

# Wilderness Quality Mapping—The Australian Experience

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**Abstract**—By 1995 wilderness quality maps developed under the Australian Government's National Wilderness Inventory (NWI) program had been published for most of Australia, but few traces of the NWI now remain and the word "wilderness" has become almost unmentionable in government and professional land management circles. Yet its popular appeal is demonstrated by its continuing frequent use in tourism industry advertising for natural areas.

This study explores this remarkable rise and fall. It establishes that there appears to have been a decision by Australian Government in the late 1990s to avoid any further official reference to wilderness because the concept of wilderness represented an ongoing constraint on development and was not acceptable to sections of the Aboriginal community. The widespread acceptance of biodiversity as a scientifically justifiable rationale for conservation provided an opportunity to discard this troublesome concept. The NWI, as the means of quantifying this concept, was necessarily discarded too.

The study concludes that the demise of the wilderness<sup>1</sup> concept was not justified. The benefits of wilderness areas may have been overstated in the past but they remain irreplaceable for inspiration and recreation, and valuable for conservation, and wilderness quality mapping remains essential for identifying and monitoring them.

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<sup>1</sup> In this paper the word "wilderness", unless otherwise specified, means a large area remote from and undisturbed by the influences of modern technological society.

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## Introduction

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This paper is informed by my own experience and discussions with colleagues in state and Australian Government<sup>2</sup> agencies and the broader environmental community.

To understand the remarkable rise and fall of the wilderness concept it is necessary to provide some historical context. My experience relates primarily to Tasmania, the small island state to the south of mainland Australia. The south-west quarter of the island remained essentially undeveloped until the 1950s when a massive hydro-electric power generation project was proposed. This involved the flooding of Lake Pedder, located near the geographic centre of "the south-west". The campaign to save Lake Pedder failed but it is generally acknowledged as the birth of the politically active conservation movement in Australia and it led directly to the successful campaign a decade later to save the Franklin River from hydro-electric development. The main focus of this campaign was the destruction of wilderness which was reflected in the name of the main environmental non-government organisation (NGO) opposing the dam, the Tasmanian Wilderness Society. This controversy led to public awareness and political attention undreamed of before or since.

There was substantial official acceptance of the term "wilderness" at this time. Since 1982 most of "the south-west" has been protected as national parks and inscribed on UNESCO's World Heritage list as Tasmanian Wilderness World Heritage Area (TWWHA). It is valued for its wilderness qualities despite wilderness not being a criterion for World Heritage listing. To quote from page 54 of the management plan (Parks and Wildlife Service, 1999): "The concept of wilderness has been the issue around which many of the conservation debates in Tasmania have focused. Recognition of the values embodied in wilderness is one of the major reasons why the WHA was originally proclaimed and this is reflected in the naming of the area as the Tasmanian Wilderness World Heritage Area".

Wilderness Mapping was one of the ten key focus areas of the management plan and consideration of the impact of new proposals on wilderness quality remains part of the Tasmanian PWS assessment process (Parks and Wildlife Service et al., 2003).

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<sup>2</sup> Australia is a federation of six states and two territories, each with a separate state or territory government. The national government is often referred to as the Commonwealth or Federal Government. In this paper I have used the term Australian Government throughout.

In 2011, the Environment Protection Authority undertook the assessment of a proposed mine in the Tarkine region of north-west Tasmania, which includes several areas of significant wilderness quality. A request for assessment of the mine's impact on wilderness quality according to NWI criteria led me to realise that very little information relating to the NWI was still available.

This focused my attention on an important phenomenon which has happened so gradually since the mid-1990s that I (and many others with an interest in conservation) hardly noticed. Biodiversity has become the primary rationale for conservation. Wilderness still features heavily in tourism industry advertising where it is usually synonymous with "spectacular natural views" but apart from material associated with the TWWHA and some other legacy documents, the word "wilderness" and the associated NWI have almost vanished from official use in Australia, and environmental NGOs which had previously embraced the concept now use it in a less rigorous sense, if at all.

The aim of this paper is to document these changes, examine possible explanations and consider whether the demise of the wilderness concept was justified.

## NWI History and Concept

In Australia, the concept of the identification and definition of wilderness first appeared in papers published in the late 1970s. The evolution of these definitions is described in detail in Robertson et al., 1992.

In 1985 the wilderness quality continuum concept was proposed (Lesslie and Taylor, 1985). This was the concept of wilderness as part of a continuum of remote and natural conditions that vary in degree from pristine to urban (Lesslie and Maslen, 1995). It included the very useful concept of a range of wilderness quality from low to high. This avoided the vexed question of needing to define a boundary between what was, or was not, wilderness, and was well suited to mapping using computerised Geographic Information Systems (GIS) which were maturing into useful tools around the same time.

The benefits of the continuum approach were appreciated by the Australian Heritage Commission (an agency of the Australian Government's environment portfolio) and it was adopted for the government funded National Wilderness Inventory (NWI) program which commenced in 1986. The

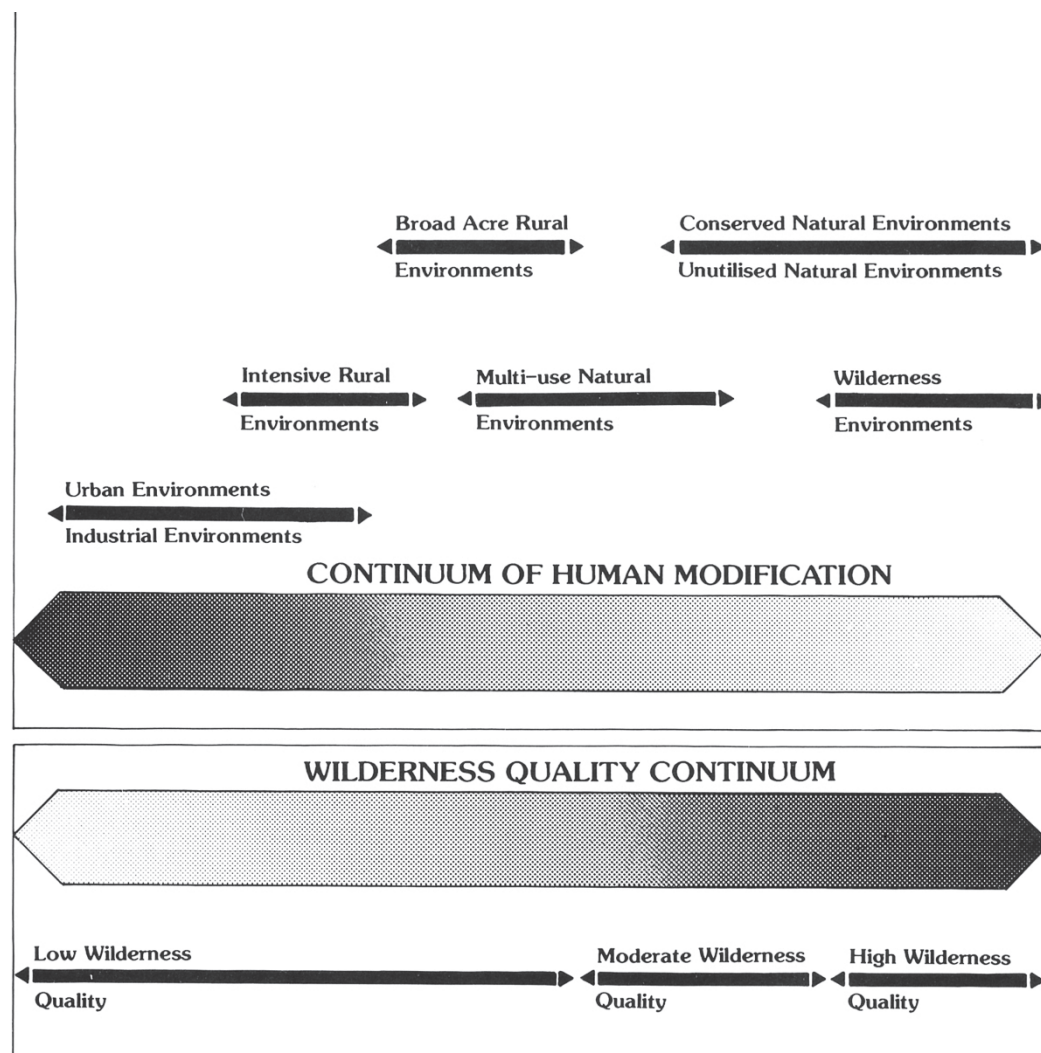


Figure 1—Wilderness continuum.

NWI mapping of Victoria was completed in 1986 and of Tasmania in 1987. The rest of the country was mapped by 1994 (Lesslie and Maslen, 1995), except for the south-west of WA which was never completed.

## NWI Criteria

The NWI Handbook (page 4) defines wilderness quality as “the extent to which a location [is] remote from and undisturbed by the influences of modern technological society”. This also demonstrates that wilderness quality is a phenomenon perceived by human visitors; it is a cultural construct (as concluded by Mackey et al, 1998, page 2).

The NWI provides neither an absolute definition of wilderness nor a legal definition although it can serve as the basis for either. The NWI makes no suggestion on where the boundary between “wilderness” and “not wilderness” should be set, or even if such a boundary is appropriate, but it has been used for this purpose. For example, the “JANIS Criteria” (as they were commonly known) defined a “High Quality Wilderness” as an area larger than 8,000 hectares with a NWI rating of 12 or larger throughout (Joint ANZECC/MCFFA National Forest Policy Statement Implementation Sub-committee, 1997). This definition was used in the Regional Forest Agreements between several of the states and the Australian Government which were amongst the major uses of the NWI.

The NWI is a practical definition of wilderness quality based on four additive parameters, each given a score from 0 – 5, so the maximum possible wilderness quality is 20 (Lesslie and Maslen, 1995). The four parameters are:

- Remoteness from Settlement;
- Remoteness from Access;
- Apparent Naturalness<sup>3</sup> (remoteness from permanent structures); and
- Biophysical Naturalness.

That is, the parameters comprise biophysical naturalness which is treated differently in “non-arid” and “arid” areas (NWI Handbook, pages 28-35) plus three remoteness criteria with different weightings according to the nature of the intrusion (NWI Handbook, pages 24-26).

## Reception of NWI Mapping

The NWI mapping was applauded by the IUCN but received a variable reception within Australia. It was generally well received where areas with significant wilderness quality were heavily vegetated and often rugged (Tasmania, most of south-eastern Australia and some parts of the tropics such as Cape York and the Kimberly).

The most controversial aspect of the NWI Map of mainland Australia was the high wilderness quality assigned to huge extents of desert and semi-desert areas. Many environmental professionals considered that such areas were not wilderness because they were accessible by four-wheel-drive vehicle

(the NWI definition of “access” did not include cross-country access by four-wheel drive vehicle). Hence one outcome of mapping the entire country was to focus attention on the usefulness (or otherwise) of identifying areas which had high wilderness quality but were of essentially no interest for wilderness recreation.

In 1998 attempts were made to address these criticisms:

- a distinction was proposed between “wilderness quality” and “wilderness area” (Mackey et al., 1998). A “wilderness area” was defined to be not just an area of appropriate size and wilderness quality but one where “wilderness quality was recognised and valued by society”; and
- the Commonwealth Wilderness program released Wilderness Delineation Guidelines (Australian Heritage Commission, 1998) in which the NWI wilderness quality was one of the factors to be considered in the delineation of wilderness, rather than the only factor, as implied previously.

## Use of the NWI prior to 2002

The Victorian Land Conservation Council’s 1991 Wilderness Special Investigation (Land Conservation Council, 1991) drew heavily on NWI criteria in its recommendations on the identification, reservation and use of wilderness areas and other areas of high wilderness quality. This led to the reservation of many of the remaining areas of significant wilderness quality in Victoria.

The NWI also contributed to the reservation of substantial areas as a result of its use in the Regional Forest Agreements in south-east Queensland, Tasmania, New South Wales (NSW) and Victoria, and its role in informing wilderness assessments conducted under the South Australian and NSW Wilderness Acts.

In 1998 a world wilderness quality map was produced using NWI principles (United Nations Environment Program World Conservation Monitoring Centre, 1998).

The NWI was also used in the 2001 study of the natural heritage significance of the Cape York Peninsula (Mackey et al., 2001) but this study noted (pages 116-7) that the wilderness indices could not adequately account for certain impacts including stock grazing impacts around water sources and the distribution of invasive organisms such as feral animals and certain weeds. This pointed the way to the future. For studies such as this, the requirement was for a more sophisticated treatment of biophysical parameters rather than a modelling of wilderness per se.

## Use of the NWI Since 2002

In the last decade, official use of the NWI mapping (or other wilderness mapping) has been conspicuous by its almost complete absence, as noted in the introduction to this paper. However, the data set that corresponds to the NWI’s biophysical naturalness layer has continued to be developed and is now far more sophisticated. The Vegetation Assets, States, and Transitions (VAST) framework now classifies vegetation by degree of human modification from pre-European settlement conditions in seven intactness classes using the criteria of floristic composition, vegetation structure and

<sup>3</sup> This was referred to as “aesthetic naturalness” in the earliest manifestations of NWI mapping but the definition was essentially the same.



regenerative capacity (Watson et al., 2009). This has been used to generate a map of wilderness in Australia but the criteria differ from those used in the NWI so the results are not directly comparable.

The only computerised wilderness mapping by a government agency that has occurred appears to be the 2005 remapping of the TWWHA and adjacent areas by the Tasmanian PWS using revised criteria. This may be the only use of NWI techniques to monitor changes in wilderness quality over time, surely one of its most important uses.

Proposed developments in the Tarkine region of Tasmania led to requests since 2005 by both the Tasmanian (see introduction) and Australian Governments to evaluate impacts on wilderness quality of individual development proposals in this area. Anecdotal evidence suggests that this had to be done manually since the Australian Government's computerised system was no longer available!

In 2012 UNESCO's World Heritage Committee recommended, in relation to the TWWHA, the provision of "comprehensive data on the impacts of adjacent forestry operations on the property's integrity ..." (World Heritage Committee of UNESCO, 2012). This has yet to be undertaken but would provide a further opportunity to demonstrate the relevance of the NWI.

## Political Context

The rise and fall of the wilderness concept and the associated NWI cannot be explained without reference to the broader political context. The national election of March 1983 was won by the Australian Labor Party (ALP) under Prime Minister Bob Hawke. In March 1983 the campaign to save the Franklin River was at its height and was a major issue in the election campaign. One of the Hawke government's first actions after taking office was to initiate the process which led to the halting of dam construction several months later.

The ALP continued a moderately pro-conservation agenda until March 1996 when the conservative government of Prime Minister John Howard took office and remained in power for the next decade. The next few years also saw the intellectual tide turn against wilderness. For example, Dr Peter Bridgewater (then Chief Science Adviser, Environment Australia<sup>4</sup>) stated: "Wilderness areas have been established on the basis of values which have no basis in science, however much they may produce warm fuzzy feelings in people. I will not deal with wilderness any further, as it is not a relevant classification in a consideration of science based protection regimes" (Bridgewater, 1998).

<sup>4</sup>The Australian Government's environment agency.

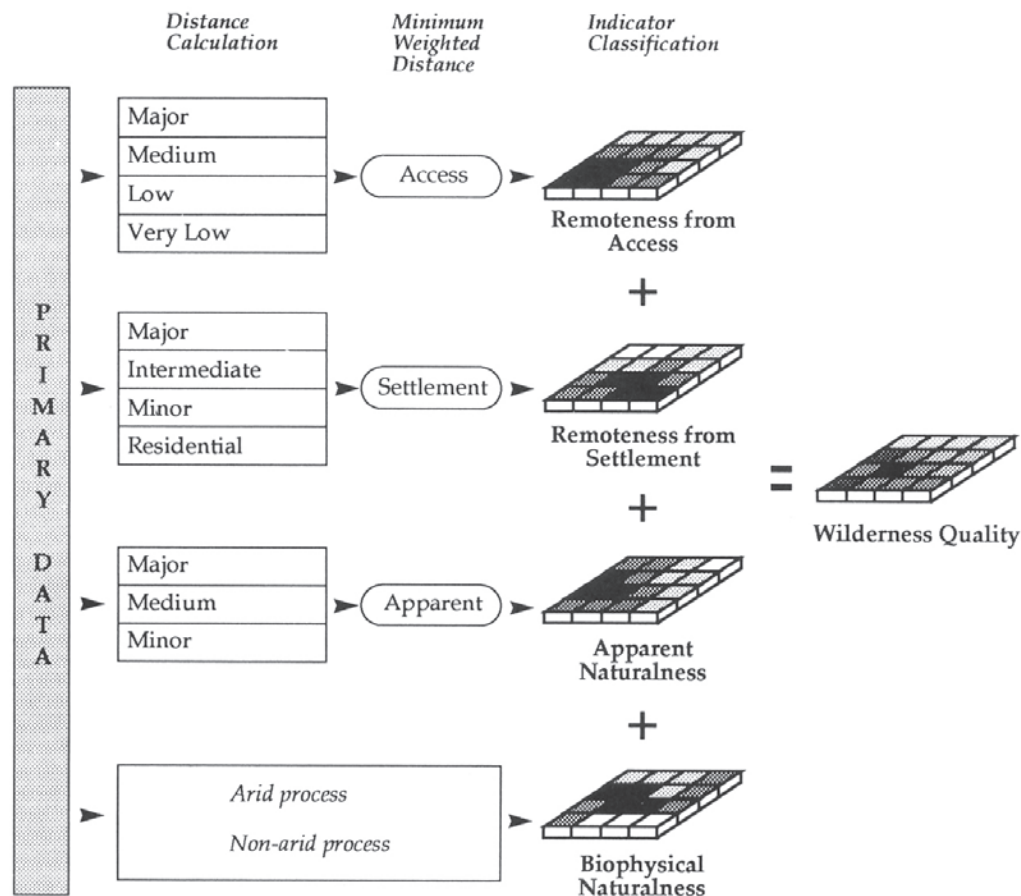


Figure 2—NWI methodology.

Several actions followed during the tenure of the Howard government:

- The Australian Government's Wilderness and Wild Rivers program (including the NWI) was terminated in June 1999. During the following years most of the material produced by this program has been removed from the department's website. There is anecdotal evidence of verbal directives from senior staff to cease use of the word "wilderness".
- Several separate pieces of Australian Government environmental legislation were replaced with the Environment Protection and Biodiversity Conservation (EPBC) Act, 1999. This did not mention wilderness except to acknowledge the IUCN Protected Areas Categories System. In contrast, one of the acts replaced, the National Parks and Wildlife Conservation Act, 1975 included provision for the declaration of wilderness zones.
- In 2004 the Australian National Heritage List, together with the Commonwealth Heritage List, replaced the former Register of the National Estate. Wilderness was prominent in the criteria for the Register of the National Estate but absent from the criteria for the replacement lists.

One consideration that appears to have been overlooked is Australia's responsibility as signatory to the Convention on Biological Diversity (United Nations, 1992). Annex I of this convention obliges signatories to identify and monitor wilderness, so the abandonment of the NWI appears to be a breach the Australian Government's responsibilities in this regard.

The above actions suggest that a decision was made during the early years of the Howard government to avoid any further reference to "wilderness" or the NWI within the Australian Government. It would be useful to understand the rationale underlying this apparent decision. In the absence of formal documentation only speculation is possible. The next section of this paper examines eight credible hypotheses.

## Why Have Both the Term "Wilderness" and The NWI Mapping Almost Vanished?

### Hypothesis 1 – The NWI Was Compromised By Technical Constraints

The NWI mapping was undertaken in the early days of computer based GIS and much of the primary data required digitisation (NWI Handbook, page 4) but the computer technology does not appear to have been a major limitation, apart from the impossibility of incorporating viewfield analysis (refer Hypothesis 2).

### Hypothesis 2 – The NWI Was Compromised By Design Constraints

#### 1. Definition of parameters

As noted previously under Reception of NWI mapping, a relatively small change in the definition of "access" would make a substantial change to the resultant wilderness quality map.

#### 2. Choice of parameters

As noted previously, the NWI criteria can be summarised as biophysical naturalness plus remoteness from access and

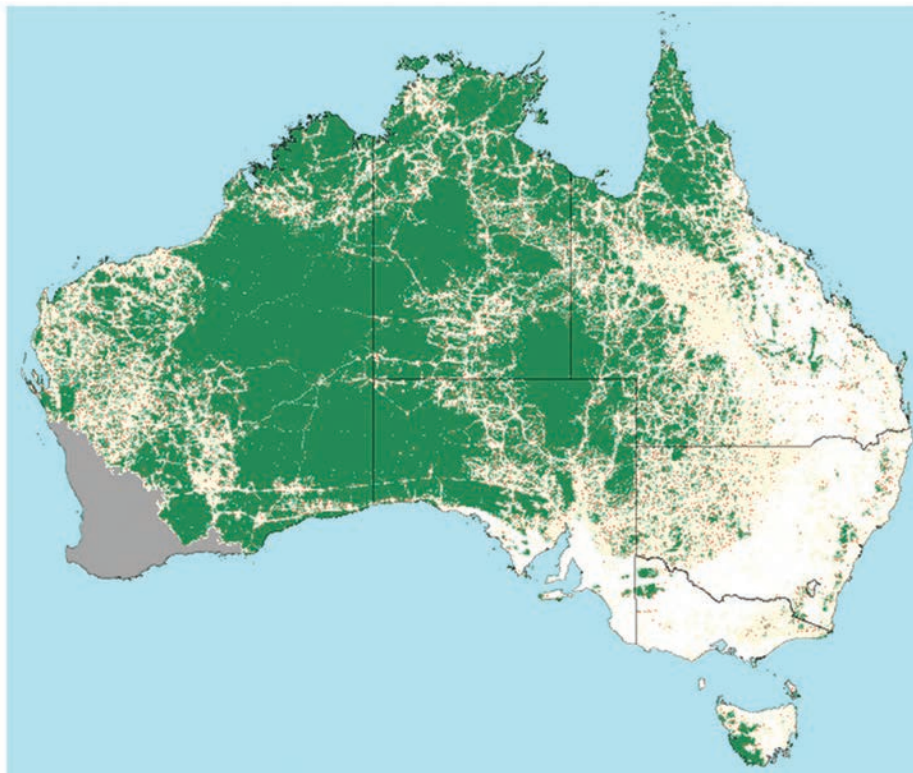


Figure 3—Wilderness quality- Australia.

remoteness from structures. Two criticisms can be made of the NWI criteria without undermining this basic premise:

- Distance is not necessarily the best measure of remoteness. In some areas of Tasmania dense vegetation can make off-track walking very difficult – 500 metres in an hour can be fast progress! Hence travel time is a more relevant parameter to describe remoteness than distance.
- The NWI methodology quantifies remoteness as the distance from the various categories of human modification, but human modification within the user's viewfield is considered to have a greater influence on the user's perception of wilderness than an identical modification at an identical distance, but out of sight – the NWI remoteness criteria could usefully be modified according to whether or not there is line-of-sight from the user to the human modification.

In 2005 the Tasmanian PWS undertook wilderness mapping of the TWWHA using a modified NWI methodology which included time-based remoteness. The incorporation of viewfields was rejected as too complicated (Hawes, 2005) although more recent mapping by Scottish Natural Heritage (Scottish Natural Heritage, 2013) has demonstrated that this is feasible. This confirms the soundness of the NWI concept and demonstrates that these constraints could have been overcome if its development had not been curtailed.

#### Hypothesis 3 – The NWI Was Too Successful

Use of the NWI led to the reservation of substantial areas (Refer to Use of the NWI prior to 2002). Without the NWI, many of these areas would probably not have been reserved when they were, if ever. This cannot have endeared it to anyone who philosophically favoured minimising constraints on development, such as conservative politicians.

#### Hypothesis 4 – Biodiversity Conservation Has Greater Scientific Justification Than Wilderness Preservation

Use of the term “wilderness” in the context of conservation in Australia predates the concept of biodiversity which did not become well established until the early 1990s (Mackey, Lesslie et al., 1998). The scientific community soon embraced the conservation of biodiversity as a major rationale for conservation (for example, it is one of the main objects of the EPBC Act, 1999) and the limitations of wilderness for conserving biodiversity were immediately apparent (for example, many threatened species cannot be preserved in wilderness areas because they do not exist there). To most environmental professionals the distinction was clear, the conservation of biodiversity was a scientifically justifiable rationale for conservation, the preservation of wilderness was one of many mechanisms for conserving biodiversity, and any other benefits of wilderness preservation were overlooked in the rush to embrace biodiversity.

#### Hypothesis 5 – Biodiversity Conservation Places Less Constraints On Development Than Wilderness Preservation

The concept that destruction of some individuals of a threatened species can be “offset” by the protection of others elsewhere has been formalised by most Australian governments. For example, the criterion used in Tasmanian Government guidelines (Department of Primary Industries, 2013) is that an offset must “maintain or improve conservation outcomes”. The effect is that the unavoidable destruction of a listed threatened species rarely halts a development. In

my experience the most usual result is a relatively minor increased cost to the developer.

If a similar principle was applied to the impact of a development on wilderness quality, offsetting such an impact would require the protection of an equivalent (or greater) extent of wilderness elsewhere. Even if feasible, this is likely to be extremely expensive, so legislated protection of wilderness quality could impose major constraints on development.

Since governments are generally keen to minimise impediments to new developments this is another motivation for them to emphasise the conservation of biodiversity at the expense of the preservation of wilderness.

#### Hypothesis 6 – Wilderness is not acceptable to the aboriginal community

In 1992 the High Court's Mabo judgement for the first time acknowledged native title to land (Reynolds, 2013). It overturned the concept (*terra nullius*) that nobody owned the continent of Australia at the time of the initial British settlement in 1788. This led to substantial areas being “handed back” to Aboriginal traditional owners and much of this had high wilderness quality according to the NWI. Some Aboriginal owners are now hostile to the wilderness designation because they see it as something which may restrict their economic exploitation of their land.

In addition, the Aboriginal community had been affronted by early definitions of wilderness which failed to acknowledge millennia of Aboriginal occupation and management of the land, and the term has become associated with *terra nullius*. In summary, despite attempts to negotiate a common meaning of the term (Australian Heritage Commission, 1998), wilderness is unpopular in the Aboriginal community for multiple reasons.

The Mabo judgement also raised the standing of the Aboriginal community; as owners of a significant part of the country their support was courted by politicians. Governments of all persuasions have seen the avoidance of any endorsement of the concept of wilderness as a means of gaining the support of the Aboriginal community and many non-aboriginal Australians who support Aboriginal rights.

#### Hypothesis 7 – Practical Reasons For Wilderness Preservation Have Been Discredited

The most commonly quoted practical reasons for preserving wilderness are:

### Scientific (Wilderness Protects Biodiversity)

It has been claimed that wilderness is the best way to protect biodiversity and ecological integrity (Washington, 2012). It is true that wilderness does protect biodiversity and ecological integrity, and large reserves do have advantages over smaller ones (Mackey, Lesslie et al., 1998) but wilderness areas are (by definition) large, and the protection of large areas, while an ideal way to protect biodiversity and ecological integrity, is rarely essential. Wilderness areas should be seen as one end of a continuum of conservation measures.

In addition, the preservation of wilderness quality is often unnecessary to protect biodiversity and ecological integrity. Many artefacts of modern technological society which adversely affect wilderness quality have little or no effect on biodiversity or ecological integrity. For example, a road into the centre of a large natural area will greatly reduce



the wilderness quality perceived by a human visitor but if the road's impact on the biota is confined to loss of habitat within the construction footprint, with no other adverse impacts, it may have negligible impact on biodiversity or ecological integrity.

### Economic (Wilderness Attracts Tourists)

There is no doubt that wilderness has been, and remains, a significant factor in attracting tourists to Tasmania and the argument that wilderness will attract tourists has often been used as a rationale for preserving wilderness (Milne, media release, 18 July 2013). However, commercial development to cater for mass tourism reduces wilderness quality and the vast majority of tourists are satisfied with easy access to a few low wilderness quality locations with spectacular views. They neither want nor need large areas of high wilderness quality – only a minority of bushwalkers (themselves a minority of all visitors) require extensive areas of high wilderness quality. The wilderness image is a key aspect of tourism industry marketing but this only requires the preservation of enough “real” wilderness to maintain the image, it is not a strong argument for preserving high quality wilderness or reserving additional wilderness areas.

### Recreational (Wilderness is Essential for Certain Forms of Recreation)

Wilderness areas provide recreational opportunities which are unavailable in any other setting and are greatly appreciated by most users. The TWWHAMP notes (page 129) that the TWWHA “is widely recognised as a focus for remote area recreation. The extensive tracts of high quality wilderness in the region set it apart from most other natural areas ... The region provides people with the chance to experience solitude, challenge, independence, tranquillity and closeness to nature”. Wilderness recreation is easily criticised as elitist because of the small numbers involved but the use of remote area walking tracks within the TWWHA has shown a steady increase between the early 1970s and mid-1990s. Since then the rate of increase appears to have plateaued (Parks and Wildlife Service, 2006, Parks and Wildlife Service, 2013) but the data show an ongoing demand with at least 10,000 individuals per year spending several days in moderate to high quality wilderness.

#### Hypothesis 8 – Intangible Reasons For Wilderness Preservation Have Been Discredited

The significance of the intangible values of wilderness is hard to quantify but they are acknowledged. For example: “a significant cultural value of the Tasmanian wilderness is a place for reflection, a source of inspiration and as a symbol of untouched nature” (TWWHAMP, page 25).

For some people these values derive from the intrinsic value of wilderness, its right to exist for its own sake (Devall and Sessions, 1985). However, wilderness calendars and books of wilderness photography sell in substantial numbers and wilderness images and the word itself are widely used in tourism industry advertising for natural areas. This confirms the broad appeal of wilderness as somewhere which is attractive and worthy of a visit.

For some Australian academics (primarily from Schools of Art and Philosophy) the Biblical concept of wilderness as a desolate wasteland takes precedence over the “large, essentially natural area” definition. This underlies the post-modernist criticism of wilderness. Postmodernism has become the dominant ideology within much of academia and is so critical of wilderness that adherents are unlikely to use the word, let alone support wilderness preservation (Washington, 2012). Washington argues that there are many associations attached to wilderness, and it is some of these that are being criticised, rather than the large natural areas themselves, but there will be little academic support for wilderness until postmodernism ceases to be the dominant ideology.

### Conclusion

By the late 1990s widespread recognition of the concept of wilderness (mostly manifested through the NWI) had led to reservation of substantial areas throughout much of Australia. Conservative governments philosophically favour minimising impediments to the development of natural resources so they had reason to see the concept of wilderness as an ongoing constraint on development as well as being unacceptable to sections of the Aboriginal community. The widespread acceptance by this time of biodiversity as a scientifically justifiable rationale for conservation provided an opportunity to discard the troublesome concept of wilderness.

The NWI, as the means of quantifying the wilderness concept, has necessarily been discarded too. It had some deficiencies but these could have been rectified with further development and were not the main cause of its demise.

The wilderness concept has received little support from academia and the environmental NGOs which were once its most enthusiastic proponents have not responded by tweaking and defending it, as might have been expected, but by dropping it or using it only in the popular (ill-defined) sense.

But the above arguments do not justify the near-total demise of the wilderness concept. I would have more sympathy for Dr Bridgewater's critique (“Wilderness areas have been established on the basis of values which have no basis in science...”) if he had specified “ecology” rather than broader “science”, because the main justification for wilderness can be found in the social sciences (his “warm fuzzy feelings”). In the appropriate context the wilderness concept remains a valuable tool for the management of natural areas as demonstrated by its successful and continuing use in the management of the TWWHA.

The alleged benefits of wilderness may have been overstated in the past and contributed to its demise. If the concept of wilderness is to regain credibility, the following (building on the conclusions of Mackey et al, 1998) need to be accepted:

- The word “wilderness” has multiple meanings. In any particular situation it is essential to be clear which meaning is intended. For example, in a land management context “wilderness” does not mean a Biblical wasteland but it can mean:
  - ◊ an area defined by physical parameters (for example, defined by the NWI);
  - ◊ an area designated by law (for example, zoning); or
  - ◊ almost anywhere with some wild character (the ill-defined popular meaning).

- Wilderness is a cultural and recreational construct (which may appear to trivialise it), but it provides recreational experiences which are highly valued and cannot be replicated in any other setting, and its inspirational value is of great and fundamental importance to very many people (which is why the term remains in popular use).
- The preservation of wilderness should be seen as one end of a continuum of measures to conserve biodiversity and ecological integrity. It is an important and effective strategy for conservation and provides additional social benefits, but the conservation of biodiversity and ecological integrity can often be achieved without the exclusion of the artefacts of modern technological society from a large area, so it is rarely a strong argument for preservation of wilderness.
- The wilderness image attracts tourists but unrestricted visitation (especially commercial tourism development) reduces wilderness quality, and the vast majority of tourists neither want nor need large areas of high wilderness quality. Attracting tourists only requires the preservation of enough wilderness to maintain the image, it is rarely a strong argument for preservation of high quality wilderness.
- It is essential to reach a consensus on the applicability of wilderness designation to areas accessible by terrestrial motorised vehicles.
- It is essential to reach an understanding with the Aboriginal community that wilderness designation acknowledges their traditional land management practices and relates to maintaining parts of their land as it was prior to European takeover of their country; nothing more.

And, once wilderness regains its rightful standing in Australia, some form of wilderness quality mapping will be needed to identify and (especially) monitor it.

## Glossary

*EPBC Act*: [Australian Government] *Environment Protection and Biodiversity Conservation Act, 1999* (the main piece of Australian Government conservation legislation)

GIS: Geographic Information System

IUCN: International Union for the Conservation of Nature

NGO: Non-Government [conservation] Organisation

NWI: National Wilderness Inventory

PWS: [Tasmanian] Parks and Wildlife Service

RFA: Regional Forest Agreement (agreement between the Australian and state governments to define the ultimate extent of forestry operations)

TWWHA: Tasmanian Wilderness World Heritage Area

TWWHAMP: Tasmanian Wilderness World Heritage Area Management Plan, 1999

UNESCO: United Nations Organization for Education, Science and Culture

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