

Australian National Weeds Strategy: What Are the Lessons?

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Abstract

In 1996, the Australian federal government endorsed a National Weeds Strategy (NWS) with a promise of \$19 million (AU) over five years for its implementation. Developed with the involvement of federal and State governments, technical experts, industry and the public, the NWS is the formal outcome of an extensive social process. The Strategy evolved within a wider political and social climate that was open to and supportive of change towards greater environmental accountability. It catalyzed a level of self-generated interest in the weed management and conservation communities that went beyond the formal consultative processes of government. The process promoted a sustained dialogue among disparate groups and a heightened awareness of the ecological impact of weeds which together enabled fundamental changes in the culture of weed management to emerge. Specific outcomes of the process include:

- environmental weeds are now a political issue
- federal and state weed control legislation and policies are being broadened to include the protection of ecosystem function and biodiversity, having previously had an agricultural bias;
- attention among managers and researchers is shifting from weed control *per se* to understanding and management of systemic causes of invasions including bio-physical and cultural aspects;
- government incentives to coordinate weed control by sustainable land-use practices are increasing;
- preventative action is increasingly recognized as a good investment and is given high priority in policy and funding;
- most States have voluntarily undertaken development of new policies and/or weed strategies;
- capacity building programs in on-the-ground weed management programs are being augmented for rural and urban communities.

The key lessons relate to the value of the process of development itself. Key attributes were that it was: socially and politically timely; sufficiently long to adequately deal with the complexity and scale of the issues; inclusive of all sectors and interest groups. This combination of factors allowed for deep consideration of issues, mature responses to complex problems, collaboration among sectors, alignment in overall approach and a high level of commitment to the Strategy's implementation.

Introduction

The Australian National Weeds Strategy (NWS) was initiated in 1991 as a conventional government planning exercise that was to last about a year. Due to unforeseen circumstances, a far more socially inclusive and complex process was generated that lasted five years and yielded immense educational and social value. It became a focus of change that transformed the weed management culture of Australia and led to the implementation of several important programs well before the strategy was formally endorsed in late 1996. Funding of \$19 million (AU) over 5 years was promised for its implementation with \$500,000 (AU) immediately available.

As a member of the NWS task force, I observed the evolution of the process from its inception and attempt here to capture attributes I perceive are important, together with enough description of the social and environmental conditions within which the process evolved to provide a context. By doing so, I hope that the lessons here gleaned in hindsight, can be used to guide the planning of similar exercises in future.

The NWS Process

The National Weeds Strategy was catalyzed by an *ad hoc* submission in 1990 to the federal government for \$5 million (AU) to prevent *Mimosa pigra*, an aggressive, leguminous shrub, from spreading into the floodplains of northern Australia's Kakadu National Park.

Provision of federal funds of this magnitude for weed control had been previously confined to strategic programs aimed at protecting agricultural production. However, Kakadu N.P. is a World Heritage Area and the federal government has international obligations for its protection. Although the government provided the money, it also took precautions to avert future *ad hoc* decision-making. In 1991 it commissioned a task force to assess the continental status of weed problems and to review the capacities of governments and the community to manage them. The task force was mandated to advise on strategic considerations for future spending of federal funds on weeds.

Prevailing weed control policies in Australia in 1990 reflected the historically agricultural focus of government. The implicit assumptions were that weeds are predominantly agricultural pests; unwanted species mostly enter the country accidentally through import of contaminated seeds; and that chemical control is the solution to weed problems. The first draft of the NWS in 1991 began to examine these shortcomings in perception and policy and included a small, separate section on environmental weeds. However, when the draft was released for public comment toward the end of 1991, it met with strong criticism.

Coincident with the NWS initiative was the publication by the Australian Nature Conservation Agency (ANCA) of a national overview of the impact of weeds on natural and semi-natural systems (Humphries et al. 1991). The report brought to the attention of the public and government agencies how widespread and critical was the threat of weeds to biodiversity and ecosystem function.

The ANCA report was heavily quoted in the public submissions to the NWS. The written responses overwhelmingly conveyed the view that the NWS document was biased toward economic consideration in land management and did not give sufficient weight to environmental, conservation and land degradation issues.

Public pressure on government to seriously address environmental weeds led to redrafting of the terms of reference for the NWS. A second task force was formed to begin again, under additional terms of reference to explicitly examine environmental weed issues.

The second phase took another four years. The process became embroiled in a host of complex and ongoing restructures within the federal government with accompanying changes in departmental responsibilities and lines of accountability. The changing larger context led to multiple reinterpretations of the terms of reference. These shifting goalposts were acknowledged in the final report and the task force was commended for its "fortitude and perseverance" during the many requisite redrafts.

The task force was accountable to the Australian Weed Committee (AWC) a Standing Committee of federal, State and technical representatives that meets several times annually and formally advises the federal government on technical aspects of weed management. All of the task force members were also members of AWC. The AWC reinforced and supported the efforts of the NWS task force and this regular forum was a key in maintaining national support and momentum at the State and federal levels of government. It was also an important mechanism for cross-fertilizing ideas and disseminating information within government.

The extended time during which the NWS was in preparation served a vital social purpose. A host of opportunities arose for members of the task force to interact with individuals and groups at seminars, conferences, workshops and through newsletters. The positive effects of interaction sustained by the promise of a National Weed Strategy was far greater than if one had been written quickly by a select number of individuals and subsequently distributed. The federal government opened the doors and legitimized the issues already in the public arena while the delays in the delivery of "the answers" provided a stimulus for thinking independently on the issues. Ideas by every group involved in weed management - federal and state government departments, research institutions, conservation societies, industry stakeholders and the community - were refined through written and spoken channels. Spin-off activities such as state-wide strategy workshops and special purpose conferences arose. My perception is that groups at the grass-roots level were strengthened through their own organizing efforts and deliberations which might have been curtailed had the federal prescriptions been out earlier. As the process progressed, it was apparent how the understanding and alignment about the ecological implications of weeds grew, how the collaboration expanded, and the commitment in the government and the public domains widened.

The extensive participation generated understanding, creativity and ideas which in turn molded the Strategy.

A Receptive Social Context

The NWS was being developed at a time when conservation and natural resource management philosophy and practices were being widely re-evaluated. Marked attitudinal changes were taking place in Australian society in the 1990s toward greater awareness of ecological imperatives, the need for limits to resource exploitation and more active conservation measures. Severe and escalating land-degradation problems coupled with loss of biodiversity was reaching a crisis of national proportions.

The domestic situation together with the international moves toward adoption of sustainable development policies expressed itself in a plethora of new federal strategies. Among the most influential are: Decade of Landcare Plan (1991), National Strategy for Ecologically Sustainable Development (1992), National Strategy for Endangered Species (1992), Vertebrate Pest Strategy (1993), and National Strategy for the Conservation of Australia's Biological Diversity (1994).

The social climate was thus receptive to and supportive of a National Weed Strategy that included strong commitment to protection of natural and semi-natural areas, that sought to integrate weed management with sustainable land-management and which promoted coordination across all government levels and the community.

By 1996 weed invasions were understood to be serious, widespread and critical threats to biodiversity and ecosystem function and to be a symptom of poor land-use decisions. It is now known that most noxious weeds are intentionally imported and mostly for ornamental purposes. To manage weeds at the national and even regional scale, cultural changes are required. In the final draft of the NWS, the distinction between environmental weeds and agricultural weeds had blurred - there is an implicit view throughout that any weed is a potential threat to ecological systems whether particular ones are recognized primarily for conservation, production, or both.

In this climate, the philosophical basis of weed management shifted from "targeting the weed" to "targeting land-use."

Weed Problems of Australia's Natural and Semi-natural Areas

Australia is an island continent, slightly smaller than the 48 contiguous United States with a highly urbanized population of less than 20 million. The country is characterized by low average rainfall, except in eastern and southwestern coastal and sub-coastal areas. The vegetation is mainly grassland/woodland, with shrub-land in the central desert and small forested areas in the east and southwest. Intensive agriculture is confined to a narrow belt in the higher rainfall areas of the east and southwest while the remainder of the continent, except the central desert, is extensively grazed, including marginal lands. Feral grazers, rabbits in particular, are a major management problem. Soils are typically infertile, shallow, stony and/or salt-prone. The poor soils, highly variable, seasonal rainfall combined with inappropriate land-use such as over-clearing of native vegetation, over-grazing especially on marginal lands and over-irrigation has resulted in a severe land degradation problem across the continent. In 1975 over 50% of the agricultural land required treatment; in 1987 estimated losses from land degradation in the central cropping and irrigation areas were over \$220 million per year (Decade of Landcare Plan 1991).

Weeds are both a symptom and a proximate cause of land-degradation (by contrast to distal causes which are ultimately cultural such as over-grazing or import of new species). Apart from land-clearing, weeds are probably the greatest threat to Australia's natural communities. Almost every major ecosystem has been extensively altered by invasion of exotic plant species and the process continues with infilling, expansion of range and introduction of new species (for details see Humphries et al. 1991, 1994).

Of the approximately 17,000 plant species occurring in Australia, about 11% are non-native of which about half became naturalized. A smaller percentage invades natural communities. Most of the major weeds are intentionally introduced. Of the 220 species proclaimed noxious, over 50% were deliberately brought in, principally for ornamental purposes (after Panetta cited in NWS 1996). This was compelling evidence that contributed to a review of plant import screening processes now being tested (see below).

The continental pattern of invasions broadly reflects the climatic zones. Broad-scale, single-species dominated invasions occur in the extensive grazing country of northern Australia. The impact of grazing, together with a fire regime very different from pre-European settlement, induced drastic direct or indirect changes to the natural systems. Exotic trees and shrubs are now displacing native vegetation over thousands of square miles of the semi-arid and monsoonal tropics. The more prominent species include: prickly acacia (*Acacia nilotica*), rubber vine (*Cryptostegia grandiflora*), parkinsonia (*Parkinsonia aculeata*), mesquite (*Prosopis* spp.), and giant sensitive plant (*Mimosa pigra*).

Invasions of this scale, over such vast distances coupled with low population density and low economic value of the land, are in practice impossible to contain from spreading if current land-use regimes (i.e. grazing) continue. In

some areas it is still more economical to abandon the land and buy similar, uninfested property than it is to control the problem. Rubber vine, in many ways the worst of these species from a conservation perspective (Humphries et al. 1991) could be managed if grazing was managed differently or stopped. The species is highly sensitive to fire but groundcover is too sparse to carry a fire, if the land is grazed. These are examples where economic and cultural causes of spread still prevail. A positive change is occurring in managing prickly acacia. These shrubs spread along open drain systems used for watering stock but there is now a program in place to cap the drains and to pipe water. Although the initial catalyst for capping was not the weed, but the lowering of the watertable, this is an example of how a systems approach to land-management can have multiple benefits.

In the eastern and south-western parts of the continent, the scale changes toward a patchwork of smaller, multiple-species invasions reflecting a more favorable climate, greater topographic variation, higher population density and a settlement-related fragmentation of natural vegetation. The invasive species are in the main ornamentals originally escaped from local plantings. The native vegetation fragments are often repositories of rare species, being the last vestiges of once more widespread communities. Weed invasion in these locations is an urgent issue of conservation of biodiversity.

The more invasion-resistant ecosystems appear to be the intact areas of rain- and temperate forests, mangroves, the alpine vegetation and the red-sand deserts. Tropical rainforest is typically resilient to invasion unless highly fragmented. Edges then become infested with large numbers of sun-loving vines, creepers and grasses. The most vulnerable ecosystems are the waterways. They provide conditions of higher moisture and nutrients than surrounding land, a transport route for seeds and other propagules, and disturbed conditions. Waterways are typically infested with a larger number of species and usually denser populations of those species that also occur in the surrounding landscape. In the desert, tamarisk (*Tamarix aphylla*) is the most serious of the riverside weeds. (This species is commonly called athel in the U.S. where tamarisk is used to refer to other *Tamarix* species including *T. chinensis*, *T. gallica*, *T. parviflora* and *T. pentandra*)

Grasses are ubiquitous and particularly insidious weeds - next to impossible to control. Their ecological effect is often indirect or subtle; they change the fire regime or choke out regenerating native species so their full impact may not be evident for many years even after they have invaded. One grass species of national significance is *Cenchrus ciliaris*, or buffel grass, which has been widely planted throughout the arid zone. It is a major threat to conservation over vast areas of the continent and particularly threatens endemic species found in mesic "islands" of the arid and semi-arid ecosystems.

Grasses and legumes have been introduced for pasture improvement to most parts of Australia but how useful they are in the longer term is now being questioned. Lonsdale (1994) surveyed the fate of exotic pasture introductions (474 grasses and legumes) that occurred in northern Australia over about 40 years. Only 21 (4%) became useful of which only 4 (<1%) were listed useful without also being weedy. Seventy-one (15%) were listed as weeds of which 54 species (11%) were weeds with no recorded use. Of the 71, 27 were weeds of cropping with 14 becoming major crop weeds, 21 were weeds of conservation and 23 were weeds of both sectors.

These results heightened the conflict between conservationists and those who have for decades supported "pasture improvement" programs. One aspect of the problem is how to screen and trial pasture species for import/release, as their weedy characteristic is one that makes them attractive to pastoralists. The onus would need to shift towards providing evidence of long-term usefulness, a change that is practically difficult and even the notion to shift the onus of proof is not yet widely accepted.

Key environmental weed issues

The problems are many and relate to issues of practical management, legislation, institutional arrangements as well as wider economic and cultural aspects. I can only provide highlights here:

- To strengthen quarantine protocols and screening such that the import of plants of risk to conservation is minimized.
- To develop a code of practice for assessment and release of plant species already in Australia in seed banks or as test species, but whose weed potential is unknown.
- To address the economic, ecological and cultural aspects of: a) the causal relationship between continuing grazing on marginal rangelands and the spread of broad-scale weeds; and b) the introduction of pasture species.
- To keep the spread of broadscale species from invading areas of high conservation value and/or into adjoining States, with priority given to the following: *Mimosa pigra* (giant sensitive plant) *Cryptostegia grandiflora* (rubber vine), *Acacia nilotica* (prickly acacia) *Tamarix aphylla* (tamarisk), *Chrysanthemoides* spp. (bitou bush, bone seed).

- To prepare and/or review comprehensive management or recovery plans addressing threats from weeds in respect of all nationally significant conservation areas, endangered ecological communities and ecosystems.
- To provide funds through Landcare groups (urban and rural) for targeting long-term management of weeds as part of sustainable land-use activities.
- To establish the institutional arrangements and federal, state and local capacity for coordinated weed management at a national scale.

For a fuller account of issues and priorities see Humphries et al. (1991) and the three year priority plan of the NWS - "National Weeds Strategy - Draft Recommendations for Initial Actions."

Grass-roots Weed Management Through the National Landcare Program

On-the-ground activities flowing from the NWS will be implemented through community landcare groups. Landcare is a powerful model for what is possible at the grass-roots level and I want to briefly introduce the concept.

Landcare groups began to be established nationwide in 1990 through the National Landcare Program (NLP), the most successful resource management initiative in Australia. The landcare groups provide the social mechanisms at the local level through which new land management initiatives can be implemented. As each new initiative is added (i.e. the implementation of the various strategies already mentioned: ecologically sustainable development, biodiversity, vertebrate pests etc.) it strengthens the knowledge base, experience, social cohesiveness and empowerment of the communities across the continent.

Land degradation in Australia had reached such dimensions that the federal government initiated this highly ambitious land stewardship program to foster co-operation between communities, individuals and the different levels of government. Rather than to treat symptoms, behind the landcare philosophy is an attempt to improve understanding of natural systems and to address the root causes of degradation which are in the social and economic factors that influence decision making. In 1995 there were some 2800 Landcare groups across Australia and 91 State Landcare facilitators trained in human interaction and group process skills. An estimated 1 in 3 rural landholders participate.

Through NLP, the federal government is providing financial support for skill development, planning assistance, facilitation and coordination to assist the formation of community groups, and for practical landcare group projects as defined locally. The planning and implementation process is organized along catchment and bio-physical region scales. NLP was allocated an initial \$32 million (AU) per year for ten years for its implementation, but owing to its success, this amount has been augmented by at least \$50-75 million (AU) each subsequent year and various 2 to 5 year special purpose funding initiatives have been added in the intervening years. Examples include: land and water audit, ending unsustainable land clearing, national rivercare initiative, drought landcare program. The concept is moving into other sectors of the Australian community including urban and semi-rural communities who care for natural area remnants, coastal dunes or watersystems.

Australia's National Weeds Strategy

A skeleton outline of the National Weeds Strategy -- the document endorsed by the federal government as official policy - is reproduced in Box 1. Specific programs and priorities are in a separate document "National Weeds Strategy - Draft Recommendations for Initial Actions" not yet endorsed by government. Both documents can be obtained by writing to the addresses at the end of the paper.

BOX 1. Australian National Weeds Strategy Principles, Goals and Objectives

The National Weeds Strategy provides a mechanism to "reduce the impact of weeds on the sustainability of Australia's productive capacity and natural systems." As its guiding considerations the NWS:

- stresses the importance of weeds as factors in land and water degradation in both developed and natural ecosystems;
- acknowledges that an historical focus on successful primary industries has inadvertently assisted the invasion of natural systems by alien plants;
- recognizes that action initiated to address these problems must be coordinated and integrated both between the variety of resource managers responsible and across all ecosystems of the bioregions involved;
- above all, seeks to foster an appreciation among all those involved in natural resource management that weeds are but one of the components of land and water degradation. If the resource is to be rehabilitated and protected in the longer term, none of these components can be tackled on its own;
- emphasizes the commitment of all governments to address weeds of national significance in co-operation with other interested parties.

Principles

The National Weeds Strategy is based on the recognition and acceptance of four principles:

1. Weed management is an essential and integral part of sustainable management of natural resource and the environment, and requires an integrated, multi-disciplinary approach.
2. Prevention and early intervention are the most cost-effective techniques that can be deployed against weeds.
3. Successful weed management requires a coordinated national approach which involves all levels of government in establishing appropriate legislative, educational and coordination frameworks in partnership with industry, landholders and the community.
4. The primary responsibility for weed management rests with landholders/land managers but collective action is necessary where the problem transcends the capacity of the individual landholder/land manager to address it adequately.

Goals and objectives

Goal 1. To prevent the development of new weed problems.

This targets the early stages. It seeks to: 1) prevent the introduction of new plant species with weed potential; 2) ensure early detection and rapid action against new weed problems; 3) reduce weed spread to new areas within Australia.

Goal 2. To reduce the impact of existing weed problems of national significance.

This seeks to prevent further spread of established weeds of national significance and to reduce their negative impact by 1) facilitating the identification and consideration of weed problems of national significance 2) dealing with established weed problems of national significance through integrated and cost effective management.

Goal 3. To provide cost-efficient and effective means for harnessing national action on weed management.

This seeks to ensure that the action required to intervene in the invasion process can continue into the future by 1) strengthening the national research, education and training capacity; 2) encouraging the development of strategic plans at all levels; 3) establishing institutional arrangements to ensure ongoing management of weed problems of national significance.

Practical Outcomes of the NWS Process

Even though the NWS is not yet formally operational, many of its recommendations and principles are in place or in progress. Because of the recursive process that evolved between the writing of the strategy and the development of ideas, many projects were implemented independently of the strategy. The achievements that grew out of the process now form the backbone of the strategy. Among these include:

Import protocols

One of the most challenging yet most urgent issues faced by the NWS task force was convincing the government to review the terms of the federal plant import legislation to incorporate responsibility for the protection of the natural environment. Under current federal legislation only plants which are economically important pests can be prohibited from importation and only if they do not already occur in Australia. New agricultural, ornamental and novelty species continue to be imported without assessment of their potential as environmental weeds.

One of the tactics of the task force was to commission an expert working group to draft a set of protocols for assessing the weed potential of plant species proposed for import. The screening protocols were to explicitly consider minimizing the risk of introducing species hazardous to the environment as well as agriculture (Panetta et al. 1994). The task force then convened a workshop inviting relevant government representatives, technical experts and industry interests to review and ratify the proposed protocols.

The workshop precipitated the subsequent development of a computer-based Weed Risk Assessment system (WRA) to estimate the weed potential of a plant on the basis of its status in other parts of the world, climate preferences and biological attributes (Pheloung 1996). The Australian Quarantine Inspection Service (AQIS), the agency responsible for controlling import of new species, intends to adopt the WRA system (Walton and Parnell 1996).

Outstanding issues remain regarding the application of the WRA system (Walton and Parnell 1996). Specifically, questions of inter-departmental jurisdiction where a) plants of conservation are at issue and b) where the WRA could be perceived as a barrier to international free trade. Negotiations are ongoing between AQIS and the Australian Nature Conservation Agency (ANCA) regarding the domestic administration and costs of processing species of conservation concern and with the Department of Foreign Affairs and Trade regarding interpretation of the General Agreements on Tariffs and Trade (GATT) in regard to its application to the proposed protocols.

State Strategies and legislation

The six States and two Territories undertook to develop State Strategies on their own initiative. The promise of the National Weed Strategy began to fade as the years wore on and most States had either completed their strategies by 1996 or the process was well under way. Cross-fertilization among the State strategies was provided through a number of formal and informal mechanisms.

Buffer zones

One of the key principles and priorities of the NWS is to prevent the spread of weeds into uninfested areas. The Northwest Territory was granted funding to patrol a 100km by 400km buffer zone along each side of its virtually uninhabited boundary with Queensland to contain rubber vine (*Cryptostegia grandiflora*). In the Queensland corridor isolated infestations will be eradicated and the existing infestations will be mapped. On the NWT side, all infestations will be eradicated. Rubber vine is a shrub-vine that has already infested about one-third of the area of Queensland and has the potential to spread across the monsoonal northern regions, or over about a third of the continent.

A more comprehensive strategy for containing current infestations within Queensland and for preventing spread into areas of high conservation value is awaiting funding (\$3m) as a priority in the three year action plan of the NWS.

Codes of practice

Thousands of accessions of seeds are stored in genetic resource centers for future use by plant breeders which will not be assessed under the quarantine screening system as they have been already permitted entry under the current legislation. Many of these species will have significant weed potential and measures are needed to minimize the risk of spread from trial sites and the assessment of their weed potential.

After the 1994 workshop (cited above) which assessed the proposed plant importation protocols, a group of scientists, mainly from the Commonwealth Scientific and Industrial Research Organization, took responsibility for

developing a professional code of practices for their own research. Their deliberations are still in progress. Self-regulation in other areas such as the nursery industry are still in their infancy, but awareness of the responsibility and forums for ongoing dialogue are an important outcome of the NWS process.

Institutional arrangements

During the five years of development of the NWS it became apparent that the administrative flow of information and decision-making power for advising government on weed priorities needed restructuring. Australian Weeds Committee, under whose auspices the NWS was being developed (see above), is a technical Standing Committee within the production portfolio of the federal government. It has representatives from the conservation portfolio and representation was further increased with the undertaking of the NWS.

Within AWC, members from both portfolios set priorities and policy recommendations collaboratively. Recommendations flowing from AWC, however, were still presented to the conservation portfolio at the discretion of the production portfolio. The decision-making structure at the senior advisory levels did not reflect the changes in AWC responsibilities. Due consideration of purely conservation-related issues was potentially at risk.

Since the ongoing implementation of the NWS was to be through the AWC, it was imperative that the lines of information flow and decision making power was equally shared by both portfolios. AWC lobbied to change their reporting procedures to submit simultaneously to both portfolios. This was granted and is now in place.

Lessons

The lessons I'd like to highlight flow from the quality of the social processes through which the Strategy was developed. Although the process was not designed to be as long or as involving of so many groups, the lessons that such a process provides are valuable in considering similar exercises in the future so that what were fortuitous events for us, could be incorporated intentionally.

The formal process included regular meetings of the task force, the Australian Weeds Committee, one public review and periodic review by several Committees within government. These sustained regular interactions among the task force members and other relevant agents of government and research organizations across Australia. Several workshops were initiated by the task force which were not a formal part of the process, notably the review of plant import protocols. The strategy precipitated a great deal of interest and activity in the wider community: members of the task force were asked to speak at weed society meetings, to conservation groups, to attend government workshops and to contribute to newsletters. These interwoven processes augmented each other and neither would have been as effective alone. The final result is a document that reflects and has molded current thinking; many of its recommendations are already in progress and the federal government has committed substantial funding for its implementation.

Three fundamental attributes that need to be considered in the design of a process are a) timing b) duration and c) participation.

Timing is vital because it relates to whether a proposal will be seriously received and cultivated. The social climate in the early 1990s was ripe for considering weed issues in a new way. The political crisis that *Mimosa pigra* engendered had the effect of suddenly focusing national attention onto weeds as an environmental issue. The subsequent political decision to develop a weed strategy was favorably received within the administration. Government was already in the throes of reconsidering its natural resource management and environment policies to address the severe land degradation problems and loss of biodiversity. Furthermore a newly released national study provided evidence of the serious impact of weeds on most ecosystems. The public was also supportive and aware - it was they who exerted pressure on government to emphasize environmental weeds in the strategy.

The duration of the process should ideally evolve in response to the nature, complexity and scope of the issues being addressed. This means knowing both the obvious questions that need to be asked and uncovering the underlying questions which often arise only over time. Unless the underlying causes of problems are addressed - the problems will persist. Ultimate causes can be so deeply embedded in the values and systemic patterns of our whole society, however, that the solutions can be beyond the scope of the project. One example is the need to find alternative uses for grazing land that is so economically marginal as to preclude the control of major weeds (see rubber vine above). However, focusing on the severity of the problem and its causes within the strategy has begun the process of publicly examining our collective accountability for the best use of such land.

The lengthened process of five years allowed time for much greater involvement of federal and state agents, academics and the community in ways that we could not have foreseen. Many people contributed specialist

knowledge on specific problems and this expertise was incorporated in the Strategy instead of deferring in-depth discussion of problems to a later date. Many actions were initiated independently of the strategy (see Outcomes section). This strengthened commitment and put in place self-sustaining programs.

On a more subtle level, it takes time for the positions, needs and assumptions of the different interests to be heard, assimilated and integrated. Where positions were polarized, the long process allowed for understanding to build and the possibility of a gradual reconciliation to take place. The decision by AQIS to implement the WRA system is an example of a successful process of negotiation that lasted for the full five years. The blurring of the distinction between weeds as a conservation concern and weeds as a production concern was a shift of revolutionary proportions but it occurred imperceptibly over months of interaction. Where two or more interest groups cannot agree on how to proceed, as is still the case with restricting the import and release of pasture grasses, the strategy has provision for establishing a formal process of reconciliation. The importance of making this provision would not have come to light had the process been abridged.

The quality of the first draft was very different to the final one. Although by definition, each represented the best that was possible at the time, the difference lay in what became possible with the extra time: more consultation, sustained, and deeper consideration of issues and consolidation of the information into coherent approaches. We gradually evolved an alignment of approach that will have an enduring effect on the culture weed management.

In summary, the quality of the process of developing a strategy will have major repercussions on the quality of the outcome. The main attributes of design are to ensure a long enough period for issues to be authentically examined and for all interested parties to participate. Much of what is needed will evolve as issues come to light so there has to be enough flexibility for this to occur. There also needs to be a blend of formal and informal processes which are interrelated. A balance is also needed between focus on the outcome and focus on the process, an open-ended process would not provide the pressure for sustained effort. In our case there were many intermediate deadlines that maintained momentum.

Finally I want to emphasize the effectiveness of determined and persistent action. Most of the pressure for changing the import protocols, for example, came from the technical community within government and research. The challenge was to convince the policy arms of government. A key approach after publications laid out the issues and set the context, was to organize workshops. These were not a requisite part of the formal strategy process, but arose out of a unified view among members of the task force, AWC and others that the current situation needed changing. Eventually these workshops and the information they generated came to be seen as valid in the eyes of the policy administration and gradually the changeover occurred.

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Note

To obtain copies of the Australian National Weeds Strategy and the draft three year priority plan "National Weeds Strategy - Draft Recommendations for Initial Actions" write to:

Robert Moore, Deputy Director Wildlife Protection Authority. Nature Conservation House 153 Emu Bank, Belconnen ACT 2617 Australia 2601; (GPO Box 636, Canberra, ACT Australia 2601); Email: rmoore@anca.gov.au

or (also for information on the National Landcare Program):

Lindsay Nothrop, National Landcare Program, Land Resources Division, Department of Primary Industries and Energy; GPO Box 858 Canberra ACT Australia 2601; email: Lindsay.Nothrop@dpi.gov.au

For information on the Weed Risk Assessment protocols write to:

Paul Pheloung, Australian Quarantine Inspection Service. Department of Primary Industries and Energy; GPO Box 858 Canberra ACT Australia 2601; Email: paul.pheloung@dpi.gov.au

For an example of a state strategy contact:

Dr. Alan Harradine, Manager, Department of Primary Industry and Fisheries, Water Resource Management Branch; GPO Box 192B, Hobart, Tasmania, Australia 7001