGEMENT AGENCY

Each management agency should:

- Refer to appropriate EREACs for comment those research related matters that may affect the conservation status of the area. This should include both research proposed by the agency itself and that conducted by researchers from other organisations.
- Ensure that a protocol for taking into account indigenous concerns about research is incorporated into the Ethical Research Guidelines developed and made available to assist research proponents in formulating proposals.
- Ensure that assessment procedures are transparent and accountable.
- Review annually the operation of the EREAC[20].
- Respond effectively to recommendations from each EREAC to ensure that research conducted is consistent with management objectives of the area[21].
- Upon the advice of the EREAC, take measures to ensure compliance with these guidelines. Wherever possible, EREAC assessment processes should be incorporated in existing permit and access regulation mechanisms and other relevant policies.
- Provide investigators with all relevant details, such as the agency's policy on research, Freedom of Information legislation, legal requirements, commercial considerations and safety procedures.
- Require that appropriate remedial measures or programs are carried out as specified by the permit and check that these are undertaken.
- Establish mechanisms to respond to inquiries or complaints concerning the conduct of the research and provide a means through which staff, students or

[20] This review should include assessment of the annual report from the EREAC and a meeting with the EREAC chair

[21] The EREAC should report through the Chair to the Cheif Executive Officer (CEO) of the agency (or delegated representative of the CEO) and when fulfilling it's responsibilities should receive the full support of the CEO.



volunteers may voice concerns without jeopardising their continuing employment/participation in the research.

- Establish independently managed grievance procedures for EREAC members and investigators and other third parties who are dissatisfied with EREAC procedures or decisions. This is most important and should be supported through Management Agencies.

- Ensure that the EREAC develops guidelines for research in these areas, including those aspects that ensure emergencies or other unexpected consequences with risk of detrimental impact are detected promptly and dealt with effectively.

- Ensure that adequate numbers of appropriately instructed staff are available with the capacity to monitor research in these areas.

- Liaise as appropriate with other EREACs to ensure comparable standards are applied and to gain from the experience of others.

3. MODEL STRUCTURE FOR AN ENVIRONMENTAL RESEARCH ETHICS ADVISORY COMMITTEE

At the Fenner Conference on the Environment, delegates indicated the need for a model structure that agencies could consider when setting up machinery to implement these guidelines. ASTEC has included suggestions for such a structure in response to this request.

The EREAC should comprise individuals who are not actively involved in research in the geographic area. A majority of members, including the Chair, should be from outside the management agency. Appropriate membership and/or representation from indigenous communities should be sought. The expertise of members should include:

- conservation, cultural and natural heritage;

- experimental design of field research;

- animal welfare;

- ethics; and

- the area itself.

The Committee should co-opt the advice of persons with specialist expertise as required.

It is envisaged that decisions by the EREAC could be made with only 80% of members present unless at least one member considers that all members should be present to discuss a particular issue and/or that the expertise of a particular member is vital to the decision.

The composition of the EREAC should take into account other advisory mechanisms set up under relevant legislation. Agencies with an established human and/or animal ethics committee(s) should consider how their management advisory committee structure might be adapted to fulfil this new role.

Before appointment, all members of the EREAC should acknowledge in writing their acceptance of the terms of reference of the committee and any requirements for confidentiality. The committee should reach agreement on how advice may be sought without breaching confidentiality.

4. WRITTEN PROPOSALS

Written proposals should contain the information that may

be required by an EREAC or other deliberative mechanism, as indicated in Appendix 1 to this document. The information should be sufficient to show that the proposed research is justified and complies with the principles of Movement, Minimisation, Modification and Maximisation (as described in Section 1.5 of this document).

A written proposal should be presented in a form that is readily assessable and understandable by all members of the EREAC. It must identify the impact of all elements of the proposal on the ecosystem and means by which the impact will be minimised.

Written proposals should contain the following information as appropriate:

a) the project title;

b) the names and qualifications of the responsible investigators and all others involved directly;

c) an explanation of how these qualifications and experience are appropriate to the procedures to be performed;

d) a clear description in plain English of
- the research and/or educational aims of the project;
- the expected benefits or value of the project; and
- the likely risks;

e) justification of the project, addressing how it will achieve the ecological and/or educational objectives;

f) reasons why the project must be conducted in the area and, in particular, why techniques which do not impact on the area have been rejected as unsuitable;

g) details of field research procedures including:
- spatial and temporal disturbance caused or likely to be caused by the research relative to the natural or cultural integrity of the area;
- expected timeline for project including proposed dates for all field trips;

h) a plain English summary, no longer than an A4 page, which should be made available to the public by the granting agency;

i) a declaration signed by the responsible researcher(s) stating that they are currently licensed or authorised to perform the planned research activities (if required by legislation) and are aware of their responsibilities set out in these guidelines and in applicable legislation; and

j) any other relevant information to be considered, according to the assessment guidelines at Appendix 2.

5. OPERATING PROCEDURES

EREACs in partnership with management agencies should ensure that operating procedures are established which will enable compliance with the provisions of these Guidelines.

Such procedures should cover in particular:

- establishment of a quorum for meetings;
- legitimately urgent proposals;
- any matter specific to the institution that will assist compliance;
- powers that the EREAC is prepared to delegate to an Executive;

- provision of secretariat, administrative and other support; and

- emergencies which arise during the performance of the approved research.

The EREAC may establish an Executive which should include at least one non-agency member. The Executive may approve minor modifications to projects and deal with emergencies[22], but any decisions by the Executive must be reviewed by the EREAC at its next meeting.

Other measures that should be adopted are as follows.

- The Executive may not approve proposals.

- Minutes must be maintained which record decisions and all other aspects of the EREAC's operation.

- Meetings should be scheduled not less than quarterly if applications are pending, and more frequently as required.

- The process by which decisions are made must be fair to investigators and supervisors, and acceptable to all EREAC members.

- Irreconcilable differences between the EREAC and a researcher must be referred to the governing body of the management agency for review.

6. ASSESSING PROPOSALS

- Guidelines that the EREAC may use in assessing proposals are at Appendix 2.

- Only those research activities which conform to the requirements of these Guidelines and relevant legislation should be approved.

- Proposals should be considered and approved only after the opinions of all members of the Committee have been sought.

- Where possible, recommendations to the agency should be made on the basis of consensus[23]. Otherwise the dissenting views in advice to the agency should be retained.

- Proponents should be informed of decisions in writing.

- The EREAC should note the provisions of the Australian Code of Practice for the Care and Use of Animals for Scientific Purposes where this is relevant to the research proposal being considered. Approvals may be required under that code, and clearance for the proposal should not be granted by the EREAC until evidence of such approval is furnished.

- Research activities involving issues of safety (eg use of biohazardous materials, isotopes, release of genetically modified organisms) should not commence until all appropriate permits are issued.

- A specified turn-around time for assessment of proposals should be adhered to.

7. MONITORING

- EREACs in partnership with management agencies must ensure that adequate records are kept of the environmental, social or cultural implications of the research.

- Where practical, inspections of field areas should be conducted periodically by members of the EREAC and

[22] The EREAC may need to put into place procedures to deal with emergencies.

[23] Where two or more members oppose a proposal, it should not be approved until the EREAC has explored ways of modifying the project that may lead to consensus.

appropriate records maintained to ensure compliance with the Guidelines[24]. Such inspections would be particularly desirable where specific areas are designated for scientific research.

- EREACs should ensure that any activity in breach of developed codes of conduct ceases immediately and appropriate action is taken. This may include referral to the head of the management agency.

- Where appropriate, the management agency should nominate a person who is authorised to act as an adviser in an emergency for each proposal referred to the EREAC.

- In cases of emergency, all reasonable steps should be taken to consult with the responsible investigator and the chairperson of the EREAC. Any action taken in response to the emergency must be reported promptly in writing to the responsible investigator and the EREAC, including reasons for the action taken.

8. ANNUAL REVIEW

Approved projects of long duration and long term impact on the area must be reviewed at least annually by the management agencies, with the EREAC consulted for re-assessment if required.

9. REPORT TO AGENCY

The EREAC must report in writing at least annually to the governing body of the agency on its activities, on:

- numbers and types of projects considered;

- administrative or other difficulties being experienced;

- any requirements for training EREAC staff

- report to management agency on adequacy of EREAC budget; and

- recommendations to improve procedures as required.

[24] This may be practical only at a local scale.

APPENDIX 4

MODEL APPROVAL PROCESS

This scheme is a process through which approvals might be processed for assessment of the ethical aspects of proposed research projects in environmentally sensitive areas. It involves judgements made by the relevant managing authority, the Environmental Research Ethics Advisory Committee set up to review ethics in such areas, and the chair of that committee. The approval process involves an application by the researcher proposing the project and a set of ethics guidelines such as are proposed in this document.

The following steps would be appropriate for an approval process.

1. The proponent submits an application to conduct a research project in an environmentally sensitive area. The proposal is submitted to the management authority with responsibility for the area. The application involves answering a series of questions relating to the ethical implications of the research or its effects, and addresses the ethics guidelines.

2. If the proposal raises no ethics questions, it may be considered and approved as appropriate by the management authority without further examination. (proceed to step 8)

3. If it has minor, non-controversial ethics implications, it may be referred to the chairman of the ethics advisory committee for consideration. (proceed to step 8)

4. If the proposal has significant or complex ethical implications, it should be referred to the full committee.

5. The committee decides whether it has sufficient information and expertise to make a decision.

6. If the committee considers it has insufficient expertise to judge the proposal, it should refer the proposal to external experts for consideration and advice.

7. If there is sufficient information and the committee considers its expertise is adequate, or when it has received advice from experts that it considers will allow it to make a judgement, the committee proceeds to a decision.

8. A decision is made on the proposal. This can take four forms:

- approval without further process;
- approval conditional on some changes in the proposal or additional consultations or precautions;
- a deferral of the proposal with a request that it be reworked to provide additional information or to take into account additional considerations, followed by resubmittal; or
- blanket rejection of the proposal.

For an approved project, the proponent is obliged to report (during and at the end of the research) on the outcomes of the research and report to the management authority or ethics advisory committee, as appropriate. For a proposal that is rejected or deferred, the decision making body must advise the proponent of the reasons for the rejection or deferral of the application.

It is also desirable to institute some form of appeal or review process.

ATTACHMENT 1

INDIGENOUS VIEW ON PROTECTED AREAS AND RESEARCH

This Attachment has been prepared by ASTEC Study Group members, in consultation with the particular groups whose interests they share. It is not intended as a definitive or permanent statement of the positions of the interested groups, but rather to place on record matters of concern, in the context of a document to be considered by regulatory authorities.

Protected Areas and Biodiversity

The establishment of protected areas is one of the key principles of the recently released National Strategy for the Conservation of Australia's Biological Diversity (1995). This strategy is based on the international United Nations Convention on Biological Diversity (1992)[25]. Research is a critical component in managing protected areas for conservation and ecologically sustainable use. Another critical component is the role of indigenous peoples have played in managing the environment, especially their traditional knowledge and practices in the use and management of protected areas.

Aboriginal and Torres Strait Islander peoples have a fundamental interest in protected areas in Australia. They view these areas as their ancestral lands/seas with which they need to, in some cases, maintain their connections, and in others to reconnect in order to revitalise and strengthen their culture. Their enforced disconnection from these environments has resulted in a deterioration of the health of the traditional culture and of the peoples in general. Indigenous Australians see continued resistance

[25] Australia ratified the Convention on 18 June 1993 and it entered into force generally on 29 December 1993.

to their aspirations to reconnect with traditional lands and, for example, to play a more central role in the management of protected areas, as a denial of a fundamental human right. Their position on this is clearly stated in the United Nations Draft Declaration on the Rights of Indigenous Peoples, Article 30:

> Indigenous peoples have the right to determine and develop priorities and strategies for the development or use of their lands, territories and other resources, including the right to require that States obtain their free and informed consent prior to the approval of any project affecting their lands, territories and other resources, particularly in connection with the development, utilisation or exploitation of mineral, water or other resources. Pursuant to agreement with the indigenous peoples concerned, just and fair com pensation shall be provided for any such activities and measures taken to mitigate adverse environmental, economic, social, cultural or spiritual impact.

Australia's biodiversity is inextricably connected with Aboriginal and Torres Strait Islander cultural practices, integrity and continuity. Before European settlement, Indigenous Australians were a significant influence on the shaping of the Australia's biodiversity for thousands of years and their culture was in turn influenced by the Australian environment. The indigenous world view provided a framework for interpreting and understanding the environment and man's place in it. It also set out a blueprint for indigenous customary law which spelt out the relationship that they had with the environment. Indigenous law included a form of environmental management that ensured a balanced use of resources.

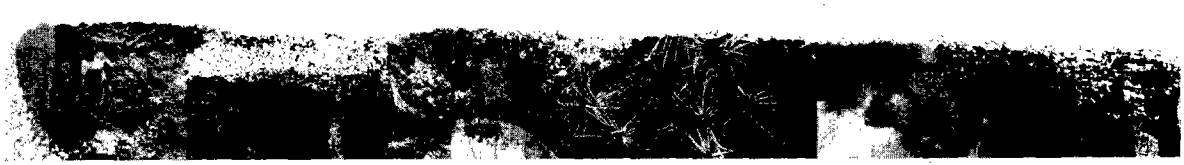
European settlement led to a massive reduction of Australia's terrestrial biodiversity and an active campaign to destroy Aboriginal culture. Government policies that removed Aboriginal people from their land also removed indigenous environmental management practices. This reshaping of Australia's biodiversity represents cultural genocide to Aboriginal people.

They believe that indigenous involvement in the management and use of Australia's biodiversity is fundamental to the maintenance of their culture and identity. To deny a place for Indigenous Australians in the use and management of Australia's biodiversity continues the practice of cultural genocide. Indigenous Australians have never ceded their ownership of the environment or its resources. Thus, as they see it, they have a legitimate right to be part of its use and management.

The growing international awareness of indigenous peoples' rights in the environment is addressed in the Convention on Biological Diversity. Indigenous interests are addressed by Article 8(j) and 10(c) which state that each contracting party shall as far as possible and as appropriate:

> Article 8(j) subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilisation of such knowledge, innovations and practices.
>
> Article 10(c) protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements.

The National Strategy for the Conservation of Australia's Biological Diversity was released in 1995 by the Federal



Government. This strategy reflected the International Convention on Biological Diversity. Aboriginal and Torres Strait Islander interests are addressed in Principle 9 and Objective 1.8.

> Principle 9 The close, traditional association of Australia's indigenous peoples with components of biological diversity should be recognised, as should the desirability of sharing equitably benefits arising from the innovative use of traditional knowledge of biological diversity.

> Objective 1.8 Recognise and ensure the continuity of the contribution of the ethnobiological knowledge of Australia's indigenous peoples to the conservation of Australia's biological diversity.

Internationally and nationally there are moves to include indigenous peoples in the management and protection of biodiversity. The growing recognition of this role for indigenous peoples is due to the realisation of the role they played in shaping the biodiversity. The close relationship between indigenous peoples and their land meant that they developed a deep understanding of its ecology from their perspective. This represents a potential reservoir of information about the environment for this reason *Indigenous Environmental Knowledge* (or *Traditional Ecological Knowledge*) is now being actively sought by scientists.

Research

Aboriginal and Torres Strait Islander peoples consider they have for too long been treated as research objects to be exploited without any respect, protection or remuneration. They are very cynical about research and researchers because as the most researched group of peoples in this country they derive few if any benefits. Research has if anything led to a devaluing of their culture and the development of biased and detrimental policies. Research historically has underpinned the oppression of Indigenous Australians.

Researchers have tended to see Indigenous Australians with their rich cultural heritage as a source of untapped research projects rather than as citizens with equal status. Researchers have profited from research into Indigenous Australians through increased academic qualifications and increased professional status. There have been few or no tangible benefits flowing back to those peoples studied.

Many researchers have been guilty of gross cultural insensitivity. Indigenous Australians have had to suffer the embarrassment of personal information becoming public, and the humiliation of academically accredited non-indigenous experts interpreting their culture and what it means for them.

The growing interest in *Indigenous Environmental Knowledge* and its potential value in ecologically sustainable development and conservation is putting even more pressure on indigenous peoples to share their knowledge with researchers. Indigenous Australians see *Indigenous Environmental Knowledge* is their intellectual property and they assert their fundamental right to have complete control over that property. Researchers need to be aware of Indigenous Australians' rights and sensitivities, adopt appropriate protocols and work closely with them in conducting research that has a potential to impact on them.

ATTACHMENT 2

WORKING WITH ABORIGINAL AND TORRES STRAIT ISLANDER GROUPS

To assist researchers to cooperate with Aboriginals and Torres Strait Islanders in the conduct of research projects, ASTEC recommends the following approach. (See also Section 2.4. Management Agencies have an important role to play in this area.)

Rationale

There are Aboriginal communities and groups which have a continuing cultural affiliation with most, if not all, terrestrial, coastal, and marine environments around Australia. This affiliation includes cultural rights and responsibilities to use and manage environments and resources associated with their traditional estates - sometimes referred to as customary tenure. *The Native Title Act 1993* provides for the possibility of legal recognition of this traditional association. Although many native title claims are currently in the process of mediation through the National Native Title Tribunal, only two have been concluded. Meanwhile, the possibility that common law native title rights and interests do exist provides an incentive for researchers to seek the meaningful involvement of appropriate Aboriginal groups in research projects.

Large areas of Torres Strait lie within native title claim areas currently under consideration by the National Native Title Tribunal. Torres Strait Islanders also have a statutory role in the management of Torres Strait marine environments and resources as a result of the Torres Strait Treaty between Australia and Papua New Guinea. This treaty requires that the traditional environments, resources and life ways of Torres Strait Islanders be protected. Research projects in

Torres Strait therefore require consultations and negotiations with the appropriate traditional inhabitants.

Identifying the appropriate Aboriginal or Torres Strait Islander group

The following organisations in each State and Territory can assist in informing researchers about which Aboriginal or Torres Strait Islander groups should be contacted prior to initiating a research project:

Aboriginal Land Councils - In some States and Territories these are statutory organisations established under State or Commonwealth legislation to represent the interests of Aboriginal landholders or claimants in negotiations with government and non-government organisations over land, sea, environment and resource issues.

State and Territory Governments have departments with responsibility for coordinating policies and programs specifically relating to Aboriginal and Torres Strait Islander peoples.

Aboriginal and Torres Strait Islander Commission - ATSIC is a Commonwealth agency with a national office in Canberra, as well as capital city and regional offices in each State and Territory. There are 35 elected ATSIC Regional Councils throughout Australia. Regional Councils are grouped into 16 zones, from each one of which a Councillor is elected to the position of Commissioner on the ATSIC Board.

Torres Strait Regional Authority - The TSRA (located on Thursday Island) fulfils the role of an ATSIC Regional Council under Commonwealth legislation. It provides advice to the Commonwealth Government on Torres Strait issues, and distributes Commonwealth funding for community infrastructure, cultural and environmental management projects throughout Torres Strait.

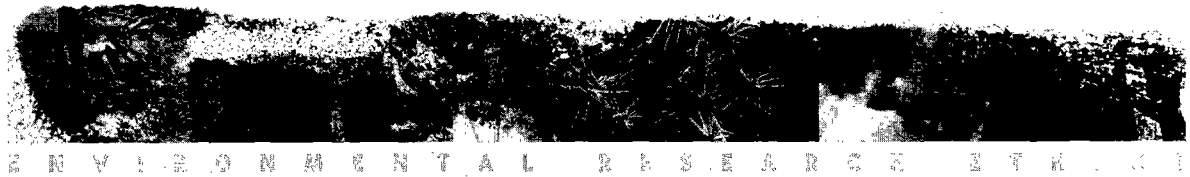
Islander Coordinating Council - The ICC (located on Thursday Island) is a Queensland statutory authority which provides advice to the Queensland Government on Torres Strait issues, particularly those relating to outlying Torres Strait Islands and the two Torres Strait communities located on Cape York Peninsula.

Any of the above organisations can provide a starting point for researchers wishing to consult with appropriate Aboriginal and/or Torres Strait Islander groups. It is often useful to seek advice from more than one organisation to ensure that all relevant people are consulted. To ensure that potential native titleholders are involved, it is advisable always to contact the Native Title Representative Body for the relevant area. Contact details for all these organisations can usually be obtained from the nearest office of the Aboriginal and Torres Strait Islander Commission.

What does it mean to involve Aboriginal or Torres Strait Islander people?

This will depend on the nature of the research project and on the particular interests of the Aboriginal or Torres Strait Islander group concerned. Involvement could vary from a desire to be kept informed about the project, to a requirement for active co-management of the project. Issues to be considered by Aboriginal and Torres Strait Islander groups may include:

- Will the project be of benefit to indigenous peoples?
- What are the potential impacts of the project on indigenous environments, resources, culture, rights or life styles?
- What are the opportunities for training and/or employment of indigenous people in the project?



- What are the safeguards for the recognition and protection of indigenous intellectual property rights (eg the application of traditional knowledge or stories)?

- What procedures are proposed to maintain communication with indigenous groups throughout the project, and report on the findings and implications of the project at its conclusion?

- What is the level of understanding among the researchers about indigenous culture, rights and interests associated with the research area?

- What is the commitment of the research institution to the recognition of Aboriginal and Torres Strait Islander rights and interests?

Some indigenous organisations have developed or are developing protocols to assist their people and research organisations to take a strategic approach to addressing issues such as those outlined above. The cooperation of researchers in the development and implementation of indigenous research protocols can simplify the consultation process for researchers, can lead to mutually satisfactory outcomes, and can strengthen the viability of the project as well make a positive contribution to the process of reconciliation.

ATTACHMENT 3

TYPES OF RESEARCH

There is a wide variety of research carried out or proposed in sensitive and protected areas. Not all types will have the same impact, nor raise the same ethical concerns. It is also important to note that Management Agencies undertake research in support of their responsibilities for managing protected areas. All research activities must be subject to the same ethical considerations. Whether the research is undertaken by a Management Agency or a researcher from another organisation, the same classification of types of research is likely to be useful. The following is a simple classification, sufficient to help in addressing the ethical questions.

Subject

First, we may classify the subject or discipline of the research broadly as one or more of the following:

- *biological*
- *geological*
- *physical*
- *cultural*

Methods

Second, we may classify research according to the broad nature of the field activities involved. These activities might include:

- *observing*
- *recording*
- *surveying*
- *collecting*
- *prospecting*

- *interviewing*
- *manipulating*
- *commercial production trials*

These methods have a range of research functions: they will yield different kinds of information and can answer different kinds of questions. They will have different impacts on the material or area being studied, and they will be subject to varying ethical concerns. We expand briefly, below, on the meaning of each.

observing

The simplest type of research is simply to go to an area and observe. In many such cases there will be little impact on the environment, and little ethical objection. Such research can yield impressive insights. A classic example is the studies of animal behaviour achieved by the early field ethologists simply by observing the behaviour of animals in their natural settings. There are limitations, however, and those same early ethologists achieved an understanding of the explanations for their observations by doing manipulative experiments.

recording

A particular case of observing is recording - for example recording calls on audio tape or behaviour on videotape. Some studies of the biology of frogs would be impossible without recordings of their calls, which can be analysed later in the laboratory. There is not necessarily any disturbance of the animal involved and in general the ethical concerns would be small.

surveying

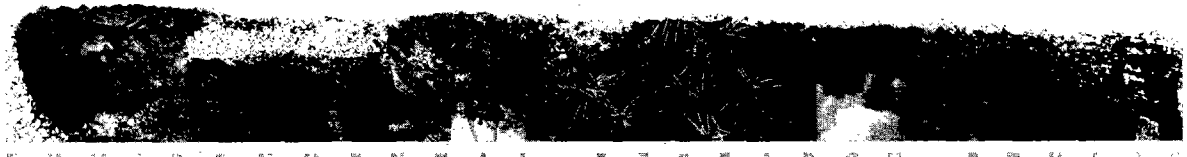
The initial stages of research in geology and ecology commonly may involve large-scale descriptive work which we broadly call surveying. It primarily involves field observations - recording the species and number of plants in quadrats or transects, for example. Generally this leads to some kind of mapping. It would entail little damage and therefore limited ethical concern, though there might be specimens taken for verification of identity.

collecting

Already mentioned above, collection is a common activity in the descriptive stages of biological or geological studies. It is considered unprofessional not to collect samples for laboratory examination, verification of identity, storage for later checking, *etc*. One cannot, for example, claim to have observed a previously unknown species of frog in a wilderness area without taking specimens for examination and permanent storage in museums. Indeed, it would be difficult to claim to have done a professional survey of the vegetation of an area without depositing voucher specimens in a museum. Collecting need not imply complete individuals. It may involve taking parts of plants or blood samples, for example. In either case, however, collecting is likely to raise ethical questions. How many specimens should be taken? What if they constitute a significant fraction of the population? Some might consider that there is an in-principle objection to taking any organisms, rocks, fossils, *etc* from a protected area. This would render such research impossible. Further, collection (for identification, verification and taxonomic research) grades into the next category.

prospecting

Mineral prospecting is certainly a type of research that may raise ethical questions. It may take a larger number of specimens and do more damage than simply descriptive geological research. It may use other techniques themselves injurious to the sensitive or protected area (*eg* seismic investigation which may involve damage to soils and vegetation on land, or disturbance to marine mammals). However, of most concern, it implies an intention to exploit any



discoveries. Thus, a major ethical concern with mineral exploration in sensitive or protected areas is that it may lead to mining.

The term prospecting is now applied also to the search for potentially valuable chemical compounds within biota (bioprospecting). This commonly involves taking a small quantity of a large number of organisms (for example, marine invertebrates such as sponges and ascidians from a reef) to be analysed for chemical activity that may be useful in diverse fields including in human health and diagnostics, antifouling, agrichemistry, and other industrial applications. In the process, inventories of biota are compiled that are a valuable source for the wider community, particularly management agencies and taxonomists. Where further material of a particular organism is required for follow up product development research, a re-collection may initially be necessary although options such as mariculture, culture of micro-organisms, molecular approaches and chemical synthesis are preferred. (See also commercial production trials, below).

Bioprospecting presents three main issues of ethical concern that require safeguarding. Firstly, as collecting is an extractive process there is potential for environ mental impact, so controls over collection procedures are necessary. Secondly, in return for allowing access to the resource, owners or custodians of protected areas may be stakeholders in potential benefits should a commercial product result. Finally, if traditional or other knowledge about the biota is shared with bioprospectors, an intellectual property interest in products subsequently developed must be protected.

interviewing

Research may involve interviewing local people. Apart from research unrelated to the environment, and which is outside the scope of these guidelines, this may be done as part of geological or biological research, in which the local people may impart their traditional and experiential knowledge of the local system to the researchers. If the information is no longer in their own custody, the researcher has a duty to protect the information on behalf of the local people. Such knowledge is clearly open to questions of intellectual property ownership. Experts in undertaking oral research and compiling oral records should be consulted. Research of this type may also require approval by a human research ethics committee.

manipulating

One of the most poorly understood categories of field research likely to be proposed in protected areas is commonly called manipulative experiments. Descriptive research - surveys, mapping, *etc* - can observe patterns, and explanations can be proposed for the patterns. These explanations may be wrong, however.
A manipulative experiment is commonly the only way to test explanations, or to distinguish between equally plausible alternative explanations.

For example there may be a clear boundary between a grassland and a woodland. Is the boundary there because there is an abrupt change in soil type, is it the result of historical human manipulation, or is it an accident of history (eg time since the last fire) that the boundary is where it is? (In the latter case, the boundary is likely to move with time.) Our view of the whole ecology of the area, and our approach to management, might be different as a result of the answer to this question.

An experiment that involves transplanting trees into the grassy area, and/or creating a clearing in the trees and planting grass there, if designed well (and design is a sophisticated business about which many technical books have been written) could distinguish between

these competing explanations for the location of the boundary. But it might raise ethical objections. Is it acceptable to make clearings among the trees to understand better the vegetation dynamics of the wilderness? Is the cultural landscape being affected by the transplantation, or addition of, plantings to an area?

An experiment that involves manipulating the system (eg cutting trees and planting grass) is called a manipulative experiment, as opposed to the kind where an hypothesis can be tested by making the necessary critical observations or measurements (a mensurative experiment). Both kinds can be useful. There are, however, many cases where a question can be answered only by manipulation. It is important to stress that what scientists mean by manipulative experiments is a procedure designed to test critically some idea or hypothesis that cannot be tested by simple observation. It is not simply a process of "tinkering with the system to see what happens".

commercial production trials

Another activity that may be termed "research" is the pilot scale trial of commercial production. This could involve, for example, small scale mining, fishing or forestry activities. While not usually permitted in areas that have formal protection, such an activity could be undertaken in sensitive areas not afforded formal protection or unprotected areas adjacent to protected areas. It could also take place in some cases in World Heritage Areas designated for multiple use. The purpose of such research is to establish the viability or practicality of full commercial production. It might involve activities such as exploratory drilling, small scale mining, exploratory fisheries, tree harvesting or the introduction of plantation crops into a sensitive area.

This type of research is especially problematic as it is likely to generate public controversy. Conflict between the conservation movement, rural communities, governments and industry is possible. It is most important that such trials be seen to comply with ethical standards, and that as part of the research, the likely impact of full scale production be considered.

It should be noted that all types of research have environmental ethics implications if the means by which researchers and equipment are transported to the research site(s) in any way damage the environment. This matter is discussed in Appendix 2, Section 5 of this report.

ATTACHMENT 4

DRAFT ETHICAL PRINCIPLES

This attachment puts forward a set of ethical principles that should be considered by researchers proposing to undertake a research project in an environmentally sensitive area, and by regulatory or management authorities when considering the evaluation of research proposals in such areas.

Ethical standards for protection

1. Environmentally sensitive and protected areas, individuals, species and systems are subject to considerations of an ethical nature. The bodies with responsibility for protecting them have an obligation to be vigilant and to adopt high ethical standards.

2. The responsibility to care for protected and environmentally sensitive areas includes a responsibility to gain knowledge about them, but since the impacts of such knowledge gathering cannot be assumed to be negligible, or conflicts assumed to be exceptional, research in protected areas cannot be left unregulated.

3. Protected areas should be seen as protected, amongst other things, for the benefit, enjoyment or flourishing of the non-human organisms and ecosystems they contain. The welfare of populations, species and ecosystems *must predominate* in the event of any conflict with knowledge-gathering activities.

4. Research should not be permitted which makes a net contribution to the long term decline[25] of populations, species or ecosystems in protected areas or to the welfare of individual members of an endangered[26] species.

[25] See glossary definition.

5. Research methodology or design premised on actively causing harm to (or creating a decline in) a population, species, or ecosystem in a protected area or to the welfare of individual members of an endangered species in order to collect data on that decline or on a possible or expected recovery process is not acceptable and violates minimum standards of protection. An exception to this is research which stimulates, under controlled conditions, human activities which are permitted in the area in order to determine whether such activities are sustainable.

6. A similar principle applies when decline is passively created by withholding remediating intervention which would otherwise have been undertaken to halt decline in order to experimentally record a putative recovery process (ie harm caused not only by commission but by omission).

Standards for researchers

7. A knowledge stance based on care and respect is appropriate for research in protected and environmentally sensitive areas. Researchers can demonstrate care for and appreciation of the value of protected and environmentally sensitive areas by research behaviour that:

- accepts the basic obligation to minimise any conflict between the research program and the flourishing of the area;
- does not propose research projects in environ -mentally sensitive or protected areas which can be done satisfactorily elsewhere;
- shows a preparedness to withdraw or redesign research projects where there is any indication that the research might cause damage to environmentally sensitive or protected areas;
- minimises disturbance or intrusion in research methods;
- gives scrupulous attention to research design, ensuring that research is carefully planned to the highest standards, and is designed to test important and tractable hypotheses;
- is conducted so that the maximum amount of data isgathered for the research effort, with research results reported to the management authority and related back to management needs.

8. It should be the responsibility of the researcher to demonstrate that any risks in a proposed research project fall within acceptable limits. Researchers have a responsibility to estimate risks realistically having due regard to the value of the area.

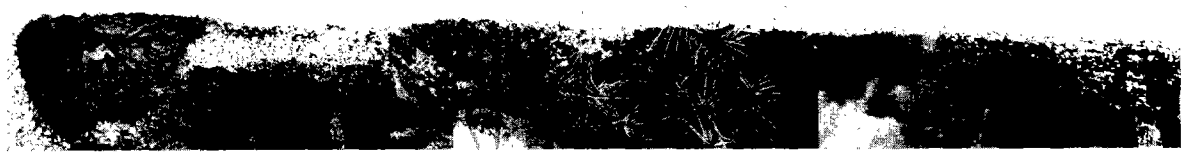
Public administration standards for Environmental Research Ethics Advisory Committees

(see also Part 1, Transparency Principles, points 4-6)

9. Evaluating bodies for research proposals should have a high degree of independence from the individuals, groups or bodies engaged in making research applications.

10. Because the value of scientific research must in cases of conflict be balanced against other non-scientific values of protected areas, high administrative standards of protection mean that non-scientists as well as professional scientists should be represented on Environmental Research Ethics Advisory Committees, and it is highly desirable that citizen groups with a special concern for the areas or animals involved in permit application decisions be represented.

11. As well as peers and stakeholders, review panels should include representatives of the public interest for the areas under consideration.



ATTACHMENT 5

AN ETHICIST'S VIEW: THE NEED FOR AN ETHICAL SCIENCE IN PROTECTED AREAS

This section addresses the question of the ethics of research in protected areas. It puts forward arguments from the ethics perspective, as background to considerations elsewhere in the report.

The Ethics of Knowledge-Gathering in Protected Areas

Environmental problems are complex and multifaceted, and may not always be understood fully by any one academic discipline. Research in environmentally sensitive areas must involve ethics as well as science. Different intellectual perspectives from the humanities and sciences can clash, but they can also be integrated into a rich conception of the environment. With the growing public awareness and concern about the environment and a range of ethical issues, one discipline cannot ignore the other.

There is a long tradition in the West that considers the environment merely a resource provided for human use. Science too has played a dominant role in Western intellectual endeavours. Together these traditions create a problem in that, if science has contributed to damaging environmentally sensitive areas, it has generally been viewed as a necessary consequence of the need to understand those areas and one which requires no regulation. Ethics has been assumed to be outside the scope of science proper. The benefits provided by scientific knowledge have been seen to outweigh any minor disruptions to individuals, species and systems.

We need to revise these views if they are out of step with the ethical standards of the community. Some submissions to the ASTEC Study alleged disruptive, poorly designed or irresponsible forms of research or experimentation in protected areas. This perception must be addressed, whether or not it is well founded. Such concerns may become more common if science becomes more market-driven and priority is given to commercial extractive activity. Ethically, the mistreatment of protected areas in the course of gaining knowledge about them is as significant as the mistreatment of non-human animal species in the context of gaining knowledge.

We have ethical models and principles for dealing with such problems. These suggest that it is neither ethical nor prudent to prioritise the study of these areas at the expense of their well-being. Finally, if there is evidence from both human and non-human cases of ratiogenic damage[27] that elements of the science culture are implicated, the resulting problems are not external but go to the heart of science as an ethical activity.

Ethical responsibility of the custodian role

Australians are fortunate to be the custodians of a rich and extensive heritage of biodiversity, which we have taken upon ourselves to protect. This heritage is threatened with decline, largely as a result of our own activities. As custodians we have ethical responsibilities of care. These obligations resemble those of a guardian towards a dependent placed in their care.

The protective obligations of guardianship are stringent: we have a well-developed ethics by which to judge a guardian's performance. Good guardians strive to defend their charges against harm. Here, harm can be understood in terms of three interrelated elements: warrant, degree, and the Doctrine of Double Effect.

Warrant means that causing harm is permissible if and only if there is good reason. For example, the pain caused by performing open-heart surgery is warranted only if the surgery is required to save the life of the patient or to prevent greater harm as a result of not performing the surgery. The pursuit of knowledge may not be a sufficiently good reason to warrant harm.

Degree means that how much harm is caused must be taken into account. A minor, temporary injury may be permissible, while a major, lingering or permanent injury is not. Degree has two important aspects: severity and longevity. To pull a single scale from a snake may not do it great or lasting damage. To pull a single wing from a fly condemns it to death. Also the degree of severity must be understood relative to the entity. Thus, to shave off the whiskers of a man may merely change his appearance, while shaving the whiskers (vibrissae) of a fur seal may condemn it to starvation, if it uses them for food location.

The Doctrine of Double Effect assesses the permissibility of an act. It distinguishes between what is *foreseen* as an effect of an action and what is *intended* as the effect of an action. Under this doctrine for an act to be permissible, the act must itself be morally good. The agent foreseeing the bad effect must not intend it and should seek alternative courses of action. The good effect should not be brought about by means of the bad effect; and the goodness of the intended act must outweigh the bad effects foreseen.

In the guardian's case the duty is to promote the flourishing of their charges. It is also to exercise care: for example, not to take risks and to follow the Precautionary Principle if in doubt. The Intergovernmental Agreement on the Environment defines the Precautionary Principle as:

[27] See glossary definition.

Where there are threats of serious or irreversible nvironmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

In the application of the precautionary principle, public and private decisions should be guided by:
(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
(ii) an assessment of the risk-weighted consequences of various options.

Because the powers of the guardian role are so great, and because they offer a potential for serious abuse, there is usually a requirement for public oversight of the guardian role.

Consequent to the guardian's duty of care, they may have need to gain knowledge about their charge. It would never be proper for this to take precedence over the welfare of the charge. A good guardian would never knowingly allow or initiate knowledge-gaining projects in application to a child, for example, involving that child being infected with a serious disease in order to learn about the course of the disease. Such an action would be universally condemned as violating the ethical requirements of the guardian role.

Non-humans and the guardian role

Ethical obligations of care and knowledge should be applied to our custodial relationships with non-humans. They are not sensitive to whether those for whose welfare we are charged are human or non-human. To admit such obligations, we do not need to decide whether ethical consideration for non-humans derives from their intrinsic worth, from our mutual interdependence, or from our own well-being. For instance, the obligations may arise from a position such as that of Aldo Leopold's Land Ethic, "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."

All these motives may be operative and all may be justified. Whether we are guardians of these areas for the human generations of the future or to provide for the benefit of the non-human organisms protected areas contain, our primary obligation is that of care and protection.

Ethical principles of care for protected areas

What does this ethical model of guardianship imply about protected and sensitive areas? To the extent that the obligation to protect such areas arises from damage caused by our own activities, there is an obligation to regulate these tendencies to damage. As in the human case, the guardian role requires high standards of probity and public oversight of custodial bodies to check the potential for abuse.

Experiments that violate the basic ethical principles devalue those experimented upon and greatly overvalue the importance of knowledge gathering. They mock the concept of a "protected" area by harming what they claim to protect. In such cases the ethics of the guardian relationship are violated.

Responsibility for protected and sensitive areas requires learning about them, but this should not be allowed to predominate over the need to protect and care for them. Yet this is implicit in experiments that undertake intentional damage in order to study the damage process or the expected recovery process. "Intentional damage" violates at least two precepts of the Doctrine of Double Effect, in that the agent foreseeing the bad effect intends it and either does not seek alternative courses of action or attempts to bring about the good effect by means of the bad effect. The goodness of the intended act may not outweigh the bad effects foreseen.

Under controlled conditions, simulation of activities allowed in an area under the prevailing management regime may be permitted to determine whether such activities are sustainable. The results of such experiments can be important catalysts for the discontinuation of unsustainable practices, especially in protected areas zoned for multiple use.

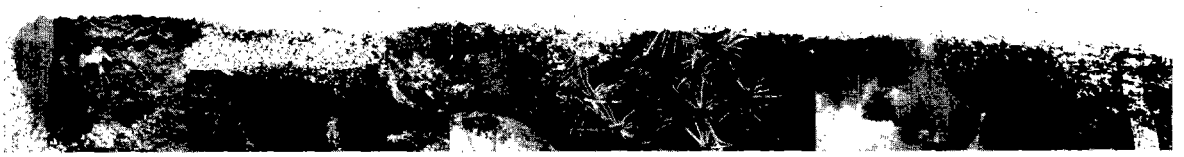
Prudence and protection

Scientific knowledge at the expense of protected areas usually offends the standards of the broader community, which may value protected areas as ends in themselves. Research in protected areas in support of greater exploitation involves values many would reject. Those who value knowledge without consideration of its social context risk being accused of arrogance. This tendency is related to Western traditions, which have valued reason at the expense of nature.

Protected areas provide a valuable and increasingly scarce knowledge resource as benchmarks or controls for manipulative research. In an unregulated context no countervailing mechanism can maintain the integrity of these areas or halt any decline in their values. To the extent that the cumulative impacts of manipulative research erode the ecological status of protected areas, the quality of research based upon their use as benchmarks must suffer.

In all other activities in protected and sensitive areas, regulation is required. There is no case for an exception for knowledge gathering activities. Although many individual scientists are highly concerned people, treating ethics solely as a matter of personal concern is inadequate. An ethical science requires both individual and institutional forms of care and responsibility.

Review of the ethics of research in protected areas is in the interests of both conservation and knowledge. Such developments may place greater demands on individual researchers but there will be benefits for both knowledge and society.



ATTACHMENT 6

AN ANIMAL WELFARE VIEW ON PROTECTED AREAS AND RESEARCH

This Attachment has been prepared by ASTEC Study Group members, in consultation with the particular groups whose interests they share. It is not intended as a definitive or permanent statement of the positions of the interested groups, but rather to place on record matters of concern, in the context of a document to be considered by regulatory authorities.

There has been legislation in Australia to protect animals since late last century. This reflects the long standing interest of the community in animal welfare. In recent years public interest in animal welfare issues has accelerated throughout the western world. Media coverage and education in schools about domestic animals and animals in the wild have increased community interest in and awareness of animal welfare issues particularly amongst the younger generation. This has lead to increasing demands for public participation in decisions on the ways in which animals are treated in our community. For example, in most developed countries there are now statutory requirements for community representation and formal ethical consideration of the use of animals in research and other scientific procedures, and an array of controls and regulation for the manner in which we deal with companion animals and farm animals.

Many animals besides humans are sentient[28]. Their lives can be enriched or impoverished. What happens to them matters to them. Similarly, they have interests, although they may be difficult to define and are different from those of human beings. The Senate Select Committee on Animal Welfare in its report on Animal experimentation recognised

[28] See glossary definition.

this and the resulting obligations this places on human animals. As quoted by the Committee from Dr Arthur Caplan's submission:

> Human beings bear the burden of being responsible moral stewards from respecting and protecting the interests and welfare of those creatures which are alive and do have minimal levels of sentience... Both the capacity for a full mental life and the ability to suffer place demands on the responsible moral agent that are sufficient in themselves to demand compliance and discharge. Animals deserve no less respect than that which we accord the most helpless and vulnerable members of our own species.[29]

This community concern for the well-being of domestic and farm animals, and those used in all forms of research, is also spreading to cover the welfare and interests of wildlife. This has reached a climax of late with the disputes that have a risen over manipulative experiments in the Great Barrier Reef region, and similar issues and instances in other regions of Australia. This simply reflects an ethic and value system that has always been present and demonstrable within many levels of society; to treat all life with respect and compassion, and to be concerned with the values represented in all living things.

These sentiments are echoed in the Goal of the National Strategy for the Conservation of Australia's Biological Diversity, which recognises that "We share the Earth with many other life forms that have intrinsic value and warrant our respect, whether or not they are of benefit to us."

Researchers who use wildlife and wild places can no longer remain immune from growing community concern about some aspects of research investigation, and the need to fully ensure that the welfare of native animal species are accounted for both directly and indirectly.

Community concern for the welfare of animals needs to be reflected in any consideration of the use of all protected areas for research and teaching. Activities which directly or indirectly impact on animals and animal communities within these areas must take into account the risks or negative impacts this may have on the welfare of animals within these environments. Activities which directly affect animals may include observation, recording, surveying, collecting and manipulating animal populations. Indirect affects may occur with pressure on these animals from habitat manipulation and any increase in human activity within these areas.

Much effort has been put into other areas of animal welfare including the production of food, the production of new medical procedures and drugs and responsible pet ownership. Wildlife research in protected areas must also be subject to a set of enforceable rules that guard against the potential for harmful and exploitative experimentation. Such protection is an inevitable and inexorable part of growth towards a more peaceful and humane society.

[29] See references

ATTACHMENT 7

A RESEARCHER'S VIEW ON PROTECTED AREAS AND RESEARCH

This Attachment has been prepared by ASTEC Study Group members, in consultation with the particular groups whose interests they share. It is not intended as a definitive or permanent statement of the positions of the interested groups, but rather to place on record matters of concern, in the context of a document to be considered by regulatory authorities.

Research is one of the major uses of protected areas. The validity of research activities in this form of land tenure is widely attested by reference to scientific research in acts and statutory documents, such as management plans. The presentation of the natural values of protected areas is also a widespread statutory responsibility.

Irrespective of legal recognition, scientific research can benefit natural values in all environmentally sensitive areas, protected or not, in two major ways. Firstly, scientific research is needed to ensure that use and management are such that no natural values are lost or unacceptably degraded. For example, it may be impossible to maintain populations of a threatened native herb without knowing something of its regeneration needs and susceptibility to various types of disturbance. Secondly, scientific research forms the basis for much of the interpretation of natural areas. People like facts about nature, and scientific research provides this information. People who know that they are standing on a glacial moraine, pushed there by the snout of a river of ice 13,000 years ago, have a more enriching experience than they would if they thought they were merely standing on a low, rocky ridge.

There is no doubt that the general public and managers see scientific research in protected and environmentally sensitive areas to be an immensely beneficial activity, and that their perception is correct.

Most scientific research in protected and environmentally sensitive areas leaves little or no perceptible evidence in the landscape. However, some questions that need scientific investigation for management or interpretation purposes can only be addressed by manipulation of natural systems in carefully designed experiments. For example, there may be some circumstantial evidence to suggest that patch burning is necessary to maintain a diversity and abundance of wildflowers in a native grassland. But this evidence is not clear cut. Managers might be wary of burning large areas of grassland, without reasonable certainty that such burning will be beneficial. Carefully controlled burning experiments in small areas of grassland will lead to a greater certainty in relation to the desirability, or otherwise, of such burning for the purpose of herb regeneration.

While such manipulative experiments will damage natural systems to some degree, the potential benefits from the knowledge gained from them will be perceived to far outweigh the harm. The harm is usually minimised by undertaking experiments in the smallest possible areas, which usually represent a minuscule proportion of the total area of the ecosystem under study.

Most scientists who work in protected areas are highly reluctant to damage natural systems, because their motivation for working in these areas is a desire to aid the conservation of nature. Scientists have been a major force in improving reservation and management of natural ecosystems in Australia. For example, the removal of cattle from the Snowy Mountains was strongly, and successfully, argued for by the Australian Academy of Science, and the constitution of the Ecological Society of Australia impels it to work towards reservation for nature and recreation.

Nevertheless, there have been occasional instances of manipulative experiments in natural systems that most scientists, managers and members of the public would agree to have been unethical.

Most scientists who work on manipulative experiments in protected and environmentally sensitive areas would welcome the development of strong guidelines. However, they would not welcome procedures based on such guidelines that divert a substantial part of their scarce time from the socially and environmentally beneficial activity of their research.

Natural science funding, and especially research funding directed towards the gaining of knowledge for its own sake, or towards the maintenance of natural values, is in a state of crisis in Australia today. Thus, loss of research time will create more harm than good for protected and environmentally sensitive areas. However, the certainty provided by widely accepted guidelines is highly important. Much scientific research in natural areas is undertaken by honours and postgraduate students, who have timelines that do not permit either protracted approval processes, or truncation of their work in midstream. Strong guidelines and time-efficient approval processes will allow such students, and other scientists, to develop projects that have a low risk of rejection within a reasonable time frame.

ATTACHMENT 8

TYPES OF PROTECTED AREAS AND RELEVANT LEGISLATION IN AUSTRALIA[30]

[30] Derived from *"Terrestrial and Marine Protected Areas in Australia (1997)"*, edited by ID Cresswell and GM Thomas, available from Biodiversity Group, Environment Australia, Department of the Environment, GPO Box 636, Canberra ACT 2601.

JURISDICTION	DESIGNATIONS	LEGISLATION
COMMONWEALTH	**National parks:** Relatively large areas declared under the National Parks and Wildlife Conservation Act 1975 which contain representative samples of major natural regions, features or scenery of national or international significance where plant and animal species, geomorphological sites, and habitats are of special scientific, educational, and recreational interest. **National nature reserves**, marine national nature reserves: Nationally significant areas declared under the National Parks and Wildlife Conservation Act 1975 primarily for nature conservation. **Marine parks, marine reserves:** Large, nationally significant areas declared under the National Parks and Wildlife Conservation Act 1975 or the Great Barrier Reef Marine Park Act 1975 (in the case of the Great Barrier Reef Marine Park) primarily for protection of the marine environment and its biota. Marine parks are zoned to allow for various activities. Mining and oil exploration are prohibited in the Great Barrier Reef Marine Park. **Historic shipwreck protected zones:** Areas proclaimed under the Historic Shipwrecks Act 1976. **Specially protected areas:** This designation is used under the Antarctic Treaty for areas of outstanding scientific interest which are accorded special protection in order to preserve their unique natural ecological systems. **Sites of special scientific interest:** Under the Antarctic Treaty, such a site may be an area that needs protecting for any sort of scientific investigation an undisturbed reference area for a particular science, an area where there is a demonstrable risk of interference or an area in which there is exceptional scientific interest and which needs long term protection.	**National Parks and Wildlife Conservation Act 1975** **Great Barrier Reef Marine Park Act 1975** **Antarctic Treaty (Environment Protection) Act 1980** **Heard Island and McDonald Islands Act 1953** **Historic Shipwrecks Act 1976** **Australian Heritage Commission Act 1975**
AUSTRALIAN CAPITAL TERRITORY	**National parks:** Extensive areas for the conservation of natural ecosystems, enjoyment and study of the natural and cultural features and compatible public recreation. **Nature reserves:** Smaller areas of land set aside primarily for nature conservation, education, study, and compatible recreational use. **Other reserves:** Areas of land set aside for both conservation and compatible recreational use; legislative protection variable.	**Nature Conservation Act 1980** **Public Parks Act 1928–66** **Land (Planning and Environment) Act 1991** **Nature Conservation Act 1980**
NEW SOUTH WALES	**National parks:** Relatively large areas set aside for their features of predominantly unspoiled natural landscape, flora and fauna, permanently dedicated for public enjoyment, education and inspiration, and protected from all interference other than essential management practices, so that their natural attributes are preserved. **Nature reserves:** Areas of special scientific interest containing wildlife or natural phenomena where management practices aim at maximising the value of the area for scientific investigation and education purposes. **State recreation areas:** Permanent reservations in the form of large regional parks established	**National Parks and Wildlife Act 1974** **Wilderness Act 1987** **Forestry Act 1916** **Fisheries and Oyster Farms (Amendment) Act 1979** **Marine Parks Act 1997** **Lord Howe Island Act 1953**

	to provide recreational opportunities in an outdoor environment. **Historic sites:** Areas preserved as the sites of buildings, objects, monuments or landscapes of national importance. **Wilderness areas:** Areas that are in a state that has not been substantially modified by humans or is capable of being restored to such a state. **Aboriginal areas:** Places of significance to Aboriginal people or sites containing relics of Aboriginal culture. **Flora reserves:** Land set aside for the preservation of native flora and the natural environment. **Aquatic reserves:** Aquatic environments requiring protection and management to ensure future fisheries are maintained for all users. Under the State's fisheries legislation, 'fish' are defined as all aquatic animals with the exception of mammals. There is, therefore, a responsibility to protect a wide range of organisms, not just species that are commercially or recreationally exploitable. Aquatic reserves range from very small units of two to three hectares, representing a particularly sensitive area, through to more extensive areas of significant habitats and faunal assemblages. The larger units are generally declared in such a way that the area included provides a comprehensive management unit within which there is a zoning scheme to provide degrees of protection and reasonable levels of use which are consistent with the conservation values.	**Heritage Act 1977**
NORTHERN TERRITORY	**National parks:** Large areas of unspoiled landscape reserved for conservation, public enjoyment, education and inspiration. **Conservation reserves**: Areas set aside primarily for conservation of anthropological, natural or scientific values. **Nature parks:** Land reserved primarily for public recreation and enjoyment in a fairly natural environment. **Hunting reserves:** Areas set aside primarily for maintenance of game which can be harvested under permit.	**Parks and Wildlife Commission Act 1995 (Conservation Commission Amendment Act 1995); Territory Parks and Wildlife Conservation Act 1980; Nitmiluk (Katherine Gorge) National Park Act 1989; and Cobourg Peninsula Aboriginal Land and Sanctuary Amendment Act 1996. Fisheries Act 1988**
QUEENSLAND	**National park (scientific):** These areas are set aside to protect their exceptional scientific values while allowing controlled scientific study and monitoring. Management may include habitat manipulation to control any threatening process. Entry is by permit only. **National park:** National parks are declared to protect outstanding and representative examples of Queensland's natural environment and cultural heritage. The 'cardinal principle' for the management of a national park states that the area is to be managed to 'provide, to the greatest possible extent, for the permanent preservation of the area's natural condition and the	**Nature Conservation Act 1992 Land Act 1994 Forestry Act 1959–1987 Marine Parks Act 1982 Fisheries Act 1994 Heritage Act 1992**

protection of the area's cultural resources and values'. National parks are also managed to represent the natural and cultural resources and their values and to ensure that any use is nature-based and ecologically sustainable. Protected areas include the land below and the air above the land surface, however the depth and height can be limited by the regulation declaring the area.

National park (Aboriginal land) and national park (Torres Strait Islander land): Land owned or leased by Aboriginal or Torres Strait Islander people or national parks successfully claimed under the Aboriginal Land Act 1991 or the Torres Strait Islander Land Act 1991 can become national park (Aboriginal land) and national park (Torres Strait Islander land). These areas are managed in the same way as a national park, while taking into account Aboriginal traditions or Islander customs.

Conservation park: Conservation parks protect areas that do not meet the strict management criteria for national park classification. A conservation park is managed to conserve and represent the cultural and natural resources and their values and for permanent conservation of the natural condition. Conservation parks may be used to protect and manage scientific sites and special natural features. Trustees can be appointed to manage a conservation park.

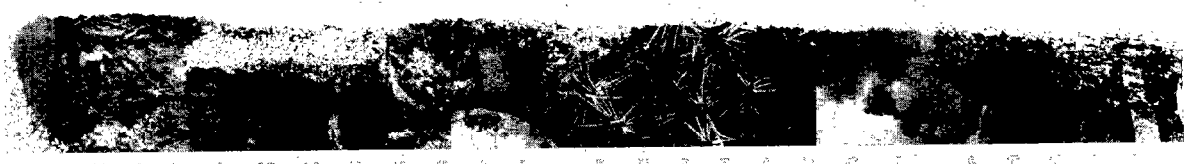
Resources reserve: Resources reserves are declared over areas of State land of high conservation value, where, for some reason, national or conservation park reservation is not possible. Areas subject to limited resource use such as fossicking or mining may fall into this category. A resources reserve is managed to recognise, and, if appropriate, protect the cultural and natural resources, provide for the controlled use of those resources, and ensure that the area is kept mainly in a natural condition. Trustees can be appointed to manage a resources reserve.

Nature refuge: A nature refuge can be declared over State land or private land, and is managed to conserve the area's significant natural resources, provide for the controlled use of those resources, and take into account the interests of landholders. Landholders can apply to have their property declared a nature refuge.

Coordinated conservation area: A coordinated conservation area can be declared over State land, or private land with the consent of landholders, and provides for coordinated management of adjacent areas of varying ownership or tenure. An area so designated is managed to conserve the area's natural and cultural values, and take account of educational, commercial, recreational and other values. Landholder interests must be maintained.

Wilderness area: Wilderness areas can be declared over State land, or private land with the consent of landholders. Wilderness areas are managed to protect or restore wilderness values and the cultural and natural resources of the area, minimise human interference, and to provide opportunities for solitude and appropriate recreational and spiritual activities.

World Heritage management area: An area on the World Heritage list can be protected under this category. The area is managed to meet international obligations, protect the cultural and natural resources and biological diversity and to transmit the area's World Heritage values to future generations.



International Agreement Area: An international agreement area can be declared over an area that has internationally significant values. International agreement areas are managed to maintain the area's international conservation importance and conserve the area's wildlife habitat. Landholder interests must be taken into account.

Reserve (or Deed of grant in trust) for Environmental Purposes: Land declared for environmental purposes under the Land Act 1994, where the environmental attributes of that land warrant protection but do not meet the specific criteria required by the Department of Environment.

Reserve (or Deed of grant in trust) for Natural Resource Management Purposes: Land declared for natural resource management purposes under the Land Act 1994, most commonly used as an interim step to safeguard any community, environmental or natural resource utilisation needs which may have been identified within areas of unallocated State land, but are not clearly defined. The primary potential use of the land should contain a strong conservation or environmental protection element.

Reserve (or Deed of grant in trust) for Scientific Purposes: Land declared for specific scientific studies under the Land Act 1994 relating to flora and fauna, the management of fossil fields, and in one case, the establishment of a marine research institute.

Scientific areas: Areas of native forest selected and managed to preserve significant natural ecosystems and to provide for their scientific investigation.

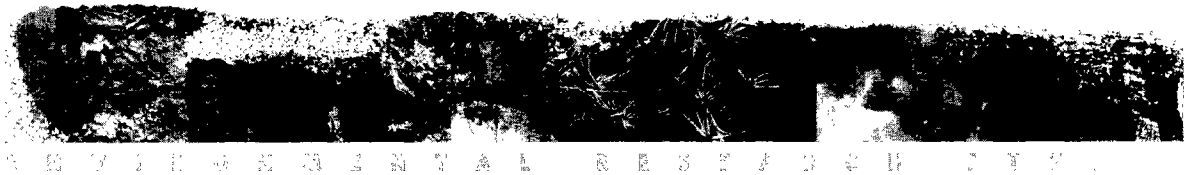
Feature protection areas: Areas that may possess one or more of the following qualities: outstanding natural beauty; spectacular biological or geological features; unique or unusual qualities; representative examples of landscape of high scenic quality in locations which are readily accessible or visually sensitive; and significant stimulating or aesthetic sensory qualities, other than visual.

Marine parks: Multiple use marine areas encompassing some 'national park' and 'preservation' zonings over areas of total protection, declared for the protection of marine resources and allowing for the management of use of those resources. Because of their multiple use nature, marine parks are generally very large in size.

Fish habitat areas: Fish Habitat Areas have been declared throughout coastal Queensland to enhance existing and future fishing activities and to protect the habitat upon which fish and other aquatic fauna depend. Legal forms of taking fish and invertebrates for food or as bait are not restricted in a Fish Habitat Area except for worm digging or within closed waters under the Fisheries Regulations 1995. Developments that disturb a declared Fish Habitat Area are severely restricted, and limited to those with minimal impact to ecological processes and considered appropriate with the original intent of the Fish Habitat Area declaration

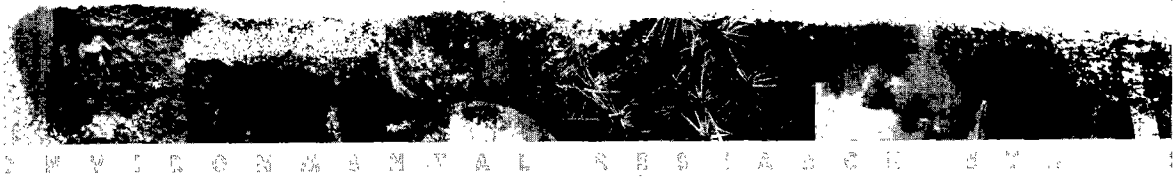
Place: Defined under the Heritage Act as a defined or readily identifiable area of land(which may be comprised in separate titles and in different ownership) and includes (a) a building and such of its immediate surrounds as may be required for its conservation ; and (b) a natural feature of historical significance and such of its immediate surrounds as may be required for its

	conservation. **Cultural Heritage** *Significance is defined under the Heritage Act in terms of a place or object and includes its aesthetic, architectural, historical, scientific, social or technological significance to the present generation or past or future generations.*	
SOUTH AUSTRALIA	**National parks:** *Protected areas 'of national significance by reason of the wildlife or natural features of those lands'. Generally they are contiguous areas of substantial size, often tens of thousands of hectares, with controlled provision for public visitation and enjoyment. They are reserves encompassing many natural values including scenic beauty, wildlife, history and inspiration to visitors.* **Conservation parks:** Lands that should 'be protected or preserved for the purpose of conserving any wildlife or the natural or historic features of those lands'. Although these areas may contain all or some of the features represented in national parks, they tend to be subject to less visitation by the public, and usually developed to a minimal extent. **Conservation reserves:** Lands that should be managed to conserve natural vegetation and wildlife while at the same allowing conditional resource use. Less stringent legislative protection applies than to conservation parks, but they nevertheless protect wildlife habitat and provide opportunities for compatible recreation use. **Recreation parks:** Lands that should 'be conserved and managed for public recreation and enjoyment'. These areas protect natural values, landscape, and historic sites but may also provide facilities for public recreation in a natural setting. **Game reserves:** Lands which should 'be preserved for the conservation of wildlife and management of game'. These areas have an important conservation role and may be declared open at prescribed times for strictly controlled hunting. Habitat manipulation is a permitted activity. **Regional reserves:** Lands that should be preserved for the purpose of conserving any wildlife or natural or historic features of the area while at the same time permitting the utilisation of the natural resources of the land. Regional reserves allow for mining and grazing to occur under controlled conditions. **Native forests reserves:** Areas of native vegetation, within forest reserves, that are a significant size and/or have important ecological features. **Wilderness protection areas:** Land that should be protected to preserve, or be restored to, its pre-European nature: substantial and contiguous areas of land remote from the negative impacts of modern technological society, generally untracked. Managed with minimal development, and providing opportunities for self-reliant low impact recreational use. **Wilderness protection zones:** Land that should be protected to preserve, or be restored to, its pre European nature but over which there is an existing mining tenement. Exploration and mining rights remain until abandoned or completed only if they are proclaimed simultaneously with the zone, and are brought under wilderness management by conditions at proclamation	**National Parks and Wildlife Act 1972** **Fisheries Act 1982** **Fisheries Act (Aquatic Reserves) Regulations 1984** **Forestry Act 1950** **Historic Shipwrecks Act 1981** **Wilderness Protection Act 1992** **Crown Lands Act 1929**



	and compliance with the wilderness code of management. **Aquatic reserves and marine parks:** Any waters, together with the bed beneath, or land and waters, proclaimed pursuant to the Fisheries Act 1982 to be a reserve. The objectives of both reserves are to: preserve biodiversity and examples of different marine habitats, protect endangered species, conserve nursery areas for economically important species, and serve as educational sites. **Historic shipwrecks:** Shipwrecks protected under the Historic Shipwrecks Act 1981.	
TASMANIA	**State Reserves:** Areas established under the National Parks and Wildlife Act 1970 specifically for conservation. No rights to exploit may be granted unless provided for in a management plan approved by both Houses of Parliament. Revocation of State reserves requires the approval of both Houses of Parliament. State reserves are assigned titles according to their principal management objective, as follows: • National parks: Extensive areas for the conservation of natural ecosystems, and enjoyment and study of the natural environment, with provision for community recreation. • State reserves: Generally small areas where the balance between conservation and recreation is maintained. • Nature reserves: Areas set aside essentially for conservation of a particular habitat which is unique or important, with (in some cases) provision for recreation. • Historic sites: Areas of significance in terms of European exploration or settlement, with provision made for recreation. • Aboriginal sites: Areas containing relics of Aboriginal people or known to be of significance to them. **Game reserves:** Areas established under the National Parks and Wildlife Act 1970 for habitat protection. Although the habitat has the same protection as in a State reserve, provision is made for hunting of game (principally ducks and muttonbirds) **Conservation areas:** Areas established under the National Parks and Wildlife Act 1970 and subject to certain regulations, but extractive or exploitative developments are not necessarily prohibited and therefore there is not the same level of protection as in State reserves. Conservation areas require the approval of both Houses of Parliament for revocation except where they occupy private land, but do not provide any protection from the operation of other statutory powers unless this is provided for in a management plan. There are three types of conservation areas: • Conservation areas: Area established as a general management area (eg South-west Conservation Area). • Wildlife sanctuaries: Area set aside to fulfil particular wildlife conservation objectives (eg Gould's Lagoon Wildlife Sanctuary). • Muttonbird reserves: Reserves where special provision is made for private and commercial harvesting of muttonbirds.	**National Parks and Wildlife Act 1970** **Forestry Act 1920** **Living Marine Resources Act 1996**

	Forest reserves: Lands set aside within a State forest for recreational purposes, preservation or protection of any features of land of aesthetic, scientific, or other value, or the preservation of the fauna or flora. **Marine reserves:** Areas set aside for conservation, recreation and research objectives under both the National Parks and Wildlife Act 1970 and the Living Marine Resources Act 1996. Under the National Parks and Wildlife Act 1970 designations or titles reflect those outlined above. For areas set aside solely under the Living Marine Resources Act 1996 the designation will be Marine Resource Protected Area (no areas have as yet been declared).	
VICTORIA	**National parks:** Areas of Crown land, generally large, characterised by predominantly unspoilt landscapes, and their flora, fauna and other features, which are reserved, preserved and protected permanently for the benefit of the public. **State parks:** Similar to national parks in legal status and purpose but on average are smaller and less diverse. **Wilderness parks:** Large natural areas which are substantially unmodified by the influences of European settlement of Australia, reserved to protect and enhance their wilderness condition and provide opportunities for inspiration, solitude and appropriate self-reliant recreation. **Other parks:** Areas of Crown land with landscape or other features of particular interest or suitability for the enjoyment, recreation and education of the public of, or in matter appertaining to, the countryside, which are reserved permanently and made available for the benefit of the public. **Marine parks:** Areas of coastal, intertidal or subtidal lands and overlying waters that, because of the nature of the land or the overlying waters, or because of their natural environments, are of conservation or scientific significance. Includes marine reserves, and marine and coastal parks. **Nature conservation reserves:** Areas of land and/or water of particular importance because of their significant flora or fauna values or natural habitat. Includes flora and fauna reserves, flora reserves, some wildlife reserves. **Natural features reserves:** Areas of land containing important elements of the natural environment, landscape and/or geological/geomorphological features that are of scenic or conservation significance. Includes reserves such as scenic reserves, bushland reserves, geological features reserves and some wildlife reserves. **Overlay Designations** **Wilderness zones:** See wilderness parks. Wilderness zones are currently all located within national parks. **Remote and natural areas:** Generally large natural areas managed to protect their natural environment and natural appearance, and to ensure that there is no incremental development.	**National Parks Act 1975** **Crown Land (Reserves) Act 1978** **Wildlife Act 1975** **Reference Areas Act 1978** **Heritage Rivers Act 1992**



	Remote and natural areas are currently all located within national parks. **Designated water supply catchment areas:** Areas of Melbourne's water supply catchments contained within Kinglake and Yarra Ranges National Parks in which the protection of the catchments and the maintenance of the water quality and otherwise protection of the water resources in those areas is paramount, and in which human activity may be restricted for those purposes. **Reference areas:** Areas of public land containing viable samples of one or more land types that are relatively undisturbed and that are reserved in perpetuity to be used as a reference for the comparative study of the land. Reference areas occur in a variety of tenures, including parks, reserves and State forest. **Heritage rivers:** Areas of public land in particular parts of rivers which have significant nature conservation, recreation, scenic or cultural heritage attributes. Heritage rivers occur in a variety of tenures, including parks, State forest and unreserved Crown land. **Natural catchment areas:** Areas of public land which are essentially undisturbed catchment areas. They occur in parks and State forest.	
WESTERN AUSTRALIA	**National parks:** Established for wildlife and landscape conservation, scientific study, preservation of features of archaeological, historic or scientific interest, and enjoyment by the public. They have national or international significance for scenic, cultural or biological values. **Conservation parks:** Established for the same purposes as national parks, but they do not have the same national or international significance. They have significant local or regional value for conservation and recreation. **Conservation/recreation reserves (5[g]):** Land reserved for conservation and recreation purposes. **Nature reserves:** Land reserved for flora and fauna and landscape conservation, scientific study, and preservation of features of archaeological, historic or scientific interest. Recreation that does not harm natural ecosystems may be allowed. **Marine parks:** Established for conservation of marine and estuarine habitats for recreation and nature conservation purposes, scientific study, and preservation of features of archaeological, historic or scientific interest. Areas may be zoned for commercial fishing on a sustained yield basis. **Marine nature reserves:** Established for conservation of marine fauna and flora and their habitats, scientific study, and preservation of features of archaeological, historic or scientific interest. Fishing and collecting are not permitted.	**Land Act 1933** **Conservation and Land Management Act 1984** **Fish Resources Management Act 1994** **Wildlife Conservation Act 1950**
INTERNATIONAL LISTINGS OF CONSERVATION SIGNIFICANCE	**World Heritage Areas** Australia's 11 World Heritage properties comprise a wide variety of land tenures including freehold, perpetual lease, pastoral lease, town reserve, State forest, national park, nature reserve, Aboriginal reserve and recreational and essential services reserves. World Heritage	**Convention Concerning the Protection of the World Cultural and Natural Heritage**

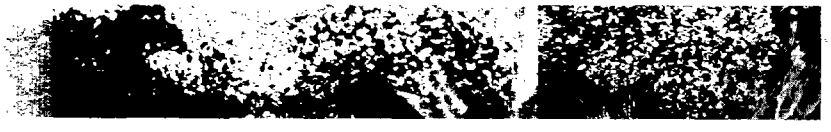
	listing does not affect ownership rights or control. Ownership remains as it was prior to nomination and State and local laws still apply. While the Commonwealth Government has an international obligation to protect and conserve World Heritage properties there is no impediment to existing land uses unless they threaten the universal, natural and cultural values of the property. In Australia management arrangements for World Heritage Areas vary from property to property. For all World Heritage properties, except Kakadu and Uluru-Kata Tjuta, there are joint Commonwealth/State management arrangements (through Ministerial Councils, committees of officials and community and scientific advisory bodies), with on-ground management carried out by State Government agencies. **Biosphere Reserves (12 in Australia)** Biosphere Reserves are areas nominated by a UNESCO member state which, because of their characteristic plants and animals and the way they are used by humans, have been given international recognition by the Man and the Biosphere (MAB) Programme of the United Nations Educational, Scientific and Cultural Organisation (UNESCO). The Worldwide Network of Biosphere Reserves is intended to eventually contain representative examples of all the major biogeographic regions, including a gradation of human interventions. **Wetlands of International Importance (49 in Australia)** The Convention on Wetlands of International Importance (Ramsar Convention) aims to promote the conservation of wetlands and waterfowl, to establish nature reserves on wetlands, to provide adequately for their protection and management and to train personnel competent in the fields of wetland research and management.	**(World Heritage Convention) - World Heritage Properties Conservation Act** **Conventions on Wetlands of International Importance (Ramsar Convention) - implemented under State and Territory legislation**

ACRONYMS

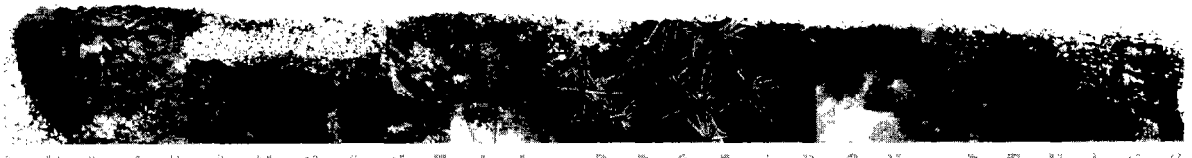
ASTEC	Australian Science, Technology and Engineering Council
AVCC	Australian Vice-Chancellors' Committee
CEO	Chief Executive Officer
NHMRC	National Health and Medical Research Council
EREAC	Environmental Research Ethics Advisory Committee

GLOSSARY

Activity	Research operations conducted in accordance with permit requirements.
Agency	Any government organisation.
Approval delegate	A person who has certain defined legal powers conferred on them authorising them to act on behalf of a management agency or a level of government.
Biodiversity	The natural variety of life in all its forms, levels and combinations, together with the environmental conditions necessary for survival. Biodiversity includes: regional diversity, ecosystem diversity, species diversity and genetic diversity.
Bioprospecting	The search for potentially valuable chemical compounds within biota.
Commercially important species	A species of animal or plant having desirable human uses (food, fuel, shelter, clothing, medicine *etc*) present in sufficient numbers to make commercial collection or harvesting economically viable.
Connections (Indigenous peoples' perspective)	A cultural element that describes the essential role played by a landscape in the life, culture and well-being of indigenous individuals and societies. "Traditional connections" refers to the elemental role played by a particular geographic area in the self image, heritage and economic well-being of an individual or a society, that has developed over many generations.

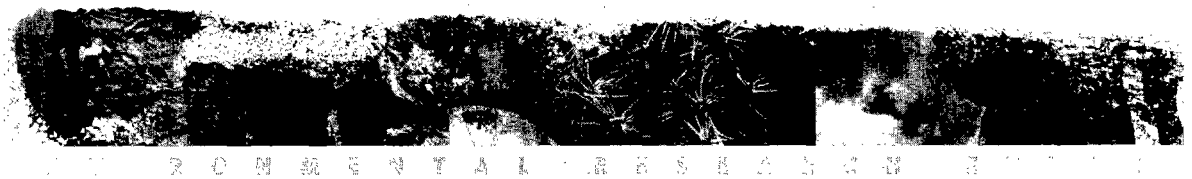



Conservation	The protection and maintenance of nature while allowing for its ecologically sustainable use.
Cultural Heritage	Aesthetic, historic, archaeologic or social value placed on movable or non-movable historic sites and artefacts by past, present or future generations.
Cultural landscape	Those parts of the earth's surface, including waterways, which have been significantly modified by human activity.
Damage	Harm (qv) that reduces usefulness, value, soundness or standing of something.
Day-to-day management	The implementation of management strategies in the field *eg* vessel patrols, track maintenance and routine monitoring.
Decline (of species or ecosystem)	A decrease in the abundance of one or more species; a decrease in the biodiversity of an ecosystem.
Deliberate damage	Intentional harm; harm that violates the Doctrine of Double Effect, qv.
Destructive techniques	Techniques of experimentation involving the destruction, disassembly or removal in whole or part of a system in order to gain an understanding of that system.
Double Effect, Doctrine of,	The doctrine or principle of assessing the permissibility of an act. It distinguishes between what is foreseen as an effect of an action and what is intended as the effect of an action. Under this doctrine for an act to be permissible, the act must itself be morally good. The agent foreseeing the bad effect must not intend it and should seek alternative courses of action. The good effect should not be brought about by means of the bad effect, and the goodness of the intended act must outweigh the bad effects foreseen.
Ecologically sustainable use	(a) use of an organism, ecosystem or other renewable resource at a rate within its capacity for renewal; or (b) use of living things or areas within their capacity to sustain natural processes while maintaining the life support systems of nature, and ensuring that the benefits of the use to present generations do not diminish the potential to meet the needs and aspirations of future generations.
Ecosystem	A community of plants, animals and other organisms together with the non-living components of their environment.



Endangered (species)	A species whose population (in a region or globally) has decreased, through habitat loss, predation, disease, environmental change or competition from other species, to the point where its continued survival is in doubt. In most if not all cases, such species are afforded formal legal protection.
Environmentally sensitive area	As distinct from a Protected Area qv. A contiguous area of land or water whose environmental values - as exemplified by the species diversity or the presence of rare or endangered species - are both unusual and sensitive to disturbance by the introduction of novel human activities. Such areas are usually in a condition similar to that in pre-European settlement times. Such areas are often candidates for formal legal protection status.
Extractive activity	Any activity that removes anything from an area. This includes fishing and collecting.
Habitat	The structural environments where a plant or animal lives *eg* mangroves, coral reefs, forests, forest canopy, soil, grasslands, rivers and lakes.
Harm	Having an adverse effect on an entity's interests, such as bodily injury and injury to central and legitimate interests, good or well-being. For the purposes of this paper harm will be defined in terms of warrant, degree and the Doctrine of Double-Effect.
Indigenous Australians	Aboriginal and Torres Strait Islander peoples
Intrude/ intrusion/ intrusive	Social: to introduce an entity not previously present that interrupts the normal functioning of the system, environment or society involved. Physical: to introduce a new element into a system whose presence affects the operation of that system by dint of interactions between the element introduced and those previously comprising the system.
Informed consent	Originally a legal doctrine introduced into clinical medicine in the United States. It refers to the need to stimulate the awareness of a party involved in a decision, and to provide such information as might be required by a reasonable and educated person, that they may take a decision with a clear understanding of its ramifications and likely outcomes.
Integrity	This document uses integrity two different but related ways. The ethical use is moral soundness, virtuous or freedom from corrupting influence or motive. This

	is a quality of character. The environmental use is systemic soundness. It is the state or quality of being entire or complete, or the quality of an unreduced or unbroken functional state. This is a quality of a system or region.
Management agency	Federal, state, territory, local government or statutory authorities with responsibility for management of protected or environmentally sensitive areas. They have the power to authorise access to areas or permit certain activities in these areas.
Net benefit	The degree to which benefits exceed negative impacts.
Outcomes	Visible or practical result, effect or product, for example, if an area is effectively managed in a natural or near natural condition in accordance with conservation goals and aims.
Output	The product of any activity viewed quantitatively, for example, permits and regulations in place that do not compromise the above outcomes.
Palimpsest	A document whose original inscriptions have been overwritten by later inscriptions: thus, by analogy, a landscape whose earlier cultural heritage has had superimposed on it the results of later cultural activities.
Population	A group of living beings of the same species occupying a particular place at a particular time.
Precautionary Principle	A principle dictating that where there is threat of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the Precautionary Principle, public and private decisions should be guided by careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and an assessment of the risk-weighted conse quences of various options.
Process	A continuous change made up of a connected and related series of events; a process has a beginning in time and a completion, when the process stops; or a sequence of connected and related events. When natural scientists say they are seeking to "understand" or to "explain" observations, they usually mean to uncover the processes - sequences of interacting events - that led to the observation. The process of discovery can be direct or indirect, involving



hypothetico-deductive testing (see section on types of research). Examples of processes include the production of rocks from molten material, the weathering of rocks by action of wind and water, or the interacting events that determine the fluctuations in an animal population - birth, death from a range of possible causes, number of young produced before death, food supply (which means interaction with the dynamics of another population of a different species), effects of fluctuations in physical conditions, *etc.* Natural scientists refer to all these inter connected, interacting events as processes.

Project

A planned undertaking in a research field that is directed towards the accomplishment of a goal, such as the making of observations, the explanation of some observations, or the discovery of some process. A research project has stated aims, a plan, and a definable beginning and end.

Protected area

Part of the planet used for the prime purpose of genetic, species and land/seascape conservation and management. The protected area may include cultural components, appropriate sustainable use and benefit sharing, and will be managed by the owners through the most effective means to achieve the conservation objectives. Or an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.

Ratiogenic damage

'Reason generated' harm or damage; Giving a greater value than is warranted to or privileging a human activity, such as scientific research, on the grounds that any damage done by the activity is warranted or legitimated by the knowledge gained. Justifying accepting a harm to individuals, species and systems because the benefits provided by the resulting knowledge will outweigh the harm the activity might inflict.

Research

The action of obtaining and disseminating new information or insights.

Researcher

Someone who performs research. Also refers to supervisors and educators responsible for the supervision of research students. In organisations where responsibilities for decisions on conducting research programs are not taken by the person(s) collecting the data or undertaking the field work, the responsibilities of the researcher as described in this report also apply to the research manager(s).

Sentient

Having the capacity to perceive through use of the senses. Of an organism, usually refers to a higher animal with the capacity to be aware of its environment on other than a purely chemical level, in a manner similar to human beings.

Stakeholder	Any person (or group of persons), institution, organisation, agency, department, authority, club, association or the like with an interest in, association with or connection to an area. (Note that Indigenous Australians prefer to be considered landholders rather than stakeholders.)
Traditional Owners	Those indigenous people who have the authority to speak for the land/sea in question. They have a continuing spiritual and cultural connection with that land/sea that goes back to before white settlement. They are the custodians for the customary law of the land/sea area in question. Under non-indigenous law they are deferred to as the potential native title holders for that land or sea. The term is used here to cover all forms of traditional association between indigenous peoples and specific geographic areas, noting that the term has a formal legal interpretation in some jurisdictions. For example, the term as used here includes the secondary customary rights in an area of the indigenous peoples from neighbouring areas. The term should be understood in a more general context where used in this report.
Utilitarianism	The ethical doctrine that the rightness of an action is judged by the contribution it makes to the increase of happiness (good) or the decrease of misery (bad). Positive utilitarianism attempts to maximise the amount of happiness, pleasure, preferences, *etc*, as in the maxim, 'The greatest good for the greatest number.' Negative utilitarianism is the attempt to minimise the amount of misery. An action is right if and only if it produces at least as much good for all affected by the action as any alternative action by the agent.
Viability	Of an organism or ecosystem: having access to an environment benign to its continued existence into the indefinite future.
Welfare	The ongoing well-being of an individual, species, ecosystem or society.

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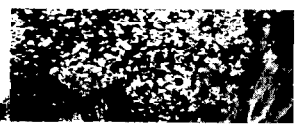

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