Threatened Species Strategy for Tasmania

Tasmania

DEPARTMENT *of*
PRIMARY INDUSTRIES,
WATER *and* ENVIRONMENT

Threatened Species
Strategy for Tasmania

Published by:

Threatened Species Unit
Nature Conservation Branch
Department of Primary Industries, Water and Environment
134 Macquarie Street
Hobart, Tasmania, 7000

ISBN: 0 7246 6208 1

Citation: Threatened Species Strategy 2000 Nature Conservation Branch,
Department of Primary Industries, Water and Environment

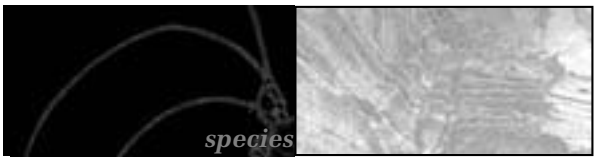
Published November 2000
Reprinted 2003

Contents

Contents i
Glossary ii
Executive Summary 1
Why a Threatened Species Strategy? 2
Extinction is Forever 2
The Magnitude of the Problem 2
Causes of Endangerment 3
Legal Obligations 4
Making it Work 4
The Benefits 5
What This Strategy Does 6
Principal Aims of the Strategy 6
Guiding Principles for the Strategy 6
Threatened Species Management 6
The Key Threatening Processes Approach 6
The Priority Threatened Species Approach 7
Implementing the Strategy 7
The Key Threatening Processes 8
Threat Abatement Plans 9
Native Vegetation Clearance 10
Pests, Weeds and Diseases 11
Degredation of Water Systems 13
Inappropriate Use of Fire 14
Inappropriate or Illegal Harvesting 16
Impact of Stock 17
Priority Threatened Species 18
Setting Species Priorities 18
Listing Statements 20
Critical Habitat 21
Recovery Plans 22
Land Management Plans and Agreements 22
Recognising Threatened Ecological Communities 23
Involving the Community 24
Community Education and Information 24
Community Involvement 25
Working With Land Owners, Land Managers and Industry 26
Social and Economic Factors 27
Research and Monitoring 28
Resourcing and Implementing the Strategy 29
Reviewing the Strategy 30

Tables

Table 1 Number of Tasmanian Threatened Species listed in 1998 2
Table 2 Key Threatening Processes and Examples of Biota Most Affected 7
Table 3 Examples of approaches to threatened species conservation which will benefit more than one threatened species 20
Table 4 Examples of Species Identified By Priority Criteria 20



Glossary

Agricultural Code of Sustainable Grazing Management: Code for the maintainance of natural systems and processes within agricultural grazing regimes.

Biota: All of the species of plants and animals at a particular locality.

Bycatch: The incidental catch of marine species that occurs while fishing for commercially harvested species.

Critical habitat: The whole or any part of the habitat that is essential to the survival of a species of flora or fauna listed on the *Threatened Species Protection Act 1995*, which may require special management considerations or protection.

Ecological community: An assemblage of native species that interact with each other and occupy a common geographical area in the wild.

Endemic: Confined to a particular area, so that for example, a Tasmanian endemic species occurs naturally only in Tasmania.

Extinct: Not located in the wild during the past 50 years and not in captivity or cultivation. Presumed extinct species are those that have not been found in recent years despite thorough searching.

Ex situ: In cultivation for plants and in captivity for animals (rather than in the wild), including situations where species are translocated to areas where they would not normally occur.

Fauna: Native animals, whether vertebrate or invertebrate, in any stage of biological development and includes eggs and any part of the animal.

Flora: Native plants, whether vascular or non-vascular, in any stage of biological development and any part of plants.

Habitat: The area, locality, site or particular type of environment, or any part of them, occupied or used by any flora or fauna.

Integrated Catchment Management: The sustainable development of land, water, vegetation and other natural resources on a catchment basis to achieve agreed natural resource management objectives.

Land: Includes land covered by the sea or other waters and any part of the sea or waters covering that land.

Landholder: The owner, occupier, manager, or controller of land or water or someone acting on their behalf.

Recovery plan: A plan made under section 25 of the *Threatened Species Protection Act 1995*, for any species of flora or fauna which is under threat of extinction.

Species: A population or group of individual flora or fauna which interbreed to produce fertile offspring or which possess common characteristics derived from a common gene pool.

Environmental Flows: Flows in river/stream situations required to maintain natural ecological processes.

Strategy: Considered system or approach for resolving a situation.

Taxon: A taxonomic group of any rank into which organisms are categorised.

Threat abatement plan: A plan made and in force under section 27 of the *Threatened Species Protection Act 1995*. The threat abatement plan deals with any process which, in the opinion of the Director, is a threatening process.

Threatened species: Flora or fauna that is listed in Schedule 3, 4 or 5 of the *Threatened Species Protection Act 1995*. That is, species or subspecies listed as extinct, endangered, vulnerable or rare.

Threatening process: Any process which, if continued, would pose a threat to the natural survival of any species of native flora or fauna.

Executive Summary

More than 600 species of plant and animal are threatened in Tasmania. They are classified according to their level of threat as endangered, vulnerable or rare in the schedules of the *Threatened Species Protection Act 1995*.

This Strategy has been developed to outline the approach to conserving Tasmania's threatened species and has the following aims:

- To ensure that threatened species can survive and flourish in the wild;
- To ensure that threatened species and their habitats retain their genetic diversity and potential for evolutionary development;
- Prevent further species becoming threatened.

The Strategy takes two broad approaches towards these objectives:

1. Addressing key threatening processes
2. Addressing priority threatened species

There are many threatening processes which impact on Tasmania's native flora and fauna. In this Strategy six processes are identified as having the greatest impact and are considered in detail:

- Clearance of native vegetation;
- Impacts of pests, weeds and diseases;
- Degradation of water systems;
- Inappropriate use of fire;
- Inappropriate and illegal harvesting;
- Impacts of stock.

Each of these processes is discussed, objectives are developed for addressing the process and a number of actions are identified. The success of these actions in mitigating each threatening process is measured with a range of performance indicators that are outlined for each process. Threat abatement plans are to be drawn up for each threatening process.

Addressing threatening processes as opposed to an individual species approach is not only efficient but more cost effective as single actions may help the conservation of several species.

Despite identifying, developing and implementing threat abatement plans, there will continue to be a need to address individual threatened species. The need may be urgent, there may be a number of threatening processes at work or there may be no particular process affecting the species but an action which can be simply addressed to conserve the species.

As there are so many listed species, it is necessary to prioritise those in greatest need of action. The Strategy looks at methods for prioritisation of individual threatened species. Factors considered may included the species' distinctiveness, its cultural significance, its reservation status or its level of endemism.

Seven primary mechanisms are addressed in the Strategy in order to integrate threatened species conservation across all sections of the Tasmanian community:

1. Community participation;
2. Working with land owners, land managers and industry;
3. Consideration of social and economic factors;
4. Establishing an adequate knowledge base;
5. Improving resources for implementing the strategy;
6. A recognition of threatened ecological communities;
7. Reviewing the Strategy.

A range of implementation actions has been developed to address each of these primary mechanisms.

This Strategy has been developed with the aim of involving all Tasmanians in the work of conserving threatened species. To be successfully implemented it needs the support, understanding and participation of all parties. It is important that the needs of landholders are taken into account and that economic and social impacts are fully understood by all sides. Endorsement of this Strategy by the key stakeholders including Government will be a major step towards its successful implementation.

The impetus for implementing this strategy must be driven by Government and its many arms especially the Threatened Species Unit of the Department of Primary Industries, Water and Environment but must also include the support of key community groups, e.g. Tasmanian Farmers and Graziers Aassociation and Tasmanian Conservation Trust. The mechanism for implementation will be through an Implementation Plan to be developed by the Threatened Species Unit which contains a budget linked to timeframe.

Why A Threatened Species Strategy?

Extinction is Forever

The current global rate of extinction of plant and animal species has no historical precedent and is disturbingly high, considerably greater than the rate of extinctions that would occur naturally. Within the last 200 years, Australia has seen a wave of plant and animal extinctions. So great is the human impact since European settlement that 50% of the known mammal extinctions worldwide since then have occurred in Australia. Tasmania is not untouched. The Tasmanian thylacine, once the largest carnivorous marsupial in the world, became extinct through overhunting, as did the Tasmanian dwarf emu and King Island emu. The Macquarie Island parakeet and and Macquarie Island rail became extinct mainly through the predation by feral cats introduced to the island. A significant number of plant extinctions have also occurred in Tasmania mainly through land development which resulted in the loss of habitat. Plants extinct in the wild in Tasmania include the giant New Holland daisy, the brown guinea-flower, the black bristle-rush and the coast banksia. In total, 41 plant and animal species are recorded as having become extinct in Tasmania in the last 200 years.

Government and community attitudes toward nature conservation have changed dramatically since European settlement. The days of bounties for the destruction of thylacines and wedge-tailed eagles are now no longer acceptable. Government policy is now reflecting that change.

The Magnitude of the Problem

The magnitude of the problem in Tasmania is highlighted by the listing on the *Threatened Species Protection Act 1995* of some 600 species of plant and animal recognised as being threatened. The status of thousands of other native species remains unknown. The number of threatened species may well increase as knowledge of our flora and fauna improves, especially of non-vascular plants and marine species which are at present poorly described and understood. Some species already at risk may not be currently listed. Most of the processes which have led to species becoming threatened are still operating and action is urgently needed to manage them.

Table 1: Number of Tasmanian threatened species listed in 1999

Group	Extinct	Endangered	Vulnerable	Rare	Totals
Broadleaved plants	22	30	47	187	286
Conifers	0	0	1	1	2
Ferns	1	1	6	11	19
Grasses, sedges, lilies	6	5	5	144	160
Lichens	1	0	1	2	4
Mammals	1	3	1	2	7
Birds	4	5	11	6	26
Reptiles	0	1	5	0	6
Amphibians	0	0	1	0	1
Fish	0	3	5	5	13
Invertebrates	6	10	19	83	118
Totals	41	58	102	441	642

Many ecological communities such as grassland and dry forests have declined significantly since European settlement. Some communities have been reduced to small remnants while others are highly restricted in distribution due to particular conditions such as an unusual rock or soil type. Such highly localised ecological communities are in a precarious position and are easily destroyed if disturbed. Loss of ecological communities may include loss of species specially adapted to these habitats or situations. This may include some species which have not yet been described, particularly invertebrates and non-vascular plants.

Threatened species are classified into 3 levels in Tasmania to reflect their risk of extinction. These are:

Endangered: taxa in danger of extinction because long-term survival is unlikely while the factors causing them to be endangered continue. Also includes species presumed extinct since European settlement.

Vulnerable: taxa likely to become endangered while factors causing them to be vulnerable continue.

Rare: taxa with small populations in Tasmania that are not endangered or vulnerable but are at risk.

Tasmanian Thylacine

Causes of Endangerment

Human actions represent the greatest threat to plant and animal survival and habitat. These include activities such as land clearing and development, inappropriate grazing or fishing, and individual recreational activities such as four wheel driving and even bushwalking. Human modification of natural processes such as the fire and flooding cycles or drainage patterns also affect species populations. When these actions threaten a species, they can be described as threatening processes. Threatened species cannot be adequately dealt with unless the process that has led to them becoming threatened is recognised and addressed. It is this connection that holds the key to conserving Tasmania's threatened species.

Tunbridge buttercup

In Tasmania threats to plant species are greatest in settled agricultural districts, especially the Midlands and eastern Tasmania. Here many native grasslands and grassy woodlands have been cleared, reducing available habitat for species such as the Tunbridge buttercup (*Ranunculus prasinus*) and eastern-barred bandicoot (*Perameles gunnii*). In heathlands and dry sclerophyll forests, the introduced plant pathogen Phytophthora cinnamomi is threatening many species, such as the heath Epacris barbata.

Weed invasion and changes to fire regimes may increase plant competition and prevent regeneration, increasing the threat of extinction for species such as South Esk pine (*Callitris sp. aff. oblonga*), which is already at risk because of habitat clearance.

Tasmania's animals are similarly threatened by habitat clearance and degradation. Many of Tasmania's threatened vertebrates are birds. Sea birds like albatross (*Diomedea sp.*) are threatened by inappropriate fishing practices, destruction of nesting sites and predation by introduced pests. Forest birds such as the forty-spotted pardalote (*Pardalotus quadragintus*) and swift parrot (*Lathamus discolor*) are threatened by loss of specific tree types. Freshwater fish are an extremely endangered animal group in Tasmania and include the endemic Pedder galaxias (*Galaxias pedderensis*), which is close to extinction following the flooding of Lake Pedder in the 1970s.

Invertebrates are a less well known group of animals but still feature prominently in the list of threatened species. Best known is the giant freshwater crayfish (*Astacopsis gouldi*) which has been threatened by fishing and modification to stream vegetation and water quality. Velvet worms, stag beetles and other ground dwelling insects rely on fallen logs, leaf litter and understorey species for survival. Loss of this habitat through too frequent burning, grazing, clearing or logging threatens these species.

Common threats to many of Tasmania's listed species can be readily identified. By addressing these threats across the State, the conservation of many species can be achieved in an efficient and cost effective manner. However, it is clear that some species listed as vulnerable or endangered are in need of immediate and individual attention if imminent extinction is to be avoided.

Pedder Galaxias

Legal Obligations, State, National and International Links

Governments around the world recognise the problem of threatened species as being of global importance. To address it, international conventions have been established that place obligations and responsibilities on member nations. These include the International Biodiversity Convention, the Convention on the International Trade in Endangered Species (CITES), The Convention on Wetlands of International Importance (Ramsar), Japan-Australia Migratory Bird Agreement (JAMBA) and China-Australia Migratory Bird Agreement (CAMBA). As a party to these conventions, the Commonwealth government and through it, the States, territories and the community have accepted the international responsibility to conserve Australia's biological diversity. Through the conventions, we not only recognise our duty to protect our own biological diversity as a component of the global biological heritage but also our responsibility to conserve the species that migrate seasonally to Australia therefore equally form part of the biological heritage of other nations.

The Commonwealth and Tasmanian governments have adopted a cooperative approach to conserving threatened species. A range of inter-governmental agreements such as the Intergovernmental Agreement on the Environment, National Strategy for Conservation of Australian Species and Ecological Communities Threatened with Extinction, and The National Strategy for the Conservation of Australia's Biological Diversity identify the responsibilities of Tasmania and the Commonwealth and means of implementing the strategies.

Programs such as the Natural Heritage Trust and the Regional Forest Agreement are national initiatives which include substantial provision for the conservation of threatened species.

The Tasmanian government has further provided for the conservation of threatened species and management of threatening processes through the provisions of the *Threatened Species Protection Act 1995*. In addition to a range of voluntary mechanisms and options, the Act provides for a number of formal instruments to conserve threatened species. These include the identification of critical habitat, imposing of interim protection orders, the making of land management plans, recovery plans and threat abatement plans, public authority management agreements and for the issuing of permits, etc. The Act has effect over all land tenures in Tasmania.

The Act also requires the preparation of a Threatened Species Strategy. The strategy is to include proposals for:

(a) ensuring the survival and conditions for evolutionary development in the wild, of threatened native flora and fauna;

(b) ensuring the identification and proper management of threatening processes;

(c) education of the community in respect to conservation and management of threatened native flora and fauna; and

(d) ensuring the availability of resources to achieve the objectives of conservation and management of threatened native flora and fauna.

The Strategy is also to consider:

- achieving its objectives with minimal social and economic impact; and
- the rights and interests of landholders and the community.

To connect protection of threatened species with wider land management requirements, the objectives of the threatened species protection system established by the *Threatened Species Protection Act 1995* are in support of the Resource Management and Planning System of Tasmania and its sustainable development objectives.

The Threatened Species Strategy for Tasmania will be an important component of the proposed Tasmanian Biodiversity Strategy and will ensure that a biodiversity approach will be taken towards threatened species conservation management. To be successfully implemented the strategy must be adopted by all other State instrumentalities in their policies, e.g. Forestry Tasmania, HEC, Department of Transport, etc.

Making It Work

The Threatened Species Strategy applies throughout Tasmania and covers the Tasmanian landmass, offshore islands and State waters. Responsibility for conservation of threatened species and their habitats rests with everyone in the community. Threatened species occur throughout the landscape on private land, in the forest estate, on Crown lands and in reserves in Tasmania and

throughout the marine environment. Threatening processes include activities undertaken directly or on behalf of all of us by governments, industry, landholders and the general community. Some practices and activities may not yet be widely understood as threatening processes and a problem for threatened species conservation.

Grassy woodland and sandstone land clearance

The government alone cannot conserve threatened species. Success relies on the managers and users of the land on which threatened species occur also being involved. The Tasmanian government recognises that protecting threatened species can coexist with other appropriate resource management and uses. To be successful and ensure ongoing support, the cooperation and involvement of landholders, industry and the general community is critical in managing for the conservation of threatened species, and in successfully reducing the numbers facing extinction. Together, all Tasmanians have a role to play and a duty of care to halt and reverse the negative trends that have taken place over the past 200 years.

Along with threatened species conservation, social and economic issues related to the use of their habitat are also significant issues for the future prosperity of Tasmania. Threatened species conservation needs to be integrated with social and economic concerns to provide long term benefits and security for all. The challenges of threatened species conservation and management are faced by the whole community. The rights and interests of landholders and the community need to be recognised in resolving threatened species issues by reconciling land management objectives with conservation goals.

Integration of the objectives for conserving threatened species with planning procedures is important. Threatened species issues can be identified and jointly resolved to provide understanding and lasting, successful outcomes. Everyone should have the opportunity to be involved.

The Benefits

Threatened species conservation provides a range of benefits and opportunities such as a competitive edge in marketing or solutions to broader land management problems. How well we deal with our environment, including threatened species, will have repercussions for Tasmania's "clean, green" image and is fundamental to ecologically sustainable development. The challenge to all Tasmanians is to ensure that while we meet our material needs, basic ecological and evolutionary processes are protected and we do not jeopardise the survival of our fascinating and unique wildlife.

Swift parrot

Benefits of Protecting Threatened Species

1. **The Web of Life**. All species are fundamental parts of systems which provide the basics of life, including the oxygen we breath, the water we drink, generation and maintenance of topsoil and pollination of crops. The accelerated loss of species indicates fundamental problems with our life support systems. We need to maintain the ability of our life support systems to respond to change.
2. **Intrinsic values**. The intrinsic right of threatened species to exist and their aesthetic and symbolic values are respected by many Tasmanians who wish to preserve our unique plants, animals and ecosystems.

3. **Economy**. The economic benefits of our native species and some of our threatened species are increasingly being recognised. They are an essential resource for developing biological control of pests and diseases and provide a tourist attraction.
4. **Genetic diversity**. Advances in biotechnology depend heavily on genetic diversity, for example, the development of crop species resistant to disease. Any loss of genetic diversity in species over time may mean an inability to evolve in changing environments and conditions, for example caused by climate change or disease outbreaks.
5. **International and national reputation and cooperation**. Tasmania benefits from meeting its international and national responsibilities. The result is a respect of our environmental credentials, greater cooperation from other States and the ability to sell Tasmania as "clean and green." These are achievements of which we can be proud.

What This Strategy Does

Principal Aims of the Strategy

The aims of the Tasmanian Threatened Species Strategy are derived from and are consistent with the objectives of the **Australian National Strategy for the Conservation of Australian Species and Communities Threatened With Extinction** which has been endorsed by the Tasmanian and Commonwealth governments. This provides for continuity and cooperation in approach between state and national threatened species management programs. The aims are to:

1. Ensure that threatened species can survive and flourish in the wild.
2. Ensure that threatened species in their habitats retain their genetic diversity and potential for evolutionary development.
3. Prevent further species from becoming threatened.

Guiding Principles for the Strategy

- We all embrace a duty of care for the protection of Tasmania's threatened species and ecological communities.
- We all share an obligation to meet state, national and international agreements and legislated responsibilities to conserve threatened species.
- By addressing the causes we can prevent many species becoming threatened
- Certainty is provided by the Strategy to ensure that both the public and private sectors can plan, invest and make decisions for the future of Tasmania.
- The challenges of conserving threatened species are shared equitably by the community.
- Conservation of threatened species is best achieved by managing their habitat and the processes that threaten them.
- Actions to conserve threatened species should be based on the best available knowledge.
- Threatened species conservation will best be achieved through a cooperative and voluntary approach with regulation and compulsion invoked only where necessary.

Threatened Species Management

The Strategy develops two approaches for cost effective action to conserve threatened species in Tasmania. These approaches are supported by the provisions of the *Threatened Species Protection Act 1995* which gives direction on species recovery plans, threat abatement plans, land management plans and agreements and public authority management agreements. The approaches address:

- key threatening processes; and
- priority threatened species.

The Key Threatening Processes Approach

Threatening processes are the cause of the decline and the endangerment of most of the species listed on the schedules of the *Threatened Species Protection Act 1995*. Threatened species themselves can be seen as the symptoms or products of threatening processes in action. The relationship between threatening processes and threatened species is clearly recognised and ameliorating these impacts is central to the delivery of this Threatened Species Strategy.

It is unrealistic to expect that protection and recovery of every species listed in the Act can be achieved by taking a species by species approach. The most efficient and cost effective way to manage most of the state's threatened species is to address the generic processes that threaten them and their

habitats. Threat abatement plans will be prepared for the key threatening processes identified in this Strategy.

Key Threatening Processes	Examples of Biota Most Affected
Native Vegetation Clearance	Grassland and grassy woodland species, hollow-nesting birds, wedge-tailed eagle
Pests, Weeds and Diseases	Species of riparian, lowland open forest and heathland communities, burrowing petrels, freshwater fish
Degradation of Water Systems	Aquatic invertebrates, cave fauna, burrowing crayfish, wetland and riverine species
Inappropriate use of Fire	Log dwelling fauna, litter and bark invertebrates, New Holland mouse, some heathland species, South Esk pine
Inappropriate and Illegal harvesting	Seabirds and marine species, freshwater crayfish, stag beetles
Impact of Stock	Orchids, palatable herbs, riparian flora

Table 2: Key Threatening Processes and Examples of Biota Most Affected

Prioritising threatening processes for management is based on the number of threatened species affected and their status. Addressing the following threatening processes is identified as the key to conserving the majority of threatened species and preventing further threats to Tasmania's biological diversity.

Recovery of threatened species can be an expensive and long term process and one which is often reactive to immediate problems. The concept that 'prevention is better than cure' is one which typifies good management and a responsible approach. A key element of this Strategy is not only to protect and restore threatened species in the immediate future but also, by addressing threatening processes, minimise further additions to the threatened species list.

Threat Abatement Plans can be developed focussing on generic threats, however, this may not always necessarily be the best approach in dealing with a threatening processes. Sometimes threats may more effectively be dealt with through Government policy, legislation or by responding to community consultation. For example, Government policy to control the indiscriminant clearance of native vegetation.

The Priority Threatened Species Approach

Notwithstanding the need to address threatening processes, there will also be a need to focus on individual taxa of threatened species because of the urgency of their problems. Many of the threat abatement programs may take decades to be effective and, in many instances, individual species cannot wait that long. Immediate remedial action is required. Recovery programs and management plans will focus specifically on these species and their particular threats at the local level.

Making the best and most effective use of limited resources is a high priority and creates a need to prioritise those species most in need of attention. It may not always be that the species which are classified as endangered are given highest priority. There may be other imperatives such as the immediate level of threat, national status, species endemic to Tasmania, and genetic significance which need to be considered.

In some situations it may be more effective to address several species in one recovery program, like burrowing crayfish or cave fauna, or to use catchment or regional approaches such as a Macquarie Island program.

Implementing the Strategy

Seven primary issues will be addressed in implementing the Strategy to facilitate the integration of threatened species conservation across the Tasmanian community. The Strategy will only be successful if it has the support of landholders and the community and if people have the knowledge and capacity to act.

1. Community participation by:
   - providing information to community groups and individuals;
   - involving community groups, land managers and individuals in nominating, planning, implementing and monitoring; and
   - encouraging access to the Community Review Committee, established under the *Threatened Species Protection Act 1995*.

2. Working with resource managers and industry by:
    - education and provision of information; and
    - integrating threatened species conservation with State Government, local government and industry planning processes and land management practices.
3. Considering social and economic factors by:
    - including landholders, community and industry concerns in planning processes;
    - establishing joint agreements and cooperative mechanisms between key stakeholders; and
    - ensuring the challenges of conserving threatened species are jointly shared by landholders, community and government.
4. Establishing an adequate knowledge base by:
    - Reviewing the status of threatened species;
    - establishing baseline data for monitoring and assessment;
    - investigating gaps in knowledge that will assist in the management of threatened species and threatening processes; and
    - undertaking appropriate research and investigation.
5. Improving resources by:
    - maximising opportunities for government funding to be directed to improving threatened species management;
    - encouraging threatened species management programs in government agencies, industry and the community; and
    - developing sponsorship, donations to the Threatened Species Trust Fund, and funding partnerships with the community, industry, tourism operators and Commonwealth government.
6. Recognising threatened ecological communities by:
    - defining and identifying threatened ecological communities;
    - implementing legislative changes; and
    - determining priorities for the protection of threatened ecological communities.
7. Reviewing the Strategy by:
    - monitoring implementation of the Strategy and programs developed under it; and
    - reporting on the progress of the Strategy.

The Key Threatening Processes

A threatening process is defined in the *Threatened Species Protection Act 1995* as any action which poses a threat to the natural survival of any native taxon of flora or fauna. These actions can influence the survival of species in the short or long term and can operate as a single threat or, more often, as part of a range of threats. Because we know that threatening processes place individuals and populations at risk, it is clear that, unchecked, they will inevitably cause the extinction of species.

Threatening processes adversely impact on species either directly, for example by predation, or by rendering their habitat or ecological community unsuitable for their survival. Often multiple processes act together and may not be restricted to a single ecological community or habitat. Threatening processes can operate throughout the landscape irrespective of ecosystem type, land tenure or jurisdictional boundaries. Many species suffer under the impact of the same threatening processes and often in the same location. It is therefore a strategic advantage to deal with the overriding threatening process rather than attempt management on a species by species basis. By identifying and addressing these threats at the strategic level we can not only achieve greater security for our most threatened species but adopt good management policies which protect all our flora and fauna.

Heathland clearance for housing

The key threatening processes acting in the Tasmanian landscape, and dealt with in this Strategy, are:

- native vegetation clearance;
- pests, weeds and diseases;
- degradation of water systems;
- inappropriate use of fire;
- bycatch and illegal harvesting; and
- impact of stock.

The "greenhouse effect" is also a key threatening process which impacts on species at risk as well as all nature conservation values. For example, some threatened alpine species may be at risk from global warming. Tasmania will follow national guidelines for greenhouse emissions to the levels agreed at the Kyoto Summit and other national initiatives devised to enhance our response to global warming.

Development and implementation of the actions listed below will help to ameliorate these threats and improve the long term future of many of Tasmania's threatened species.

These threats identified are a representative list but not exhaustive. There is always a need to be aware of the potential for new threatening processes to occur at any time. Invasion of the European fox, for example, is potentially a devasting threat to Tasmania's native fauna.

Woodland clearance, Spring Hill

Threat Abatement Plans

Threatening processes which impact on a range of species and ecosystems may be managed under a threat abatement plan. This is an effective way to conserve numbers of threatened species which share a common threat. The plan outlines clearly the steps needed to address the threats which may act upon a whole range of species, e.g. weed infestation displacing populations of native plants. The most significant threatening processes are identified in this strategy and, by addressing these threats in threat abatement plans, several species may be conserved with single actions.

Threat abatement plans should recognise approved processes such as the Forest Practices System and Regional Forest Agreement.

Managing significant threats to native flora and fauna in accordance with this strategy will help species listed as threatened and help prevent other species being added to the lists.

Objectives

The objectives of preparing threat abatement plans are to:

- lessen the impact of threatening processes on threatened species; and
- as far as possible, provide protection to a number of threatened species in one program.

Actions

1. Prepare a threat abatement plan for each of the key threatening processes identified in this strategy.
2. Identify and monitor other threatening processes and prepare a threat abatement plan for any which require it. Where species or communities extend beyond Tasmania, by agreement, work with relevant governments.
3. In the threat abatement plan identify, among other things:
    - the threatened species to benefit from the plan;
    - the characteristics of the threatening process;
    - the objectives of threat abatement;
    - any research needs;
    - actions required;
    - resources required; and
    - performance indicators

Performance Indicators

- Threat abatement plans for key threatening processes are in place.
- The impacts of threatening processes on species are decreasing.

Grassland restoration

Native Vegetation Clearance

Across Australia and indeed around the world, the rapid loss or degradation of native vegetation is acknowledged as the single biggest threat to the conservation of biodiversity and hence the most significant factor causing species to be threatened with extinction. At the international level, the Australian Government has committed itself to reducing land clearance. Nationally, the Commonwealth and all states and territories have agreed, through the Intergovernmental Agreement on the Environment, the National Biodiversity Strategy and the National Strategy for Ecologically Sustainable Development, to tackle this pressing issue.

While the total area cleared may be greater in other states, the clearance of native vegetation continues today in Tasmania at a significant level. Clearance takes place for commercial forestry, agriculture, industrial development, mining, residential expansion and even activities like firewood collection, and can target extensive native forests, grassland and woodland, riverine scrub or remnant vegetation bordering existing cleared land.

The need to put in place effective measures to retain and manage native vegetation is urgent. Tasmania has committed itself to such measures in both the Regional Forest Agreement and the Natural Heritage Trust Partnership Agreement. Some local governments have established comprehensive controls on vegetation clearance in specific contexts. It is hoped that approaches can be adopted which would lead to the reversal across the entire landscape, of the longterm decline in the extent and quality of native vegetation.

Many landholders and community groups are now undertaking restoration of cleared habitat in response to the clearing that has occurred in the past. This is a valid approach where there is insufficient intact habitat for the survival of a species, but it is not a substitute for controlling clearing. Restoration is slow, costly, and less assured of success than conserving and managing intact habitat.

Through the Regional Forest Agreement, Tasmania has committed itself to maintain identified forest communities at or above identified minimum levels in the native forest estate and the Natural Heritage Trust Partnership agreement commits the State to conserving threatened species and communities.

Objectives

The objectives for controlling clearance of native vegetation are to:

- protect listed species and their habitats threatened by clearance;
- retain critical habitat of any threatened species;
- ensure more species do not become threatened; and
- improve processes used for managing threatened species in native vegation.

Actions

1. Develop, in conjunction with other state instrumentalities which have an interest in land use regulation, a policy on the retention and management of native vegetation which:
    - includes incentives to maintain native vegetation cover and quality;
    - determines the limits to clearing and the conditions under which clearing can proceed;
    - requires the retention of critical habitat;
    - restricts clearing of remnant, unreserved and poorly reserved native vegetation types; and
    - limits clearance of native vegetation to a level which is consistent with ecologically sustainable development.
2. Monitor the rate and distribution of native vegetation clearance across Tasmania and publish the results of this monitoring every five years, pursuant to the State of the Environment reporting process.

3. Educate landholders about the values of native vegetation areas for threatened species conservation and promote the values of maintaining undisturbed vegetation cover for threatened species, including duty of care principles.
4 Develop and implement community involvement programs to encourage the retention and restoration of native vegetation such as:
    - nature conservation covenants;
    - stewardship and management agreements; and
    - voluntary off-reserve conservation programs such as 'Land for Wildlife'
5. Encourage local government to develop and implement programs for the protection and retention of native vegetation.
6. Regularly monitor and review land management practices and codes to ensure that the mechanisms to protect threatened species from land clearing are effective and being complied with. This could extend to a range of activities, for example firewood collection.

Performance indicators

- Identified critical habitats retained intact.
- A draft policy on native vegetation retention and management is prepared as soon as practical.
- There is a decline in the overall rate of native vegetation clearance.
- There is a reduction in the number of species listed because of native vegetation clearance.
- Species threatened by native vegetation clearance are no longer declining.

Native Vegetation Clearance and Threatened Species

The grasslands, grassy woodlands and forests that were once relatively widespread in the Midlands have suffered the greatest degree of clearance of any vegetation type in Tasmania. Due to habitat clearance many of the species that are confined to these grassy ecosystems have become severely threatened. The remaining habitat often occurs in small patches which remain under threat of clearance or severe degradation. Some plant species threatened by the clearance of grassy ecosystems are the bush pea (*Pultenaea prostrata*), Tunbridge leek orchid (*Prasophyllum tunbridgense*), Lemon beauty heads (*Calocephalus citreus*), blue devil (*Eryngium ovinum*), roadside wallaby grass (*Danthonia popinensis*), native soybean (*Glycine latrobeana*) and native peppercress (*Lepidium hyssopifolium*).

In order to save these plants, their habitats must not be cleared or degraded by fertilising and ploughing or other threatening processes. Appropriate management will ensure the necessary conditions for the species to reproduce and persist in the remnant habitats.

Once the most important habitats for threatened species are identified, land management plans and agreements can be negotiated with landholders for the retention and sustainable management of the habitat. Fencing and day to day management regimes that provide the opportunities for reproduction of each species will help. Success will mean populations of threatened species flourish in protected and well managed habitats.

Tunbridge leek orchid

Pests, Weeds and Diseases

Pests, weeds and diseases impact on nearly all native plants and animals but are particularly harmful to species already at risk. For example the soil borne fungus Phytophthora cinnamomi is now spread throughout lowland parts of the State weakening and killing many plants commonly found in heath, buttongrass sedgeland, dry sclerophyll woodland and low scrub. Over 15 threatened species including six Tasmanian endemics are under immediate threat from the root rot fungus and a further 24 threatened species, as well as some agricultural crops, are known to be susceptible.

Aquatic weeds such as willow (*Salix sp*), and Canadian pondweed (*Elodea canadiensis*) alter stream flows and the floristic composition of riparian and wetland communities. Japanese brown kelp (*Undaria pinnatifida*), introduced via ballast water, and rice grass (*Spartina anglica*), introduced to help stabilise mudflats and maintain shipping channels, have the potential to spread to suitable habitats around the coastline, displacing and threatening native species. The introduced northern Pacific seastar (*Asterias amurensis*) is affecting the marine habitat of the Derwent River and is thought to be a major cause of endangerment to the unique Tasmanian spotted handfish.

Objectives

The objectives for managing pests, weeds and diseases are to:

- control or eradicate pests, weeds and diseases;
- protect threatened species susceptible to them; and
- prevent the entry and outbreak of new pests, weeds and diseases.

Actions

1. Identify and prioritise the threats from pests, weeds and diseases.
2. Assist development of and implement the national threat abatement plan for *Phytophthora cinnamomi*.
3. Develop and implement integrated weed control techniques for major weed problems threatening species.
4. Support the preparation of national threat abatement plans for feral goats and feral cats and adopt policies to manage these and other feral fauna which impact on threatened species.
5. Prepare an emergency plan to deal with any introduction of foxes into Tasmania.
6. Promote responsible management and control of domestic pets and livestock.
7. Review quarantine measures to prevent further introductions of exotic flora and fauna particularly to offshore islands and the sub-Antarctic.
8. Manage exotic species in accordance with threatened species recovery plans and threat abatement plans.
9. Prevent rabbits reaching offshore islands currently rabbit free.
10. Integrate the conservation of threatened species into the regional weed management strategies and the State weed control strategies.

Performance indicators

- Pests, weeds and diseases that threaten species and communities are identified and prioritised.
- Successful control measures for priority pests, weeds and diseases are being implemented.
- Effective quarantine measures are in place.
- Effective systems are in place to respond to any outbreak of a new pest, weed or disease.
- No new pests, weeds or diseases are identified in the Tasmanian ecosystem.
- Species threatened by pests, weeds or diseases are recovering.

Phytophthora cinnamomi and Threatened Species

Epacris limbata is a small endemic heath species that was discovered in the mid 1980s and is yet to acquire a common name. It is only found between the southern end of the Douglas Apsley National Park and Hardings Falls, where it forms small isolated populations. The introduced root rot fungus *Phytophthora cinnamomi* is among the greatest threats to this species, which is listed as vulnerable. Once root rot fungus infects a population it cannot be removed and may eventually kill the entire population.

To maintain this species in the wild, actions need to be concentrated on those populations that can be most successfully protected. In these areas, the aim is to prevent the introduction of root rot fungus to the populations or contain its spread where it already exists.

In some cases, closing roads or tracks and applying hygiene prescriptions on the maintenance and use of those that remain open will help. Use of some areas may also be curtailed by discouraging entry or legally restricting access. This most suits remote populations such as one occurring in the Douglas Apsley National Park. Strict fire fighting prescriptions will also maintain a level of protection from root rot fungus while providing for practical fire protection. These may include excluding machinery and fire vehicles and establishing adjacent low fuel areas as a focus for fire suppression.

operations. Experiments aimed at reducing the mortality of plants through application of the fungicide phosphite have begun where populations are already succumbing to root rot fungus.

Ultimately, management success will be indicated by prevention or containment of infection by root rot fungus, reduction in mortality and regeneration.

Grass with Phytophthora cinnamomi symptoms

Pests and Threatened Species

At least 19 exotic species ranging from the weka, or flightless Maori hen, to horses and donkeys have been introduced to Macquarie Island since its discovery in 1810. Today the rabbit, deliberately introduced as a food source, the feral cat and the black rat are having a catastrophic impact on Macquarie's unique bird life. Individually (via predation) and in combination (overgrazing leading to predation) these three pests have caused the extinction of the Macquarie Island rail and Macquarie Island parakeet and have led to the listing of six species of burrowing petrel. Every species of petrel has seriously declined in number with the blue petrel, white-headed petrel and fairy prion now listed as vulnerable and the Antarctic tern listed as endangered near extinction. An eradication program for these three pests would not only conserve the status of the burrowing petrels but lead to complete restoration of the island's biota, a feature for which Macquarie is universally recognised.

Weka or flightless Maori hen

Degradation of Water Systems

Activities such as mining, wood production, agriculture, subdivision, roading, damming, landfill and irrigation all potentially impact on water channels, wetlands, and hydrological processes. These processes influence the quality, quantity, and availability of habitat within or surrounding the water body and may cause resident species to decline or become locally extinct. The loss of the soil profile and the vegetation it supports can result in increased run-off, siltation and turbidity of adjacent water bodies, and 'downstream' threats to aquatic and marine flora and fauna. Some species and habitats, for example caves, are highly sensitive to changes in water quality and flow. Maintaining the integrity of the water catchment, including its riparian vegetation, is imperative. There are currently 14 species of freshwater plants, 76 species of freshwater fauna, 12 cave species, and over 30 riparian plant species listed on the *Threatened Species Protection Act 1995*. In addition, Tasmania contains 10 of Australia's 49 wetlands identified as being of international significance (Ramsar sites), but only six are securely reserved for conservation purposes. Currently there are no freshwater riverine reserves specifically to protect freshwater species. This represents a significant ommission in the Tasmanian reserve system, particularly as so many of our native fish and aquatic species are threatened.

Objectives

The objectives for water systems are to:

- protect threatened species from damaging levels of pollution and habitat disturbances to water systems;
- maintain the ecological health of waterways by land management practices;
- maintain or restore natural water systems and hydrological processes; and
- establish a riverine reserve system where appropriate.

Actions

1. Work with other state instrumentalities which have an interest in land use regulation to develop and implement integrated catchment management policy guidelines.
2. Support the design and implement integrated catchment management plans which include measures to protect threatened species from pollution and habitat disturbance.
3. Encourage the development of an agricultural code of sustainable practice identifying management techniques for protecting water systems and water quality.
4. Support the development and adoption of a state wetlands policy and consider additional areas containing threatened species for inclusion on the Ramsar list.
5. Manage water systems, including wetlands, where necessary to protect threatened species.
6. Ensure water storage developments and drainage proposals include an assessment of impacts on threatened species.
7. Manage aquatic and riparian environments to protect threatened species.
8. Include threatened species conservation measures in the development of a State Environmental Flows Policy and any other policy dealing with water resource management.
9. Identify priority areas that could be protected as freshwater riverine reserves for threatened aquatic species.

Performance indicators

- Catchment management plans are in place throughout the state.
- An agricultural code of sustainable water management practice is in place.
- State policies dealing with water resource management include measures for threatened species conservation.
- Water management agencies recognise the importance of threatened species conservation.
- The rate of drainage of wetlands has decreased.
- Water quality of waterways has improved.
- Pollution and habitat disturbance have declined.
- Reserves are established to protect water systems particularly significant for threatened species conservation.
- There is no increase in the number of species threatened because of degradation of water systems.
- Species threatened by degradation of water systems are recovering.

Fairy tern

Degradation of Water Systems and Threatened Species

The inundation of Lake Pedder in the 1970s destroyed unique habitat for many species locally endemic to the area and introduced an array of exotic species like trout to the area. Since the flooding, the Lake Pedder earthworm (*Diporochaeta pedderensis*) has never been relocated, despite active survey, the swamp galaxias (*Galaxias parvus*) and Hickman's pygmy shrimp (*Allanaspides hickmani*) have seriously declined in range and the Lake Pedder galaxias (*Galaxias pedderensis*) remains on the brink of extinction, classified as endangered.

Another major water body, the Great Lake, contains nine threatened species which are confined to the lake bottom. These species, like those in Lake Pedder, are entirely reliant on water quality and maintenance of the lake ecosystem.

Inappropriate Use of Fire

Fire has played an integral part in the formation of the Tasmanian landscape over many thousands of years. Fire regimes have altered since European settlement to be more frequent in some areas and less frequent in others. Fire is currently used for pasture and rangeland management (burning off),

eucalypt regeneration (after logging), to manage the impact of wild fires (fuel reduction burning) and to enhance ecological properties (habitat management burning). Wildfires occur as a result of arson, escaped management fires, escaped campfires, other accidents, or lightning strikes.

All of our native flora and fauna is adapted to particular regimes of fire frequency and intensity, and for many species fire is an essential requirement. Species can persist under altered fire regimes but only if the changes do not prevent them from completing their normal life cycle and allow young to reach the adult breeding population. Hence the inappropriate use of fire refers to fire frequency and intensity that represents a threat to the survival of native species by preventing the life cycle from being completed.

Across all land tenures, fire management can create potential tensions between statutory responsibilities for protecting life and property and the need to manage threatened species. Organisations such as the Parks and Wildlife Service and Forestry Tasmania recognise this dilemma and more scientific information is required on which to base ecological fire management strategies.

Objective

The objective for managing use of fire is to:

- use fire as a management tool in an ecologically sustainable manner to enhance the survival of threatened native flora, fauna and habitats.

Actions

1. Identify areas of high conservation value for threatened species susceptible to adverse impacts from current fire regimes.
2. Increase understanding of the effects of fire on threatened species by establishing research and monitoring programs.
3. Determine appropriate fire management practices for the habitats of threatened species.
4. Include and implement fire management actions in recovery programs.
5. Address threatened species conservation in all fire management plans.
6. Complete and implement outstanding fire management plans for State Reserves and significant off-reserve areas.
7. Educate and train landholders and fire managers in relation to the ecological relationships between fire and threatened species.
8. Prepare and widely distribute fire suppression and management guidelines for protecting threatened species.

Performance Indicators

- Significant fire-threatened species and their habitats are identified and managed in an ecologically sustainable manner.
- Fire management plans and fire management recommendations in recovery programs are implemented.
- An education program is established and any necessary changes to fire management practices are implemented.
- Species threatened by inappropriate use of fire are no longer declining.

Inappropriate Use of Fire and Threatened Species

The South Esk pine (*Callitris oblonga*) and yellow eyebright (*Euphrasia scabra*) are threatened by inappropriate fire regimes. The first is threatened by frequent fire and the other by infrequent fire.

South Esk pine regeneration relies on seed which is held in cones in the tree's canopy and then released to germinate after fire. A single fire before young trees are old enough to produce sufficient numbers of cones to provide seed will drive the species to extinction at any site. In contrast, Yellow Eyebright is an annual plant that produces and releases seed into the soil every year. Because it has soil-stored seed that can germinate after fire and replenishes the seed store every year, yellow eyebright can persist in an environment of relatively frequent fire. However, if there is a long period between fires the vegetation often becomes too dense for annual species to germinate and survive. The longevity of seed in the soil and the period between fires determines the ability of Yellow Eyebright to survive.

Research on Yellow Eyebright

For species like those above we must assess the need to intervene and apply the appropriate fire regime in areas in which they are known to occur. By monitoring species response to fire management, that management can be adapted to any changes in the demography of species. In some cases, fire will need to be excluded from sensitive vegetation and habitats.

Inappropriate or Illegal Harvesting

Impacts from commercial or amateur activities can often result in added pressure on threatened species or be the direct cause of their decline. For example, longline fishing, drift net and trawl fisheries all result in incidental catch (bycatch) of non-target species and are a major cause of mortality for Tasmania's threatened albatross and other marine species, especially birds such as giant petrels. Threatened marine turtles become entangled in fishing lines after being attracted to buoys which are suspected to resemble jellyfish. They are also ingesting plastic. Gill net fishing often results in the loss of the net and/or entanglement of non-target species including small dolphins and whales.

Illegal collection and export of Tasmania's threatened stag beetles and cave species and, until recently, recreational fishing for species such as the giant freshwater crayfish (*Astacopsis gouldi*) are processes which have all contributed to the decline of these species.

Objectives

The objectives for managing inappropriate or illegal harvesting of flora and fauna are to:

- mitigate the impacts of inappropriate harvesting; and
- prevent illegal harvesting.

Actions

1. Develop or instigate threat abatement plans (including the adoption of national and international plans and agreements) for incidental bycatch resulting from deep sea trawling, drift net and longline fishers.
2. Implement management plans for sustainable harvesting of native flora and fauna where harvesting is appropriate.
3. Review the impacts of gillnetting on threatened species.
4. Assess impacts on threatened species of activities such as kelp harvesting in sensitive environments.
5. Provide guidelines for appropriate harvesting techniques where incidental impacts on threatened species occur.
6. Coordinate monitoring and enforcement to prevent illegal harvesting of threatened species.
7. Focus enforcement efforts on the priority threatened species that are subject to illegal harvesting.

Performance indicators

- National threat abatement plans are being implemented.
- The incidence of illegal harvesting has declined.
- Species threatened by inappropriate or illegal harvesting are no longer declining.

Inappropriate Harvesting and Threatened Species

Most species of albatross and giant petrel have foraging ranges stretching throughout the southern oceans. Therefore a collaborative effort and consensus of agreement between countries is needed to ensure their long term protection and survival.

Wandering Albatross, Macquarie Island

Tasmania has been at the forefront of developing ways to reduce the accidental death of seabirds, particularly albatross, from longlining and commercial fishing operations. The Macquarie Island Wandering Albatross (*Diomedea exulans*) has declined to just ten breeding pairs and is considered to be "Critically Endangered". Approaches have been to work directly with the fishing industry to develop improved techniques for setting longline hooks and trawl nets, to participate in national and international forums to

enforce fishing bans, setting of night lines, and seasonal constraints on a global scale. Industry is now aware of the urgency of the problem and the need for conservation practices.

Impact of Stock

Domestic stock graze in many native plant communities throughout Tasmania. Sensitive vegetation such as alpine, riparian and coastal communities can be easily destroyed or degraded through constant trampling of stock seeking water or feed. Stock can interfere with the habitat and successful breeding of a wide range of plants and animals and many native plants cannot withstand heavy grazing or browsing by livestock. This, in conjunction with other agricultural activities, can lead to some native species declining to the point of local extinction.

The greatest impacts of stock are caused by:

- repeated grazing of flowers that are essential for seed production and the continued survival of threatened plants;
- grazing of habitat plants that harbour invertebrates, or grazing of seedlings that are essential for maintenance and regeneration of the community;
- trampling of vegetation;
- damage to fragile ecosystems such as sand dune systems;
- soil compaction and erosion preventing seedling establishment;
- fouling of water;
- degradation of river and creek bank vegetation; and
- the spread of weed seeds from pastures into native vegetation.

On the other hand, many threatened plant species require some disturbance as a trigger to germination or to provide openings or new habitat for them to occupy. In restricted circumstances, removal of stock may mean loss of a regeneration niche for a species. Therefore a planned grazing regime is required to promote and maintain conditions suitable to sustain the ecological community.

Objective

The objective for managing the impact of stock is to:

- adopt stock management practices that prevent or minimise the specific and combined impacts on threatened species.

Actions

1. Develop and implement an agricultural code for sustainable grazing in consultation with landowners that includes provisions for threatened species protection.
2. Protect threatened species habitats from inappropriate stock access or grazing.
3. Protect threatened flora from grazing during flowering periods to ensure that seed is available for regeneration.
4. Determine and promote sustainable grazing regimes in areas of threatened vegetation sensitive to trampling and over-grazing.
5. Use tools such as fencing for temporary and/or permanent stock exclusion from areas containing threatened species.
6. Promote the use of alternative stock watering systems where impacts on threatened species occur.
7. Rehabilitate degraded threatened species habitats.
8. Provide extension services for landholders managing areas containing threatened species.

Performance Indicators

- An agricultural code of sustainable grazing management practice is in use.
- Critical habitat is protected from stock impacts.
- Viable populations of threatened species persist in grazed ecological communities.
- Ecologically sustainable grazing management practices are accepted and adopted by landholders.
- Species threatened by the impact of stock are recovering, with population increase in the wild.

Impact of Stock and Threatened Species

Native wintercress (*Barbarea australis*) is a riverine plant now found only along the Ouse, Mersey, the Shannon, the Nive and Clyde rivers and along a creek located in the eastern Central Plateau. These rivers are part of the ecosystem of one of Australia's most endangered vegetation types, the grassy woodlands. Though it appears that this species has always been rare, many of the populations have disappeared and most remaining populations occur only on private land. This species is highly palatable to native animals and domestic stock and the majority of sites where *Barbarea australis* is located are stocked with sheep, adding significantly to the

grazing pressure placed on these plants. Other threats such as willow infestation, alteration of the river courses and flood regimes by hydroelectric development and irrigation combine withthe impact of stock to make this species highly vulnerable to local extinction.

For *Barbarea australis* to survive, threats compromising existing populations need to be reduced. Because *Barbarea australis* is biennial, population densities need to be maintained at levels which are self-sustaining. It is vital that the plants are able to mature and produce seed. Protecting this species from grazing will help achieve this and at the same time help protect the river systems by controlling stock access.

With limited resources, acquiring land to protect this species is not feasible. Therefore as a safeguard, additional populations of *Barbarea australis* are being re-established outside the present distribution but within the known range of the species. In conjunction with developing management guidelines with landholders to help protect existing populations, this should ensure that Barbarea australis is less likely to become extinct.

Barbarea australis growing in a nursery bed

Priority Threatened Species

There are currently over 600 species of plants and animals in Tasmania listed on the *Threatened Species Protection Act 1995* as being either Endangered, Vulnerable or Rare. The list is continually being reviewed using scientific assessment processes, and will in future include non-vascular plants, marine organisms, and invertebrate groups not previously considered. Some species like the orange-bellied parrot, wedge-tailed eagle and King's holly are well known to the community. Others like aquatic insects, log dwelling beetles or small herbaceous plants and grasses are largely unknown and little publicised. Many of these species are unique to Tasmania and are part of this island's magnificent natural heritage.

King's holly

With so many species listed, it is not possible to deal with each threatened species individually. In many cases, as mentioned earlier, this is neither practical, necessary or sensible. While dealing with threatening processes can be effective, some individual threatened species require specific recovery actions and immediate remedial action because threat abatement programs may take decades to become fully effective.

Choosing those species most in need of specific attention is not straightforward and the species with the most pressing needs change with circumstances. This strategy does not identify individual priority species, but sets out the process by which species requiring specific action may be identified and prioritised. As a general rule those species which are most endangered will be given highest priority for recovery attention.

Setting Species Priorities

The Scientific Advisory Committee, established under the *Threatened Species Protection Act 1995*, has a number of roles including advising on priorities. Its purpose, as detailed in the Threatened Species Protection Act, is to advise the Minister and the Director on:

- the listing and de-listing of taxa of flora and fauna;
- threatening processes;
- the criteria to be followed in the determination of critical habitats;
- other matters relating to the

conservation of threatened native flora and fauna; and
- the review and approval of listing statements.

Additionally under the Regional Forest Agreement the Scientific Advisory Committee has a role to endorse any changes to the Priority Species listing in Attachment 2 of the Agreement or new or altered management prescriptions where relevant.

Fundamental priorities for action on threatened species in Tasmania are provided through the schedules of the *Threatened Species Protection Act 1995*. These are:

1. Endangered species (highest priority);
2. Vulnerable (second priority); and
3. Rare at risk (lower priority).

The Scientific Advisory Committee has developed quantifiable criteria for the listing of species under the Act in these three categories.

Priorities can further be determined according to those species listed on the schedules of the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* as nationally Endangered or Vulnerable. Priorities within the Commonwealth's schedules are set by the Endangered Species Advisory Committee (ESAC). The ESAC priorities represent those species ESAC considers most important for preparation and implementation of recovery plans.

Commonwealth funding for recovery programs is limited to ESAC priority species but other Tasmanian priority species may benefit as a result of implementing ESAC priority recovery programs.

A multi-species approach which integrates flora and/or fauna is a practical and effective approach to threatened species conservation. Wherever possible a multi-species approach will be adopted in this strategy.

Objectives

The objectives of setting species priorities are to:

- determine those threatened species most in need of protection and recovery action;
- determine the most effective use of protection and recovery resources; and
- develop an instant response plan for species requiring action but not having a recovery plan.

Actions

1. Apply the following criteria to prioritising protection and recovery action for threatened species in Tasmania:
   - national priorities;
   - State threat classification as listed in the schedules of the *Threatened Species Protection Act 1995*;
   - endemism;
   - taxonomic distinctiveness;
   - keystone role;
   - grouping or multi-species options;
   - cultural and community significance;
   - likelihood of recovery with minimum action; and
   - reservation status of the species.
2. Classify Tasmania's endemic threatened species according to national criteria and have them recognised nationally by inclusion on national lists and work with other relevant governments where threatened species extend beyond Tasmania.
3. Direct recovery resources and actions to the highest priority species.
4. Publish a list of threatened species priorities.

Performance Indicators

- A priority list of threatened species is developed for Tasmania.
- Protection and recovery actions are developed for the highest priority species.
- Endemic threatened species are listed nationally.
- Management actions are underway for priority species.

Table 3: Examples of approaches to threatened species conservation which will benefit more than one threatened species

Group	Examples of projects
Taxonomic group approach	Plants in the families Fabaceae and Rhamnaceae; several burrowing crayfish species
Ecological community	Threatened species occurring in grasslands
Threatening process	A broad range of plant species susceptible to *Phytophthora cinnamomi;* inappropriate harvesting such as long-line fishing affecting many sea bird species
Habitat type	Forest, tree-hollow or cave dependent fauna
Geographic/regional approach	Macquarie Island which has a large range of threatened species

Listing Statements

Listing statements are required by legislation for all listed species. They include distributional and biological data, recovery program information, actions carried out and actions required. The quickest and most readily obtainable advice on threats and management of a particular species will be provided in listing statements. They offer a brief but comprehensive outline of the best management practices to protect the species and its habitat and how to obtain further advice from specialists.

Objectives

The objectives of preparing listing statements are to:

- comply with the requirements of the *Threatened Species Protection Act 1995*; and
- provide a summary of the current knowledge and requirements for management and conservation of each threatened species.

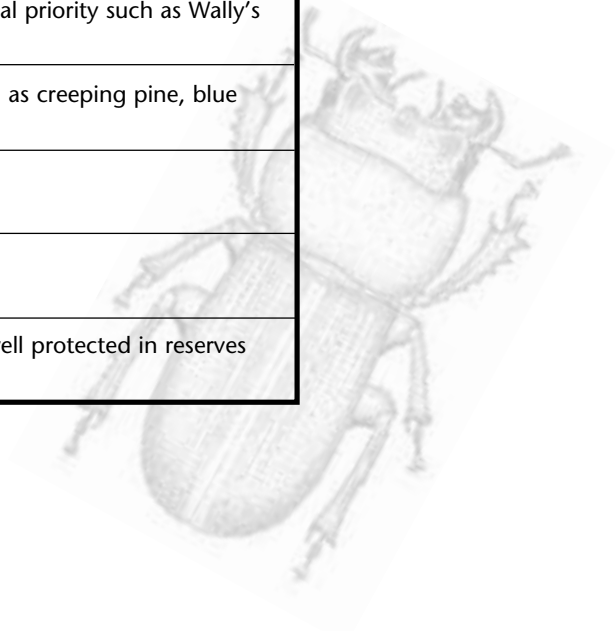
Actions

1. Prepare listing statements for listed threatened species.
2. Give priority to preparation of statements in accordance with the priorities detailed in Action 1(Pg 19).
3. Use listing statements in place of recovery plans where the required recovery actions do not warrant preparation of a full recovery plan.

Table 4: Examples of Species Identified By Priority Criteria

A variety of levels of action will be taken on threatened species according to their priority. These actions are set out below.

Criteria	Examples
Level of endangerment	Listed as endangered in Tasmania but not recognised nationally such as anchor plant, broad-toothed stag beetle
Endemism	Endemic species that are not a national priority such as Wally's wattle
Taxonomic distinctiveness	Monospecific genus in Tasmania such as creeping pine, blue pincushion, spotted handfish
Cultural and community significance	Southern right whale
High likelihood of recovery with minimum action	King's holly
Reservation status/land tenure	Grey goshawk, orchids that are not well protected in reserves



Performance Indicators

- Listing statements are prepared.
- Listing statements provide concise current information on threatened species.
- Listing statements provide a useful basis for action in the absence of more detailed recovery programs.

Morrisby's gum

Critical Habitat

Any habitat that is determined by the Director after consultation with the Scientific Advisory Committee, to be critical to the survival of a species may be declared as critical habitat in accordance with Section 23 of the *Threatened Species Protection Act 1995*.

Generally, identification of any critical habitats will be based on the following criteria:

The critical habitat for a threatened taxon includes that part of the habitat of any listed taxon of the native flora or fauna that is critical to the survival of that taxon. Usually in the case of endangered and vulnerable taxa, this would include all areas which are currently occupied by the taxon and which are at risk from threatening processes, unless:

a) the extent and populations of the taxon are known to be limited by threatening processes that do not relate to the physical modification of land or water (eg. hunting, fishing, predation by feral animals, diseases), and not limited by the availability of suitable land or water, in which case no critical habitat would be declared;

b) it can be demonstrated that part of the area occupied by the taxon is inhabited intermittently, with individuals in this area not contributing to the perpetuation of the species, in which case only the areas necessary for the core populations would be declared critical habitat;

c) it can be demonstrated that an area that does not support populations of the taxon at present needs to be protected in order to ensure the long term future of the taxon, in which case it would be declared critical habitat.

In undertaking assessment of the critical habitat of any listed species, the Director would need to consider each species on a case by case basis. Critical habitat would normally only be defined when it is the most appropriate mechanism for ensuring the future survival of any taxon.

Objective

The objective for determination of critical habitat is to:

- ensure threatened species can survive and flourish in the wild.

Actions

1. Identify areas of habitat critical to the survival of listed threatened species focussing first on the priority threatened species.
2. Prepare maps in accordance with the *Threatened Species Protection Act 1995* showing the boundaries, extent and details of critical habitat areas.
3. Make the public and other notifications required by the *Threatened Species Protection Act 1995* of any critical habitat determined by the Director.
4. Identify and implement the recovery program mechanisms necessary for protection and management of critical habitat.

Performance Indicators

- Critical habitats are identified and notified as required under the *Threatened Species Protection Act 1995*.
- Appropriate recovery mechanisms are in place for each area of critical habitat.
- Threatened species populations in critical habitat are recovering.

Wedge-tailed eagle

Recovery Plans

Species requiring individual long-term strategies or requiring complex planned management may be managed under a recovery plan with actions identified for several years. Recovery plans will usually be prepared detailing the actions required for the recovery and long term security of one or more species or ecological communities for a period of five years. They will also usually detail the funds required to carry out these actions.

Objective

The objective for preparing recovery plans is to:

- provide detailed action programs for recovery of threatened species.

Actions

1. Prepare a recovery plan for all national priority species.
2. Seek funding for implementation of recovery plans for national priority species and, where appropriate when threatened species extend beyond Tasmania, prepare joint recovery plans with other relevant governments.
3. Identify and prepare recovery plans for Tasmanian priority species best managed by this mechanism.
4. Establish recovery teams representing a wide range of interests and expertise including community to guide the implementation of recovery plans.
5. Implement recovery plans.

Performance Indicators

- Recovery plans for national priority species and appropriate Tasmanian priority species are prepared and funded.
- Species dealt with by a recovery plan are recovering.

Spotted handfish

Land Management Plans and Agreements and Public Authority Management Agreements

Some species or groups of species may best be managed under specific agreements with the landholders involved. Land management plans and management agreements as identified in the *Threatened Species Protection Act 1995* are prepared following discussions between landholders and government. They will be drawn up in cases where the conservation actions are well known for the species in question and where the affected land is identified. Land management plans and agreements are prepared on a voluntary basis. However, land management agreements are binding on both parties as detailed in the *Threatened Species Protection Act 1995*. These plans and agreements will become increasingly important as necessary recovery actions are identified in listing statements and recovery plans.

Land management agreements may be prepared for a variety of purposes and include fixed term or perpetuity agreements and may relate to individual sites or to processes.

Land management plans and agreements may take a wide range of forms depending on the situation, such as Part Five Planning Agreements, management prescriptions, conservation covenants or private wildlife sanctuaries, etc.

A Public Authority Management Agreement may be made with one or more public authorities for the management of listed species or threatening processes.

Objectives

The objectives of preparing land management plans and management agreements are to:

- protect threatened species in cooperation with landholders; and
- ensure agreement on the means of, and resources required for, protection.

Actions

1. Identify threatened species and areas requiring land management plans.
2. Consult with and cooperatively prepare land management plans with affected landholders.
3. Make written agreements with landholders identifying works, resources and other matters to be dealt with arising from land management plans.

4. Make written agreements with public authorities where necessary to protect threatened species.
5. Ensure existing or new programs promoting land management protections options, e.g. covenanting, work in cooperation with the threatened species program.

Performance Indicators

- Land management plans are prepared for key areas and species.
- Landholders support the measures contained in land management plans.
- Landholder and public authority management agreements are in place and are being implemented.

Recognising Threatened Ecological Communities

Ecological communities are difficult to clearly define and identify to stakeholders. Consequently ecological communities were not listed in the *Threatened Species Protection Act 1995*. However, during the more recent Regional Forest Agreement (RFA) process, threatened forest communities were recognised as the basis for the conservation assessment of forest values on private land. Not only does the RFA recognise threatened forest communities and the need for their protection in the same way as threatened species, but similar recognition is given to ecological communities in the *Environment Protection and Biodiversity Conservation Act 1999*.

One result of the RFA has been the identification of a suite of threatened forest communities in Tasmania. These communities satisfied criteria that identified them as severely depleted since European settlement. Depletion of the extent of a community is not the only criterion potentially rendering them threatened. The threatening processes, listed and discussed earlier, impact on ecological communities in exactly the same way as they do on single species. The degree to which threatening processes have degraded or altered any of Tasmania's ecological communities is an additional criterion for judging which communities are threatened.

Although severely depleted communities containing threatened species are a significant conservation priority, these communities can partly be addressed through habitat conservation of individual species. However, there are threatened ecological communities which do not contain any threatened individual species. They may include for example, communities of cave animals or animals from other specific habitats and these combinations of fauna and flora making up distinct ecological communities also need recognition. All of these community types need protection and recovery action. Priority communities are those that have been most severely reduced in extent or degraded throughout a large portion of their range, such as coastal saltmarsh communities.

Green and gold frog

Threatened ecological communities have recently been listed in the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*. Tasmanian legislation does not currently recognise threatened ecological communities. Their formal recognition and listing should be considered in the near future.

Objectives

Consistent with the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the Regional Forest Agreement, the objectives of recognising threatened ecological communities are to:

- protect threatened ecological communities in Tasmania;
- amend the *Threatened Species Protection Act 1995* to allow listing of threatened ecological communities as identified through clear and unambiguous criteria; and
- direct actions to the threatened ecological communities most in need of protection and recovery.

Actions

1. Prepare clear definitions for the identification of threatened ecological communities.
2. Identify threatened ecological communities.
3. Identify threats to these communities.
4. Consult with stakeholders in relation to the making of amendments to the *Threatened Species Protection Act 1995* to include threatened ecological communities.
5. Prepare legislative amendments for Parliamentary approval.
6. Apply the following criteria to prioritising protection of threatened ecological communities that do not contain threatened species:
    - communities that are subject to current and continuing threats likely to lead to extinction;
    - communities that have suffered a marked decrease in geographic distribution or a marked alteration in community structure;
    - communities that have lost or are in danger of losing native species that play a major role in the community;
    - communities that have such a restricted geographic distribution that the community could be lost in the short term by the action of a threatening process; and
    - community processes have altered to the extent that a marked alteration of community structure will occur.

Performance Indicators

- Threatened ecological communities are defined.
- Threats to ecological communities are identified.
- Legislative amendments are in place.
- Threatened ecological communities are listed.
- Protection and recovery actions are focussed on priority threatened ecological communities.

Small toungue orchid

Involving the Community

The involvement of the entire Tasmanian community is essential for long term conservation of threatened species in Tasmania. This will require increased public awareness and understanding of the issues and the processes which have caused their decline. Community pride in and ownership of the conservation of species which are threatened will be a key factor in the success of the Strategy.

Programs to encourage and support community involvement will focus on:

- education and information; and
- involvement in nominating species, planning, implementing recovery actions and monitoring populations, threats and recovery actions.

Community Education and Information

Objectives

The objectives of community education and information are to:

- encourage community understanding of the issues involved in threatened species conservation;
- inform the community about Tasmanian threatened species and threatening processes and their management; and
- obtain and develop community support for threatened species conservation.

Actions

1. Prepare, publicise, and make readily available factual information and extension material on threatened species, threatening processes and threatened species programs.
2. Encourage the media and publishers to profile threatened species and programs to mitigate threatening processes.
3. Develop and promote threatened species education and information in consultation with community groups and integrate it with community based programs such as Landcare, Bushcare, Farmwi$e, Land for Wildlife, Coastcare, Wildcare, Waterwatch, Oceancare, Fishcare and the Threatened Species Network, etc.

4. Encourage inclusion of a threatened species curriculum in schools.
5. Inform people when they are likely to be affected by threatened species recovery programs.
6. Inform landholders of the implications of threatened species occurring on their land.
7. Make public information on threatened species and threatening processes available on the internet and databases which can be accessed readily by the community.
8. Provide information on threatened species in a form suitable for its intended audience.

Performance Indicators

- There is an increased profile of threatened species and threatening processes in the print and electronic media.
- Threatened species curriculum or themes are integrated into the teaching program of schools.
- A threatened species database is available to the general public on the internet and is widely used.
- Information on threatened species and threatening processes is readily available in a variety of media to members of the public.
- There is increasing community support for threatened species conservation.

New Holland mouse

Community Involvement

Objectives

The objectives of community involvement are to:

- prepare and implement threatened species recovery programs supported by and including the community;
- utilise community interest and resources in implementing threatened species recovery programs;
- utilise community interest and resources in establishing and maintaining effective baseline and specific purpose monitoring for threatened species recovery programs; and
- maintain community support for threatened species conservation.

Actions

1. Encourage community participation in nominating species for listing or de-listing on the Schedules of the *Threatened Species Protection Act 1995*.
2. Provide and publicise opportunities for the public to be involved in preparation and implementation of threatened species recovery programs.
3. Make draft and final documents available to the community.
4. Establish clear and accessible links between Nature Conservation Branch (Threatened Species Unit) and the community.
5. Provide opportunities for members of the community to participate in training programs and field days.
6. Prepare listing statements and recovery plans in a form that landholders and community interest groups are readily able to adopt and implement.
7. Encourage ownership of and active participation in threatened species recovery programs by landholders, community groups and individuals.
8. Encourage individuals and community based groups to be actively involved in protecting threatened species and their habitat.
9. Integrate threatened species conservation with other community programs and projects.

Community involvement in planting

10. Provide opportunities for members of the community to assist with monitoring by:
    - counting and surveying;
    - recording major changes;
    - measuring impacts and population trends; and
    - identification.
11. Encourage use of the Parks and Wildlife Service WildCARE program.

Performance Indicators

- Key community stakeholders are represented on relevant threatened species recovery teams and threat abatement teams.
- Individuals and community based groups are actively engaged in threatened species conservation.
- Landholders and community groups are using listing statements and recovery plans to manage threatened species on their land.
- The public provide comment on and support for threatened species nominations and recovery programs.

Working with Land Owners, Land Managers and Industry

State government agencies, local government, other resource managers such as landholders and industry are key players in conserving threatened species. State and local government agencies are bound by the principles of the Resource Management and Planning System of Tasmania, which, while promoting sustainable use of natural and physical resources, equally promotes the maintenance of ecological processes and genetic diversity. Everyone has a responsibility to abide by the requirements of the *Threatened Species Protection Act 1995*.

Management and conservation of threatened species needs to be taken into account in development proposals and in all aspects of planning which affect land and the marine environment in Tasmania. Providing relevant information and training, integrating planning and action, and monitoring success will be crucial in achieving successful outcomes. Local government is seen as a key participant in this process.

Objectives

The objectives of working with land owners, land managers and industry are to:

- provide planners and managers with the necessary knowledge and skills to protect threatened species within their area;
- integrate threatened species conservation with the activities of all land owners, land managers and industry. Secure the willing support of managers and industry for the programs and
- ensure threatened species conservation is addressed in all aspects of planning.
- develop incentives to encourage land owners, managers and industry to conserve threatened species.

Actions

1. Establish public authority management agreements with public authorities to provide accreditation for the management of those threatened species detailed in the agreement, and consistent with the requirements of the Tasmanian *Threatened Species Protection Act 1995*.
2. Include conservation of threatened species and management of threatening processes in the development of major planning initiatives such as catchment management plans, coast and clean seas plans and local government planning schemes.
3. Provide land owners, land managers and industry with information detailing their statutory responsibilities for protection of listed species.
4. Provide appropriate information on identification, distribution, and status of threatened species, details of defined critical habitats, the impacts of threatening processes, as well as relevant listing statements, recovery plans and threatened species management guidelines to land owners, land managers and industry including local government.
5. Hold training days for landowners, land managers and industry on appropriate ways of managing threatened species.
6. Include information on threat abatement in industry training programs such as those for the fishing industry, and sustainable farming.
7. Establish clear and accessible communication links between the Nature Conservation Branch (Threatened Species Unit) and landowners, land managers and industry.

8. Develop a range of packages and options to assist landowners, managers and industry to conserve threatened species without disadvantage.

Performance Indicators

- A comprehensive threatened species information package including locality maps is available in a readily useable form to resource managers and industry.
- The Threatened Species Unit regularly participates in industry and community training programs, field days, workshops, seminars and other forums.
- Requirements for threatened species surveys for planning are published.
- Industry training programs include threatened species issues in their curriculum.
- Public authority management agreements are in place.
- Threatened species are routinely considered as part of all management planning and operations.
- All planning documents and initiatives contain accurate and pertinent references to threatened species protection.
- Land management plans are prepared within five years for individual properties or groups of properties containing threatened species.
- Landowners, land managers and industry support threatened species plans covering their land or area of operation.

Orange-bellied parrot with chicks

Social and Economic Factors

Care and responsibility for land and water is an accepted principle for most of the community. It is a matter of pride to most landholders that they are managing their resources in an ecologically sustainable manner. Likewise, most landholders are very willing to play their part in ensuring that threatened species can survive in the long term. Most landholders want to hand their operations on to the next generation in as good or better condition than when they began to manage them. Indeed, community expectation is moving towards a position where landholders have a duty of care towards threatened species.

However, fundamental to obtaining and encouraging support for conserving threatened species and addressing threatening processes is ensuring that landholders do not have to bear undue cost in the process. Many threatened species occur in relatively small defined areas and can be managed or protected with minimum action.

To ensure that the social and economic impact of the implementation of management agreements for threatened species and a number of other matters are fully considered, the *Threatened Species Protection Act 1995* establishes the Community Review Committee (CRC). The CRC has a membership of nine including:

- the Chairperson;
- a person nominated by the Tasmanian Farmers and Graziers Association;
- an economist;
- a representative of the rural industry;
- a representative of the forest industry;
- a representative of the fishing industry;
- two members of the Scientific Advisory Committee;
- and a person nominated by the Local Government Association of Tasmania.

The roles of the CRC as laid out in the *Threatened Species Protection Act 1995* are:

- to receive and consider draft recovery plans and listing statements;
- in respect of private land to assist in and make recommendations to the Minister on the preparation of land management plans and land management agreements;
- to provide for conciliation as may be required in any matter arising from a land management agreement or for the purpose of making any such agreement;
- to consider the social and economic impact of the implementation of land management agreements;

- to advise the Minister on the effect of interim protection orders;
- to consider and advise on other matters that may be referred to it by the Minister.

The role of the CRC is to be well informed of the conservation requirements of threatened species in relation to the impacts and potential affects on landholders. The CRC receives all copies of listing statements, recovery plans and other relevant documents for information. Where required, it assists landholders with the preparation of land management plans and the agreements which flow from them.

The CRC also has an important role in providing for conciliation in matters arising from or during the process of drawing up land management agreements including disputes which may arise between the government and landholders.

Objective

The objective of considering social and economic factors is to:

- ensure that landholders do not carry an unreasonable burden for conserving threatened species on their land.

Actions

1. Prepare species management programs in cooperation and consultation with landholders. Ensure that the responsibilities of both parties are clearly identified, funding sources are identified, and the costs of materials and on-ground work are apportioned.
2. Provide support to facilitate the recovery and/or conservation of threatened species on private land where possible and appropriate.
3. Develop innovative strategies for conserving threatened species which minimise potential adverse impacts on economic production.
4. Examine and develop mechanisms to help landholders conserve threatened species on their land, eg rate relief for conservation management, to ensure they are not disadvantaged.

Performance Indicators

- Landholders and managers support threatened species conservation on their land.
- Landholders and managers are being helped with threatened species conservation on their land.

Research and Monitoring

While threatened species management has been under way in Tasmania since the 1970s, the refinement of international assessment criteria by the IUCN in 1994 now provides a sound platform for classifying the level of species endangerment and identifying species most at risk. Often the ranking of species is based on limited information and relies on historic records and expert judgement. To better assess and manage our threatened species and threatening processes we must strive to fill gaps in our knowledge. Information on species' taxonomy, biology, ecology, habitat requirements and tolerance to disturbance is needed.

The most important and fundamental requirement for threatened species conservation is maintenance of up-to-date information on the species listed in the Schedules of the *Threatened Species Protection Act 1995*. Many distribution records have limited use because of a lack of supporting data. Our knowledge is only as good as the data we have collected, so an ongoing effort is required to maintain the best current information on threatened species including taxonomy, ecology and threats to the species' existence.

Research and monitoring is not limited to the work of universities and governments alone. A whole community approach is required with the development of a central database incorporating all threatened species data. Resource managers and industry, community groups and the general public can all help. The Scientific Advisory Committee, with its expertise in the sciences of flora and fauna conservation, can also contribute advice on the directions and scope of research into threatened species.

Objectives

The objectives of research and monitoring are to:

- improve understanding of threatened species for management and the issues to be confronted in protecting them;
- establish and maintain comprehensive information, including data on threatened species; and
- provide the scientific basis for management decisions in support of threatened species conservation.

Actions

1. Research the locality and distribution of threatened species.
2. Research the ecology, biology and habitat requirements of threatened species.
3. Research the taxonomy of threatened species.
4. Monitor the condition of threatened species habitats.
5. Regularly review the status of threatened species.
6. Determine the conservation status of poorly understood groups of species such as marine species and communities, invertebrates, non-vascular plants and those with high local endemism.
7. Identify threatening processes and their impacts.
8. Research the tolerance of threatened species to threatening processes.
9. Undertake research to develop threat amelioration strategies.
10. Encourage and collaborate in threatened species research undertaken by research institutes, specialist groups, field naturalists groups and others.
11. Ensure that management prescriptions for threatened species in recovery plans, listing statements, codes of practice, etc, are effective and adequate.
12. Develop a list of research opportunities for research institutes, organisations and others interested in threatened species management.
13. Assist with supervision of undergraduate and postgraduate students undertaking applied research on threatened species.
14. Seek research assistance from national or international organisations and encourage collaborative work and the interchange of information.
15. Encourage community participation in research programs.
16. Develop and maintain accessible data bases for storage and retrieval of threatened species information.
17. Target research to the highest priority species.
18. Develop funding opportunities for increased research and monitoring.

Performance Indicators

- Readily accessible, comprehensive and current databases on threatened species are available.
- Threatening processes are well understood by both researchers and the general community.
- The status of each threatened species is based on the best available research and monitoring.
- The threatened status of marine species, invertebrates and non-vascular plants is better known.
- Threat amelioration strategies are based on well researched information.
- The number of species of indeterminate status is reduced.

Resourcing and Implementing the Strategy

Resources are essential to implement the Threatened Species Strategy. These resources must be directed carefully to achieve maximum benefit for the investment of time and money. Two approaches to threatened species conservation have been set out in this Strategy. They are to address threatening processes at the broad scale as well as to prepare and implement priority species recovery and management programs at the local scale. Implementing these approaches will require flexibility and strategic thinking to make best use of resources, harnessing them in various combinations to address the objectives of the Strategy, from administration and education to research and on-ground works.

Over the last few years, however, with increased recognition of the significance of biological conservation and threatened species, Commonwealth and State governments have allocated greater funding for threatened species conservation. However this level of funding needs to be increased to meet the objectives of this Strategy. Just as important as the amount of resources is the way we deploy them. We must always be striving to improve our efficiency and targeting resources to the most effective end. Similarly, community and industry resources need to be developed to ensure their responsibilities are addressed in a timely manner. The more quickly action can be taken to abate threats, the lower the cost of doing so and the less the potential for extinction. Much of the Strategy is aimed at

prevention mechanisms which will yield considerable financial savings in the longer term.

Objectives

The objectives for resourcing and implementing the Strategy are to:

- improve the level of resources available for threatened species management within all levels of government and across the community; and
- ensure effective utilisation of resources; and;
- ensure effective implementation of the Strategy.

Actions

1. Develop an implementation plan for this Strategy as a priority. This plan should show who will carry out the actions, when they are to be carried out and completed, and what priority should be assigned to each action.
2. Prepare a budget plan identifying the resources required to implement the Strategy.
3. Encourage government agencies and landholders responsible for managing land on which threatened species occur to direct resources into conserving species through joint agreements.
4. Establish a fund raising program to attract community and industry donations, bequests or sponsorship, particularly to the Threatened Species Trust Fund.
5. Encourage community and industry to contribute expertise, labour, materials and loan of equipment in community based conservation programs.
6. Raise finance through provision of a threatened species management consultancy service by the Nature Conservation Branch.
7. Maintain national partnership agreements supporting research and management of threatened species.
8. Adopt innovative methods to minimise the cost and impact of threatened species conservation.
9. Combine efforts where resource needs are similar.
10. Seek financial or other resource contributions from those making financial gain from threatened species.
11. Seek compensatory financing or other resourcing from those contributing to threatening processes.
12. Encourage non-government organisations such as the Bush Heritage Trust to target funds towards threatened species conservation.

Performance Indicators

- More threatened species or threatening processes are being targeted because of increased resources.
- The Threatened Species Trust Fund is financially well supported.
- Funding for threatened species conservation across all levels of government shows an upward trend.
- The general community, support groups and industry are actively involved in conservation of threatened species through funding, in kind support, or volunteer work.

Reviewing the Strategy

Threatened species problems, our knowledge, and management opportunities and techniques evolve. Periodic review of the Strategy will be required to ensure that it is being implemented, that it is achieving its intended outcomes, to optimise its effectiveness, and to adapt to altered circumstances.

Objectives

The objectives for reviewing the Strategy are to:

- ensure that the Strategy is being implemented;
- check that outcomes are those intended by the Strategy; and
- improve performance by building on experience.

Actions

1. Establish a program to monitor and evaluate implementation of the Strategy.
2. Incorporate monitoring provisions in recovery programs including listing statements, recovery plans and threat abatement plans.