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# THE POLITICAL ECOLOGY OF CONSERVATION PRIORITIES IN AUSTRALIA<sup>1</sup>

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Conservation conflicts constitute the public face of resource-management and priority setting. Analyses for conservation priority setting, often restricted to scientific merit, are incomplete without the examination of the political and economic motivations of the protagonists. In a quick overview of selected conservation issues in Australia, the drive to conserve forests is used as the basis of comparison. It is argued that the correspondence of scientific and economic significance on the one hand, and popular sentiment and activism on the other hand, varied widely across the main conservation issues examined.

## Introduction

Protecting the environment has been a mainstream political priority worldwide for some decades now, with increasing budget allocations reflecting the increased attention. In 1996/97, Australia spent \$8.6 billion on environment protection (ABS 1999). \$3 billion of this was spent on waste water management and water protection, \$2.5 billion on waste management, \$1.5 on the protection of biodiversity and landscape, \$0.4 billion on protecting ambient air and climate, and \$0.3 billion on soil and groundwater protection. These figures are likely to have increased substantially since, with the establishment of the Natural Heritage Trust (Natural Heritage Trust 2001).

The purpose of this paper is to examine how priorities have been set in Australia among environmental issues in the recent past. The focus is on how the various interests perceived, values held and influences exerted by stakeholders and the environmental movement have shaped priorities. An attempt is made to identify and use relevant quantitative information, but the assessment also relies heavily on qualitative assessment using the conceptual approach of political ecology.

## Assessment framework

A rigorous comparison of social returns in environmental management options would include:

- A full set of distinct issues of environmental management
- Full costing of each management option, including administrative costs, opportunity costs of inaction and opportunity costs of action

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<sup>2</sup> Suggestions by Romy Greiner, Chris Margules and Anna Williamson have improved the paper.  
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- Identification and measurement of all benefits of management options so that they are comparable and include non-market values of environmental attributes.

With the benefit of the above information, one could carry out comparative cost-benefit analyses, and demonstrate the social returns compared to resource use in implementing different options.

In practice, it is not possible to satisfy the above requirements. Environmental management activities are rarely distinct. Work in one is likely to impact on another (e.g., vegetation preservation on salinity and water balances). Comprehensive and consistent information on costs and benefits is not available. In this paper, a limited set of conservation priority issues is selected; trying to include the popular preferences, big economic issues and the ones without major champions. No claim is made for comprehensiveness, and the scope does not extend beyond the coastline or into the atmosphere. An effort is made to compile data on the costs and benefits of options in these priority issues. However, these data come from a disparate range of sources, limiting their comparability. Nevertheless, to the author's knowledge, the paper constitutes a pioneering attempt to bring such information together. Further work will be necessary to make the comparisons sounder, and readers' help in pointing to additional sources would be much appreciated.

Priority issues are mainly described qualitatively, using a standard set of attributes and a political ecology perspective, based on the author's personal experience with relevant policy processes as well as secondary information. The attributes used are:

- **Objective:** how the conservation objective tends to be presented to the public
- **Conservation value:** the cardinal scientific reason for conservation
- **Activism value:** the public impact of seeing direct action and lobbying on the issue
- **Economic value:** an indication of the importance of the economic activities affected by resource conservation
- **Industry behaviour:** the attitude of the affected industries to conservation of the resource
- **Opportunity cost of inaction:** economic, environmental and political costs of delaying conservation measures
- **Public resources needed for resolution:** how much the taxpayer will have to pay to compensate the user/entitlement holder for loss of access

## Political ecology

Political ecology shows common family traits with the older and better known political economy (Greenberg and Park 1994). Despite its mixed parentage (by radicals such as Marx and such conservatives as Smith and Ricardo), political economy is united in acknowledging the value-driven side of economic agents that applications of neo-classical economics tend to lack. Political ecology casts a similarly wide net in observing the motivations of those taking a stand on ecological issues, beyond the common assumption of a scientific starting point. Although Marxist influence is very strong in some practitioners' perceptions about the purpose of the field (e.g., "Political ecology is an ideological project in the service of the

environmental movement.” Atkinson 1991, p. 76), just like Marxism, it offers useful analytical approaches.

## **Australian environmentalist history – a critical review**

Forest conservation was an early priority in Australia from the late 1800s, promoted by a broad coalition of scientists, clergymen and concerned citizens. Its motivation was partly the desire to ensure the survival of local fauna and flora and partly the deep-felt concern caused by the fast rate of the often wasteful practices of logging, bark harvesting and clearing in forests (Hutton and Connors 1999, pp.50-57). The administrative response to this popular sentiment and professional opinion was the declaration of Forestry Acts before WWI and the establishment of Forestry Departments, whose heads were significantly called Conservators. Contemporary interest in soil and water conservation was more utilitarian and more institutionalized than that in forests, in order to preserve the resource base of farming. Soil conservation services were set up in several states during the 1930s, and dam building was seen as the best approach for water conservation.

The first nation-wide conservation organization, the Australian Conservation Foundation, was established in 1965 (Hutton and Connors 1999, p.101). This appearance of a volunteer organization, dedicated to environment conservation in general, heralded a conceptual and institutional change in Australian society.

The activist stage of the Australian conservation movement, from the 1970s, can be seen as a continuation of the social activism developed during the campaign against the Vietnam War. After an initial stage of urban protests against developments, it became strongly focused on two issues: opposing uranium mining and preserving wilderness (Hutton and Connors 1999, pp.137-164). Of the latter, the Franklin River campaign (causing the planned dam's cancellation in 1983) is the best known, but similar wilderness campaigns were fought in most states at the time. “Wilderness and forestry issues tended to dominate the Australian environmental movement throughout the 1980s, in contrast with Europe where anti-nuclear and urban issues tended to define the movement.” Jonathan West (1991) attributed this to a deliberate decision by leading Australian environmental activists. Hutton and Connors 1999, p. 197, argue that this was due to the intention to “mobilise public opinion on key issues”. “The term ‘biodiversity’ became a key concept for the environmental movement arising out of the campaigns of the 1970s and 1980s and the scientific understanding that informed them. This word became overlaid with emotional and value-laden meanings for conservationists – it became, for many, almost an absolute value for itself.” (Hutton and Connors 1999, p. 196)

Labor's three-mines uranium policy and the prevention of the Kakadu mine reduced the heat of the uranium issue during the 1980s. In contrast, forests became the almost sole focus, stirred up by wilderness values and the controversy about woodchipping. The forest-oriented environmentalist pressure came to a head in the early-1990s. It has resulted in the signing of the National Forest Policy Statement in 1992, setting in motion the process of Comprehensive Regional Assessments and Regional Forest Agreements. Large demonstrations and counter-demonstrations in 1994 and 1995 constituted the public face of the pressure applied by interest groups (Hutton and Connors 1999, pp. 255-256). However, governments of all persuasions were beginning to reach the limits of acceptable political costs of yielding to

conservationist demands, and the Regional Forest Agreements did not deliver on all conservationist expectations (Hutton and Connors 1999, p. 257).<sup>3</sup>

In all, Hutton and Connors (1999 pp. 243-245) are strongly critical of the formal attempt of reconciling economic and environmental interests within the framework of sustainable development (renamed *ecologically* sustainable development in Australia). They see this process of seeking a political compromise as acceding too much to economic interests at the expense of environmental ones.

Hutton and Connors (1999) give a detailed account of the development and attention of the conservation movement in Australia from the mid-1800s. Where they are lacking, though, is the clear identification of the motives. They highlight the connections between conservation activists on the one hand and the political Left and the unions on the other hand, particularly from the 1970s onwards (ch. 4), but do not elaborate. DeLuca (1999, Ch.3) documents the attention paid by environmentalists to creating media images that portray the intrusion of destructive resource industries into pristine nature or the bravery of ordinary people in facing the onslaught of the industrial world. Hutton and Connors (1999, p.127) speak of the “bitter struggle ... between the environment movement and the politically powerful resource industries”. The objective, in DeLuca’s view (1999, p. 52) is “not merely to call attention to particular problems but also to challenge the discourse of industrialism ... attempting to create a social movement”. In that, activists represent the postmodernist antithesis of the modernist industrial ethos that considers nature a “realm apart from humans to be used as a storehouse of resources” (DeLuca 1999, p. 69). There is much less agreement on what should be put in place instead.

Atkinson (1991, p. 5) distinguishes between “green Greens” and “red Green”: the former consider industrialism as the main opponent while the latter oppose capitalism as such. This classification ignores those who pursue environmental improvements within the socio-economic status quo.

Theories attempting to explain environmentalist motivation tend to include some reference to the reduced importance attached to material aspects of life (McAllister 1994, p. 24). McAllister (1994) distinguishes between local-issues environmentalism and cosmopolitanism motivated by more general sentiments and value judgements. It is the latter that is found more conducive to political activism and active support for political parties with compatible programmes in Australia, and directly or indirectly forest-related issues feature very high on its agenda.

It is an intriguing question then, to what extent environmental activism managed to motivate politicians, in comparison to pressure applied by other interest groups and scientific factors? The next section of the paper tries to find answers to this question through the examination of individual environmental issues.

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<sup>3</sup> Nevertheless, there are indications that some governments tried their best to deliver. The Carr government of New South Wales created a fait accompli before the Eden RFA by declaring large areas of local State Forest as National Parks, just as the RFA negotiations were progressing. The 425,000 ha to be set aside for immediate reservation under the Beattie government’s South-East Queensland Forest Agreement was over half as much again than that recommended by scientists of the Queensland Environment Protection Agency.

## Selected current and recent environmental issues in Australia

### *Forest conservation*

<b>Objective:</b>	Reduction of human impact on forests, most of all banning logging
<b>Conservation value:</b>	High biodiversity combined with high levels of threat, substantial option and bequest values
<b>Activism value:</b>	Largest of all: most emotive conservation issue regardless of scientific value, based on images of clearfelling, conducive to simplistic campaigning and direct action
<b>Economic value:</b>	Significant but fragmented economic interests, regional significance dominates
<b>Industry behaviour:</b>	Timber industry has been defensive and reactive, other forest users are shrewder but small and carry little political weight
<b>Opportunity cost of inaction:</b>	Short-term domestic political backlash, long-run resource depletion, biodiversity losses of debated extent
<b>Public contribution needed for resolution:</b>	Significant, to compensate industry and workers

The drive for forest conservation has peaked in the Regional Forest Agreements (RFAs) that substantially increased reserved forests at the expense of State Forests which are subject to logging. Between 1996 and 2001, at least \$280m (evenly split between the Commonwealth and States) was spent on preparatory work for RFAs (John Martinez, AFFA, pers. comm.). Another \$395m has been committed for timber-industry adjustment, to be spent over 5-10 years after the agreement. Together, the annual expenditure is \$45-60m over the 10-15 years of the assessment and adjustment.

Total forest area reserved is in excess of 2.5m ha. Reservation has been partly on the basis of agreed conservation criteria (the JANIS criteria, see Commonwealth of Australia (1997a)). However, conservation lobby groups have secured areas well beyond those recommended by scientists. E.g., in the South East Queensland Forest Agreement scientists of the Environment Department recommended 200-250,000 ha to be reserved out of a total of 890,000 ha State Forests. Actual immediate reservation, including icon areas nominated by conservationists, was 425,000 ha. In NSW, the government even transferred State Forests to National Parks while negotiations between stakeholders were under way towards the Eden RFA, reflecting the official view of the process.

In most RFAs, the timber industry especially was severely affected by resource loss. While expected total losses have not been published, one could consider the adjustment package some guide to their magnitude.<sup>4</sup>

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<sup>4</sup> The political objective has been typically to prevent job losses from the pre-RFA level. This was achieved by financing industry development to 'make more' of the reduced resource and by compensation in various guises. In other words, combining the without-RFA timber resource AND the industry development could have provided an opportunity for industry expansion in value terms. This forgone expansion constitutes an opportunity cost of the RFAs that is not shown in public documents.

Benefits of reservation are not yet documented, although doing so is one of the objectives of the 5-year reviews of RFAs beginning in 2002. In particular, there is no scientific consensus on the biodiversity benefits of discontinued logging in Australia. The Wilderness Society (2000) contains references to scientific opinion expressing concern over the detrimental effects of logging, while Kile (2000) considers the two reconcilable. Since before the drive for reservation, codes of practice have been introduced to limit the adverse impact of logging. Queensland EPA states that “In State Forests, a code of practice has been developed to help ensure that native wildlife is not greatly affected by logging.” (Dorricott et al. 1999). Nevertheless, the assumption that logging poses a grave threat to biodiversity values in Australian forests has been at the core of RFAs. It remains to be demonstrated how much more environmental benefits RFAs achieve over what has already been secured through codes of practice for logging. Vicarious consumption of forest conservation may well turn out to constitute the lion’s share of the benefits.

**Summary:** activist attention to forest conservation has been instrumental in the establishment of a nation-wide reserve system, at considerable economic cost, even without the support of a scientific consensus.

### *Vegetation clearing*

<b>Objective:</b>	Vegetation retention in woodlands that are sparser than forests
<b>Conservation value:</b>	Prevention of salinization, soil erosion and carbon release, biodiversity protection
<b>Activism value:</b>	Limited, reliant on repeated images of felled mature trees regardless of actual type, now also carbon arguments
<b>Economic value:</b>	Strongly held perceptions of economic loss by graziers
<b>Industry behaviour:</b>	Strongly opposed, but weakened by losing privileged status in the political priority order in NSW and Queensland
<b>Opportunity cost of inaction:</b>	Medium-term international political fallout over carbon release, long-term salinity and green-house effect, biodiversity losses
<b>Public contribution needed for resolution:</b>	Large: to compensate for lost rights, income and property values

Clearing of native vegetation for grazing and cropping is an issue in NSW and Queensland particularly, as the other states have little left to clear. The Queensland Conservation Council estimated that annual clearing in Australia affects 687,000 ha (Reuters 2001). In 2000, a controversial case study of Queensland has found that a ban on vegetation clearing of land suitable for grazing would cause an economic loss to graziers of around \$500m in present value (or some \$50m annually over 20 years). However, this study did not consider such issues as long-term salinization and land already precluded from clearing (e.g., riparian zones). Assuming that such problem areas represent 20% of the land area, total potential losses in Queensland are closer to \$400m. Madden et al. report a nation-wide financing requirement of \$600m over 10 years for the implementation of land-clearing controls.

Despite the potential for biodiversity losses, conservation lobby groups do not apply as much pressure on governments over land clearing as over native-forest logging. The dispersed nature of land clearing is not conducive to high-profile direct action, and it does not provide stirring media images.<sup>5</sup> Coupled with the potential of large compensation claims, this makes governments reluctant to ban land clearing outright. Despite pre-election promises, by the time the Queensland Labor government's Vegetation Management Act 1999 was finally declared, "of-concern" ecosystems had been removed from protection, significantly reducing its impact.

**Summary:** modest activist effort has been insufficient to bring about radical conservation measures in the face of economic interests and potential compensation costs.

### *Soil erosion*

<b>Objective:</b>	Reducing the practices causing soil loss
<b>Conservation value:</b>	Varied on-site impact, significant off-site impact
<b>Activism value:</b>	Now low: have been part of long-standing argument against modern agriculture and logging
<b>Economic value:</b>	Large but variable: on-site impact is most quantifiable
<b>Industry behaviour:</b>	Best record of active participation in mitigation and remediation among all environmental issues
<b>Opportunity cost of inaction:</b>	Long-run damage to agriculture, some political fallout, off-site externalities
<b>Public contribution needed for resolution:</b>	Significant but declining as practices are transformed

Soil erosion is the issue where the fact of adverse human impact on the environment has been long accepted. Due to the clear and large threat to the agricultural resource base, formal and institutionally-supported mass-participation conservation effort has been present in Australia since the 1930s. While soil loss has not been stopped altogether, reformed agricultural practices have significantly reduced it in some parts of the country. Erosion-related costs were reported to amount to \$80m annually in 1995 (Madden et al. 2000).

The National Landcare Program, launched in 1989, took over from the state-based soil-conservation effort, to deal with "Land degradation [that] is Australia's most serious environmental problem" (Boardman and Eckersley 1991, p. 26). By 2000, one-third of Australia's farmers have participated in it (Toyne and Farley 2000). Although the National Landcare Program broadened its attention to other farming-related conservation issues, soil conservation remained a central theme.

No overall estimate seems to have been made of the environmental degradation avoided or reversed through Landcare. Anecdotal evidence suggests that physical achievement has been substantial, even if it failed to fix all land degradation during its

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<sup>5</sup> For some years now, reports on land clearing by ABC TV have been using the same footage of felling mature trees by bulldozer-pulled chain.

10 years. Toyne and Farley (2000) consider the attitudinal change Landcare's most outstanding legacy. Its 10-year budget of \$340m (in current dollars), was "thought to be a vast amount at the time" in itself (Toyne and Farley 2000), and in terms of resources devoted to an environmental problem those days. Madden et al. (2000) estimate the costs of remedying soil erosion and structural decline to be \$2.2 billion over 10 years.

**Summary:** long-standing consensus over need for conservation measures among industry and conservationists has ensured government role and funding.

### *Dryland salinity*<sup>6</sup>

<b>Objective:</b>	Reducing surface salt deposits from rising water tables to avoid loss of agricultural land and water contamination
<b>Conservation value:</b>	Soils unable to support traditional ecosystems and economic crops, biodiversity losses on- and off-site
<b>Activism value:</b>	Low, not conducive to activist approaches
<b>Economic value:</b>	Large, both on-site and off-site
<b>Industry behaviour:</b>	Focused on short-term production, ignoring long-term damage
<b>Opportunity cost of inaction:</b>	Long-run damage to agriculture, some political fallout
<b>Public contribution needed for resolution:</b>	Largest of all issues considered here

Dryland salinity has not been subject to environmental activism aimed at influencing public opinion (even though some conservation organizations have been actively lobbying governments over the issue). The general public is ignorant of the issue to the extent that the distinction between dryland salinity and that caused by irrigation is not understood. However, due to its huge economic importance, salinity is taking over from soil erosion as the focus for government action.

According to the National Dryland Salinity Program (Reuters 2000), some 2.5m hectares (around five per cent of Australia's cultivated land) is affected by salinity. Costs include \$140m lost agricultural production, \$100m damaged urban infrastructure and \$40m in lost environmental assets. Without action, up to 15m ha of land may go saline in 50 years. Forecasts point to annual damage bills of \$670m and \$2 billion, respectively, for 2020 and 2100 (Madden et al. 2000).

On 3 November 2000, the Commonwealth Government has announced a National Action Plan on Salinity and Water Quality that would be funded by an allocation of \$1.4 billion over seven years from the Commonwealth and the States, or \$200m per annum. Priority issues are the prevention of dryland and irrigation salinity via engineering works and incentives in land clearing and water rights, rehabilitation of waterways and remediation by revegetation. However, Madden et al. (2000)

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<sup>6</sup> There is clearly a causal overlap between land clearing and dryland salinity. However, they are considered separate issues in this paper, since dryland salinity threatens much more extensive areas of Australia than those still potentially subject to clearing.

estimated the finance needed for complete remediation and prevention of dryland salinity at \$46 billion over ten years.<sup>7</sup>

The fact that salinity is still on the increase ought to raise the issue of responsibility for unsustainable production aimed at short-term private benefits that will burden society with the long-term costs.

**Summary:** documented magnitude of economic costs of inaction have forced governments to act, even if funding is dwarfed by the task.

### *Surface water*

<b>Objective:</b>	Reverse reduced streamflows and changed stream patterns caused by water diversion
<b>Conservation value:</b>	Direct impact on in-stream ecosystems, large externalities including salinization and acid-sulphate runoff
<b>Activism value:</b>	Low except dam building: complex hydrology arguments do not fire simplistic campaigns
<b>Economic value:</b>	Large short/long-term benefits from irrigation, both regional and national
<b>Industry behaviour:</b>	Tooth and nail, still retains political clout
<b>Opportunity cost of inaction:</b>	Large environmental damage in salinity and to riverine ecosystems, little political cost
<b>Public contribution needed for resolution:</b>	Large: to compensate and remedy

For some time, public perception associated the “conservation” of surface-water flows with dams. Irrigated agriculture built on such water “conservation” has been very profitable, especially for the first owners of water allocations, even though social returns were questioned as far back as 1965 (Davidson 1965). The reason is economic importance. Irrigated agriculture uses a mere one per cent of Australia’s agricultural land (ABS 2002), but in 1995/96 it provided 28 per cent of total agricultural production, or \$7.8 billion. The value of diverted water is likely to well exceed this sum in uses ranging from industry to municipal water supplies.

However, negative environmental consequences of intensive irrigated agriculture have been mounting. The oldest and most extensively developed Murray-Darling river system is symptomatic, by exhibiting just about every possible consequence (Quiggin 2001). Meanwhile, lost production and infrastructure costs in the Murray-Darling Basin will amount to between \$600m and \$1 billion annually due to salinity (Toyne and Farley 2000). Madden et al. (2000) quote the figures of \$65m and \$450m, respectively, for annual damage caused by irrigation salinity and poor water quality nationwide.

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<sup>7</sup> For comparison: ABS (2002) has put the worth of rural land at \$110 billion, out of a total Australian land value of \$916.8 billion.

Payments to the states under the National Competition Policy constituted the Commonwealth's tool to force change on the states in managing their water resources. OECD (2001) considers the Australian Water Reform Framework (Environment Australia 2001a) "a good example of integration of micro-economic reform and environmental policies". Annual payments of \$500m were provided to the States in 1999/2000 and 2000/01. Further payments of \$750m will be forthcoming over the five years to 2005/06. In exchange, governments are obligated to provide water for environmental flows, stop further water allocations on overused rivers and refrain from building ecologically unsustainable dams. Water prices were expected to be brought closer to the actual costs of provision. Commonwealth contributions to the actual remediation and prevention of environmental damage is being financed through the Natural heritage Trust. Over the six years of the programme, the following total allocations are reported by the Natural Heritage Trust (2001): Murray-Darling 2001 Program \$195.6m, National River Health Program \$15.8m, National Rivercare Program \$82.9m, Riverworks Tasmania \$8.8m, Waterwatch Australia \$13m – together, just under \$53m per annum.

Madden et al.'s (2000) estimate for required remediation measures includes capital costs of \$1.46 billion for riparian zone protection, \$150m for environmental flows and \$200m for irrigation drainage control over a 10-year period, plus an annual maintenance cost of \$41m for riparian-zone management. Together, these amount to \$222m per annum.

Water reforms have been progressing in the face of strong opposition by irrigators.<sup>8</sup> Apart from inflicting short-term financial losses on irrigators, pre-existing rights need to be curtailed (Quiggin 2001). In addition, unlike graziers, irrigation farmers seem to have retained their political clout even in Labor states, making governments wary. Consequently, Queensland's water-pricing reform was finally enacted with a seven-year delay. Neither are new water diversions and storages off the political agenda: in Queensland the state Labor government has approved the controversial diversion of overland flows in the Condamine-Ballone river region (Hodge 2001) and there is bipartisan support for the building of Paradise Dam on the Burnett River (QFF 2000).

**Summary:** at the Commonwealth level, water reform constituted a rare case of resolute government action in line with scientific arguments, against well-organized economic interests.

### *Artesian water*

<b>Objective:</b>	Retaining artesian water
<b>Conservation value:</b>	Generally low, except for local habitats supported by mound springs; mainly existence value
<b>Activism value:</b>	Low: does not fire imagination
<b>Economic value:</b>	Low in short term, as status quo has no advantage over alternative

<sup>8</sup> Reforming irrigation water use was one of the few issues where the federal Coalition government confronted rural interests head on. This conflict has contributed to the rural disaffection with both main political formations and the rise of One Nation.

<b>Industry behaviour:</b>	Passive, unable to pay
<b>Opportunity cost of inaction:</b>	Long-run damage to industry, changed ecosystems, little political cost
<b>Public contribution needed for resolution:</b>	Significant, to cap and pipe

Conservation of artesian water tends to be the lowest priority for environmental activists. Among the largest in the world, the Great Artesian Basin (GAB) holds an estimated 8,700 million ML. Outflow through bores, put at 570,000 ML (GABCC 1998), exceeds recharge and is depleting the basin. Moreover, 90% of the outflow is wasted in open drains. Not merely allowing grazing, such artificial abundance of water has itself changed the ecosystems above the GAB, threatening native species and contributing to weed and pest problems. While 15-38% of native plant species are in decline, another 10-33% are ascendant, among them woody weeds (Morton 1998). The key to sustainable management of the GAB is capping 880 free-flowing bores and converting open drains to reticulated systems which, at around \$200,000 each, is beyond the capacity of the pastoral industry to pay (Antony 1995).

Costs of inaction have been broadly outlined by GABCC (2000), but largely remain unquantified. Bores and natural springs would continue drying up until an equilibrium between use and recharge is reached, leaving remote communities and natural ecosystems relying on springs without water. Up to that point, pressure on the environment would continue to mount. An intriguing question concerns the existence value of the GAB: should the broader community care if it is emptied?

The Great Artesian Basin Management Plan, initiated in 1998, envisages a 15-year programme of rehabilitation, to slow, stop and hopefully reverse depletion. Its budget is \$286m, or \$19m per annum in nominal terms.

**Summary:** ignored by environmental activists, relatively low environmental costs of inaction and high economic costs of action result in artesian water conservation being a low priority.

### *Exotic weeds/pests*

<b>Objective:</b>	Control/extermination of introduced weeds/pests
<b>Conservation value:</b>	Large: damage to native ecosystems, biodiversity loss
<b>Activism value:</b>	Low: familiarity breeds indifference, not conducive to demonstrative action
<b>Economic value:</b>	Large losses to agricultural production
<b>Industry behaviour:</b>	Various: from active participation to helpless inaction
<b>Opportunity cost of inaction:</b>	Long-run damage to industry, changed ecosystems, little political cost
<b>Public contribution needed for resolution:</b>	Significant: in research and implementation, and particularly in routine control

Exotic pests and plants rate a last place in conservation organizations' documents outlining environmental priorities (e.g., Fisher 2000) or no place at all (Australian Conservation Foundation 2001). The general public's well-known affection for furry animals is fully utilized in conservation drives with images of native mammals. However, the same affection makes conservation activists avoid issues which may involve the culling or eradication of exotic species. High-profile activists offer little support: the author witnessed David Suzuki publicly stating that Australia should learn to live with the rabbit instead of trying to eradicate it. Public ignorance of the gravity of threat caused by exotic species is general. Morrison (1996) bemoaned the popular support for introduced species such as cats and rabbits, despite their environmental costs. Consequently, governments get no environmental kudos from weed and pest control. The NSW government has banned the aerial culling of feral horses in National Parks on 7 December 2000, due to a public outcry about dead animals. Most exotic weeds have been intentionally introduced to Australia, some only recently, and some are still sold to the public as ornamentals. It is a common complaint by landholders Australia-wide that budgets are inadequate to stem the spread of declared weeds such as lantana on government land (in National Parks and state forests).

For the five years between 1996/97 and 2001/02, the National Weeds Program had a budget of \$28.5m through the National Heritage Trust, representing the Commonwealth's contribution to the implementation of the National Weeds Strategy (Environment Australia 2001). Over the same period, the National Feral Animal Control Program was given \$18.9m (Natural Heritage Trust 2001). On a yearly average, these amount to \$5.8m and \$3.8m, respectively. ABS (1999) shows the annual pest and weed control bill by agricultural industries in 1996/97 as \$69.5m (presumably not all for exotic species). In addition, various levels of governments, non-agricultural enterprises and private individuals spend unknown amounts to contain and physically eradicate exotic pests and weeds. Madden et al. (2000) put the desirable allocation for environmental weed control at \$100m over 10 years.

By virtue of their direct economic cost, best known examples of imported pests and weeds are prickly pear and the rabbit. Nation-wide, the direct agricultural cost of weeds alone was put at \$3.3 billion annually (Anon 1999). However, the ecological costs of such other exotic species as lantana and the cane toad are also significant, as they constitute a threat to biodiversity.

Biological control, such as the cactoblaster moth for prickly pear and the rabbit myxomatosis and calici viruses, is highly cost effective. The three-year rabbit calicivirus research programme started in 1991 cost A\$750,000 plus NZ\$300,000 (MAF undated). Recent CSIRO budget for rabbit-virus research was \$750,000 p.a. (CSIRO 1998). At the time of the release of the rabbit calicivirus, estimates of the annual costs of rabbits to Australia included \$600m in lost agricultural production, conservatively \$300m in environmental damage (remediation costs only) and \$100m for control measures (Morrison 1996). Results indicate a reduction in rabbit numbers by as much as 95% in some temperate areas, although the virus is less effective in wet and warmer climates. Even if resistance builds up as it did with myxomatosis, returns from a few years' reduced rabbit pressure will generously pay for the control programme. No cost-benefit analysis of the cactoblaster programme could be found. Nevertheless, old newsreels are sufficient proof that without it Australian agriculture would not exist as we know it today.

Other weeds and pests require incessant physical control measures that do not amount to eradication. Information on most gazetted pests and weeds is patchy at best. In 1995, parthenium weed was costing Queensland graziers \$14m annually and still spreading. Its human-health impacts are well documented, unlike the environmental impact. A three-year research programme was initiated for the biological control of the weed in 1995, with an annual budget of \$270,000 (CRC for Tropical Pest Management 1995). Choquenot et al. (1996) have put the economic cost of feral pigs at \$100m per annum. Commonwealth expenditure on fox control was around \$800,000 annually between 1992 and 1998 (Environment Australia 1999). Baiting, financed by state and local governments, has not prevented the steady Northward spread of foxes. There is little popular awareness of the potential ecosystem damage that may be caused by the unchecked spreading of some exotic species.

One exception to the apparent neglect is the much-reported recent drive to eradicate the South-American fire ant in Queensland, supported by a budget of \$130 million over five years, or \$26m per annum - most likely exceeding resources devoted to the control of all other exotic species Australia-wide. Media reports have provided a powerful case for the eradication effort with references to potential economic losses put at billions of dollars annually, and by pointing to the threat to Australia's outdoors suburban lifestyle. On the other hand, environmental consequences of the fire ant's spread remain little reported.

**Summary:** the issue of exotic weeds/pests is avoided even by the most respected environmental organizations, despite large threats to biodiversity, and government funding is well short of the substantial economic costs of inaction.

## Conclusions

Some trends seem to appear from the comparative examination of some environmental issues in Australia at around the turn of the 21<sup>st</sup> century. The data on costs and benefits, economic and environmental importance, as well as government budget allocations, are lacking in consistent coverage and would not support rigorous statistical analysis. Nevertheless, complemented with published evidence on the motivating factors of stakeholders in the setting of conservation priorities, the available information allows some tentative conclusions.

Issues in the forefront of the environmental movement's attention have been selected as much for their value in mobilizing public opinion in a general anti-establishment struggle by a social movement as for any other reason. Forests and forest conservation thus became more than a conservation issue: they became a banner issue, a political issue, a politicized issue. This has placed much pressure on environmental policy-making to depart from a position of pure scientific merit, with most success in Labor jurisdictions.

Governments of both colours have been committing significant resources to mitigating soil erosion and salinity, on account of their substantial and direct economic costs, even when there was little activist pressure to resolve them. In the case of surface water, water reform even went against important short-term economic interests.

Environmental issues without champions, particularly exotic weeds and feral animals, do not receive attention from governments in proportion to their significance. Such issues are ignored by environmental organizations and activists, due to their lack of popular appeal, despite the scientific proof of environmental threat.

While activism is a legitimate social tool, it has the capacity to divert environmental priorities away from objective need. To avoid the inefficiency of activism-driven priorities, there is a need for a consistent framework for the assessment and setting of environmental priorities, and one that places emphasis on objective measures. Having a common denominator for measuring damage and opportunity cost across all issues is indispensable. Costs and benefits of conservation/preservation measures need to be comparable to identify issues of greatest need and maximum impact. Improved environment valuation, e.g., along the lines of ecosystem-services valuation, is a precondition for such comparability. Integrated economic evaluation remains the most consistent assessment framework, even with its shortcomings.

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