

# Threatened species legislation and threatened species recovery: does the former lead to the latter?

James M. Shields

Forests NSW

Locked Bag 23 Pennant Hills NSW 2120

jims@sf.nsw.gov.au

## ABSTRACT

Vision statements and key action statements are primary and useful tools for threatened species recovery and threat abatement. In this chapter I provide a view of the necessary vision and key action statements. Listing a species or biological entity through threatened species legislation may or may not lead to its recovery, and this factor should be carefully taken into account in the process of funding natural resource management actions. Recent experience in NSW (1995 -2003) has provided examples of the application of a comprehensive Threatened Species Conservation Act, and its effect on biodiversity management. Some recovery plans have been written, but few actions have been resourced or delivered positive outcomes for the target taxa. Examples where recovery actions have been successful, apparently failed, or are still in question are discussed. Some required elements for successful recovery action and threat abatement are set out (scientific analyses of the environment, monitoring, transparency, community ownership, redundancy, exit strategy). Clearly, it would be better if more actions were resourced and improved conservation outcomes were delivered. A synthesis of current planning processes (2004) required by legislation, which produces fewer plans, processes and meetings, and more measurable conservation outcomes is a simple way forward. This can be done by using a hierarchical process to restore ecosystems, using fundamental and generally available knowledge and techniques.

**Key words:** threatened species recovery, successful management, vision statement, ecological communities, National Forest Policy, Hastings River Mouse.

## Introduction

Many authors, including myself, query the usefulness of current Threatened Species legislation. In particular, and rightly so, the listing process is questioned. However, the legislation in NSW (which is similar to that of Australia, most other Australian States and the U.S.) and its criteria are carefully crafted. They can be used to put in place a process of recovery and successful biodiversity management, despite any flaws in the Act(s) or mistakes in past applications.

In this chapter, I discuss the conservation outcomes from threatened species legislation in NSW, in particular those occurring from 1995 to the present. These outcomes, which have some deficiencies, are discussed in comparison to a proposed process which uses current regulations to produce true recovery for threatened biological entities based on my experience in writing legislation and policy, and through my occupation as a professional wildlife manager and scientist. This experience includes implementing the regulations that result from legislation, the actions which result from policy; and involvement in court when these regulations have been allegedly and actually breached, as well as participating in management actions for the successful recovery of relevant taxa.

Experience has led me to the conclusion that although current processes effectively ensure that regulations are followed, they seldom lead to recovery of the targeted species, population, or ecological community, or the abatement of threats. This however does not need to be

the case. The processes required by legislation can and should be converted into synergistic actions for recovery. The successful use or application of legislation requires a clear vision as to what success might comprise, and a basic plan for the key actions necessary to achieve success (Dickman 1996).

## The Vision: Clearly Articulated Statements that Define Success

To be successful and useful, environmental legislation (i.e. rules for social behaviour with regard to natural resource management), must have a clear, succinct vision as to what the natural landscape should look like as a result of applying these rules (Caughley 1994). In the case of Threatened Species legislation, there needs to be a clear, common understanding (“vision”) on the part of implementers, regulators and the public as to what is an acceptable degree of success. “Key Actions” also need to be identified and prioritised. This step in the recovery process is discussed in the next section, as key actions arise from the vision for success. Vision and action statements are also necessary to garner mainstream community support for environmental legislation, a key element for success.

One way for legislation to be successful and useful is to specify and implement Targets and Standards, which then provides the vision (Beckworth and Moore 2001). This process has its merits and is discussed at length in the

documentation of changes to recent legislation in NSW, Australia and elsewhere (O'Connor *et al.* 2003, Song and McGonigle 2001). However, specified Targets and Standards have seldom been implemented successfully, and more rarely do they provide common understanding or vision for success. Elaborating this vision for success is best done through clear declaration of a simple message (a vision statement) to the target audience (in this case, natural resource managers, the corporate world, and citizens of NSW). This is clear from first principles, but there are many examples from business, social work, and land management which show the value of vision statements in successful enterprises (McNamara 2003).

Although simple vision statements can clarify goals for biodiversity management, such statements have not been written for threatened species in NSW or elsewhere in the world (there are no vision statements for threatened species, for instance, listed on the IUCN website; there is a vision statement from the IUCN Species Information Section, run by no doubt by Information Technology professionals, not ecologists). Vision statements occur as part of the planning process in Wildlife Refuges managed by the US Fish and Wildlife Service (*e.g.* USFWS 2000, Kern National Wildlife Complex Planning Update). Threatened species are a part of the planning process for USFWS Wildlife Refuges, and there is some clear vision as to what a successful outcome might be. However, the vision is concerned with land management, not threatened species recovery planning, nor does it contain provisions for implementation.

Some attempts have been made (*e.g.* the NSW Biodiversity Strategy) to synthesize planning efforts, which could have provided vision statements. The principles in the NSW Biodiversity Strategy have not been adopted or incorporated into threatened species management. The authorship list of this volume, attendance at this conference, and the discussion notes attest to the deficiency of this aspect of the legislation in NSW with regard to vision, action or outcomes.

Government policy statements can specify vision and action. Their publication is not an obligatory part of the legislative process or policy production, although there are examples where these concepts have been addressed by governments. Most notable in Australia is the National Forest Policy (1992) which outlined a vision, actions and outcomes that intended to resolve dispute about reserve size and resource allocation. It specified Comprehensive Regional Assessments (for biodiversity, social values, and economic resources) and subsequent Regional Forest Agreements. The National Forest Policy clearly stated that there would be a "Comprehensive, Adequate and Representative Reserve system, which gave rise to the production of specific criteria for forest ecosystems and their management (*Nationally agreed criteria for the establishment of a Comprehensive, Adequate and Representative Reserve System for forests in Australia*). A report by the joint ANZECC/MCFFA National Forest Policy Statement Implementation Sub-committee (JANIS 1997)). It also specified that there would be a viable and sustainable forest industry in Australia. Although the policy is not necessarily satisfactory to any of the

stakeholders, the process was applied, and the tenure and management of forest ecosystems have as a consequence changed radically across Australia.

The National Forest policy illustrates how environmental legislation can work on public land (albeit at significant cost), because very few people are directly adversely affected - problems arise when legislation is applied with the same rigour on private land, with many people and industries affected. Community support consequently recedes, and society is faced with enforcing command-control legislation on an unwilling population.

Vision statements that are produced within the realm of policy, and certainly legislation, must follow a regimented format and be as unequivocal as possible. Therein lies a difficulty: where ecological matters are concerned, good vision statements are inherently equivocal, and there is great value to be taken from the consideration of variability. Of course, a useful vision statement must carefully consider the text of the relevant legislation or policy for which it is trying to provide common understanding. In NSW, the threatened species legislation has two key components: threats (Key Threatening Processes) and recovery (Listing and Recovery Process). Given these two components, vision statements for the threatened species legislation in NSW (and thus Australian and US) acts might be constructed as follows. Two versions of the same vision are suggested for different target audiences.

### **Vision statements for threats:**

Target Audience 1. - *Public-Corporate version:* Key threatening process cease to affect biodiversity across the landscape [of NSW] within 50 years as a result of sound planning, to the maximum extent possible.

Target Audience 2. - *Ecological-Land management version:* Key threatening processes cease to operate within a 50-year time frame, based on Threat Abatement Plans that pragmatically address the needs of biodiversity management, prioritised by the threats, in particular to Endangered Ecological Communities, to the extent that the maximum number of these threatening processes can be removed from the Schedules of the act.

### **Vision statements for recovery:**

Target Audience 1. - *Public-Corporate version:* Endangered species, populations and communities recover or are stabilised across the landscape within the next 50 years as a result of sound planning to the maximum extent possible.

Target Audience 2. - *Ecological-Land management version:* "Threatened species, populations and communities are stabilised and enhanced from their current status within a 50-year time frame by recovery plans for Endangered Ecological Communities and their component species and populations, to the extent that the maximum number of species, populations and communities can be, effectively, removed from the Schedules of the Act.

The two different versions represent an attempt to communicate the same message to two different audiences; one is the general public combined with

corporate or business interests, and the other is comprised of regulators, experts (scientists, field staff, technical staff), and land managers. The vision statements put forward may not be comprehensive but they exist, and can form the basis for planning and prioritising actions. The wordy, convoluted version directed towards scientists and public servants includes the key scientific principles necessary to allow objective action based on the scientific method, and takes into account the provisions of the NSW *Threatened Species Conservation Act 1995* (TSC Act).

Vision statements for threatened species recovery and threat abatement have not been written in NSW (or elsewhere). The strategic planning steps that are currently in place (establishment of goals, outcomes, priorities, targets, and standards) therefore have no successful endpoint to which they can aspire or be held accountable - they are structured to most simply meet the requirements of various regulations. A vision and its expression are clearly different from regulations. They are also just a necessary for realistically achieving threatened species recovery and threat abatement.

The next step is consideration of key actions. The vision statements need to consider matters of transparency, pragmatism and ecological principles. By targetting endangered ecological communities (EECs) in reference to recovery, the broadest possible planning approach allows for maximum efficiency and synergism. For threats, maximum efficiency can be gained through a consolidated approach, which prioritises other elements of the biodiversity planning processes. Useful tools have been developed recently to allow the on ground application of consolidated biodiversity planning for EECs (Gibbons and Briggs 2004, Oliver and Parks 2003). Useful tools for addressing threats have been developed for the NSW Fox Threat Abatement Plan (2001) (Meek and Kirwood 2003).

The vision statements all contain the concept of “the maximum extent possible”, which is certainly equivocal. This phrase is necessary to provide a common understanding of “success”. The words “maximum extent” indicate that all efforts and resources necessary should be devoted to achieving the vision. The word “possible” provides a link to reality, and leads to an objective process of resource allocation. The phrase “maximum extent possible” would not be an acceptable part of a regulation, but is crucial for providing vision.

In the recovery vision statements, I would include the word “effectively” to qualify “removed from the schedules” to cover the likely scenario where an entity remains on the list despite having recovered to the maximum extent possible. Many species and populations will remain at risk, under even the best management regimes (Caughley 1994). A combined vision statement, in its simplest form might be: “To achieve a stable set of regional ecosystems with the minimum number of threatening processes or threatened biological entities”. Hopefully, that would serve to focus actions and thought on achieving success - the *removal* of entities and processes from an undesirable status.

## Key actions for success

Key actions should be elucidated to cover the following elements of the recovery and threat abatement processes. The first key action is gaining mainstream community support for environmental legislation. Given this generality, I suggest the following order for actions.

**1. Required Processes:** Any action list must include the required processes that have been put in place by the legislation. These actions dominate the process at present and are discussed in length at the websites of the NSW Departments of Environment and Conservation and Infrastructure, Planning and Natural Resources, and elsewhere (Australia, USA, UK Acts). The first action required is the development of a plan. That is usually where key actions stop, and where the current vision stops.

**2. Planning:** Planning has been developed as a means of meeting legal requirements rather than as a part of achieving success. Conceptually, planning comes first, as was noted in the logo of a now defunct NSW government organisation. Planning is based on the principles of the system within which operations occur and the obstacles which prevent success. Basic input by pragmatic planners to achieve success is required, but often absent, during the planning process.

An “in-joke” amongst natural resource planners in NSW government (2000-03) has been: “Plan First - Think Second”. In other words, a good idea is frequently a bad plan.

Planning should not necessarily be undertaken solely by research scientists who are expert in the biological entity or process involved, and certainly not in isolation from other disciplines. A variety of scientific disciplines are relevant to the development of a successful plan. Land management is a science and profession in itself, and senior managers or researchers from this field should be involved. Other professionals required for good planning include administrators, field personnel, geneticists, and public relations experts. Planning provides a structure for the two key actions: assessment, and recovery/abatement actions, and their sub-components. Given this structure, each of the actions in the plan moves directly toward achieving the vision.

**3. Assessment:** Assessment has two elements. The status of the biological entity needs to be clearly elucidated, for example population size and threats for a listed species, or the extent of fox predation on native vertebrates. An assessment of the knowledge required to manage the entity is also necessary. If there is sufficient knowledge, a set of recommended actions can structure the recovery or abatement actions. If there is not sufficient knowledge, reasonable steps must be taken to acquire this information (e.g. research, technical developments). After such knowledge or technical capabilities have been acquired, the appropriate recovery or abatement actions can then be implemented.

There are some examples where this approach has been taken, notably the Fox Threat Abatement Plan for NSW (NPWS 2001) and the draft Bitou Bush-Bone-seed Threat Abatement Plan (DEC 2004). However, further actions are hampered by the lack of a clear vision as to what they are meant to achieve.

**4. Recovery/Abatement Actions:** Actions to achieve success should be articulated based on the assessment. At this stage, a projected statement of the scope and scale of actions required needs to be made so resource estimates can then be calculated to achieve success. Again, the Fox TAP and the Bitou Bush TAP are examples where this step has been taken, resources have been allocated, and actions are underway to alleviate the threat.

Recovery and threat abatement actions should always 1) adhere to the best scientific analyses of the environment, 2) provide monitoring information 3) be transparent and accountable, 4) maximise community ownership and 5) include an element of a redundancy, or an exit strategy or both.

**5. Providing Estimates of Possibility:** The vision statement directs action towards achieving the possible. To do this, the inevitable task of costing must be completed. Following completion of Actions 1-3, this can be done objectively. The tasks of resource estimation and allocation are crucial to enable the actions to be carried out.

*Resource estimates*, a euphemism for costs in social and economic terms, should be presented in the plan, with a range of options and time scales. There are two types of costs. There are the direct costs of recovery actions, and there are the indirect costs of opportunities forgone by recovery actions e.g. prevented actions. The opportunity costs of conserving threatened species, populations, or communities, or abating threats, are often orders of magnitude greater than direct costs (Hawken 1993). Both costs must be calculated and presented to society to allow sound decisions about priorities for natural resource management (Daily 1997).

*Resource allocation* can then become an iterative process amongst plans. To give an example, if the costs for recovery of populations of the Long-footed Potoroo *Potorous longipes* are correlated with abatement of threat from Fox Predation, the total cost of recovery and abatement for both plans can be judged more realistically.

A more complex (and theoretical) example could be an Endangered Ecological Community centred on woodland bird species listed on the schedules of the Act in NSW. The resources for the recovery plan would cover all those species in the listed community as well as the plants and invertebrates that make up the plant associations that provide resources for the birds. This would probably include several already listed Endangered Ecological Communities described in terms of their vegetation associations.

Calculating the costs of NOT undertaking recovery or abatement (alternative costs) may be relevant, or useful in terms of prioritising implementation (Lowe, pers. comm., McNamara 2003).

**6. Implementation:** Simply put, the actions planned to achieve the vision now be carried out. Review and monitoring are part of implementation. Although this factor appears simplistic, it is now often the case that the only recommended actions carried out are periodic reviews of the plan.

## Key actions: research, priorities, and overlaps

In my opinion, research is not always a required activity for achieving success. However, monitoring, which involves scientific measurements of suitable parameters, is required because it is the only objective means to determine success, failure, and future needs. There are cases where the focus on research on threatened entities or process has not provided successful outcomes in terms of recovery or threat abatement in NSW and elsewhere. An example could be the Hastings River Mouse *Pseudomys oralis*, which has been studied in depth in NSW since its rediscovery 30 years ago (Meek 2003). A large amount of information has been compiled, and yet at a recent forum a combined group of experts could not provide guidance to recovery actions in the short, medium or long term, other than more research (Shields and Meek 2004). Nonetheless, carefully designed experiments can provide direct input that increases the chance of successful management if there is a knowledge gap which prevents overcoming obstacles to recovery or threat abatement. Research needs should be carefully articulated in the context of successful management.

Scientists and managers are well aware that ecological questions are boundless, budgets are limited, and success in natural resource management is becoming urgent and important for governments and citizens alike. This is a crucial point. Scientists must be held accountable for prioritising research needs, rather than maintaining everything is important, or replying to management questions of extents with, "How long is a piece of string?"

The legislation provides for exclusion of issues that are covered by other processes, of which there are many, such as the State and National programs to reduce greenhouse gases, or manage salinity and water use. Other government and non-government processes exist which consider weeds, pest animals, animal welfare, and the national research needs for biodiversity. All of these processes should be scrutinised to eliminate redundancy and maximise synergism. For example, Noxious Weeds have a control program at present, and Threatening Abatement Plans centred on weeds should be developed around existing programs.

## A hypothetical example

Let us examine a hypothetically successful example for recovery and threat abatement, based on the vision and actions discussed above. A pertinent example is the mallee associations in the western districts of New South Wales. A well written and implemented nomination for an endangered ecological community, centred on real data, could set in train the means for writing an over-arching recovery plan that would consider the needs of a wide range of taxa, threatening processes and economic operations that relate to mallee habitat (Cody and Smallwood 1996, Simberloff 1999). The following scenario might ensue. A landholder has 200 hectares of mallee available. In the past, this could first be cleared at a profit (sale of mallee and the roots) and then agricultural

activities could commence to produce revenue (grazing or cropping). In our hypothetical world, the regulation protecting the mallee Endangered Ecological Community is used to give a real value to the loss the landholder incurs from not undertaking these activities, and thus create a *property right for the mallee*. To prevent perverse rewards, incentives are directed toward the landholder to undertake management of the biodiversity entity (the Mallee Endangered Ecological Community) and all of its components, and not towards his neighbour who inherited land that had been flogged for the past century. Recovery plans for threatened species and populations and threat abatement plans could direct funds, activities and profit sharing incentives towards the mallee landholder, or private investment could be sought to manage the identified biodiversity asset and its attendant property rights. For the unfortunate neighbour, suitable incentives for biodiversity improvement could be introduced, through the same recovery/threat abatement process, and other natural resource management instruments (the aforementioned overlaps, e.g. sustainable agriculture, salinity, soil, water, green house gas programs). Direct actions on the Mallee property could include priority for fox abatement funding, subsequent inclusion as a site for re-introduction of Malleefowl *Leipoa ocellata*, funds to establish a commercial stand of mallee for harvest and local use, public relations assistance to capitalise on labelling value, and assistance with property planning. Direct actions on the degraded property would work to restore environmental values (soil, water) at a much more basic level, and there would be little funding for ecological resources.

Two concepts are applicable in our example, based around how funds are allocated. There is funding to compensate for actions foregone because of legislation, where a landholder is paid for opportunity lost due to regulations. Alternatively there is funding where a landholder is paid to manage land for natural values. Compensation comes from government, but funding to manage for natural resources may come from a variety of sources.

### **The status quo in NSW 2004: using threatened species legislation for evil rather than good?**

Examination of the first principles with regard to threatened species, and legislation regarding thereto, is a useful step. Let us examine how threatened species recovery is addressed currently by the relevant legislation in NSW (and many other places around the world).

### **Unclear visions and unfocused actions?**

The vision and actions to halt decline to threatened species, communities, and populations are currently embedded in the legislation, and they are straight forward: The aim is to stop threatening activities through regulation. The actions are that people and corporations who do not comply with the regulations may be prosecuted. These principles are easy to write into legislation, and easy to

enforce in a command control system of regulation (Hollings and Meffe 1996, Briggs 2003). For instance, habitat assessment for threatened fauna can be written into the requirements for development applications. If the assessment is not done, development may stop or the developer may be prosecuted. The issues involved with command regulation discussed at length by Farrier and Whelan (2004).

The visions and actions to achieve recovery are not so clear, and are obscured in legislation (Beckwith and Moore 2001). One vision is that populations will increase as threatening processes are abated. Actions are not specified in legislation for recovery beyond the requirement to prepare a Recovery Plan. Actions in recovery plans are seldom articulated beyond the research or information gathering (survey) phase. The exact steps to be taken to achieve recovery or abate threats are either not known or considered to be too expensive for detailed planning to be worthwhile.

Recovery Plans and Threat Abatement Plans are nonetheless developed and duly published. In real terms two conditions must be met for them to be effective: public acceptance and adequate resources (Hollings and Meffe 1996). Currently acceptance by government is provided for through the legislation - any Minister whose agencies, actions or land are affected must approve the plan. Private citizens are compelled to comply by the regulations of the Act. Vegetation management plans for private property need to consider the conditions set out in recovery or abatement plans, but there is no command requirement to do so at present (September 2004). However, acceptance by the public at large can only be achieved by successful cooperation, education, incentives and persistence (McDonald 2003) which is, at present, seldom realised. Adequate resources are the second condition which must be met. All actions must be paid for. At present, government funds the vast majority of recovery actions - in the case of birds, almost 100% of costs have been met by the States or the Australian Government (Smythe *et al.* 2000). In many cases in NSW, direct costs are calculated, but no resources are allocated. Indirect costs are almost never calculated, although Forests NSW has made an attempt to do so in recent years (SFNSW 2002). In short, complying with the requirements of threatened species legislation is regarded as the equivalent of recovery or abatement action. It is not. Compliance and successful recovery or abatement action are not necessarily the same thing.

Let us examine the role of recovery in the context of the actual processes of listing, planning and on-going management.

### **Threatened species legislation processes**

The normal process by which the *Threatened Species Conservation Act (1995)* is enacted are described below. The purpose of this discussion is to accurately describe what happens when a species, population, community or threatening process enters the regulatory process.

## Nomination

The first step in the process of threatened biodiversity management and threat abatement in NSW, and in most other legislation, is the nomination of the species, population, community or threatening process to a scientific committee that administers the schedules of the Act. The presumed motivation for this step is the likely threatened or threatening status of the species, population, community or threatening process. However, in real terms, nominations are often instigated by a perceived threatening development or other human activity.

The initial phase can consume a large amount of resources; the process of nomination must demonstrate that the species, population, community or threatening process meets the criteria in the Act. This work includes a literature review, and in some cases, original research. If clear and well-documented nominations are based on threatening processes affecting the species, population, community or threatening process, the process moves ahead quickly. In reality, the nominations are often superficial and require considerable input from the Scientific Committee during the next phase (Determination).

It is interesting to look at the basic motivation of the nominator and the basic thrust of the nomination. The original NSW legislative text notes that spurious nominations are not to be considered. This, however, is the only social criteria for excluding consideration; otherwise, the Act specifies that social and economic factors are not to be taken into account. Many nominations are of the “not in my backyard” nature (sometimes literally), where the nominator notes a decline in the species, population, or community involved, or the appearance of a threat, and prepares a nomination based on personal interest in the land area or processes. A smaller number of nominations come from experts who have access to data which indicates a decline is imminent or has happened, or that a threatening process exists. A large number of nominations are prepared and submitted by NGOs as a part of their core activity. The Department of Environment and Conservation (NSW) prepares some nominations as part of the core activity of threatened species management. The Scientific Committee also has the power and capability to prepare nominations itself, and it does so when considered necessary (for complex or urgent issues). Finally, nowhere in the nomination process is the recovery of the species explicitly considered, beyond the general knowledge that regulations will now apply to this entity. It is not possible or necessary to include recovery considerations at the nomination stage, but it is necessary to be aware that this has not occurred.

## Determination

After nomination, the status of the species, population, community or threatening process is determined by the Scientific Committee. That is, a decision is made to accept or reject the nomination, and subsequently include it (or not) on the Schedules of the Act. This can be a time consuming process, where the evidence put together by the nominator is taken into account along with other information that the Scientific Committee accumulates.

In some cases, years may go by before a nomination is determined. In making a determination, the Scientific Committee is not required to consider the steps or actions necessary for recovery or abatement. It is not required to take into account economic or social consequences of any determination. Again, it is not necessary at this stage (for successful threat abatement or recovery), but it is necessary to be aware that that it has not occurred.

## Planning

The result of listing on the Schedules of the TSC Act are that a plan must be prepared for the recovery of the entity under consideration or the abatement of the listed Key Threatening Process. These plans are the responsibility of the Department of Environment and Conservation, through a recovery team. The actual preparation of the plan is normally done by consultants under contract to DEC, and the resultant document is approved by the recovery team, put on display as a draft for public comment, and signed off by the relevant Minister.

## Implementation

These plans become statutory documents, which must be followed by government agencies and the general public. In particular, the provisions of these plans must be followed by Local Government, in the process of land management, business and recreational activities. This involves consideration in the development approval process, but does not include “routine agricultural activities”. There are, however, many “loop-holes” in the requirements for compliance with recovery plans, particularly where industrial or suburban development is involved. The combination of loop-holes, lack of vision, and lack of clear action plans for recovery result in little implementation activity. However, most plans are reviewed regularly by the Recovery Team, which is also a requirement of the legislation. Along with the other recent and relevant policy developments described below, the processes described above constitute the recovery and threat abatement actions at present in NSW. [NB. In NSW, legislation is in the process of amendment at the time of writing September 2004].

## Other Recent and Relevant Policy Developments

Vision and action plans for recovery and abatement management can come from other government, NGO and private initiatives. Over the past decade, a variety of processes have been underway which affect the recovery of threatened species and the management of natural resources (Allan and Curtis 2003, NSW Department of Urban Affairs and Planning 1999). A major recent change was with regard to forest management. On the east coast of NSW, land tenure, funding for land management, and regulations for threatened species have changed greatly (Lindenmayer and Recher 1998). In particular, large areas of former State Forest are now part of the nature reserves and National Parks managed explicitly for conservation goals by the Department of Environment and Conservation. The process of conversion to nature reserve status and National Park continued in 2004, with

large areas under moratorium from logging until they can be converted into nature reserve or National Parks, or the conflict with NGOs dissipates (Nicholson 1999). In areas that remain as State Forest, operations are conducted under the auspices of a Threatened Species Licence, which contains provisions to protect threatened species at the regional, landscape, and local-site level.

In brief, there is no logging of old growth forest, rainforest, riparian areas, rocky outcrops, cliffs, drainage lines, or heath, and all of these areas are protected by buffer zones. Winter flowering Euclapyts, Banksias, Allocasuarinas and Xanthorrhoea are all afforded specific protection. It is noted that the definition of rainforest includes stands with eucalypt emergents, *e.g.* is a broad, rather than narrow, interpretation of rainforest. Hollow trees and recruits *i.e.* trees that may grow to produce hollows are protected within logged stands, except for plantations, and hollow trees are further recruited in the prescriptions for other landscape level resources (riparian areas, rainforest buffers, as listed above). Stags, *i.e.* dead trees, and down wood, *i.e.* fallen trees and branches, have special prescriptions in the license, as do individual threatened species (NSW Department of Urban Affairs and Planning. 1999). The conditions of this licence are monitored vigorously by the Department of Environment and Conservation, NGOs and individual citizens.

Off Crown land, a variety of recent changes to native vegetation regulation have occurred. Generally, it is now illegal to clear native vegetation without a permit, in particular listed ecological communities, for agricultural or other rural land use, based on requirements from Native Vegetation Acts (1997, 2003). Consent from the appropriate government agency (Catchment Management Authorities, 2004 onwards) may be required when a listed entity will suffer significant impact from a development. There are a variety of loop holes in these regulations - for instance, most non-rural development is exempted. Further, no detailed agreements or regulations have been developed as was done for the forest industries.

## Recovery and threat abatement actions

Let us examine three sets of recovery efforts. Recovery actions have been limited by funding or lack of knowledge, as noted above. In some cases, however, actions have been taken that significantly reduce threats and provide for recovery of the target taxa. In other cases, actions have achieved little, while a large number are “still working”.

Most recovery actions are related to stopping development which would destroy habitat, *e.g.* the species or other entity must be considered in the development application process, and by other government processes affecting land management. Precautionary actions exist for forestry operations, where new prescriptions must be developed for newly listed species, populations or communities. In some cases, habitat restoration work is undertaken (usually weed removal, tree planting or feral animal control). However, the actions and funding are limited, and there is seldom synergism between elements of the recovery program. Three examples follow.

**Success:** Gould's Petrel *Pterodroma leucoptera leucoptera* - is an example of successful recovery action. The elements of vision and action were addressed in the planning processes, and then the actions, including research, were implemented. In the first instance, the problem was assessed (Priddel *et al.* 1995a) in terms of population status. Aside from some birds on the nearby Boondelbah Island, the species was limited to one breeding site, Cabbage Tree Island, New South Wales. Mortality was investigated (Priddel and Carlile 1995b), key threatening processes were identified - the introduced rabbit, weeds - and subsequently eliminated (Priddel *et al.* 2000). The original population on Cabbage Tree Island showed a positive response to these recovery measures. After appropriate technological developments to secure permanent nest sites (Priddel and Carlile 2001a) and determine the feasibility of translocation (Priddel and Carlile 2001b) a second population was established on a nearby island to provide long term security. An ongoing education and publicity effort vastly aided acceptance (Priddel and Carlile 1999). An ongoing monitoring program is part of the Recovery Plan (NPWS 2000). In effect, all the necessary steps outlined in the vision and action statements proposed at the outset of this paper have been put in place.

**Failure?:** Long-footed Potoroo *Potorous longipes* - The Long-footed Potoroo was described only recently (Seebeck and Johnston 1981). It is a 2 kg potoroid, confined to northeastern Victoria and possibly southeastern NSW. Since its discovery and description in the early 1980s, recovery efforts, particularly in NSW, have shown few positive results. Originally known from a few (16) hair tube records and one jaw bone in NSW (Dovey 1987), it has not been recorded in recent times (over the past five years). The national recovery plan has been adopted for the species by NSW, but the status of the plan in that state at present is unclear. In NSW, large areas (approximately 30 000 ha) of land have been converted from multiple use forest to nature reserve and National Park with direct reference to this species (based on precautionary modelling procedures in the Eden Regional Forest Agreement), but the effect of this tenure change has not been monitored (DEC website 2004). Further, information available to the public online does not reflect this change in land tenure in NSW, and indicates that the species is primarily threatened by forest management practices across its range (Massicot 2002).

With regard to other objectives of the plan, the captive population in Victoria has ceased to reproduce (National Recovery Team *in litt.* 2004). There is no plan for positive management (translocation, reintroduction) although new, genetically compatible (Luikhart *et al.* 1997) and relatively abundant populations have been discovered in Victoria. As noted in the National Recovery Plan, this species is in the peculiar position of having increased its known range since listing (due to increased survey effort). The major recovery action is further reservation from logging (National Recovery Team, *in litt.* 2004).

Research into longevity, reproductive rate, diet, disturbance, and effects of predator management has not proceeded or has not produced useful tools for successful recovery.

In NSW, the species is in much the same state now as it was 15 years ago. That is, its status and threatening processes are unknown. The public and the scientific community have little interest in the issue at present in NSW. Virtually none of the principles or practices suggested in the vision and action sections of this paper have been accomplished. The situation has arisen because there was insufficient or incorrect assessment of the species status, insufficient or incorrect assessment of threats, and inadequate or inappropriate actions have thus been the result. Where positive action has seen positive results (population size doubled after predator control at Bell Bird in Victoria, National Recovery Team *in litt.* 200), there has been little recognition by the public or the scientific community. There has been little persistence and less cooperation in managing this species in NSW, which are key elements of recovery. This has led to limited acceptance of the plan, in financial, scientific or public relations terms.

*Still working:* Regent Honeyeater *Xanthomyza phrygia* is a large member of the honeyeater family, Meliphagidae, which nomadically follows flowering events in forests and woodlands from South Australia to Queensland (Longmore 1991). As these forest and woodland habitats have diminished, it has declined dramatically over the past two decades. The need for a comprehensive assessment of the species and threats to population survival have been addressed (Menkhorst 1993, 1997). Longevity, foraging requirements, captive husbandry, genetics, re-introduction techniques, and habitat restoration tools have been studied and developed, primarily in Victoria (NRE 1998a).

After a decade of recovery work, source populations are now known, there is a successful captive breeding population in existence, and habitat restoration work has created at least 2 000 ha of new habitat, with at least 1 000 ha in a single block (Menkhorst *et al.* 2000, National Recovery Team *in litt.* 2003).

However, population abundance in the wild has yet to respond to these efforts in a detectable, positive manner. The wild population has yet to make use of new habitat, possibly because some of these areas are remote from source populations. Genetic work has shown the species is essentially one large gene pool (Schodde *et al.* 1992), and mark-recapture work has shown that all major populations intermingle (Menkhorst *et al.* 2000). With this knowledge, it is clear that principles of conservation biology could be achieved using translocation of captive bred birds. That is, there is not a risk of genetic pollution of local populations resulting from translocations or re-introductions.

Recently, Regent Honeyeater habitat has acquired protected status as Endangered Ecological Communities or their equivalent which have been described and enacted into regulation in NSW, Victoria and the Australian Capital Territory (Muir *et al.* 1995, NSW TSC Act website 2004, Australian EPBC website 2004, Environment ACT website 2004). The Regent Honeyeater has been incorporated as part of the Recovery Planning process for these communities in

the ACT. An over-arching and synergistic process is beginning to emerge. However, there is little public acceptance and less funding available for constructive action (Menkhorst *et al.* 2000).

The major work of the recovery team for the Regent Honeyeater remains to be done - more habitat needs to be restored, and possibly aggressive action needs to be taken to establish populations in areas of suitable habitat. There has been adequate assessment of the problem, but action and acceptance are still lacking. In particular, funding needs to be secured, preferably from a long term, vested-interest partner with large economic resources. The apiary industry, for instance, has a long term interest in establishing nectar resources across the range of the Regent Honeyeater. Through serendipity, the colours of the target species and the usual logos of the apiary industry are well coordinated from a marketing point of view (bright yellow and black).

## Conclusions

Although threatened species legislation empowers biodiversity managers, this legislation has thus far rarely been used effectively in NSW. Instead, a diverse range of activities has been funded, few of which synergistically move toward the recovery of species, populations or communities, or the abatement of threats. By developing a vision for success, and carrying out logical recovery or abatement actions, the situation could be reversed. An over-arching vision, which provides focus to the actions, is a key element which has not been developed. Articulating clear vision statements will allow government and the private sector to plan and deliver funding for effective recovery and threat abatement actions. Continuing to manage biodiversity by increasing the number of listed entities is not a satisfactory end point.

The real task of threatened species or biodiversity legislation is to remove entities from a threatened status, not simply to list these entities on schedules of Acts. To remove threats, it is necessary to address three equally important topics with vision and action statements:

Acceptance - acquire acceptance for the vision and planned actions.

Assessment - properly assess the status of the entity.

Actions - acquire resources, support and continuity for all necessary recovery actions.

Although the proposed processes may not guarantee success, they will guarantee that legislation and regulations assist in the positive management of biodiversity resources, rather than simply add more entities to "the schedules of the Act".

Chris Dickman asked me on the day of the conference if I would retain any entities on the lists, and my answer is: "Some may need to remain on lists in perpetuity, due to inherent risks compounded by human development. However, all threatened species, population and communities can be managed to achieve success."



## Acknowledgement

I would like to thank Daniel Lunney and the two referees who commented so effectively on the draft. Elisabeth Larsen provided detailed comment and conceptual input to the manuscript. I would also like to acknowledge the Scientific Committee for the Threatened Species Conservation Act in NSW. It has been a privilege to work with its members over the past 9 years. Bill Shields, Jake Tanner, and Bethany Ostry

made significant contributions to the delivery and creation of this work. Forests NSW and its staff, particularly Doug Binns, Paul Meek and Justin Williams, have contributed significantly to work on threatened species, communities and populations, and to threat abatement. Paul Mahon and Andrew Leys from DEC NSW have contributed to, but are not responsible for, some of the concepts in this paper.

## References

- Allan, C. and Curtis, A. 2003. Regional scale adaptive management: Lessons from the North East Salinity Strategy (NESS). *Australasian Journal of Environmental Management* 10, 76-84
- Beckwith, J. A. and Moore, S. A. 2001. The influence of recent changes in public sector management on biodiversity conservation. *Pacific Conservation Biology* 7, 45-54
- Botkin, B.D. 2001. *No Man's Garden: Thoreau and a New Vision for Civilization and Nature*. Island Press, Washington D.C.
- Briggs, S. 2003. Command and control in natural resource management: Revisiting Holling and Meffe. *Ecological Management and Restoration* 4, 161-162
- Caughley, G.C. 1994. Directions in conservation biology. *Journal of Animal Ecology* 63: 215-44.
- Cody, M. and Smallwood, J. (eds) 1996. Long-Term Studies of Vertebrate Communities. Academic Press, Inc.
- Commonwealth of Australia. 1992. *National Forest Policy Statement: a New Focus for Australia's Forests*. Australian Government Printing Service, Canberra.
- Daily, Gretchen. 1997. *Natures Services*. Island Press, Washington D.C.
- Department of Conservation and Environment. 1991. Regent Honeyeater Management in Victoria. Procedural Document 02-20-0642-1, Department of Conservation and Environment. Heidelberg, Victoria.
- Department of Natural Resources and Environment, Victoria; National Parks and Wildlife Service, New South Wales; Parks Victoria, State Forests of New South Wales (2000) Long-footed Potoroo (*Potorous longipes*) Recovery Plan, DEH Website, 2004.
- Dickman C. 1996. Incorporating science into recovery planning for threatened species. Pp. 63-73 in *Back from the brink: refining the threatened species recovery process*. Edited by S. Stephens and S. Maxwell. Surrey Beatty and Sons, Chipping Norton, NSW.
- Dovey, E. 1987. *Use of databases, indirect survey and predictive techniques in the discovery of the Long-footed potoroo in NSW*. Thirty third Scientific Meeting of the Australian Mammal Society. Australian Mammal Society News, Abstract p.16.
- Gibbons, P. and Briggs, S. 2004. Biodiversity Incentives Framework : A framework for allocating incentive payments for biodiversity on private land. Draft. Department of Environment and Conservation, CSIRO Sustainable Ecosystems, Canberra.
- Gibbons, P., Briggs, S. and Shields, J. 2001. How many credits is your property worth ? *Australian Landcare*, December 2001, 20-21.
- Gibbons, P., Briggs, S.V. and Shields, J.M. 2002. Are economic instruments the saviour for biodiversity on private land? *Pacific Conservation Biology* 7, 223-228.
- Hawken, P. 1993. *The Ecology of Commerce*. Harper Collins.
- Holling C. S. and Meffe G. K. 1996. Command and control and the pathology of natural resource management. *Conservation Biology* 10, 318-327.
- JANIS 1997. Nationally Agreed Criteria for the Establishment of a Comprehensive, Adequate and Representative Reserve System for Forests in Australia. Natural Resource Management Ministerial Council, Canberra.
- Lindenmayer, D.B. and Recher, H.F. 1998. Aspects of ecologically sustainable forestry in temperate eucalypt forests – beyond an expanded reserve system. *Pacific Conservation Biology* 4: 4-10.
- Longmore, W. 1991. *Honeyeater of Australia and their Allies*. Angus and Robertson, Sydney.
- Luikart, G J Painter, R. H Crozier, M Westernman, W. B Sherwin. 1997. Characterization of microsatellite loci in the endangered long-footed potoroo *Potorous longipes* *Molecular Ecology* 1997 6:5 p. 497
- Massicot, Paul. 2002. Long-footed Potoroo. Animal Info Website © 2002
- McDonald T. 2003. Persistence and cooperation: Undervalued keys to restoration? *Ecological Management and Restoration* 4, 82.
- McNamara, C. 2003. Strategic Planning (in nonprofit or for-profit organizations). In: *Field Guide to Nonprofit Strategic Planning and Facilitation*. 296 pp. Free Management Library, Authenticity Consulting, Minneapolis, Minnesota.
- Meek, P. and Kirwood R. 2003. Generating Conservation Kernels to Select Areas to Control Foxes and the Implications for Pest Management Practice in State Forests. *Ecological Management and Restoration* 4: 66-72.
- Meek P. and Shields, J. 2004. *The Hastings River Mouse Scientific Forum*. 4-5 March, 2004, Cumberland State Forest, Sydney. Proceedings edited by P. Meek and J. Shields. Forests NSW, Locked Bag 23, Pennant Hills, NSW.
- Menkhorst, P., Schedvin, N., and Geering, D. 1999. Regent Honeyeater (*Xanthomyza phrygia*) Recovery Plan 1999-2003. DEH Website 2004.
- Muir, A.M., Edwards, S.A. and Dickens, J.M. 1995. *Description and conservation status of the vegetation of the box-ironbark ecosystem in Victoria*. Flora and Fauna Technical Report Number 136, Department of Conservation and Natural Resources, Victoria.
- Nicholson, E. 1999. Winds of change for silvicultural practice in NSW native forests. *Australian Forestry* 62: 223-35.
- Natural Resources and Environment. 1998a. *Threatened Vertebrate Fauna in Victoria*. Department of Natural Resources and Environment, Melbourne.
- Natural Resources and Environment. 1998b. *Victoria's Biodiversity: our living wealth*. Department of Natural Resources and Environment, Melbourne.
- NPWS (National Parks and Wildlife Service). 2001. *Threat Abatement Plan for Predation by the Red Fox (Vulpes vulpes)*. National Parks and Wildlife Service. Hurstville.
- DEC (Department of Environment and Conservation). 2004. *Draft Threat Abatement Plan for Invasion of native plant communities by bitou bush/boneseed*. National Parks and Wildlife Service. Hurstville.
- NSW Department of Urban Affairs and Planning. 1999. *Report for the Comprehensive Regional Assessment Project NA57/ ESFM: Application of protective measures/ forest practices into a quantitative database*. Resources Assessment and Conservation Division, NSW Dept of Urban Affairs and Planning, Sydney.

- O'Connor C, Marvier M. and Kareiva P. 2003. Biological vs. social, economic and political priority-setting in conservation. *Ecology Letters* 6 No. 8 Pp 706-711 (6)
- Oliver, I. and Parkes, D. 2003. *A Prototype Toolkit for Scoring Biodiversity Benefits of Land Use Change*. Department of Infrastructure, Planning and Natural Resources, Sydney.
- Priddel, D. and N. Carlile. 1999. Reclaiming a Petrel's Paradise. *Nature Australia* 3: 60-63.
- Priddel, D. and N. Carlile. 2001. A trial translocation of Gould's Petrel (*Pterodroma leucoptera leucoptera*). *EMU*: 2001: 101: 79-88
- Priddel, D. and N. Carlile. 1995. An Artificial Nest Box for Burrow-Nesting Seabirds. *EMU* 1995: 95, 290-294.
- Priddel, D. and N. Carlile. 1995. Mortality of Gould's Petrel (*Pterodroma leucoptera leucoptera*) at the Nesting Site on Cabbage Tree Island, New South Wales. *EMU* 1995: 95, 259-264
- Priddel, D., N. Carlile and R. Wheeler. 2000. Eradication of European rabbits (*Oryctolagus cuniculus*) from Cabbage Tree Island, NSW, Australia, to protect the breeding habitat of Gould's Petrel (*Pterodroma leucoptera leucoptera*). *Biological Conservation* 94 (2000) 115-125.
- Priddel, D., N. Carlile., C. Davey and P. Fullagar. 1995. The Status of Gould's Petrel (*Pterodroma leucoptera leucoptera*) on Cabbage Tree Island, New South Wales. *Wildl. Res.* 1995, 22, 601-10.
- List of Bibliography of the Hastings River Mouse:**
- Blackwell, G., Graham, K., Hochuli, D. and Meek, P. D. 2003. Habitat use by the Hastings River Mouse (*Pseudomys oralis*): are management prescriptions accurate? Poster Paper at the Ecological Society of Australia, 2003 Conference, Armidale NSW.
- Fox, B., Read, D., Jefferies, E and Luo, J. 1994. Diet of the Hastings River Mouse (*Pseudomys oralis*). *Wildlife Research* 21: 491-505.
- Jerry, D. R., Dow, T. A., Elphinstone, M. S. and Bavestock, P. R. 1998. Historical and contemporary maternal population structuring in the endangered Hastings River Mouse (*Pseudomys oralis*). *Conservation Biology* 12, 1017-1022.
- Graham, K. 2003. Responses of invertebrate and mammalian fauna to hard and soft edges in Eucalypt forests, Chapter 4. Honours Thesis, University of Sydney.
- Keating, J. 2000. Factors affecting the distribution of two rare small mammals at Grady's Creek Border Ranges national Park, North-East NSW. Honours Thesis, Southern Cross University, Lismore.
- King, G. C. 1984. Habitat utilised by *Pseudomys oralis*. *Australian Mammalogy* 7, 139-47.
- King, G and Mackowski, C. 1986. Two new localities for *Pseudomys oralis* Thomas (Rodentia:Muridae) in NSW. *Australian Mammalogy* 9: 63-5.
- Meek P. D, 2002a. Radio tracking and Spool-and-line study of the Hastings River Mouse *Pseudomys oralis* (MURIDAE) in Marengo State Forest NSW. State Forests of NSW Unpublished Report.
- Meek P. D, 2002b. The nest of the Hastings River mouse *Pseudomys oralis*. *Australian Mammalogy* 24: 225-227.
- Meek P. D., McCray, K. and Cann, B, 2003. New records of Hastings River Mouse *Pseudomys oralis* from State Forest of NSW pre-logging surveys. *Australian Mammalogy* 25: 101-105.
- Meek, P. (unpublished) Home range and habitat use of *Pseudomys oralis* I. radio tracking.
- NSW NPWS 2003. Draft Recovery Plan for the Hastings River Mouse (*Pseudomys oralis*). NSW NPWS, Sydney.
- Pyke, GH and Read DG, 2002. Hastings River mouse (*Pseudomys oralis*): A biological review. *Australian Mammalogy* 24: 151-176.
- Schodde, R., Mason, I.J. and Christidis, L. 1992. Regional age and sexual differentiation in the Regent Honeyeater *Xanthomyza phrygia*. *Corella* 16: 23-28.
- Seebeck, J.H. and Johnston, P.J. 1980. *Potorous longipes* (Marsupialia : Macropodidae); a new species from eastern Victoria. *Australian Journal of Zoology*, 28, 119-134.
- Simberloff, D. 1999. The role of science in the preservation of forest biodiversity. *Forest Ecology and Management* 115: 101-11.
- Smyth, A.K., Lamb, D., Hall, L., McCallum, H., Moloney, D. and Smith, G. 2000. Towards scientifically valid management tools for sustainable forest management: species guilds versus model species. Pp 118-24 in *Management for Sustainable Ecosystems*, edited by P. Hale, A. Petrie, D. Moloney and P. Sattler. Centre for Conservation Biology, the University of Queensland, Brisbane.
- Song, S. J. and McGonigle, R. M. 2001. Science, power and system dynamics: the political economy of conservation biology. *Conservation Biology* 15. 980-989.
- State Forests of NSW. 2002. *Seeing: Social, Environmental and Economic Report 2001/02*. State Forests of NSW, Locked Bag 23, Pennant Hills, N.S.W.
- Read, D. G. 1993a. Prescriptions for the identification of habitats of the Hastings River Mouse *Pseudomys oralis*. *Forestry Commission NSW Technical Paper No. 58*.
- Read, D. G. 1993b. Body size in Hastings River Mouse *Pseudomys oralis* from old and new locations. *Australian Zoologist* 29: 117-23.
- Read, D. G. and Tweedie, T. D. 1996. Floristics of habitats of *Pseudomys oralis*. *Wildlife Research* 23, 485-93.
- Smith, A, Ferrier, S, Hines, H. and Quin, D. 1996. Modelling the geographical range of the endangered Hastings River Mouse (*Pseudomys oralis*) (Rodentia:Muridae) in North-East NSW. Unpublished Report to the Hastings River Mouse Recovery Team, AUSTECO, Armidale.
- Smith, A. and Quin, D. 1996. Patterns and causes of extinction and decline in Australian Conilurine rodents. *Biological Conservation* 77, 243-267.
- Smith, A, Phillips, C., and Townley, S. 1996. Diet and habitat preferences of the Hastings River Mouse (*Pseudomys oralis*) (Rodentia:Muridae). Unpublished Report to the Hastings River Mouse Recovery Team, AUSTECO, Armidale.
- Smith, A. P. and Quin D. G. 1997. Microhabitat requirements of the Hastings River Mouse (*Pseudomys oralis*) (Rodentia: Muridae). Unpublished report to the Hastings River Mouse Recovery Team. AUSTECO Environmental Consultants.
- Tasker, E. and Dickman, C. 2004. Small mammal community composition in grazed and frequently-burnt Eucalypt forests of the northern tablelands of NSW. Pp 721-740 in *Conservation of Australia's Forest Fauna* (second edition), edited by D. Lunney D. Royal zoological Society of NSW, Mosman, NSW.
- Tasker, E. 2003. Disturbance and the Hastings River Mouse: landscape-scale processes and management of the endangered species. Abstract from the Ecological Society of Australia Conference, Armidale 2003.
- Townley, S. 1997. Diet and social organisation of the Hastings River Mouse *Pseudomys oralis* (Rodentia:Muridae) in north-eastern NSW. Unpublished Draft report to NSW NPWS.
- Townley, S. 2000. The ecology of the Hastings River Mouse *Pseudomys oralis* in North eastern NSW and Queensland. PhD Thesis, Southern Cross University, Lismore.
- Tweedie, T. and York, A. 1993. Survey Guidelines for the Hastings River Mouse (*Pseudomys oralis*). SFNSW Technical Paper 62. State Forests of NSW, Sydney.