

# A

## Appendices

### Appendix 1 Responsible Ministers and agencies for the TWWHA, 1992–1999

#### Commonwealth Ministers for the Environment

Ros Kelly (Labor) <sup>102</sup>	1991–1994
Graham Richardson (Labor)	1994
John Faulkner (Labor)	1994–1996
Robert Hill (Liberal)	1996–2001
David Kemp (Liberal)	2001–present

#### State Ministers for the Environment

John Cleary (Liberal)	1992–1995
Peter Hodgman (Liberal)	1996–1998
David Llewellyn (Labor)	1998–2002
Premier Jim Bacon (Labor)	2002–2004

#### World Heritage Area Ministerial Council

##### COMMONWEALTH MINISTERS

Ros Kelly, Minister for the Arts, Sport, the Environment and Territories (Labor)	1992
Duncan Kerr, Minister for Justice (Labor)	1992–1995
John Faulkner, Minister for the Environment, Sport and Territories (Liberal)	1993–1995
Warwick Smith, Minister for Sport, Territories and Local Government (Liberal)	1996–1997
Jocelyn Newman, Minister for Family and Community Services (Liberal)	1998–
Robert Hill, Minister for the Environment (Liberal)	1996–2002
David Kemp, Minister for the Environment and Heritage (Liberal)	2002–present



**John Faulkner** was the Federal Minister for the Environment, March 1994–March 1996. During his term as Minister, there were three new inscriptions on the World Heritage List: the Australian Fossil Mammal Sites (Riversleigh/Naracoorte); Uluru Kata Tjuta as an associative cultural landscape; and additional areas to the existing Central Eastern Rainforest Reserves. A preliminary assessment of the possible world heritage values of the Blue Mountains National Parks was also undertaken. Senator Faulkner is probably best remembered for issuing a Proclamation under the *World Heritage Properties Conservation Act* to protect the Hinchinbrook Channel's world heritage values from the effects of the Port Hinchinbrook development.

Photo by Auspic



Senator **Robert Hill** was the Federal Minister for the Environment and Heritage between 1996 and 2002. During this period, Senator Hill oversaw significant developments in the Australian World Heritage management regime. In 1997, two sub-Antarctic properties—Macquarie Island, and Heard and McDonald Islands—were inscribed on the World Heritage List. In addition, in June 1998, the Greater Blue Mountains Area was nominated for World Heritage listing. In 1998, Senator Hill signed a four-year funding agreement to provide Commonwealth funds totalling \$20.6m million. Between 1996 and 1999 the Commonwealth provided over \$19.6 million for management of the Tasmanian Wilderness World Heritage Area. During this period, a major initiative of Senator Hill was the development of the *Environment Protection and Biodiversity Conservation Bill 1999* for presentation to Federal parliament in 1999. This new legislation offers enhanced protection for World Heritage properties, introducing a values based World Heritage management regime and more efficient environmental assessment and approval processes.

Photo by Commonwealth of Australia

<sup>102</sup> A photograph of Ros Kelly is not included because of the service charges levied.

**John Cleary** was State Minister for National Parks and Wildlife from 1992 until February 1996. Minister Cleary negotiated and approved the first World Heritage Area Management plan with the Commonwealth. Finalisation of the management plan was a long negotiated process involving recreational users, conservation groups and a number of meetings with the Federal Minister Ros Kelly, and included a number of on-site inspections by Ministers for the TWWHA.



Photo by Tasmanian Parliamentary Liberal Party

**Peter Hodgman** was State Minister for the Environment, February 1996 to August 1998. Minister Hodgman oversaw the foundation work for review of the 1992 TWWHA management plan, involving the most extensive public consultation program for reserve management planning yet undertaken in Tasmania.



Photo by Tasmanian Parliamentary Liberal Party

**David Llewellyn** was State Minister for Primary Industries, Water and Environment between 1998 and 2002, and administered the *National Parks and Wildlife Act 1970*. (This Act was recently replaced by the *National Parks and Reserves Management Act 2002* for which the Premier, Jim Bacon<sup>103</sup>, has administrative responsibility.) Minister Llewellyn oversaw finalisation and approval of the 1999 TWWHA management plan which received high levels of support from a wide range of stakeholders.



Photo by Graham Harrington

<sup>103</sup> Premier Jim Bacon has recently resigned on account of ill health. Minister Ken Bacon now has responsibility for administering the *National Parks and Reserves Management Act 2002*.

## STATE MINISTERS

John Cleary, Minister for National Parks and Wildlife (Liberal)	1992–1995
Ray Groom, Premier (Liberal)	1992–1995
Tony Rundle, Premier (Liberal)	1996–1997
Peter Hodgman, Minister for Environment (Liberal)	1996–1998
David Llewellyn, Minister for Primary Industries, Water and Environment (Labor)	1998–2002
Jim Bacon, Premier and Minister for Tourism, Parks, Heritage and the Arts (Labor)	1998–2004

## World Heritage Area Standing Committee

The listings below are based on meeting records held by the Parks and Wildlife Service, and may be incomplete and/or contain some errors. Staff of the managing agency attended Standing Committee meetings as required.

## COMMONWEALTH REPRESENTATIVES

David Kay, Department of Environment, Sport and Territories	1995
Elizabeth Williams, Department of Environment, Sport and Territories	1995–1997
Warren Nicholls, Department of Environment, Sport and Territories	1993–
Mike Preece, Department of the Environment and Heritage	1993–
Daryl King, Department of the Environment and Heritage	2001
Fleur Paech, Department of the Environment and Heritage	2001

## STATE REPRESENTATIVES

Bob Tyson, Parks and Wildlife Service	1992–present
Dan Norton, Department of Premier and Cabinet	1993
Derek Inglis, Department of Treasury and Finance	1993
Martine Wallace, Department of Treasury and Finance	1993
<b>Max Laughlin (Chairperson), Parks and Wildlife Service</b>	<b>1993–1995</b>
Rod Pearse, Parks and Wildlife Service	1993–1995
Ken Felton, Forestry Tasmania	1993–1995
Peter Bosworth, Parks and Wildlife Service	1993–1995
David Spence, Department of Premier and Cabinet	1995
Michael Brown, Forestry Tasmania	1996
Kate Kent, Department of Premier and Cabinet	1996
Stuart Lennox, Department of Tourism	1996–1997
Lynne Dean, Forestry Commission	1994–1997
Rob Nicholl, Department of Treasury and Finance	1995–1997
Steve Whitely, Forestry Tasmania	1997
Leica Wagner, Department of Premier and Cabinet	1997
Peta Dowell-Hentall, Forestry Tasmania	1998
Ingrid Rosemann, Department of Premier and Cabinet	1998
<b>Max Kitchell (Chairperson), Parks and Wildlife Service</b>	<b>1996–1999</b>

Hans Dreilsma, Forestry Tasmania	1998–present
Jane Foley, Department of Tourism Sport & Recreation	1995 and 1998–present
Derek Inglis, Department of Treasury and Finance	1998
Sue Chappell, Premier and Cabinet	2001
<b>Peter Williams (Chairperson), Parks and Wildlife Service</b>	<b>2000–2004</b>
Wendy Sawford, Treasury and Finance	2001–present
Tim O’Loughlin, Parks and Wildlife Service	1992–present

## World Heritage Area Consultative Committee

The listings below are based on meeting records held by the Parks and Wildlife Service, and may be incomplete and/or contain errors in dates. Staff of the managing agency attended WHACC meetings as required.

David Jennings, Primary Resources Representative	1992
Jack Kile, Warden Esperance Council	1992
Harry McDermott, Councillor Strahan Council	1992
Bob Geeves, Wilderness Tourism Representative	1992
Helen Gee, Representative of conservation interests	1992–1993
Peter Allan, Primary Resources	1992–1993
Michael Hill, Australian National Parks and Wildlife Service	1992–1994
Don Howe, Local Government Representative	1992–1994
Rhys Jones (Archaeologist), Australian National University	1992–1994
<b>Ralph Chapman (Chairperson 1992–1995)</b>	<b>1992–1995</b>
John Luscombe, Tourism Management Consultant	1992–1996
Recreation and Land Users Federation	1992–1999
Bob Burton, Representative of conservation interests	1992–1999
Greg Lehman, Representative of Aboriginal Community	1992–1999
Les Monson, Freshwater Anglers’ Representative	1992–1999
Peter Griffiths, Wilderness Tourism Representative	1993–1995
Mark Addis, Forest Industries Representative	1994–1996
Geoff Ashton-Jones, Local Government Representative	1994–1999
Barry Ford, Independent Conservation Interests	1994–1999
Tim Richmond, Australian Nature Conservation Agency	1995–1996
Mike Grey, Primary Industry Representative	1995–1999
Anne McConnell, Archaeological Representative	1996–1998
Jane Morgan, Wilderness Tourism Representative	1996–1998
Ian Whyte, Forest Industries Representative	1996–1999
Richard Dax, Tourism Representative	1997–1999
Brian Clark, Commonwealth Interests	1997–1999
Steve Stanton, Tasmanian Aboriginal Land Council	1998
Tim Morris, Local Government Representative	1999–2000
Jenny Cox, Wilderness Tourism	1999–2002



<b>Bryce McNair, Forest Industries Representative (Chairperson 1995–1999)</b>	<b>1992–present</b>
Professor Jamie Kirkpatrick (Ecologist) University of Tasmania	1992–present
Simon Cubit, Tas. Traditional and Recreational Land Users	1992–present
Helen Thyne, Bushwalking Representative	1992–present
Robin Sim, Archaeology	1999–present
Jennifer Pragnell, Independent Conservation Representative	1999–present
Ashley Artis, Independent Freshwater Angling Representative	1999–present
Barry Lathey, Local Government Representative	1999–present
Helen Dunn, Conservation Interests	2000–present
Clyde Mansell, Representative of Aboriginal Community	2000–present
Tony Park, Tourism Representative	2000–present

## Commonwealth agencies with responsibilities for the TWWHA, 1992–1999

The following Commonwealth agencies held responsibilities for World Heritage properties over the 1992–1999 period:

- 1. Department of the Arts, Sport, the Environment and Territories, 1992–March 1993**
  - Environment and Conservation Policy Division
- 2. Department of the Environment, Sport and Territories, March 1993–October 1997**
  - World Heritage Group/World Heritage and Biodiversity Branch, Environment Strategies Directorate
  - Australian and World Heritage Group, Environment Australia
- 3. Department of the Environment, October 1997–October 1998**
  - Australian and World Heritage Group, Environment Australia
- 4. Department of the Environment and Heritage, October 1998–present**
  - Australian and World Heritage Group/Division, Environment Australia
  - Heritage Branch

### Secretaries:

<b>A.S. Blunn</b>	1992–March 1993
<b>Stuart Hamilton</b>	March 1993–March 1996
<b>Roger Beale</b>	March 1996–present

## Tasmanian agencies with responsibilities for the TWWHA, 1992–1999

### PRINCIPAL TASMANIAN MANAGING AGENCY (PARKS AND WILDLIFE SERVICE)

During the 1992–1999 period, the majority of land within the Tasmanian Wilderness World Heritage Area was protected under the Tasmanian *National Parks and Wildlife Act 1970*<sup>104</sup> and primary responsibility for managing the area was with the Tasmanian Government department responsible for administering that Act.

During the 1992–1999 period, the responsible department (and relevant divisions with responsibilities for World Heritage management) underwent several structural and administrative changes, with corresponding name changes as follows:

1. **Department of Parks, Wildlife and Heritage**<sup>105</sup>, 1989–1992
  - Land Management Division and Resources, Wildlife & Heritage Division
2. **Department of Environment and Land Management**, 1993–1998
  - Land Management Division; and Resources, Wildlife & Heritage Division, 1993–1995
  - Conservation and Land Management Division, 1996–1998
3. **Department of Primary Industries, Water and Environment**, 1999–2002
  - Resource, Management and Conservation Division, 1999
  - Parks and Wildlife Service Division and Resource Management and Conservation Division, 2000–2002
4. More recently, in 2002, the management arrangements for National Parks and Wildlife were separated to align with the creation of new legislative Acts. The Parks and Wildlife Service became a division of the newly created **Department of Tourism, Parks, Heritage and the Arts** with management responsibilities under the *National Parks and Reserves Management Act 2002*; while the Resource Management and Conservation division of the **Department of Primary Industries Water and Environment** assumed responsibilities under the *Nature Conservation Act 2002*. Responsibilities for managing Protected Archaeological Sites under the *Aboriginal Relics Act 1975* also transferred to the new Department of Tourism, Parks, Heritage and the Arts through the Tasmanian Heritage Office.

For a history of the Parks and Wildlife Service, go to the PWS website <[www.parks.tas.gov.au](http://www.parks.tas.gov.au)> and go to the page 'A full history of the Parks and Wildlife Service'.

## DIRECTORS, GENERAL MANAGERS AND SECRETARIES FOR NATIONAL PARKS

### Directors of National Parks under the Act

1. **Max Laughlin**, Secretary, Department of Parks, Wildlife and Heritage, 1992–1995
2. **Max Kitchell**, General Manager, Conservation and Land Management Division, Department of Environment and Land Management, 1996–2000
3. **Kim Evans**, Secretary, Department of Primary Industries, Water and Environment, 2000–2002
4. **Jeff Kelly\***, Secretary, Department of Tourism, Parks, Heritage and the Arts, 2002–2004

### General Managers/ Secretaries for the managing agency for National Parks

1. **Max Laughlin**, Secretary, Department of Parks, Wildlife and Heritage, 1992–1995
2. **Max Kitchell**, General Manager, Conservation and Land Management Division, Department of Environment and Land Management (Secretary: John Ramsay), 1996–1999
3. **Peter Williams\*\***, General Manager, Parks and Wildlife Service division, Department of Primary Industries, Water and Environment (Secretary: Kim Evans), 2000–2002; Department of Tourism, Parks, Heritage and the Arts (Secretary: Jeff Kelly), 2002–2004

104 In 2002, this Act was replaced by two Acts—the *National Parks and Reserves Management Act 2002* and the *Nature Conservation Act 2002*.

105 Previous names for the relevant department were the Department of Lands, Parks and Wildlife between 1987 and 1989; and the National Parks and Wildlife Service between 1972 and 1987.

\* Scott Gadd has recently been appointed as Secretary DTPHA.

\*\* Peter Mooney has recently been appointed as General Manager PWS.

### INLAND FISHERIES SERVICE (FORMERLY INLAND FISHERIES COMMISSION)

During the 1992–1999 period, the Inland Fisheries Service was responsible for administering and managing inland fisheries resources within the TWWHA under the *Inland Fisheries Act 1995*.

#### Directors

Rob Sloane	1992
Wayne Fulton	1993–1997
Greg McCrossan	1998–2003
John Diggle (Acting Director)	present

### FORESTRY TASMANIA (formerly Forestry Commission)

During the 1992–1999 period, the Forestry Commission was responsible for managing three small Forest Reserves in the TWWHA—Meander, Liffey and Drys Bluff.

#### Chief Commissioner/Managing Director

Evan Rolley, 1992–present

### HYDRO TASMANIA (formerly Hydro-Electric Corporation, and Hydro-Electric Commission)

During the 1992–1999 period, the Hydro-Electric Commission was responsible for administering limited areas both within and enclosed by the TWWHA under the *Hydro-Electric Commission Act 1944* and more recently under the *Electricity Supply Industry Act 1995*.

#### Chairpersons

Brian Gibson	1992
Peter Rae	1993–present

### TASMANIAN ABORIGINAL LAND COUNCIL

The Tasmanian Aboriginal Land Council—the representative organisation of the Aboriginal community—was responsible for managing the three Aboriginal cave sites in the TWWHA and, together with the managing agency, for managing the Aboriginal heritage within the TWWHA.

#### Chairpersons

Luke Maynard is the current Chairman of TALC. Information on previous Chairpersons of the TALC was not readily available from TALC.

## Appendix 2

### Funding and other resources for management

#### History of funding

Prior to 1983, State funding for management of the national parks in southwestern Tasmania (including the Park Centres at Cradle Mountain, Lake St Clair, Strahan and Maydena) was less than \$1 million per year. Funding for management of the area increased dramatically following the recognition of the area as a World Heritage Area in 1982 and the decision of the High Court of Australia in July 1983 that resulted in cessation of the proposed lower Gordon dam and power development. These decisions were accompanied by the provision by the Commonwealth government of a significant package of funds to Tasmania.

Joint Commonwealth/State management arrangements for the World Heritage Area were negotiated in 1986/87. These arrangements provided for a rolling program of Commonwealth and State funding for planning and management of the area, which has continued to the present.

Funding levels increased in 1989/90 following the expansion of the World Heritage Area, and reached a peak during 1989/1993 when the first (1992) management plan for the area was developed and significant capital works were undertaken (eg the construction of the Cradle Mountain Visitor Centre).

The level of funding for management of the TWWHA has remained relatively stable since 1993 at approximately \$8.4 million<sup>106</sup> per year, comprising about \$5 million from the Australian Federal government, and \$3.4 million from the Tasmanian State government (see Figure A2-1).

More recently, in 2002, the Commonwealth government announced changes to World Heritage funding arrangements. These included a reduction in the Commonwealth's direct contribution to baseline funding for the TWWHA by \$1 million (i.e. from \$5.3 million to \$4.3 million), but the provision of additional funding to be made available through a proposed regional Natural Resource Management planning mechanism. The timeframe of the Commonwealth's ongoing funding commitment for the TWWHA decreased from four years to 12 months.

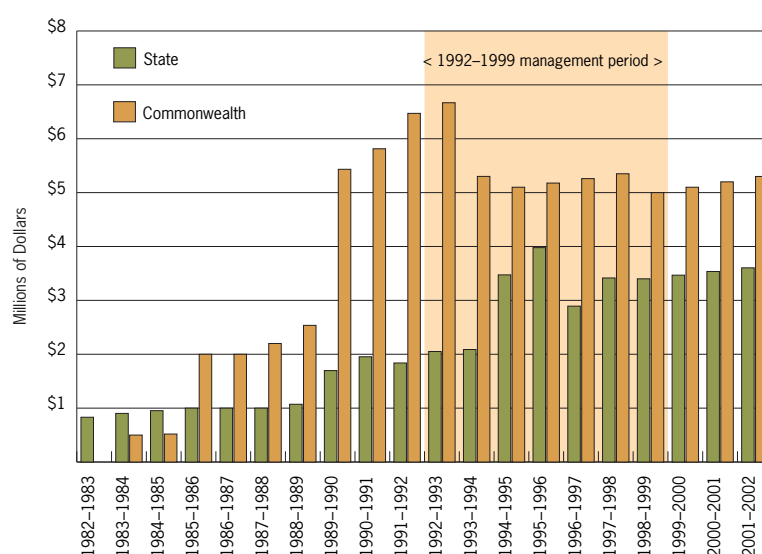
The Tasmanian government responded to the above changes by increasing its contribution to funding for the TWWHA by \$1 million for 12 months to the end of 2002/03 to cover the immediate shortfall in funding.

Uncertainty regarding the level and nature of ongoing funding for management of the TWWHA raises concerns for the future of many long-term management programs for the TWWHA.

**Figure A2-1**

#### History of World Heritage funding for management

Commonwealth and State World Heritage funding for management of the Tasmanian Wilderness World Heritage Area, 1982–2002. The national parks in southwestern Tasmania were first inscribed on the World Heritage List in 1982. Prior to this, the Tasmanian State Government alone provided funding for management of these parks. The period of the 1992 (first) management plan for the TWWHA (September 1992 to March 1999) is highlighted.



#### Notes

In 1982/83, State expenditure on the National Parks of Cradle Mountain–Lake St Clair, Franklin–Lower Gordon Wild Rivers, and Southwest (including the Park Centres at Cradle Mountain, Lake St Clair, Strahan and Maydena) was \$831,000. In 1989, the World Heritage Area was expanded from the original 769,000ha to 1.384 million hectares. This expansion was accompanied by a significant increase in Commonwealth funding commencing in the financial year 1989/1990.

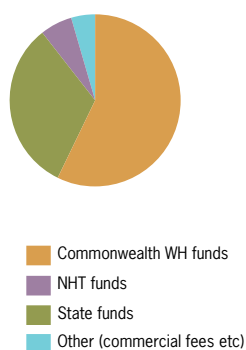
#### Sources

Figures for the years 1982/83 to 1997/98 are sourced from the *Draft Submission to the Commonwealth of Australia by the State of Tasmania for a joint five year funding program 1998/1999–2002/03 for the Tasmanian Wilderness World Heritage Area*, from the table titled 'Tasmanian Wilderness WHA State–Commonwealth Funding', Parks and Wildlife Service unpublished report on departmental file. Note that only the funding agreement (pp 15–20) of this document was a draft; the remaining content was final. Figures for the years 1998/1999 to 2001/02 are sourced from the *Agreement between the State of Tasmania and The Commonwealth of Australia on Arrangements for Funding of the Tasmanian Wilderness World Heritage Area* (1998/99 to 2001/02).

<sup>106</sup> Approximately \$US4.5 million.

Figure A2-2

### Levels and sources of funding for management of the TWWHA, 1992–1999



Notes  
The above chart is based on the financial file records held by the Parks and Wildlife Service. Note that Park entry fees were introduced in 1992/93 and Natural Heritage Trust (NHT) funding commenced in 1997/98. 'Other' includes Entry fees, Cradle Mountain Enterprise, Park Concession Fees, Capital Improvement Program funds and other miscellaneous receipts. Note that the financial records for entry fee receipts and park concessions are approximate only and will underestimate actual levels to some extent as financial records are not available for some years. Information on NHT funding is sourced from Natural Heritage Trust Annual Reports 1998/99 and 1999/2000, World Heritage Management and Upkeep program—Program Report Highlights.

## Funding for management over the 1992–1999 period

The funding package for management of the TWWHA over the term of the first management plan was negotiated between the State and Commonwealth governments on the basis of the estimated requirements to adequately implement the jointly approved statutory management plan for the area.

Figure A2-2 indicates the levels and sources of funds for management of the TWWHA over the 1992–1999 period. These comprised:

- Commonwealth World Heritage Funding (a total of \$37.8 million);
- State World Heritage Funding (a total of \$21.3 million);
- Natural Heritage Trust (NHT) which commenced in 1997 (a total of about \$4.0 million);
- Other revenue (a total of more than \$3 million). This includes Park Entry Fees (introduced in 1992), the Cradle Mountain Enterprise (a trust fund generated from sales from the Cradle Mountain Visitor Centre and used to fund staff and projects), Park and Concession fees; licence fees for game and recreational hunting and miscellaneous (e.g. cave entry fees).

## Staffing arrangements within the managing agency

During the 1992–1999 period, operational management of the TWWHA was primarily the responsibility of the Parks and Wildlife Service (and its predecessors, see Appendix 1).

At the commencement of the 1992–1999 period, there were 86 permanent PWS employees involved in planning, managing and providing specialist advice regarding the natural and cultural heritage of the TWWHA. Fifty one (59%) were based in field centres and 35 (41%) were based in the Hobart office. Additional temporary staff (e.g. project officers, summer interpretive rangers, track rangers and walking track construction workers) were also regularly employed.

There was a net increase in staff with responsibilities for management of the TWWHA over the 1992–1999 management period. By 1999, there were 112 permanent PWS employees with responsibilities for the TWWHA, with 66 (59%) based in field centres and 46 (41%) based in the Hobart office. There was also a significant shift over the management period towards utilising more volunteers (both Tasmanian and international), work experience students, and trainees to undertake a wide range of activities. The agency's personnel record system does not allow for the cost-efficient analysis of more detailed data about the nature or level of employment of staff with World Heritage responsibilities over the period.



## Appendix 3

### Implementation of the 1992 management plan

#### PART 1

Implementation of prescribed actions—presents an overview of the extent of implementation of the prescribed actions of the 1992 management plan.

#### PART 2

Major management actions undertaken during the 1992–1999 period—outlines in dot point format the main management actions that were undertaken during the term of the 1992 management plan, 1992–1999. Section headings include:

- Identification and understanding of values;
- Protection, conservation and rehabilitation of values;
- Presentation of values; and
- Other responsibilities.

## PART 1 Implementation of prescribed actions

Audits were conducted of the extent of implementation of the prescribed actions of the 1992 management plan at the halfway and end points of its 7 year term (1992–1999). These audits were based on databased progress reports prepared by relevant officers of the managing agency with responsibility for implementing each prescribed action.

Figure A3-1 shows that just over half (55%) of the 520 actions prescribed by the 1992 management plan were fully implemented during the term of the plan. Of the remaining prescribed actions, 29% were partially implemented, and 16% were not commenced. Of the 81 actions not commenced, 63% are expected to be implemented during the term of the current (1999) plan. This represents a further 10% of the total number of prescribed actions under the 1992 plan.

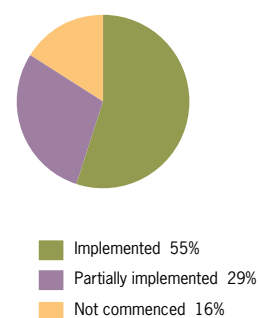
Figure A3-2 shows that the main reasons why some actions were not commenced were (in decreasing order of frequency): low priority/ financial constraints (80%); awaiting prerequisite action (7%), the action was no longer considered necessary or the most appropriate way of achieving the management objective (7%), the action was dependent on a 'trigger' action or event that had not occurred (5%), and the action was technically not feasible (1%). For an explanation of these reasons, refer to the explanatory notes below Figure A3-2.

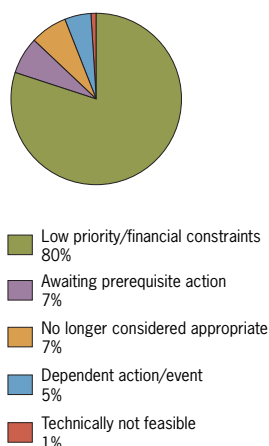
Staff with responsibility for implementing the prescribed actions identified a significant limitation to the implementation of the actions was a lack of funding or insufficient time. In both cases, this situation usually stemmed from the action being considered a low priority—either by those allocating funds to the project or by those allocating staff time to implement the action (within the managing agency or externally). The potential for financial constraints to significantly limit the implementation of the 1992 plan was identified during the funding negotiations between the State and Federal Governments in 1995, when the Parks and Wildlife Service advised that the total funding package being made available for the 4 year period 1995/96–1998/99 would only enable the highest priority actions in the plan to be actioned.

Figure A3-1

#### Extent of implementation of prescribed actions of the 1992 plan

The majority of prescribed actions in the 1992 management plan were fully implemented over 1992–1999 term of the plan.





**Figure A3-2**

## Reasons why some prescribed actions were not implemented

The main reason why some prescribed actions were not implemented was that there was insufficient staff time and/or money to undertake the task. This situation resulted in those tasks that were considered a lower priority, either by funders or managers, not being commenced.

### Explanatory Notes

#### LOW PRIORITY OR FINANCIAL CONSTRAINTS

The action was not commenced due to a lack of funding or insufficient time. In both cases, this situation usually stemmed from the action being considered a low priority—either by those allocating funds to the project or by those allocating staff time to implement the action (within the managing agency or externally).

#### AWAITING PREREQUISITE ACTION

The action was not implemented because it was awaiting the completion of a prerequisite action. For example, the construction of toilets at all huts and of shelters at Liawenee was not commenced because huts and shelters were awaiting an assessment of significance and impact to determine whether or not they were to be retained.

#### NO LONGER CONSIDERED NECESSARY/ APPROPRIATE

The action was not commenced because it was no longer considered necessary or the most appropriate way to achieve the management objective. For example, monitoring mining operations at Adamsfield was not commenced because the mining operation that actually continued was so small that monitoring was considered unwarranted.

#### DEPENDENT ACTION/EVENT

The action was only required in the event that some 'trigger' event occurred and this event did not occur over the term of the plan. For example, the action to 'seek to ensure that the current consolidated mining lease at Melaleuca is cancelled once the existing lessee ceases mining' was not undertaken because the existing lessee has continued mining.

#### TECHNICALLY NOT FEASIBLE

The action was not implemented because it proved to be technically not feasible. For example the prescribed action to 'monitor the impact of blackberry rust on potentially susceptible native plants' was not commenced as the technical ability to isolate and identify blackberry rust strains was not available during the management period.

## PART 2

## Major management actions undertaken during the 1992–1999 period

The main management actions that were undertaken for the TWWHA during the term of the 1992 management plan (1992–1999) are summarised below. Note that this is not a comprehensive listing of all management actions undertaken during this period.

## IDENTIFICATION AND UNDERSTANDING OF VALUES

### IDENTIFICATION, DOCUMENTATION AND RESEARCH ON NATURAL RESOURCES

- Vegetation and habitat mapping was undertaken. Half of the TWWHA has now been mapped and 61 x 1:25,000 vegetation maps have been produced. A further 24 x 1:25,000 maps are in the production phase. These vegetation maps can be seen on the World Wide Web at the DPIWE Geographical Information System (GIS) website <[www.gisparks.tas.gov.au](http://www.gisparks.tas.gov.au)>.
- Geomorphological and geoconservation research included:
  - A review and inventory of sites of geoconservation significance within the TWWHA.
  - Detailed geomorphological investigations with respect to stream bank stability were undertaken on the Gordon River and rivers flowing into Port Davey and Bathurst Harbours.
  - Geomorphological inventories of the karst systems at Mole Creek and Ida Bay were undertaken.
  - Research was undertaken into the rates and nature of karst processes at Ida Bay.
  - A survey of hard rock coastal geomorphological features was conducted to assist the Oil Spill Response Atlas.

- Comprehensive surveys of the cave fauna within reserved lands at Mole Creek and of the Ida Bay karst were undertaken, including assessment of the status of *Goedetrechus mendumae*, a highly restricted species listed on the *Threatened Species Protection Act 1995*.
- Research was undertaken and/or supported to improve knowledge and management of the natural and cultural heritage (and related issues) within the TWWHA. Research projects included:
  - Studies on the ecology, dynamics and conservation management of *Sphagnum* peatlands.
  - Studies of a number of rare species of plants including: *Oreoporphantha*, *Sagina sp. nova*, *Milligania longifolia*, *Lomatia tasmanica*, *Centrolepis paludicola* and *Centrolepis pedderensis*.
  - Research commenced on some aspects of rare plant communities of the Central Plateau Conservation Area.
  - A manual for vegetation monitoring was developed.
  - Several studies were completed on the effects of fire on buttongrass moorlands and biota, including epigeic arthropods and the Broad-toothed mouse, *Mastacomys fuscus*. A study was also completed on the effects of fire on *Sphagnum* peatlands.
  - Survey work was undertaken on the unique subtidal marine benthic communities at Port Davey–Bathurst Harbour.
  - Several studies were completed on invertebrate faunas within the TWWHA, including: epigeic and cave-dwelling arachnids; soil and litter fauna (particularly Collembola); earthworm fauna of Lake Pedder; high altitude stream faunas in the Mt Pelion East–Mount Doris area; and landsnail survey of the Central Plateau.
  - Vertebrate studies within the TWWHA included surveys for small mammals, including the broad-toothed mouse, *Mastacomys fuscus*.
  - A survey of the impacts of park infrastructure and visitor activity on water quality was undertaken.
- Inventories of natural and cultural resources were compiled onto spatial or GIS-based databases and updated.
  - Geological, geomorphic and soil sites of geoconservation significance were entered onto the Tasmanian Geoconservation Database.
  - Botanical and fauna records were entered onto the database GTSpot. These inventories are available on the DPIWE GIS website <www.gisparks.tas.gov.au>.

## IDENTIFICATION, DOCUMENTATION AND RESEARCH ON CULTURAL SITES

- Inventories of historic sites and structures in the TWWHA were compiled through systematic regional and/or thematic surveys. These included surveys of the Central Plateau, Southwest National Park, Cradle Mt–Lake St. Clair, Overland track, and Wild Rivers National Park. In 1999, the Adamsfield site record was underway.
- A number of projects to identify Aboriginal values were undertaken including at Adamsfield, Melaleuca, Frenchmans Cap and along the Overland Track.
- Aboriginal sites were entered on the Tasmanian Aboriginal Site Index (TASI). Due to the sensitivity of some of this information, this site is not available on the website.
- Historic sites were entered on the CHIS database.
- Cultural Heritage Information System (CHIS) audits of historic heritage and Aboriginal heritage were completed.

## SITES OF SPECIAL SIGNIFICANCE OR VALUE

- Sites of special significance or value in the TWWHA were identified. This included:
  - The discovery of unique marine invertebrate communities in the Bathurst Channel (southwest Tasmania) and detailed surveys of the fish, macroinvertebrate and macroalgal communities. A proposal for a Marine Reserve was subsequently developed for the Port Davey–Bathurst Harbour region. To assist the reserve proposal, a survey of the Port Davey area was undertaken to describe specifically the distribution, range and extent of habitats ‘representative’ of the broader Davey bioregion, and the boundaries between these representative habitats and the unique habitats associated with the tannin-stained waters of the estuary.
  - Surveys were undertaken to identify sites where rare and threatened species occur, including the orange-bellied parrot, cave fauna, and pencil pine moth.
  - Cultural sites of special significance were identified.

## IDENTIFICATION OF SOCIAL VALUES AND ISSUES RELATED TO MANAGEMENT OF NATURAL AND CULTURAL VALUES

- The cultural significance of traditional practices in the TWWHA was investigated and a report prepared as a prelude to determining the appropriateness of maintaining these practices in the TWWHA. A steering group consisting of departmental officers, representatives of ‘traditional practices’ groups and others with appropriate expertise oversaw the project. This work led to the chapter on ‘Established Practices’ in the 1999 management plan.

## PROTECTION, CONSERVATION AND REHABILITATION OF VALUES

### IDENTIFICATION AND AMELIORATION OF THREATS

- Impact assessment procedures were undertaken to assist consideration of proposals in the World Heritage Area and to minimise potential adverse impacts of projects and developments.
- Development assessment procedures were reviewed prior to the Pump House Point development to incorporate input from the Environment division, public comment, site planning etc.
- Guidelines were prepared to assist the design of an environmentally sensitive tourist development at Pump House Point, Lake St Clair. (This development has not proceeded to date.)

### SCIENTIFIC RESEARCH, MONITORING AND MANAGEMENT OF THREATS TO VULNERABLE SITES AND VALUES

- Fragile or vulnerable sites and values in the World Heritage Area susceptible to damage through visitor use or other causes were identified, and monitoring programs were undertaken to assess and guide the aversion or mitigation of adverse impacts.
- Impact assessment and monitoring studies of potential threats within the WHA included:
  - walking track and vehicular track erosion at various sites in the World Heritage Area;
  - the impact and monitoring of horseriding and trampling in sensitive areas on the Central Plateau Conservation Area and at Cradle Mountain (management strategies were developed to reduce impacts);
  - erosion of organic soils resulting from burning and other erosive forces;
  - the impact of recreational activities on cave and karst systems including Ida Bay, Mount Anne, Cracroft Valley and peripheral karst areas;

and the impact of quarrying on the karst resources at Ida Bay.



- The impact of walking on plant communities was assessed through trials established in the Central Plateau Conservation Area and in the southwest. This included a three-year monitoring program of walker impacts on alpine environments of western Tasmania and a 12-month trial of walker impacts on montane buttongrass moorlands.
- The environmental impacts of hunting were investigated through annual counts of wallabies in the designated hunting zone on the Central Plateau Conservation Area. (No evidence of decline in the hunted species was observed.)
- A Long Term Ecological Research site (LTER), Warra, was established around Mt Weld in 1995 to further knowledge about the impacts of forest practices, in keeping with Commonwealth and State government commitment to sustainable forest management. The site straddles State Forest in the east and the TWWHA to the west. Forestry Tasmania is responsible for the ongoing planning at the site with input from others including DPIWE, Parks and Wildlife Service, and the University of Tasmania.
- Impact assessment and monitoring of studies were also conducted on aquatic ecosystems within the WHA. These included:
  - streambank erosion on the Gordon River (to monitor the impact of tourist and recreational vessels);
  - lake shore erosion caused by fluctuating water levels in HEC impoundments;
  - erosion monitoring on rivers draining into Port Davey–Bathurst Harbour (to monitor the impact of small craft);
  - survey and mapping of the fragile marine invertebrate communities in the Bathurst Channel (Port Davey). (Management recommendations were also developed for inclusion in kits for yachties and fishers as well as management guidelines for Cruise Boats.)
- In coastal areas, a program was undertaken to stabilise threatened and eroding Aboriginal coastal sites on the southwest coast.

## PLANT DISEASES

- Surveys of the distribution of the root rot disease *Phytophthora* in the World Heritage Area were undertaken in 1992 and 1993. Surveys of additional specific sites were undertaken as required.
- A *Phytophthora cinnamomi* Management Plan and Hygiene Manual was produced in 1993. The implementation of the plan is continuing, including track-reporting, installation of washdown facilities and monitoring spread of the disease on the walking track system.
- Rare species were tested for their susceptibility to *Phytophthora*. Long-term plots were established to monitor the impact of *Phytophthora cinnamomi*, short-term studies are also being conducted.
- A research program was undertaken to investigate the cause and impact of dieback at Pine Lake (program completed in 2000). An interim management plan to control the spread of disease within the Pine Lake area was established. A Ph.D. scholarship was established to conduct research into pathogens isolated at Pine Lake.

## WEEDS

- The weed management program for the TWWHA included the following actions.
  - Survey of weed distributions completed and mapped for the World Heritage Area in 1990. The Central Plateau Conservation Area weed distribution surveys were completed in 1992.
  - The invasive potential of exotic woody species used in garden and amenity plantings was also assessed in the World Heritage Area.
  - A World Heritage Area weeds distribution database was established. In 1998, the *Tasmanian Environmental Weed Database* was developed. (This replaced the Department's former weed management manual.)

- Introduced Plant Policy adopted in 1997. More recently, a weed management strategy was developed for the TWWHA to guide weed control and to focus management on the most significant weeds and highest value sites (*Tasmanian Wilderness WHA Weed Management Plan 2000–2003*).
- A survey of the weed marram grass distribution was undertaken, and the impacts of marram grass (*Ammophila arenaria*) and sea spurge (*Euphorbia paralias*) on the southwest coastline was investigated. An investigation into the distribution of the weed marram grass (*Ammophila arenaria*) in the TWWHA was conducted and infestations were sprayed. A specific plan for marram grass control was developed and is being implemented.
- Aquatic weed survey of higher use waterways and lakes completed in 1998.
- Recording of all infestations of weed species is ongoing.
- Identification of weed control requirements at cultural sites in the World Heritage Area.

## INTRODUCED ANIMALS

- The moratorium on seasonal grazing in the Central Plateau Conservation Area prescribed by the management plan was enacted and sheep are no longer present in the World Heritage Area.
- Strategies and control programs for feral animals were developed and implemented where practicable within the TWWHA, especially in areas where rare or threatened species were endangered by the presence of feral animals. These included:
  - An eradication program for goats in the World Heritage Area. Over 200 goats were removed from 15 sites.
  - Feral cat control programs were also implemented at Melaleuca to protect orange-bellied parrots.
  - Strategies for control of selected starling populations were developed. Starlings were shot and nests destroyed on an annual basis in orange-bellied parrot breeding areas. Starling control is ongoing.
  - Strategies for control of selected rabbit populations were developed. A rabbit eradication program was developed and implemented for Strathgordon (Oct 1998–Feb 2000). Impacts of rabbits on Breaksea Island, Port Davey were assessed and monitoring programs have been established.
  - Rangers continued ad hoc feral cat control work, and methods to control cats using poisoned bait stations were investigated.
  - Strategies for control of selected wasp populations were developed. Localised control of wasps occurred at visitor nodes (e.g. Heritage Landing, Hastings Caves). Parasitic wasps were released at Hastings Caves and Cockle Creek.
  - DPIWE produced a policy for the management and control of feral animals in Tasmania.
- Research was facilitated into the impact of selected introduced animals on natural ecosystems e.g. a Ph.D. study into the impact of trout on native fish and invertebrates commenced in 1998; a Ph.D. study into the impact of commercial honeybees on leatherwood forests commenced in 1997 and was completed in December 2000. A study of the impacts of bumblebees on the native environments commenced in 1999.

## FIRE MANAGEMENT

- Fire training was conducted.
- Some fuel reduction burning and habitat management burns were undertaken in accordance with fire management plans.
- The effect of fire management policies and habitat manipulation, fuel reduction burning and suppression techniques in and adjacent to the World Heritage Area was monitored.
- Several fire management plans were prepared, including plans for the Walls of Jerusalem National Park and the Central Plateau Conservation Area, and a report was completed on the practicalities of habitat management burning (*Orange-bellied Parrot Recovery Plan: operational prescriptions for habitat management burns*, 1993).
- Extension of the Fuel Stove Only Area to cover almost the entire TWWHA (see 1991 management plan) was advertised in Angling Magazines and in a range of PWS pamphlets, track notes and publications. On-site signs advising the public about fuel stove only areas were installed at various sites within the World Heritage Area.
- Several long-term research projects were initiated to increase understanding of the role of fire in the regeneration or maintenance of species and communities in the World Heritage Area, as well as its effects on peatlands. Research projects included:
  - Long term monitoring and research on the impact of fire on Sphagnum peatland communities;
  - Long-term monitoring sites have been established in areas that are fuel-reduced regularly on the Lyell Highway, at McPartlan Pass and Birches Inlet.
  - Field studies and fire behaviour modelling of buttongrass moorlands. Plots were established on Lyell Highway, Gordon River Road, Scotts Peak Road and Melaleuca to investigate the impact of fire on moorland communities and biota. This included a six-year survey of the impacts of fire on small mammals and a study into the effects of fire on invertebrates.
  - The impact of fire on floral species diversity and dominance in moorlands in southwest Tasmania and the Central Plateau has also been investigated.

## SURVEYS AND CONSERVATION ASSESSMENTS FOR RARE SPECIES

- Surveys and conservation assessments were prepared for several rare or threatened species.
- Listing statements, required under the Tasmanian Threatened Species Protection Act 1995 were prepared for the blind cave beetle, the Ida Bay Cave Beetle, Ida Bay Cave Harvestman, Lake Pedder earthworm, Pencil Pine Moth, Broad-striped Ghost Moth, Pedra Branca Skink and Hickmans Pygmy Mountain Shrimp. These listing statements include management recommendations that have been implemented to varying degrees.
- Listing statements were prepared for five plant species: *Centrolepis pedderensis*, *Lomatia tasmanica*, *Oreoporanthera* sp. petalifera, *Sagina diemensis* and *Pomaderris elachophylla*.

## CONSERVATION PLANS AND STRATEGIES

- Recovery plans were prepared and implemented for a range of endangered and rare animal species including: the Pedder galaxias, swamp galaxias, and Clarence galaxias fish, wedge-tailed eagle, orange-bellied parrot, swift parrot and Ptunarra brown butterfly.
- A recovery plan for the endangered plant *Lomatia tasmanica* was developed and is being implemented.
- An earth science conservation strategy was developed and management plans were prepared for sites of geological significance e.g. cave and karst management plans
- Cave fauna management plans were published for Ida Bay Caves and Mole Creek.

- With the assistance of National Estate funds, a strategy was developed for the conservation of earth science (*Geoconservation—Discussion Paper and Strategy with particular reference to Tasmania*). The strategy is being implemented

#### WILDERNESS QUALITY

- Over the 1992–1999 period, management consolidated and promoted visitor and management facilities at pre-existing access points or new points along existing major roads. This was intended to improve access and recreational opportunities for the public without significantly impacting on wilderness quality.
- Structures in the Wilderness and Self-Reliant Recreation Zones that were considered not to be of special cultural significance or scientific or management value were removed to restore wilderness quality. Actions included:
  - Hydro Tasmania removed power lines and towers from the Lyell Highway.
  - some structures were removed from Southwest National Park, e.g. the Deadmans Bay and Junction Creek three-sided shelters.
  - Some of the Hydro Huts at Sir Johns Falls, Wild Rivers National Park were removed.
  - All Hydro structures have been removed from the Liffey Forest Reserve.

#### ENVIRONMENTAL QUALITY

- In 1997, a surface water quality monitoring program was undertaken at three strategic points within the World Heritage Area. This was subsequently followed by a survey of streams associated with selected visitor facilities on the Overland Track.
- DPIWE Environment Division commenced developing Tasmanian state standards for effluent quality. Guidelines are also being developed to protect the quality of ground water in the World Heritage Area.
- Existing sewage treatment systems within the various zones of the World Heritage Area were upgraded through the application of a range of different sewage treatment standards and methods. The performance of these approaches is being monitored.
- A survey of the distribution of the waterborne parasite *Giardia* was undertaken (based on detection in animal faeces). PWS is supporting the development of a practical method for field testing water for *Giardia*.
- Emissions from exploration and mining programs at Ida Bay were monitored until 1995. Quarrying ceased in 1993.
- Toilet waste from Western Arthurs was flown out; commercial rafting operators on the Franklin River were required to carry out all waste (including faecal waste) and licence conditions were applied to tourism cruise boat operators regarding the release of effluent.
- Waste disposal for boats was addressed through the preparation of Minimal Impact Boating education notes and incorporation of measures to reduce waste in the draft Melaleuca site Plan (e.g. promoting take in/take out, encouragement of pumpout of waste from holding tanks (especially for Bathurst Harbour /Port Davey area).

#### LANDSCAPE AND SCENIC QUALITY

- Assessments of visual impacts of proposed activities became a regular aspect of environmental assessments conducted by the managing agency.
- A viewfield analysis was undertaken as part of the assessment process for the proposed Pump House Point development at Lake St Clair.
- The managing agency consulted with adjoining landowners, local council, industry and stakeholders regarding future management and developments outside and within the World Heritage Area, especially in relation to potential developments in the Cradle Mountain area.



- Forestry Tasmania managed landscape aspects of its operations taking account of the viewfields from major viewpoints within the TWWHA and as required by the Forest Practices Code (Forest Practices Board, 2000).

## REHABILITATION OF DEGRADED SITES AND VALUES

- Rehabilitation works were undertaken at a number of sites to reduce visual impacts of disturbed or degraded environments.
- The Lune River limestone quarry (Benders Quarry) closed in 1993. (The Commonwealth government acted by Proclamation and Regulations under the *World Heritage Properties Conservation Act 1983*, to prohibit, except with the consent of the Federal Minister in writing, operations for the mining of limestone within Mining Lease 69M/81 at Marble Hill.) Rehabilitation of the site began in 1993. Rehabilitation is now complete and monitoring is ongoing.
- A priority list of degraded areas requiring rehabilitation within the World Heritage Area was prepared and rehabilitation of these sites is progressively being undertaken.
- Extensive rehabilitation works were conducted on degraded alpine country on the Central Plateau. Quarry sites adjacent to roads and roadside verges on the Mt McCall Road were also treated.
- Lakeshore erosion around Lake St Clair was mapped and recommendations made for stabilisation and rehabilitation.
- Rehabilitation works at significant lunette sites on the Central Plateau Conservation Area has been completed.
- Trials were established to study the effectiveness of different rehabilitation techniques and the findings are being applied to ongoing rehabilitation programs. Rehabilitation sites where research was conducted included Talinah Lagoon, Central Plateau, Cradle Mountain, and Adamsfield.
- Extensive photo monitoring and regular site visits to areas being rehabilitated were conducted to monitor and evaluate the success of rehabilitation work and determine ongoing requirements.
- A seed bank of native plant species for different provenances suitable for revegetation work was established and is being maintained.
- Rehabilitation trials have been established for track closures at Cradle Mountain and New Harbour Range.

## ABORIGINAL HERITAGE

- Disturbance and/or erosion to Aboriginal sites was prevented or reduced where feasible.
- Investigations were conducted into the causes of erosion or damage to Aboriginal sites, and into the effectiveness, feasibility and impact on other values of halting and preventing further erosion. Where necessary and appropriate, stabilisation and/or salvage work was undertaken. Actions included:
  - An erosion study was completed in Cradle Mt–Lake St Clair and Central Plateau.
  - Southwest stabilisation works were completed and are currently being monitored.
  - Monitoring on Central Plateau is underway.
- Aboriginal site surveys were undertaken following consultation with and advice from the Tasmanian Aboriginal Land Council (TALC), including:
  - Central Plateau survey completed.
  - Surveys of Frenchman Cap/Overland Track are currently in progress.
- The Aboriginal community was actively consulted and involved in management of Aboriginal heritage.

## HISTORIC SITES AND STRUCTURES

- Conservation Plans were prepared for a number of historic huts and structures including:
  - Pillinger and the Kelly Basin Track,
  - Custom House Historic Site,
  - Reindeer Lodge,
  - Pine Lake,
  - Old Pelion,
  - Du Cane Hut,
  - Dixon Kingdom Hut,
  - Kitchen Hut,
  - Dove Lake and Crater Lake Hut,
  - Mt Kate House Hut,
  - Braddon River Hut
  - Macquarie Heads Station
  - Regatta Point Wharf
  - Sarah Island Gaol
  - Sarah Island Bakehouse.
- Priority in implementing these plans was given to those huts that still provide a public recreational function. The Du Cane Hut Conservation Plan has been largely implemented; plans for Pillinger, Kelly Basin track, Customs House Historic Site, Reindeer Lodge, Pine Lake, and Old Pelion have been partially implemented.
- A new Lake Nameless Hut was constructed.
- Stabilisation works were undertaken on a number of significant historic sites and features including brick kilns at East Pillinger, the Bird River Bridge, and Sarah Island convict ruins.

## ADDITIONAL MANAGEMENT ACTIONS

- Additional initiatives that were undertaken during the 1992–1999 period that were consistent with—but not prescribed by—the 1992 management plan included the production of a threat abatement plan for the incidental catch (or by-catch) of seabirds during oceanic longline fishing operations.

## PRESENTATION OF VALUES

### MAJOR PROJECTS

- A major new Visitor Centre was constructed at Lake St Clair, and the Visitor Centres at Strahan and Cradle Mountain were completed.
- A range of high quality short walks with interpretive signs were provided at tourist stops along the Lyell Highway (including Donaghy's Hill, Franklin River and Nelson falls), at Mt Field and Sarah Island.
- A Summer Interpretive Ranger Program provided a hands-on program of activities to inform and educate park visitors.
- The Waldheim Chalet at Cradle Mountain was converted to a 'living museum' to recognise the early history of the park and the contribution of Gustav and Kate Weindorfer to preservation of the area.

- Interpretive signs and displays were provided at a variety of locations including Pine Lake, King William Saddle, Franklin River, Sarah Island, Heritage Landing, Donaghys Hill, Lake St Clair, Hartz Mountains, Kuta Kina, and Cockle Creek and the orange-bellied parrot hide at Melaleuca.
- A strategy for interpreting Aboriginal heritage was prepared (Aboriginal Interpretation of the Tasmanian World Heritage Area (Leaman (1995) A Strategy for Interpreting Palawa Culture and Heritage).
- A teacher training World Heritage Area slide kit was developed and sent to schools to promote the World Heritage Area to school teachers and students.
- A world wide website was initially developed for the World Heritage Area. This was later expanded to become the Parks and Wildlife Service website (<[www.parks.tas.gov.au](http://www.parks.tas.gov.au)>). This site provides a wealth of information about the TWWHA and its natural and cultural heritage.

## VISITOR FACILITIES AND INFRASTRUCTURE

- Site plans were prepared to guide the provision of facilities and services at major visitor entrances to the TWWHA. Site plans were completed for the following Visitor Services Zones or Sites:
  - Cradle Mountain (Cradle Valley–Pencil Pine) 1993,
  - Lake St Clair (Cynthia Bay Site Plan 1993),
  - Kelly Basin/Bird River Bridge (1993)
  - Huon Campground Wedge River (1993)
  - Franklin River Visitor Services Site (1994)
  - Kia Ora commercial hut (1997)
- Site planning also commenced for numerous other sites. Draft site plans were developed for Hartz Mountain (1992), Liffey Falls (1993), Cockle Creek–Recherche Bay (1994), Liawenee (1995) and Melaleuca (1995) while planning was also undertaken for Matsuyker Island, Mt Field, Sarah Island, Collingwood Bridge, Pump House Point, and Meander Forest Park.
- A recreation plan was produced for the lower Gordon River (Lower Gordon River Recreation Zone Plan, 1988).
- In accordance with the site plan for the area, the following visitor facilities and infrastructure were provided at the following sites.

### AT CRADLE VALLEY:

- The Cradle Mountain Visitor Centre was completed and modified to include a wet area for visitors, new entrance to gallery and slide show venue. Extensions to the rangers' office and park shop were undertaken.
- Waldheim and surroundings were converted to a Weindorfer Museum
- The Dove Lake Circuit Track was constructed and several walking tracks were upgraded.

### AT LAKE ST CLAIR:

- A major Visitor Centre was constructed (completed in 1995) which included the development of a visitor reception and information area, management offices and concessionaire operated restaurant.
- The lake-side carpark was closed and rehabilitated, and a larger car park was provided in a less intrusive area.
- A major new sewage treatment plant was constructed to service the site.
- A series of new accommodation cabins and a bunkhouse were provided in the Cynthia Bay campground by the concessionaire.

- A variety of short walks were constructed, eg the interpreted Woodland Nature Walk and Platypus Bay Walk.

#### AT OTHER LOCATIONS:

- The Visitor Centre at Strahan was constructed by PWS in conjunction with the Forestry Tasmania, the Strahan Council and the Department of Tourism, Sport and Recreation.
- The Strahan Customs House was consolidated as the PWS Western District's office.
- A range of visitor facilities (e.g. walking tracks, viewing platforms, safety fencing, picnic facilities, walker registration booths, footbridges etc) were provided or upgraded at a variety of sites including Liffey Falls, Sarah Island, Heritage Landing, Strahan Customs House, Devils Gullet, Hartz Mountains, East Pillinger, Meander Forest Reserve, and The Needles.

### INFORMATION, EDUCATION AND INTERPRETATION

- Visitor information and orientation was provided to on-site visitors and the general public through a range of programs and products, including:
  - Major interpretation centres at Pencil Pine/Cradle Valley, Lake St Clair, and Strahan were managed as 'gateways to the World Heritage Area'.
  - New onsite interpretation signs and/or displays were produced for a variety of locations including Pine Lake, King William Saddle, Nelsons Falls and the Franklin River Nature Trail, Sarah Island, Heritage Landing, Donaghys Hill, Lake St Clair, Hartz Mountains, Cockle Creek, Liffey Falls, Meander Forest Reserve, and at the Orange-Bellied Parrot hide at Melaleuca.
  - Seasonal interpretation (summer ranger program). The Summer Ranger Program run by the Summer Interpretation Rangers continued at the most popular WHA centres : Mt Field, Cradle Mountain, Lake St Clair and Cockle Creek.
  - Development commenced of an educational slide kit about the TWWHA.
  - The track ranger program continued to be provided annually along major tracks including the Overland Track and South Coast Track.
  - Rangers were stationed on the Bass Strait ferry to provide information to prospective visitors about Tasmania's national parks and reserves.
  - Promotion of World Heritage Area sightseeing routes (Lyell Highway, Gordon River Rd and Anthony Road);
  - A staff journalist was employed to liaise with the media and assist in the production of stories of interest related to the World Heritage Area, although the position was downgraded and then removed during a restructure. (A similar position has recently been reinstated.)
  - A Parks and Wildlife Service newsletter featuring events and stories was produced for several years.
  - A booklet was published to provide information about the fauna, flora and science of the TWWHA, based on the findings of scientific studies conducted in the TWWA ('Natural Wonders of Tasmania's World Heritage Area' PWS 1996)
  - Lake St Clair was used as a venue for arts interpretation with arts-in-residence and some sculptures planned.
  - Posters highlighting the values of the World Heritage Area were produced. These included posters featuring Geology, an Aboriginal shell midden at Louisa Bay, Cradle Mountain, and Mt Oakleigh at dawn.
  - An interpretative guidebook for the Overland Track was produced *The Overland Track: A Walkers Notebook* (first published in 1992, revised 1996).



- Preparation commenced of a full range of pre-visit brochures on the TWWHA. Completed brochures included *Count the ways...your guide to recreation in Tasmania's World Heritage Area* and *Tasmania's National Parks, Forests, Walks & Waterways* which covers all Tasmania's National Parks.
- A wide range of Parks and Wildlife Service notesheets continued to be provided free of charge to the public. Small pre-visit brochures for National Parks were produced but were later phased out due to lack of demand.
- Information about the TWWHA and its values was provided free of charge through the World Wide Web (<[www.parks.tas.gov.au](http://www.parks.tas.gov.au)>) and follow the links to Visitors' Guides and Tasmanian Wilderness World Heritage Area.
- An audio-cassette was produced to accompany and provide information along the drive along the Gordon River Road telling the story of the area *A Special Place*.
- The Tall Trees Walk at Mt Field (interpreting the tall forest values of the WHA) was completed.
- A slide kit on the TWWHA was developed for use by Summer Rangers and other PWS staff in giving presentations.
- Educational programs and training included:
  - PWS staff provided regular talks to schools about wildlife, threatened species and the TWWHA;
  - Every year, PWS provides an intensive training course for about 30 Summer Interpretive Rangers which prepares those rangers to present slideshows and talks to groups of visitors in parks throughout the state over the summer months.
  - Since 1998, there has been a shift towards 'training the trainer' types of approaches to maximise the multiplier effect of educational programs. For example, the Parks and Wildlife Service has provided formal training segments for University of Tasmania students undertaking training to become teachers (Bachelor of Education courses) regarding wilderness and World Heritage Area themes (approximately 100–200 students each year). PWS has also been involved in training people who may enter the ecotourism industry.
- Strategic planning for interpretation included:
  - An Aboriginal Interpretation Strategy for the World Heritage Area was prepared which identified Aboriginal values at several key visitor nodes around the World Heritage Area. The strategy has provided the basis for developing appropriate interpretation.
  - An interpretation prospectus was prepared for Lake St Clair which guided the development of interpretive displays for the visitor centre.
  - A visitor management strategy and interpretation plan was produced for the Western Tiers by Forestry Tasmania in conjunction with the Parks and Wildlife Service (McArthur & Gardner, 1993)
  - A Draft Interpretation Plan for Mt Field National Park was prepared.

## RECREATION RESEARCH AND VISITOR STATISTICS

- An inter-agency visitor research group was established to coordinate collection of strategic visitor information. The group includes representatives from Forestry Tasmania, DPIWE, Tourism Tasmania and Sport & Recreation. The group meets every quarter to coordinate collection. As a result of the group, a representative from The Australian Bureau of Statistics evaluated the data sets and gave recommendations on how to improve data collection and sharing. These recommendations are presently being implemented.

- Visitor statistics for the World Heritage Area were collected through a variety of programs:
  - Statistics have been collected from the large visitor zones (Cradle Mountain, Lake St. Clair, Mt Field). Bushwalker statistics are collected from logbooks and counters. Collecting statistics on fishing and bushwalking use of the Central Plateau Conservation Area and the western lakes needs improving. (Data gaps exist for the Central Plateau Conservation Area, Walls of Jerusalem, Cockle Creek and Hartz Mountain National Park.)
  - Statistics on 4WD users are collected from permits.
  - The Wilderness Walkers' Survey Series were conducted between 1991 and 1996. Site surveys were conducted in 1992/1993 at Cockle Creek, Melaleuca and Mt Field and 1994 on the Gordon River. Assessment of visitor facilities and services were conducted in the summer of 1999. This was a statewide series but included Cradle Mountain, Marakoopa and Mt. Field.
  - Walker Registration booths and logbooks have been installed for most major WHA tracks.
  - Easily accessible and less sensitive caves in the WHA have a registration system. All restricted (due to their sensitivity) access caves require permit and report.

## ROADS AND SIGHTSEEING

- The Lyell Highway, Gordon River Road and the Lake Highway were promoted as a major World Heritage Area sightseeing route. This was promoted through the park entry brochure and through the brochure *Count the ways...your guide to recreation in Tasmania's World Heritage Area* which promotes the short walks along the highway. The Gordon River road was also promoted through the SW audiotape—*A Special Place*—which was designed to accompany the drive along the Gordon River Road and tell the story of the area.
- Signs along the Lyell Highway were maintained in good condition and new interpretation was installed at Frodshams Pass.
- Several access roads to the TWWHA were upgraded:
  - The access road into Marakoopa was upgraded through stabilisation of roadside banks and construction of a new bridge.
  - The Lake Ada Road was extended.
  - A turnaround and parking area was provided in the Little Fisher Valley.
  - Road maintenance was undertaken as required to a number of roads accessing the TWWHA.

## CODES OF CONDUCT

- Codes of conduct were prepared to encourage environmentally responsible practices for a variety of recreational activities including:
  - Updating the Minimal Impact Bushwalking Code and developing the Minimal Impact Bushwalking (MIB) material. This was distributed through the Summer Ranger Program, the MIB website and the MIB notesheets.
  - In consultation with recreational vehicle organisations, a Minimal Impact Code for recreational driving was introduced. Two publications that included minimal impact driving codes were produced for recreational drivers (*Cruisin' without Bruisin'* and *Ride Around Tas*).
  - In consultation with boating and fishing groups, minimal impact fishing and boating codes developed for freshwater and saltwater fishing (*Tackling More than Trout* and *What's in your Wake?*)
  - In liaison with commercial aircraft operators and aviation clubs, voluntary flight guidelines were developed to reduce potential conflicts between aircraft use and onground users or wildlife. Fly Neighbourly Advice (1999).

- A horseriding code of conduct was developed in close liaison with riders for horse riding in the Cradle Mountain–Lake St Clair National Park and the Central Plateau Conservation Area ('Horse riding in the high country', PWS 1997)
- A hunting code of practice for the Central Plateau was developed to late draft stage, but remains unfinished.

## MONITORING OF RECREATIONAL IMPACTS

- Sensitive areas vulnerable to degradation from recreational activities were identified and mapped for the Central Plateau. These maps are used by Rangers in recommending appropriate routes for horseriding to avoid these areas.
- Monitoring and management of recreation and tourism activities within the World Heritage Area included:
  - Walking track and campsite monitoring
  - Vehicle tracks and recreational driving, including track closures and permit system
  - Gordon River tourism cruise vessels
  - Horse riding
  - Hunting
  - Large-scale (1:5,000) aerial photos were taken of the major Visitor Services Zones and Sites to the TWWHA to establish a base for long-term monitoring of the condition of these high-use areas.
  - Canoeing and rafting campsites along the Franklin River were monitored every three years.

## WALKING TRACKS AND WALKING

- A three volume *Walking Track Management Strategy for the Tasmanian Wilderness World Heritage Area* (1994) was prepared which included an inventory of the condition of the main walking tracks and routes, an assessment of use levels, trends in use, projected changes in track condition and appropriate management responses (available on the World Wide Web at <[www.parks.tas.gov.au](http://www.parks.tas.gov.au)> and follow the links to Services and Management/Track Management Team. Works were implemented to manage walking tracks in accordance with and by priority as listed in the *Walking Track Management Strategy*.
- Track management plans were prepared for Western and Eastern Arthurs, Cradle Mountain Day Walks, the Overland Track, and commenced for Mt Field.
- A statewide walking track strategy was jointly developed by the Parks and Wildlife Service with Tourism Tasmania and Forestry Tasmania. This strategy dovetailed with the TWWHA Walking Track Strategy.
- A Tracks Education officer was employed to educate authors and magazine editors etc to limit publication of descriptions of walking tracks and routes in the WHA to those areas being promoted as part of the *Walking Track Management Strategy for the Tasmanian Wilderness World Heritage Area* (1994). Some meetings with authors occurred with limited success.
- All the very high and high priority works required under the WHA Track Management Strategy were completed. The following is a sample of works undertaken on a variety of high volume walking tracks.
  - Repairs and upgrading Overland Track nearly complete, side tracks upgrading in progress.
  - A new track from Lake Salome to Dixons Kingdom in the Walls of Jerusalem was constructed.
  - Australian Conservation Trust Volunteers and Greencorp volunteers upgraded Kelly Basin track and implemented site plan, especially around Bird River Day Use Area.

- A new nature trail was constructed at Franklin River.
- A short interpreted boardwalk was developed to view 900-year-old pencil pines at Pine Lake on the Lake Highway. (This track was subsequently closed to quarantine the area of high altitude dieback.)
- Forestry Tasmania re-routed and upgraded the track at Mt Wedge as a half-day walk.
- In Southwest National Park the beginning of the Old Port Davey Track was relocated from Red Knoll Lookout to the Huon River camping area and the use of the old route is discouraged.
- In the Hartz Mountains National Park, The Hartz Peak Track, Lake Osborne, Waratah Lookout and Arve Falls tracks have been upgraded, and existing tracks to Lakes Perry and Osborne were rationalised and upgraded to provide a 'walk' standard loop.
- Rehabilitation of Marions Lookout rehabilitation commenced.
- A guide to the accessibility of sites for disabled people was produced for the TWWHA.

### VEHICLE TRACKS AND RECREATIONAL DRIVING

- In consultation with recreational vehicle organisations, a recreational driving permit system was introduced for Sawback Range, Mt McCall and Low Rocky Point tracks and appropriate signs were installed at all access points.
- In consultation with recreational vehicle organisations, a monitoring system for use and maintenance of tracks was introduced for permitted tracks in the Central Plateau Conservation Area—Lake Augusta, Ada Lagoon and Pillans Julian track. A monitoring system has been set up at Low Rocky Point.
- A number of degraded areas associated with vehicle tracks were rehabilitated:
  - Degraded areas beside Mt McCall track were rehabilitated.
  - The Raglan Range track has been closed, and rehabilitation has started and is ongoing.
  - Disused logging tracks were closed, ripped and allowed to revegetate.

### PICNICKING AND CAMPING

- An inventory of campsite conditions along major walking routes was compiled.
- A central database of remote walking/rafting and some fishing sites was established.
- Campsites have been installed and/or hardened at several locations in the Recreation and Self Reliant Recreation Zones.
- Investigations for camping sites outside the main chamber at the Walls of Jerusalem were undertaken and recommendations made for development and/or hardening of 2 camp sites: one at Wild Dog Creek and the other possibly at the Pool of Bethesda.

### BOATING (MOTORISED)

- In addition to the Code of Practice for boating (*What's in Your Wake?*) prescriptions for MIBoating code were included as part of the *Minimal Impact Boating Strategy* (1998). Associated with this was the production of a brochure (*Afloat and Aware*) which focused on MIBoating practices. These were sent to every licenced boat owner in Tasmania through MAST (Marine & Safety Tasmania).
- Boating impacts have been closely monitored on the lower Gordon. The rate of erosion has decreased with management changes. Monitoring systems are also in place on the Davey, Old, Spring and North Rivers as well as Melaleuca Creek and Inlet.
- Existing jetties and boat ramps were maintained and repaired as necessary, and all jetties have been improved to meet elevated structures standards.



- A new jetty was installed at Sarah Island.
- The jetty at Heritage Landing was modified to allow for small craft to use the site without affecting commercial operators.
- The jetty at Sir John Falls camp was replaced, then lost to a flood. (However, redeposition of sand has now built a 'beach' which overcomes the need for a jetty.)
- Claytons Jetty at Melaleuca was rebuilt in 1998.
- Other jetties are subject to an ongoing maintenance program.

## HORSE RIDING

- The impacts of horse riding on some alpine environments of the Central Plateau, and subalpine environments at Cradle Mountain were examined.
- A map of areas on the Central Plateau Conservation Area sensitive/resistant to horse riding impacts has been produced.
- A registration system for horse riding was introduced for the Central Plateau Conservation Area as a means of providing information to riders and gaining data on levels of use and areas visited. However as with all registration systems there is some level of non-compliance.
- In conjunction with horse riding groups, a code of conduct for riders was developed ('Horse riding in the high country. A code of practice for riding in Tasmanian highland areas', PWS 1997) and distributed.
- A permit system for riding applies to the areas approved for riding in the Cradle Mountain–Lake St Clair National Park (at February Plains and Lone Gum Plain).

## HUNTING

- The Game Management Unit of DPIWE annually produces a booklet titled *Game Tracks* which identifies protected duck species. This is issued with every Game licence.
- Spot light surveys of wallaby populations in the Central Plateau Conservation Area have been undertaken on an annual basis since 1975. There has been no evidence to suggest that permit conditions and policies need to be adjusted.
- The hunting zones on the Central Plateau were adjusted (as allowed for in the 1992 management plan) to better meet hunter needs after the western access to the east of the Lake Highway was made more difficult following the declaration of the Pine Lake quarantine area. (The new zones are shown in Map 4 of the 1999 management plan.)

## FISHING

- Inland fisheries within the TWWHA is managed by the Inland Fisheries Service.
- In collaboration with the Inland Fisheries Service, a draft fishery management plan was produced although not published (Sloane, RD, & French, GC, 1991, 'Trout Fishery Management Plan Western Lakes—Central Plateau Tasmanian World Heritage Area'). More recently, the Inland Fisheries Service has finalised the *Western Lakes Fisheries Management Plan 2002*.
- In consultation with fishing clubs, minimal impact fishing and boating codes were developed for freshwater and saltwater fishing in 1992; distribution is ongoing.
- Bait fishing was limited to two areas in the Central Plateau Conservation Area in the 1999 TWWHA management plan.

## CAVING

- The identification of priority caves for management planning was completed.
- An inventory of all known caves within the World Heritage Area was commenced (there are approximately 60 areas to cover). An inventory of the Ida Bay caves is complete, and preliminary inventories are available for other karst areas within the WHA, however these have not been extensively field checked.
- A draft cave classification system for Tasmania was completed.
- A management plan for Mystery Creek Cave has been completed.
- A draft management plan was prepared for Mole Creek Karst National Park (which includes the Marakooopa portion within the WHA) and a draft management plan for the Ida Bay Karst area is in preparation.
- Management prescriptions for the lower Gordon karst are in place, as part of the *Lower Gordon River Recreational Zone Plan* (1998).
- Means of regulating caving usage were investigated (e.g. gating).
- Marakooopa Cave walkways were refurbished and new lighting and new handrails installed (for visitor safety).
- Caving notesheet (*Tasmania's Cave Reserves*) was published by the PWS (1997) and promotes less easily damaged caves, information on minimal impact caving, and recommends joining a caving club for wild cave access.
- Specific notesheets have been produced for high value cave systems to guide parties with minimal environmental disturbance. Signs were erected at each restricted access cave explaining reasons for access restrictions.

## OTHER RECREATIONAL ACTIVITIES

- Preliminary investigations were made of opportunities for mountain bike use in Lake St Clair and Kelly Basin Track, although the latter site is most likely unsuitable.
- Portage structures along the Franklin River were upgraded to meet appropriate safety requirements.

## HUTS

- The cultural significance of many existing huts in the World Heritage Area was assessed, including: Derwent Bridge huts, Deadman's Bay shelter, Sir John Falls hut complex, Farrell Point shelter, New Pelion Hut, Adamsfield and Bennetto's huts, Lake Tahune Hut, Echo Point Hut, Narcissus Hut, Ranger Hut, Allison's Hut, Lake Meston Hut and Junction Lake Hut.
- Blandfordia and Scout lodges were assessed for their social values; Gordonvale and Pump House Point were surveyed, and a fabric assessment was conducted on the Raglan Range.

## TEMPORARY STANDING CAMPS

- A temporary standing camp policy to cover non-permanent camps set up by commercial operators was drafted in 1995. The policy is yet to be finalised.
- The 1999 management plan allows for additional temporary standing camps at sites available for commercial huts. It also allows the continuation of the present structures at the Forest Lag camp at Melaleuca as a pre-existing right.

## COMMERCIAL TOURISM AND CONCESSIONS

- A high level working group was established to guide Tourism Development in Natural Areas, which included the Heads of Government Agencies (including the Director of PWS) that were involved in Tourism, in partnership with peak body representatives from the tourism industry. This group helped to develop mutual understandings of

respective stakeholder viewpoints and to provide a more strategic approach to tourism development issues in the TWWHA.

- Assistance was provided to commercial tour operators to provide quality interpretation to visitors. For example:
  - A training manual and course were developed for Gordon River Tour operators.
  - An accredited Interpretation Skills course was developed in conjunction with the Tasmanian Outdoor Leadership Council.
  - A Training Resource was developed for World Heritage tour operators, TAFE students, Summer Interpretation Rangers and tertiary students.
- Licence arrangements for a number of commercial operations were developed or reviewed:
  - A licence agreement was developed for commercial adventure day tours
  - Conditions of operations for adventure tour operators were reviewed and adjusted at licence renewal in response to the monitored condition of campsites.
- Tourism Tasmania worked with the tourism industry to improve quality and levels of service and use, and assisted in raising operators' awareness of accreditation.
- Tourism 'branding' clearly identified the nature and value of the TWWHA e.g. 'Discover your state' promotional material.
- Tourism Tasmania worked in partnership with Parks and Wildlife Service to ensure that Tasmania's tourism strategy and funds were directed towards delivering appropriate tourist facilities and services which supported visitation to the TWWHA e.g. 'Tourism 21' (Tourism Tasmania & Tourism Council Tasmania, 2001).
- A variety of measures were introduced to protect the quality of visitor experience in the TWWHA including:
  - Establishment of client to guide ratios for licensed commercial operators e.g. overnight walks in the Recreation Zone to have a maximum group size of 12 including at least two guides;
  - Establishment of minimum guide qualifications and experience e.g. Franklin River rafting guides are required to hold a remote area first aid certificate or equivalent, and must have a minimum of 65 days of white water rafting experience on rivers graded 3–4 (including at least 2 rivers of grade 4 standard); and trip leaders must have acted as a guide with a licensed commercial rafting operator on no less than 3 occasions.
  - Group size limits were introduced for commercial operators, school and scout groups.

#### ADDITIONAL INITIATIVES

- Additional initiatives that were undertaken during the 1992–1999 management period that were consistent with—but not prescribed by—the 1992 management plan included:
  - A bronze whale sculpture was erected at Cockle Creek to reflect the area's whaling history.

## Other responsibilities

### COMMUNITY ENGAGEMENT

- Public awareness and involvement in planning for the TWWHA was actively encouraged through a number of public participation programs:
  - The first public participation program related to the development of the first management plan for the TWWHA. This program was reviewed to identify its strengths and weaknesses (Rando, 1992) and the findings guided the development of the public consultation program for the preparation of the current (1999) management plan.
  - A major public participation program was undertaken to involve the public in identifying issues and management options during the preparation of the current (1999) management plan for the TWWHA, and to assist in developing the revised plan. In addition, many opportunities were provided for the community to provide input as the new management plan was developed. For example, the managing agency organised meetings with all key stakeholder groups (often several meetings per group) and the World Heritage Area Consultative Committee organised public fora on the World Heritage Area and its management.
  - Public consultation programs were also undertaken during the development of all site plans for the TWWHA.
- Lists of individuals and groups interested in being consulted about management of the World Heritage Area were maintained as a sub-set of the Recreation Contacts database.
- A Community Partnerships Section was established to forge cooperative arrangements between the managing agency and community groups in the management of reserved lands.
  - District Community Consultative Committees (DCCC's) were established in all management districts to provide community input to management decisions of the managing agency's seven management districts across the state.
  - A volunteer program ('WILDCARE') was established to encourage and coordinate volunteers to participate in management of the state's reserve system.
  - A volunteer program ('Adopt-a-Track') was established to assist the maintenance of walking tracks.

### PUBLIC SAFETY

- A range of brochures and notesheets were reviewed and updated to include public safety information and advice, e.g. *Tasmania's Wilderness World Heritage Area Essential Bushwalking Guide Trip Planner*; *Welcome to the Wilderness*; *Hypothermia* and the Franklin River rafter notesheets. Education focused on topics such as avoiding hypothermia and toilet hygiene.
- A video (*Walk Safely*) was produced to promote healthy, safe and minimal impact practices by bushwalkers.
- Registration booths were constructed and a poster produced to encourage visitors to register their trip plans (especially walkers intending to visit remote areas).
- A safety review of all elevated structures within the TWWHA (and statewide) was undertaken following the collapse in New Zealand of a public viewing platform. A report was prepared which detailed the findings of engineering inspections, reports and maintenance schedules for public facilities (Sinclair Knight, 1996).
- A variety of facilities were upgraded to meet appropriate safety standards, e.g. several suspension bridges were replaced; lookouts were upgraded and several structures assessed as being unsafe (e.g. cable crossings) were closed; safety fences and gate were erected at several sites (including Devil's Gullet and Glacier (Suicide) Rock at Dove Lake; and new handrails were installed at Marakoopa Cave.

- The old entrances to Oakleigh Creek wolfram mine were blocked following an assessment that they posed a threat to public safety.
- Occupational Health and Safety training was undertaken by all field staff of the managing agency.
- Track Rangers and Summer Interpretation Rangers were given training to equip them to give talks and to educate visitors about minimal impact bushwalking and safe bushwalking practices—how to look after themselves and the environment.
- Staff responded to emergency situations, providing first aid, organising support, and where necessary assisting police with Search and Rescue Operations.
- Inspections were conducted of all elevated structures and remedial work was undertaken as necessary to meet appropriate engineering standards.
- An Australian Standard was developed for remote structures and walking tracks (Standards Australia 2001a, 2001b).
- Following a fatality or serious injury, a report of the incident was prepared and any opportunities for improving future management of such incidents recorded.

## ASSET MANAGEMENT

- A major workshop on risk management was organised for staff of the managing agency. This led to the development of risk management plans for specific sites and structures.
- Building control procedures were introduced.
- Works were undertaken to upgrade and improve the condition of a variety of structures, buildings, bridges, jetties etc throughout the TWWHA.
- Inventories of radio equipment held at each field centre were maintained, and all radio bases and links were maintained to a satisfactory level.

## MONITORING AND EVALUATION

- A framework was developed for evaluating management effectiveness for the TWWHA (Hocking, 1994b)
- A variety of monitoring projects were undertaken and several long-term programs were established. The main monitoring areas and projects are outlined below.

### TOURISM AND VISITOR IMPACTS:

- **Riverbank erosion on the lower Gordon River:** to investigate and monitor geomorphic processes (both natural and cruise vessel-related) and their response to management action. This monitoring program has been progressively refined since its inception in 1988. It is the longest running monitoring program in the TWWHA, with over 50 monitoring sites, which are measured twice a year. Two reports are produced each year detailing erosion rates. Rivers draining into Bathurst Harbour–Port Davey are also monitored.
- **Track monitoring system:** to monitor the biophysical impacts of recreation walking in the TWWHA. Trials were undertaken and monitored to determine impact of walkers on vegetation and erosion at various sites. Approximately 500 track and campsite monitoring sites were established and regularly monitored. This work is ongoing but a large data set has already been analysed which provided valuable input to the development of the World Heritage Area Walking Track Management Strategy.
- **Impacts of horse riding on the Central Plateau Conservation Area:** Trials were undertaken and monitored to determine the impact of horses on vegetation. Findings have been published and presented at public forums.
- **Impacts of recreational caving:** A study to monitor the impacts of recreational caving on wild caves within karst systems is in progress. This work is mainly being conducted at Exit Cave in association with the management plan for the Ida Bay system. Impacts of recreational caving have also been assessed at Ida Bay, Mount Anne, and Cracroft Valley.

- **Aerial photographic monitoring of Visitor Services Zones and Sites.** Baseline (or reference) sets of large-scale (1:5,000) stereo photographs were established of the major visitor entrances to the TWWHA as a means of detecting long-term subtle changes in the condition of these high-use areas. Aerial photographs have been taken of: Cradle Valley (1991), Marakooa Cave (1991), Cockle Creek–Recherche Bay (1991), Hartz Mountain (1992), Hastings Caves (1992), Melaleuca (1999), Lake St Clair (including Pump House Point) (2000) and Mt Field (2000).

#### FIRE, PLANT DISEASES, INTRODUCED PLANTS AND ANIMALS:

- **Databases and GIS maps** were established and/or maintained to monitor the causes of wildfires and the areas burnt, and to monitor the distribution of plant disease and dieback (in particular *Phytophthora* root rot disease), and introduced plant and animal species.
- **Pine Lake dieback:** to monitor the distribution of Pine Lake dieback.
- **Erosion of organic soils:** to monitor erosion of organic soils resulting from burning and other erosive forces. Researchers initially attempted to monitor the erosion of organic soils in association with management-initiated fuel reduction and habitat management burns but experienced practical difficulties with their techniques (which were not yielding meaningful results). Instead mapping is being conducted to examine the extent of degraded organic soils in the TWWHA and the impacts of fire on hydrology.

#### HYDRO-ELECTRIC POWER GENERATION OPERATIONS:

- **Lake shore erosion:** to monitor lakeshore erosion caused by fluctuating water levels in Hydro Tasmania impoundments. A study of Lake St Clair was completed in 1994 and recommendations made for rehabilitation. Prescriptions were added to the 1999 TWWHA management plan to minimise lakeshore erosion in future.

#### CONDITION OF SIGNIFICANT VALUES (INCLUDING DEGRADED VALUES):

- **Rehabilitation of the Lune River Quarry and Ida Bay karst system:** to monitor and assess the success of different rehabilitation methods in a limestone karst mine environment. Monitoring programs cover vegetation, karst and invertebrates. Due to the success of the Lune River Quarry rehabilitation program, monitoring frequency has been decreased in recent years.
- **Rehabilitation trials of sheet eroded country in the Central Plateau:** to monitor the effectiveness of different rehabilitation techniques on badly degraded areas in an alpine environment.
- **Rare and endangered species:** to monitor the distribution and abundance of rare and endangered species. Species monitored over the 1992–1999 period include orange-bellied parrot; Pedder galaxias fish; pencil pine moth; blind cave beetle; and New Zealand fur seal.
- **Stabilisation of Aboriginal midden sites in the Southwest.** An 8-year program to monitor the effectiveness of stabilisation measures undertaken at 13 Aboriginal midden and artefact scatter sites along the Southwest coast between 1993 and 1995 was established in 1996. The monitoring program was implemented over three years from 1996 to 1998 and showed that the stabilisation measures had successfully halted erosion and encouraged dune-stabilising plant growth at 9 of the 13 sites. The monitoring program was discontinued in 1999 due to lack of agreement between the Tasmanian Aboriginal Land Council and the managing agency as to whether community access trips should be integrated with the monitoring trips. A number of reports contain details of the stabilisation and monitoring methods and results.
- **Monitoring of other significant Aboriginal heritage sites:** Various short-term monitoring programs were also established at other significant Aboriginal sites between 1994 and 1998 to determine whether sites were being damaged. Monitored sites included a number of cave and shelter sites and an open quarry site at Mt



Rufus. Open artefact scatters on the Central Plateau were monitored from 1996 to 1998 to identify the causes of damage to sites and to assess the degree of damage caused by vehicles, walkers, horses and native animals.

**PUBLIC AND VISITOR OPINION:**

- **Public awareness and attitudes to the TWWHA.** A market research firm was commissioned to measure changes in the level of public awareness, knowledge and support for the TWWHA. Telephone surveys of Tasmanian residents were undertaken in 1993 and 1999.
- **Visitor surveys:** A variety of visitor surveys was undertaken to address specific needs. Some of these surveys establish reference data that will enable changes in visitor attitudes and opinions to be tracked in future, e.g. attitudes to wilderness.

**OTHER:**

- **Audits of Aboriginal and historic heritage site records systems** (THPI and TASI) were conducted to assess the extent, quality and consistency of the information base and to identify gaps and problems with the systems. (Note that the results of this program have not been able to be applied due to inadequate staffing for management of site data records for the Cultural Heritage Information Systems.)

## Appendix 4

### Summary of offences in the TWWHA, 1992–1999

#### Summary of Offences Recorded in the Tasmanian Wilderness World Heritage Area over the 1992–1999 management period

Year	Legislation	Verbal Cautions	Formal Cautions	Infringement Notices	Prosecutions	TOTAL OFFENCES
1992	National Parks and Reserve Regulations 1971 (NP&RR 1971)	Not Recorded (NR)	7	Not Recorded (NR)	3	10
1993	NP&RR 1971	NR	11	NR	6	20
	Wildlife Regulations 1971	NR	3	NR	0	
1994	<i>National Parks and Wildlife Act 1970</i>	NR	2 (plus cancellation of commercial licence for 14 days)	NR	0	7
	NP&RR 1971	NR	3	NR	2	
1995	NP&RR 1971	NR	4	NR	0	4
1996	NP&RR 1971	NR	6	NR	0	6
1997/1998	NP&RR 1971	0	2	5	0	7
1998/1999	NP&RR 1971	2	3	7	2	14
1999/2000	NP&RR 1971	3	2	21	3	29

Note: More detailed information about the nature of offences and penalties applied could not be cost-efficiently retrieved from the existing file records system.

## Appendix 5

### World heritage values of the TWWHA

The Tasmanian Wilderness was inscribed on the World Heritage List for natural World Heritage values in 1989, following extension of the original area inscribed for natural and cultural values in 1982. The World Heritage criteria current in 1989 and against which the Tasmanian Wilderness was listed remain the formal criteria for the natural World Heritage values of this property. The criteria current in 1982 remain the formal criteria for the cultural World Heritage values. These criteria have been included in the Values Table below. The World Heritage criteria are periodically revised and the criteria against which the property was listed in 1982 and 1989 are not necessarily identical with the current criteria. Examples of the World Heritage values for which the Tasmanian Wilderness was listed are included in the Values Table for each criterion. These examples are illustrative of the World Heritage values of the property, and they do not necessarily constitute a comprehensive list of these values<sup>107</sup>.

<sup>107</sup> The information presented in this appendix has been sourced from Department of the Environment and Heritage's website at: <http://www.ea.gov.au/heritage/awh/worldheritage/sites/tasmania/taswild.html>.

#### Values Table

Criteria against which the Tasmanian Wilderness was inscribed on the World Heritage List in 1989 following extension of the original area listed in 1982.	Examples of World Heritage natural values of the Tasmanian Wilderness for which the property was inscribed on the World Heritage List in 1989 following extension of the original area listed in 1982.
<b>Natural criterion (i) outstanding examples representing the major stages of the earth's evolutionary history.</b>	<p>The Tasmanian Wilderness is an outstanding example representing major stages of the earth's evolutionary history. The World Heritage values include:</p> <ul style="list-style-type: none"> <li>• geological, geomorphological and physiographic features, including:</li> <li>• rock formations including Precambrian rocks and Cambrian rocks;</li> <li>• Late Cambrian to Early Ordovician sequences of the Denison Range;</li> <li>• fossiliferous Ordovician limestone;</li> <li>• Permian–Triassic sediments and associated Jurassic dolerite intrusions;</li> <li>• Darwin Crater and Lake Edgar fault;</li> <li>• karst systems including glacio–karstic features;</li> <li>• karst geomorphology and karst hydrology;</li> <li>• glaciation, including glacial deposits of the Late Cainozoic, Permo–Carboniferous and Precambrian;</li> <li>• extraglacial areas (eg solifluction sheets, block streams, rock glaciers, landslip deposits);</li> <li>• periglaciation (e.g. Mt Rufus, Frenchman's Cap);</li> <li>• soils (e.g. peatlands); and</li> <li>• undisturbed river systems which show particular geomorphological processes;</li> <li>• relict biota which show links to ancient Gondwanan biota including:</li> <li>• endemic conifers (including the King Billy pine <i>Athrotaxis selaginoides</i>, the Huon pine <i>Lagarostrobos franklinii</i> and the genera <i>Diselma</i>, <i>Microcachrys</i>, <i>Microstrobos</i>);</li> <li>• plant species in the families Cunoniaceae, Escalloniaceae and Winteraceae;</li> <li>• the plant genera <i>Bellendenia</i>, <i>Agastachys</i> and <i>Cenarrhenes</i> in the Proteaceae;</li> <li>• other plant genera with Gondwanan links (e.g. <i>Eucryphia</i>, <i>Orites</i>, <i>Lomatia</i> and <i>Nothofagus</i>);</li> <li>• monotremes (e.g. platypus <i>Ornithorhynchus anatinus</i>, short beaked echidna <i>Tachyglossus aculeatus</i>);</li> <li>• dasyurid species;</li> <li>• parrots (e.g. orange-bellied parrot and the ground parrot);</li> <li>• indigenous families of frogs with Gondwanan origins (e.g. Tasmanian froglet <i>Ranidella tasmaniensis</i>, brown froglet <i>Ranidella signifera</i>, Tasmanian tree frog <i>Litoria burrowsi</i>, brown tree frog <i>Litoria ewingi</i>);</li> <li>• invertebrate species in the genera <i>Euperipatoides</i> and <i>Ooperipatellus</i>;</li> <li>• the Tasmanian cave spider (<i>Hickmania troglodytes</i>);</li> <li>• aquatic insect groups with close affinities to groups found in South America, New Zealand and Southern Africa (e.g. dragonflies, chironomid midges, stoneflies, mayflies and caddisflies);</li> <li>• crustaceans (e.g. <i>Anaspidacea</i>, <i>Parastacidae</i>, <i>Phreatoicidae</i>);</li> <li>• primitive taxa showing links to fauna more ancient than Gondwana (e.g. Anaspids, <i>Trogdoneta</i> (a mysmenid spider), species of alpine moths in the subfamily Archearinae, species in the genus <i>Sabatinca</i> of the primitive lepidopteran sub-order Zeugloptera).</li> </ul>

<p><b>Natural criterion (ii) outstanding examples representing significant ongoing geological processes, biological evolution and man's interaction with his natural environment.</b></p>	<p>The Tasmanian Wilderness has outstanding examples representing significant ongoing geological processes and ongoing ecological and biological processes in the evolution and development of terrestrial, fresh water and coastal ecosystems and communities, including:</p> <ul style="list-style-type: none"> <li>• sites where processes of geomorphological and hydrological evolution are continuing in an uninterrupted natural condition (including karst formation, periglacialiation which is continuing on some higher summits (e.g. on the Boomerang, Mount La Perouse, Mount Rufus, Frenchmans Cap), fluvial deposition, evolution of spectacular gorges, marine and aeolian deposition and erosion, and development of peat soils and blanket bogs);</li> <li>• ecosystems which are relatively free of introduced plant and animal species;</li> <li>• coastal plant communities free of exotic sand binding grasses which show natural processes of dune formation and erosion;</li> <li>• undisturbed catchments, lakes and streams;</li> <li>• alpine ecosystems with high levels of endemism;</li> <li>• the unusual 'cushion plants' (bolster heaths) of the alpine ecosystems;</li> <li>• ecological transitions from moorland to rainforest;</li> <li>• pristine tall eucalypt forests;</li> <li>• examples of active speciation in the genus <i>Eucalyptus</i>, including sites of: <ul style="list-style-type: none"> <li>• hybridisation and introgression;</li> <li>• clinal variation (e.g. <i>E. subcrenulata</i>);</li> <li>• habitat selection (e.g. <i>E. gunnii</i>); and</li> </ul> </li> <li>• transition zones which include genetic exchanges between <i>Eucalyptus</i> species;</li> <li>• plant groups in which speciation is active (e.g. <i>Gonocarpus</i>, <i>Ranunculus</i> and <i>Plantago</i>);</li> <li>• conifers of extreme longevity (including Huon pine, Pencil pine and King Billy pine);</li> <li>• endemic members of large Australian plant families (e.g. heaths such as <i>Richea pandanifolia</i>, <i>Richea scoparia</i>, <i>Dracophyllum minimum</i> and <i>Prionotes cerinthoides</i>);</li> <li>• endemic members of invertebrate groups;</li> <li>• invertebrate species in isolated environments, especially mountain peaks, offshore islands and caves with high levels of genetic and phenotypic variation;</li> <li>• invertebrates of unusually large size (e.g. the giant pandini moth—<i>Proditrix</i> sp, several species of Neanuridae, the brightly coloured stonefly—<i>Eusthenia spectabilis</i>);</li> <li>• invertebrate groups which show extraordinary diversity (e.g. land flatworms, large amphipods, peripatus, stag beetles, stoneflies);</li> <li>• skinks in the genus <i>Leiopisma</i> which demonstrate adaptive radiation in alpine heaths and boulder fields on mountain ranges;</li> <li>• examples of evolution in mainland mammals (e.g. sub-species of Bennett's wallaby—<i>Macropus rufogriseus</i>, swamp antechinus—<i>Antechinus minimus</i>, southern brown bandicoot—<i>Isodon obesulus</i>, common wombat—<i>Vombatus ursinus</i>, common ringtail possum—<i>Trichosurus vulpecula</i>, eastern pygmy possum—<i>Cercartetus nanus</i>, the swamp rat—<i>Rattus lutreolus</i>) in many birds (e.g. the azure kingfisher—<i>Alcedo azurea</i>) and in island faunas;</li> <li>• animal and bird species whose habitat elsewhere is under threat (e.g. the spotted-tail quoll—<i>Dasyurus maculatus</i>, swamp antechinus—<i>Antechinus minimus</i>, broad-toothed rat—<i>Mastacomys fuscus</i> and the ground parrot—<i>Pezoporus wallicus</i>); and</li> <li>• the diversity of plant and animal species.</li> </ul>
<p><b>Natural criterion (iii) contains superlative natural phenomena, formations or features, for instance outstanding examples of the most important ecosystems, areas of exceptional natural beauty or exceptional combinations of natural and cultural elements.</b></p>	<p>The landscape of the Tasmanian Wilderness has exceptional natural beauty and aesthetic importance and contains superlative natural phenomena including:</p> <ul style="list-style-type: none"> <li>• viewfields and sites of exceptional natural beauty associated with:</li> <li>• flowering heaths of the coastline;</li> <li>• the south and southwest coasts comprising steep headlands interspersed with sweeping beaches, rocky coves and secluded inlets;</li> </ul> <p>eucalypt tall open forests including <i>Eucalyptus regnans</i>, the tallest flowering plant species in the world;</p> <p>rainforests framing undisturbed rivers;</p> <p>buttongrass, heath and moorland extending over vast plains;</p> <p>wind-pruned alpine vegetation;</p> <p>sheer quartzite or dolerite capped mountains (including Cradle Mountain, Frenchmans Cap, Federation Peak and Precipitous Bluff);</p> <p>deep, glacial lakes, tarns, cirques and pools throughout the ranges;</p> <p>the relatively undisturbed nature of the property;</p> <p>the scale of the undisturbed landscapes;</p> <p>the juxtaposition of different landscapes;</p> <p>the presence of unusual natural formations (e.g. particular types of karst features) and superlative examples of glacial landforms and other types of geomorphic features; and</p> <p>rare or unusual flora and fauna.</p>

<p><b>Natural criterion (iv) contain the most important and significant habitats where threatened species of plants and animals of outstanding universal value from the point of view of science and conservation still survive.</b></p>	<p>The ecosystems of the Tasmanian Wilderness contain important and significant natural habitats where threatened species of animals and plants of outstanding universal value from the point of view of science and conservation still survive, including:</p> <ul style="list-style-type: none"> <li>• habitats important for endemic plant and animal taxa and taxa of conservation significance, including:</li> <li>• rainforest communities;</li> <li>• alpine communities;</li> <li>• moorlands (e.g. in the far southwest);</li> <li>• riparian and lacustrine communities (including meromictic lakes).</li> <li>• habitats which are relatively undisturbed and of sufficient size to enable survival of taxa of conservation significance including endemic taxa;</li> <li>• plant species of conservation significance</li> <li>• animal species of conservation significance, such as:</li> <li>• spotted-tail quoll <i>Dasyurus maculatus</i>;</li> <li>• swamp antechinus <i>Antechinus minimus</i></li> <li>• broad-toothed rat <i>Mastacomys fuscus</i></li> <li>• ground parrot <i>Pezoporus wallicus</i></li> <li>• orange-bellied parrot <i>Neophema chrysogaster</i></li> <li>• Lake Pedder galaxias <i>Galaxias pedderensis</i></li> <li>• Pedra Branca skink <i>Niveoscincus palfreymani</i>.</li> </ul>
<p><b>Cultural criterion (iii) bear a unique or at least exceptional testimony to a civilisation which has disappeared.</b></p>	<p>The Tasmanian Wilderness bears a unique and exceptional testimony to an ancient, ice age society, represented by:</p> <ul style="list-style-type: none"> <li>• Pleistocene archaeological sites that are unique, of great antiquity and exceptional in nature, demonstrating the sequence of human occupation at high southern latitudes during the last ice age.</li> </ul>
<p><b>Cultural criterion (v) an outstanding example of a traditional human settlement which is representative of a culture which has become vulnerable under the impact of irreversible change.</b></p>	<p>The Tasmanian Wilderness provides outstanding examples of a significant, traditional human settlement that has become vulnerable under the impact of irreversible socio-cultural or economic change. The World Heritage values include:</p> <ul style="list-style-type: none"> <li>• archaeological sites which provide important examples of the hunting and gathering way of life, showing how people practised this way of life over long time periods, during often extreme climatic conditions and in contexts where it came under the impact of irreversible socio-cultural and economic change.</li> </ul>
<p><b>Cultural criterion (vi) directly or tangibly associated with events or with ideas or beliefs of outstanding universal significance.</b></p>	<p>The Tasmanian Wilderness is directly associated with events of outstanding universal significance linked to the adaptation and survival of human societies to glacial climatic cycles. The World Heritage values include:</p> <ul style="list-style-type: none"> <li>• archaeological sites including Pleistocene sites, which demonstrate the adaptation and survival of human societies to glacial climatic cycles and periods of long isolation from other communities (e.g. the human societies in this region were the most southerly known peoples on earth during the last ice age).</li> </ul>

## Appendix 6 Fires in the TWWHA, 1992–1999

Cause	Date*	Site	Size (ha)	Escaped?
<b>ARSON</b>				
arson	14 Nov 1992	Cardigan Flats (Lyell Hwy)	7	N/A
arson	15 Jan 1997	Coates Creek (Lyell Hwy)	447	N/A
arson	9 Nov 1997	Cardigan Flats (Lyell Hwy)	177	N/A
arson	6 Jan 1998	Nelson Valley (Lyell Hwy)	44	N/A
<b>LIGHTNING</b>				
lightning	prob. 9 Jan 1995	The Twins	15	N/A
lightning	20 Jan 1995	Birchs Inlet	1	N/A
lightning	13 Feb 1995	Lake Petrarch	110	N/A
lightning	24 Jan 1996	Bathurst Narrows	1	N/A
lightning	24 Jan 1996	Cox Bight	214	N/A
lightning	24 Dec 1998	Deception Range	14	N/A
lightning	24 Dec 1998	Marion Creek	5	N/A
lightning	24 Dec 1998	Mt Pitt	6	N/A
lightning	24 Dec 1998	Sophia Peak	54	N/A
<b>UNKNOWN</b>				
unknown	14 Jan 1993	Harrisons Opening	354	N/A
unknown	Aug 1993	Parsons Track	43	N/A
unknown	28 Oct 1995	Bill's Creek (Lyell Hwy)	45	N/A
<b>MANAGEMENT INITIATED</b>				
Hazard Reduction Burn	14 Sept 1992	Redan Hill (Lyell Hwy)	9	No
Hazard Reduction Burn	16 Sept 1992	Scarlet Creek (Lyell Hwy)	12	No
Hazard Reduction Burn	1994	Wombat Glen (Lyell Hwy)	14	No
Environmental Management Burn (orange-bellied parrot)*	26 Sept 1995	Birchs Inlet	417	Yes: planned size= 172 ha
Hazard Reduction Burn	1996	Coates Creek (Lyell Hwy)	735	No
Hazard Reduction Burn	1996	Redan Hill (Lyell Hwy)	119	No
Hazard Reduction Burn	1997	Melaleuca Creek	13	No
Hazard Reduction Burn	1997	Melaleuca north Moth Creek	6	No
Hazard Reduction Burn	1999	Artist Hill (Lyell Hwy)	70	No
Hazard Reduction Burn	1999	Beehive Canal (Lyell Hwy)	232	No
Hazard Reduction Burn	1999	Burns Dam (Lyell Hwy)	110	No
Hazard Reduction Burn	1999	Cardigan Flats south (Lyell Hwy)	185	No
Hazard Reduction Burn	1999	Collingwood Plain (Lyell Hwy)	224	No
Hazard Reduction Burn	1999	Collingwood River (Lyell Hwy)	305	No
Hazard Reduction Burn	1999	Franklin River (Lyell Hwy)	14	No
Hazard Reduction Burn	1999	Cardigan Flats south (Lyell Highway)	185	No
Hazard Reduction Burn	1999	Pigeon House Hill (Lyell Hwy)	163	No



## Appendix 7

### Rare and endangered plant species recorded in the TWWHA

#### Endangered and Vulnerable Species

<i>Asplenium hookerianum</i>	This fern is listed as vulnerable on the State schedule. The species has not formally been recorded from the TWWHA (no voucher specimens have been lodged with the Tasmanian Herbarium); however there have been unverified records of the species from the TWWHA. Verification is required before the significance of these reports can be determined.
<i>Brachyscome rigidula</i>	This herbaceous daisy (known as the hairy cutleaf daisy) is listed as vulnerable. An erroneous record appears in the GTSpot data set for the TWWHA with a spurious grid reference from surveys of Jackey's Marsh. This species is not likely to be located within the TWWHA.
<i>Centaurium spicatum</i>	Further survey work is required to confirm whether this rare species (known commonly as Australian centaury) is located at Quamby Bluff, within the TWWHA. Its security over the management period is not known.
<i>Centrolepis paludicola</i>	This species, previously listed as vulnerable, has now had sufficient genetic research to show that it is not a species in its own right. Additional survey work has also shown it to be relatively common and it has therefore been taken off the threatened species list. It is now considered to be a subspecies of <i>Centrolepis monogyna</i> .
<i>Centrolepis pedderensis</i>	This species is listed as endangered. Survey work has managed to locate only one extant population of this species but further populations may occur in other remote tarns on the Frankland Range. Propagation of the species is being attempted. The population is remote from human activity but its restricted distribution suggests routine monitoring needs to be undertaken to ensure that the habitat remains suitable for the species' perpetuation.
<i>Diuris lanceolata</i>	This endangered species was erroneously recorded from the TWWHA.
<i>Euphrasia gibbsiae</i> subsp. <i>psilantha</i>	This endangered species was erroneously recorded from the TWWHA.
<i>Lomatia tasmanica</i>	Surveys and propagation have resulted in an increase in the known population of <i>Lomatia tasmanica</i> . Trials suggest that the species is susceptible to the water mould <i>Phytophthora cinnamomi</i> , a disease present in the moorlands adjacent to the forest that this species inhabits. The risk from disease will only become a problem if the stand is burnt. The species remains endangered.
<i>Microstrobos niphophilus</i>	The stronghold for this species is within the TWWHA and just adjacent within the Mt Field National Park. The species has at least 12 disjunct populations within sub-alpine and alpine coniferous heathlands. It is listed as vulnerable due to its extreme sensitivity to fire and its relatively restricted distribution and population size. The populations are likely to have remained stable over the management period.

<i>Pomaderris elachophylla</i>	This vulnerable species appears to have been erroneously recorded from the TWWHA; however one of two known populations of the species occurs on the border of the TWWHA and consists of only 3 plants at Butlers Gorge, where it is at risk of local extinction.
<i>Rhytidosporum inconspicuum</i>	This endangered prostrate creeper has been found in highland tussock grassland and alpine heath of the Central Plateau within the TWWHA. Further surveys are required to determine its extent. However, this habitat type is extremely vulnerable to inappropriate fire regimes and a lack of fire may be leading to a decline in this and other such species. Recent surveys for this species have failed to locate it.
<i>Sagina diemensis</i>	No recent surveys have been undertaken but it is possible this species may have become extinct. It was known from only one population and the previous survey failed to locate the species. It was previously recorded from an area subjected to trampling by cavers. It is presently listed as endangered.
<i>Veronica novae-hollandiae</i>	This vulnerable herb of tussock grasslands on stabilised calcareous dunes has been recorded once from limestone on the lower Gordon River. However the species has not been relocated within the TWWHA in recent decades and is probably now extinct from this location.

## Rare Species

<i>Acacia mucronata</i> subsp. <i>dependens</i>	This tree is known from the riparian and scrub communities and is widely distributed in Tasmania and the TWWHA. Further surveys are needed to ascertain its abundance and whether it should be downlisted from its current listing status as rare.
<i>Agrostis</i> aff. <i>australiensis</i>	This undescribed endemic grass taxon is known from wet margins of lakes, marsh and streams within the Central Plateau Protected Area. More surveys and taxonomic work are required to determine the extent and threats to this taxon.
<i>Agrostis</i> aff. <i>hiemalis</i>	This undescribed grass taxon is known from Hartz pass within the Hartz Mountain National Park. More surveys and taxonomic work are required to determine the extent and threats to this taxon.
<i>Asperula minima</i>	This small herb species has been recorded from the Upper Ouse river in the Central Plateau although Curtis described its distribution as local on the North coast. It is likely that this species has been overlooked. The distribution and habitat of this species requires further survey work.
<i>Australina pusilla</i> subsp. <i>muelleri</i>	Inaccurate grid-referencing is likely to be responsible for the recording of this small mat herb within the boundary of the Central Plateau Protected Area on the northeastern boundary of the TWWHA. Surveys for this species are required to determine if this species occurs within the TWWHA.
<i>Asperula subsimplex</i>	This small herb is recorded from the Central Plateau and is described by Curtis as widespread but occasional on river banks and in marshy places. This species has probably been overlooked. Unverified records from the Cradle Mountain National Park and Wild Rivers National Park suggest that

surveys will reveal that the species is relatively common and may warrant downlisting.

- Australopyrum velutinum* This grass species has been recorded within grassland vegetation from just outside the Cradle Mountain Lake St Clair National Park in the Middlesex plains and south of Lake Augusta within the Central Plateau Protected Area. Further survey work is required to increase the known distribution of this rare species. If no further records for the species are found then the conservation status of this species may need to be elevated to vulnerable.
- Baumea gunnii* This sedge grows on wet moors, creeks and river banks and although the stronghold of this species in Tasmania is on the central east coast, there are several records from the TWWHA and northwestern Tasmania. Further surveys are required to determine the accuracy of these observations and the extent of the species within the TWWHA.
- Brachyscome nivalis* This small herbaceous daisy, which was listed as rare but is now considered to be *Brachyscome* aff. *radicans*, is found occasionally in wet alpine and montane grassland. It has been recorded from the Upper Ouse River catchment of the Central Plateau Protected Area and the Walls of Jerusalem National Park. The species is likely to have remained secure over the management period. However future monitoring work is required to ensure the perpetuation of this species given its dependence on grassland habitat and wet herbfields. Further work on its taxonomic and conservation status is required.
- Brachyscome radicata* This herbaceous daisy (known as rooted daisy) is known from the Central Plateau within the TWWHA.
- Brachyscome sieberi* var. *gunnii* This endemic variety of herbaceous daisy (known as Sieber's daisy) has been recorded from rainforest within the Southwest National Park. The species is likely to have remained secure during the 1992–1999 period.
- Carex capillacea* This short sedge species has been recorded from only four locations—one within the Cradle Mountain Lake St. Clair National Park on the Arm River flats, and the others within the Central Plateau Protected Area and Central Highlands. This species occurs in montane marshy habitats and alpine snow patches and has a cosmopolitan distribution. It has probably remained secure within the TWWHA during the management period but further survey work is required.
- Carex cephalotes* Within Tasmania this sedge species has only been collected from one location at Mt Eliza within the Southwest National Park. It has probably been overlooked and further survey work is required to establish the extent of this species. The species is also found in Victoria and New South Wales.
- Carex hypandra* Within Tasmania this sedge species has been collected from Cradle Mountain (Cradle Mountain Lake St. Clair National Park) and Mount Eliza (Southwest National Park). Further survey work is needed to establish the extent of this species. The species is also found in New South Wales.
- Carex longibrachiata* This sedge species has been located within grasslands and is relatively widespread. The observations recorded for it in the Southwest National Park need to be further investigated. The stronghold for the species is outside the TWWHA in the central highlands and northeast. Further survey work

	needs to be undertaken to determine if this species should be downlisted.
<i>Colobanthus curtisiae</i>	This small endemic cushion herb species, listed as vulnerable nationally, has its stronghold in eastern and central Tasmania and occurs on the Central Plateau within the TWWHA.
<i>Colobanthus pulvinatus</i>	This small alpine cushion herb is presently recorded from fieldmark vegetation on the Southern Ranges in the Southwest National Park. The limited distribution of this species within Tasmania may warrant increasing the conservation status of this species from rare to vulnerable.
<i>Comesperma defoliatum</i>	This herbaceous species is known from low open moorlands and heaths. It is rare in Tasmania and is likely to have been overlooked or confused with the more common species <i>Comesperma volubile</i> . It has been located within Southwest National Park, its likely strong hold. More work is needed to determine the distribution and ecology of this species.
<i>Crassula moschata</i>	This species is rare in Tasmania and has its stronghold in the Subantarctic Islands and New Zealand. It is an itinerant species in coastal environments, not necessarily maintaining a constant presence in any one location. It has been found occasionally along the Southwest coastline on creek outlets. The relative lack of weedy species along the coastline would enable this species to colonise and it is expected that conditions for the species would have been favourable over the management period. However competition from recently invading species such as <i>Euphorbia paralias</i> may decrease opportunities for <i>Crassula moschata</i> to colonise newly exposed sandy areas.
<i>Deschampsia gracillima</i>	This small grass species is so far known only from the Southern Ranges within Australia where it has been found on Maxwell and Moonlight Ridge. The stronghold for the species is New Zealand. Further population assessments are needed before the conservation status of this species can be assessed.
<i>Deyeuxia brachyathera</i>	This rare grass has been recorded within the Lake St. Clair National Park in recent surveys but subsequent surveys have failed to relocate it. More survey work is required.
<i>Deyeuxia densa</i>	This is a grass species which is known from a range of habitats from coastal, riparian, sedgelands and heath. It has been recorded from the Southwest National Park. The diversity of situations this species is able to occupy suggests that it is relatively secure from human disturbance although it is likely to have been overlooked.
<i>Deyeuxia minor</i>	This grass species is known from vegetation with a sparse eucalypt canopy and from the margins of wet forest. It has been recorded from the Southwest National Park and is likely to have been overlooked.
<i>Epacris acuminata</i>	This small heath species (known as clasping leaf heath) grows in sub-alpine and montane heathy woodland situations at 600–1100m, as well as riparian and other wet heath habitats. The species has its stronghold in eastern and central Tasmania outside the TWWHA. However a population on the Central Plateau has been recorded within the TWWHA and this is likely to have remained secure over the management period. Further surveys are required to

	determine the extent and size of this geographically outlying population.
<i>Epilobium willisii</i>	This species has only recently been recorded in Tasmania where it was found in montane wet herbfields in the upper Ouse River catchment within the TWWHA. It also occurs in New Zealand. The species may have been overlooked elsewhere in Tasmania and further surveys are required.
<i>Eucalyptus radiata</i> ssp. <i>robertsonii</i>	Logging of populations of this tree species outside the TWWHA increases the importance of the species within the reserve. The species is quite restricted within the TWWHA and may require active management.
<i>Euchiton fordianus</i>	This small daisy herb is located in grassy depressions in alpine heathland within the Central Plateau of the TWWHA. Further surveys are required to determine the distribution of this species, which is known from a very few locations.
<i>Euchiton poliochlorus</i>	Previously known as <i>Gnaphalium supinum</i> this herb was originally known within Tasmania only from Cradle Mountain buttongrass moorlands but recent taxonomic reviews suggest the species is more widespread and consideration may be given to delisting the species.
<i>Euphrasia gibbsiae</i> subsp. <i>pulvinestris</i>	There is only one record of this herb from the TWWHA. The main stronghold for the species is within the Mt Field National Park. However this subspecies may have been overlooked as abundant habitat for the species occurs within the TWWHA.
<i>Geum talbotianum</i>	Surveys have increased the known distribution of this rare herb species over the management period. It is however restricted to rocky boulderfields in alpine and subalpine environments where it is relatively safe from human disturbance, apart from possible pressure from illegal collection.
<i>Glossostigma elatinoides</i>	This semi-aquatic herb has been recorded from stream banks in the north of the state including the Cradle Mountain–Lake St Clair National Park. No recent surveys have been undertaken for this species within the TWWHA and its current distribution is poorly known.
<i>Hovea montana</i>	This subalpine shrub is known from the subalpine heathlands of the TWWHA within the Cradle Mountain National Park and the Walls of Jerusalem National Park. The species is likely to have remained secure over the management period but is uncommon.
<i>Isoetes humilior</i>	This aquatic fern ally is endemic to Tasmania and has its stronghold within the lakes of the Central Plateau. It also occurs within the Cradle Mountain–Lake St Clair National Park. The species is likely to have remained secure over the management period.
<i>Isoetes</i> sp. <i>nova</i> ‘Maxwell River’	This species is restricted to the alkaline pans within the Southwest National Park. Populations of this species are likely to have been maintained throughout the management period as these pans did not suffer any interference or disturbance.
<i>Isolepis habra</i>	This small sedge is known from wet montane and coastal habitats. Further taxonomic work on this taxa is needed. The

	species is secure within the coastal areas of the Southwest National Park.
<i>Lachnagrostis aequata</i>	Previously known as <i>Agrostis aequata</i> , this grass species is known from the sandy beaches of southwest Tasmania as well as outside the TWWHA along the west and northwest coasts. This species has probably been overlooked in previous surveys but is likely to be uncommon, though secure, in the TWWHA.
<i>Lepidium flexicaule</i>	This is a rare herb species that occurs within the coastal habitats of the Southwest National Park. Surveys have increased the known extent of this rare species.
<i>Lepilaena marina</i>	This annual herb is known from intertidal habitats and appears to have been erroneously recorded from the Southwest National Park. Herbarium specimens for the species have been collected from the east and southeast and do not include specimens from southwest Tasmania. Further survey work is required to establish whether this species does in fact occur within the Southwest National Park as it is otherwise unreserved.
<i>Lepilaena patentifolia</i>	This rare species is an annual monocotyledonous aquatic herb less than 20cm tall. It occurs in coastal lagoons, creeks and other brackish situations in the midlands and east coast. One record has been confirmed for the south coast of the TWWHA but as the vegetation of these areas has been poorly surveyed the species may be more widely distributed than currently known.
<i>Luzula atrata</i>	Within Tasmania this wood rush species has only been found on the Cradle Mountain Plateau. It is likely to have remained secure over the management period but further survey work is required to establish the extent of this species.
<i>Milligania johnstonii</i>	This species is largely restricted to alkaline pans. As these areas did not suffer any interference or disturbance through the management period, populations of this species are likely to have been maintained.
<i>Milligania longifolia</i>	This species is known from two habitat types—the riparian limestone cliffs within the Wild Rivers National Park, and tall alpine herbfields within the Cradle Mountain–Lake St. Clair National Park. Although small, the populations are likely to be relatively secure. However there may be some risk to them from fire and trampling within the Cradle region.
<i>Monotoca submutica</i> var. <i>autumnalis</i>	This medium to tall shrub species occurs in alpine heaths of the western and central mountains and has a population stronghold within the TWWHA. Further survey and population assessments are required to determine whether this species may be a candidate for down listing. The species is likely to have remained secure over the management period.
<i>Muehlenbeckia axillaris</i>	This species occurs in alpine heath and deciduous heath in rocky areas in the Central Plateau Walls of Jerusalem National Park and elsewhere in the eastern mountains. The populations of this species within the TWWHA are likely to have remained secure over the management period.
<i>Oreoporphantha petalifera</i>	Survey work established population estimates and the distribution extent for this species, which is restricted to one ridgeline. The current population is healthy but its



limited distribution warrants monitoring to ensure the habitat remains undisturbed from human impacts and suitable for the ongoing perpetuation of the species. No propagation work has been undertaken for this species. The species is listed as rare; however given that the species is restricted to a single population, the conservation status of this species may warrant being upgraded to vulnerable.

- Orites milliganii* Surveys have extended the known distribution, number and size of populations of this species, which is relatively widespread in subalpine regions of the TWWHA. The populations of this species are likely to have remained stable over the management period and could be considered for removal from the rare and threatened species schedule.
- Persoonia gunnii* var. *oblanceolata* This shrub taxon is located within subalpine heaths and woodlands of the Southwest and Wild Rivers National Parks which are the stronghold for the taxon. This taxon is likely to have remained secure over the management period.
- Persoonia moscalii* This shrub species is restricted to the Southwest National Park where its stronghold is in alpine fieldmark and montane heath vegetation. The species is likely to have remained secure over the management period. This species has not been tested for its susceptibility to the water mould *Phytophthora cinnamomi* but must be considered at risk from the disease given the susceptibility of other members of this genus and family. The principal threat to this species is likely to be fire and, in lower altitude populations, disease.
- Persoonia muelleri* var. *angustifolia* This shrub taxon is located within subalpine heaths and woodlands of the Southwest National Park, the stronghold for the taxon. This taxon is likely to have remained secure over the management period.
- Pilularia novae-hollandiae* This species is a small aquatic fern that is easily overlooked. It is only reserved within the Cradle Mountain–Lake St. Clair National Park where it is known to occur within Lake St Clair. It is found elsewhere in lakes and rivers of the upper Derwent Valley and the midlands. Its habitation of lakes and rivers makes this species relatively secure from human disturbance.
- Pimelea flava* ssp. *flava* This small shrub species is widespread but uncommon in Tasmania. It has been recorded from within the Southwest National Park and outside the TWWHA within the Mount William National Park. However since no voucher records exist for this species from within the TWWHA, the distribution of the species must be considered dubious until further survey work can verify its distribution within the area.
- Pimelea milliganii* Surveys during the management period revealed that this species is relatively widely distributed and common in western alpine habitats within the Southwest National Park and Wild Rivers National Park. A review of the conservation status of this species is warranted.
- Planocarpa nitida* Previously known as *Cyathodes nitida*, this small shrub grows on the sand dunes of the eastern Central Plateau around Lake Augusta. It is vulnerable to erosion and monitoring of the population is warranted.
- Planocarpa sulcata* This shrub occurs in exposed alpine, coniferous and deciduous heath on shallow soils in western Tasmania. The population of this species within the TWWHA is likely to have remained secure over the management period.
- Plantago glacialis* Within Tasmania this species is confined to snow patches within alpine vegetation of the Cradle Mountain National Park. The species

	is likely to have remained secure over the management period.
<i>Poa poiiformis</i> var. <i>ramifer</i>	This coastal grass species is located on offshore islands and its major stronghold in Tasmania is likely to be the Bass Strait Islands. However it has also been recorded from the islands off the south coast within the Southwest National Park. The species is likely to have remained secure over the management period.
<i>Prasophyllum tadgellianum</i>	This species is so far known only from a few records within the TWWHA in the northern parts of the region.
<i>Pterostylis falcata</i>	One record only, from 1848, exists for this species within the area that is now the TWWHA. It is likely that the species is no longer found within the TWWHA and is now known only from the northeast and northwest of the state.
<i>Pterostylis pratensis</i>	This endemic orchid species (known as the Liawenee green hood) occurs on the Central Plateau around Liawenee and southeast. The species is listed nationally as vulnerable. The population remained stable over the management period.
<i>Ranunculus acaulis</i>	Surveys of beaches along the southwest coast during the management period located a number of large populations of this species colonising sand dunes and marsupial lawns. The species appears to have been expanding over the management period. A review of the conservation status of this species may be warranted.
<i>Ranunculus amphotrichus</i>	This small herb is widely distributed and well reserved within Tasmania. It occurs within the Wild Rivers National Park and its extent suggests that it is quite secure. This species is under consideration for delisting.
<i>Ranunculus jugosus</i>	This endemic herb is restricted in its distribution within the Reserve network to alpine wetlands within the Walls of Jerusalem National Park and the Central Plateau Protected Area. The species is likely to have remained secure over the management period.
<i>Scleranthus brockiei</i>	In Tasmania this species is restricted to the alpine communities of the Cradle Mountain–Lake St Clair National Park. The species is likely to have remained secure over the management period but further surveys are needed to determine the extent of the species.
<i>Senecio velleioides</i>	This daisy shrub (known commonly as forest groundsel) has been found in the vicinity of Strathgordon just within the TWWHA boundary. The species is widely distributed in Tasmania and probably relies on disturbance for its perpetuation. It is either very uncommon or overlooked within the TWWHA and other places.
<i>Stackhousia pulvinaris</i>	This species is known to occur in the alpine vegetation of the Walls of Jerusalem National Park and the Central Plateau Protected Area. It is likely to have remained secure during the management period.
<i>Rhodanthe anthemoides</i>	Previously known as <i>Helipterum anthemoides</i> , this rosette daisy herb is restricted to populations just on or beyond the boundaries of the TWWHA. However, further surveys may reveal populations within the reserve in the Cradle Mountain National Park and Great Western Tiers.

<i>Stellaria multiflora</i>	This herbaceous species is widely dispersed in eastern and central Tasmania and has a small population on the Central Plateau within the TWWHA.
<i>Taraxacum aristum</i>	This species has been found in an alkaline habitat on Mt Gell within the Wild Rivers National Park. It is also known from the Central Plateau and other eastern mountains. The population status of this species during the management period is not clear and further survey work is required.
<i>Trithuria submersa</i>	This species has been recorded only once within the TWWHA and a voucher specimen is held by the Tasmanian Herbarium. Further surveys are required to determine the distribution and abundance of this species within the region.
<i>Ucinia elegans</i>	This sedge species is widely distributed in Tasmania but is only reserved within the Southwest National Park where it is known from alpine vegetation. The species is likely to have remained secure over the management period.
<i>Utricularia tenella</i>	This small carnivorous herb, known as pink bladderwort, has been observed only once within the Central Plateau of the TWWHA and no substantiating voucher specimen exists in the Tasmanian Herbarium. Further surveys for this species are warranted. The only other records for the plant are on the north coast and Bass Strait islands.
<i>Veronica plebeia</i>	A number of populations of this species have been located by surveys of alkaline habitats. Population numbers within the TWWHA are likely to have remained stable over the management period.
<i>Viola cunninghamii</i>	This herb species is known to be reserved within wet forests of the Central Plateau Protected Area and outside the TWWHA within the Mount Field National Park. The stronghold of the species is on the Western Tiers. The species is likely to have remained secure within the TWWHA over the management period.
<i>Viola hederacea</i> subsp. <i>curtisiae</i>	This species has been recorded only once within the TWWHA and a voucher specimen is held by the Tasmanian Herbarium. Further surveys are required to determine the species' distribution and abundance within the region.
<i>Westringia angustifolia</i>	This endemic shrub is recorded from within forests of the Southwest National Park. The absence of voucher specimens within the Tasmanian Herbarium places some doubt on the validity of this record. Further surveys are needed to establish whether this species is reserved within the Southwest National Park. The species has a widespread distribution from sea level to 1,000m.
<i>Westringia brevifolia</i> var. <i>raleighii</i>	This endemic species is common in the coastal shrublands of the southern and southwest coasts where disturbances have been restricted to natural coastal disturbance events. The species is likely to have remained secure over the management period. Given the apparent abundance of records of the taxon within coastal vegetation, the status of this species warrants review.

#### SPECIES THAT ARE PRESENTLY LISTED AS UNRESERVED THAT MAY OCCUR WITHIN THE TWWHA

<i>Carex gunniana</i>	This species is widely distributed in Tasmania and although not formally recorded from the Southwest National Park it may occur in seepage zones along the coast. The species occurs in a wide range of habitats from wet forest through to sandy heathlands. Survey work is warranted within the TWWHA since the species is presently considered unreserved.
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## Appendix 8

### Rare and endangered animal species recorded in the TWWHA

#### Endangered species

Tasmanian tiger	This species was known to occur in the World Heritage Area but is presumed to be extinct.
Orange-bellied parrot	The distribution and breeding range of the orange-bellied parrots has further contracted but the number of birds at Melaleuca has remained stable over the management period.
Wedge-tailed eagle	The breeding population of wedge-tailed eagles in Tasmania is about 100 pairs, and many of these are outside the TWWHA. The population suffers as a result of human persecution linked to perceived stock predation, and disturbance during breeding. The population remained stable in Tasmania during the 1992–1999 period.
Swift parrot	The swift parrot is a migratory species that breeds only in Tasmania, predominantly in the southeast of the state. The TWWHA provides important foraging habitat for birds on their migration between Tasmania and the Australian mainland. Between 1987/88 and 1995/96 the number of breeding pairs of the species declined from an estimated 1,320 to 940 probably due to a loss of habitat in the breeding range.
Soft-plumaged petrel	The Australian breeding population of this species is less than 50 adults. The species breeds on Macquarie Island and probably Maatsuyker Island. Introduced predators are probably responsible for the petrel's scarcity on Macquarie Island. Surveys of Maatsuyker Island are required.
Grey goshawk	This species has a breeding population of less than 110 pairs, most of which occur in unprotected sites. Outside of the TWWHA, the species is threatened by habitat destruction and human persecution. The population has remained stable in the TWWHA over the management period.
Pedra branca skink	The Pedra Branca skink is naturally restricted to the rock islet of Pedra Branca, situated 26km off the south coast of Tasmania. Between 1985 and 1996, the population declined by more than 50% from about 564 individuals to 290. The probable cause of this decline is an increase in the breeding colony of silver gulls on Pedra Branca which has been associated with increased predation. Gull populations have increased substantially across coastal Australia due to their exploitation of tips and other human refuse. Management options for controlling the gull population are being investigated.
Pedder galaxias	Pedder galaxias is now possibly extinct in Lake Pedder. However, fish translocated to Lake Oberon have established a small breeding colony. For detailed information, see Section 5.7.3 'Endangered species: Pedder galaxias fish'.
Clarence galaxias	The Clarence galaxias is found only in central Tasmania and is restricted to the Clarence and Nive River catchments. Some new sites containing the Clarence galaxias were found

within these catchments in 1997 and 1998. However the species' distribution and abundance is severely restricted by the introduced brown trout. The current Clarence galaxias population continues to be under threat from the further spread of trout either by natural migration or illegal introductions.

Lake Pedder earthworm	This species was first discovered near the shore of the original Lake Pedder prior to its flooding for hydro power generation. Surveys conducted in 1991 and 1996 failed to locate further specimens and the species is now probably extinct.
Lake Pedder caddis-fly	This species was first discovered in 1965 near the shore of the original Lake Pedder prior to its flooding for hydro power generation. Several post-flooding surveys failed to locate this species. Surveys conducted in 1998 and 1999 found one specimen of the species in a small stream feeding into the new Lake Pedder thus confirming the continued existence of the species.
McCubbins caddis-fly	This species was first discovered in 1965 near the shore of the original Lake Pedder prior to its flooding for hydro power generation. Several post-flooding surveys failed to locate this species. Surveys conducted in 1998 and 1999 found two specimens of the species in a small stream feeding into the new Lake Pedder thus confirming the continued existence of the species.

## Vulnerable species

Shy albatross	The shy albatross breeds on only three islands, two within the TWWHA—Mewstone and Pedra Branca—and one in Bass Strait—Albatross Island. Formerly 20,000 pairs bred on Albatross Island but the population was greatly reduced in the late 18th C (killed for feathers) to about 300 pairs. The population is slowly recovering but is vulnerable to deaths associated with commercial fishing.
Australian grayling	This is a freshwater species of fish that favours estuaries and streams. Outside of the TWWHA, the species is believed to be under threat from loss of riparian vegetation and the construction of weirs that form barriers to migration.
Ptunarra brown butterfly	This species of butterfly is found in parts of central northern Tasmania, at altitudes greater than 400m above sea level and containing dense tussock grass. A small (650ha) but important part of its range is protected in the TWWHA. Outside the TWWHA, large areas of habitat have been lost to conversion to pasture and tree plantations.
(Pencil pine moth)	Surveys in 1998 found this species to be widely distributed in the central highlands of Tasmania. As a result of these findings, this species has been delisted.

## Rare species

New Zealand fur seal	In Australia, this species is only known to breed on islands within the Maatsuyker group off the south coast of Tasmania. The species is monitored annually and a small
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	increase in breeding was recorded during the 1992–1999 period.
Swamp galaxias	This species of fish was first listed in August 1999. The species occurs only in swamps and streams around Lake Pedder. The main threat to this species is the potential for Redfin Perch to be introduced into Lake Pedder either from Lake Gordon through the McPartlan Canal or through illegal introduction.
Western paragalaxias	This species of fish was first listed in August 1999. It is an endemic species which is naturally restricted to lakes in the upper reaches of Little Pine, James and Ouse Rivers in the Western Lakes on the Central Plateau. There are twelve known populations in an area of less than 20km <sup>2</sup> . Known threats are trout predation and water level fluctuations in Lake Augusta (controlled by Hydro Tasmania).
Little six-eyed spider	This species is known only from a small number of widely dispersed locations in the TWWHA. Specimens have been collected from moss in forests and from inside caves. Given the species is small and easily overlooked, and has been found in both cave and forest habitats, it is expected that the species will be found in further locations.
Ida Bay Cave harvestman	This species of spider is naturally restricted to the Ida Bay karst system. The population has remained largely stable over the management period. Closure and rehabilitation of the Lune River limestone quarry has probably improved the species' numbers within parts of its range. Population monitoring commenced in August 1998.
Mole Creek Cave harvestman	This species of spider was first recorded in the TWWHA in 1999 during cave fauna surveys in the Mole Creek Karst National Park. The species appears to be naturally restricted to the Mole Creek karst system.
Mole Creek Cave pseudoscorpion	This species was first recorded in the TWWHA in 1999 during cave fauna surveys in the Mole Creek Karst National Park. The species appears to be naturally restricted to the Mole Creek karst system.
Hickmans pygmy mountain shrimp	This species is naturally restricted to a small area of buttongrass moorlands at McPartlan Pass in southwest Tasmania. The population is being monitored to assess the impacts of fuel reduction burns on this and other species.
Ida Bay Cave beetle	This species is naturally restricted to the Ida Bay karst system. The population has remained largely stable over the management period. Closure and rehabilitation of the Lune River limestone quarry has probably improved the species' numbers within parts of its range. Population monitoring commenced in August 1998.
Blind cave beetle	The conservation status of this species was changed from Vulnerable to Rare following surveys in 1997/98 which extended the known distribution of this species within the Ida Bay karst system. The species is naturally restricted to this karst area.
Mole Creek Cave beetle	This species was first recorded in the TWWHA in 1999 during cave fauna surveys in the Mole Creek Karst National Park. This resulted in the species' conservation status being changed from Vulnerable to Rare. The species is naturally restricted to the Mole Creek karst system.



Broad-striped ghost moth	This species is known from only a few widely dispersed locations within Tasmania. Specimens have been collected from markedly different habitats and it is possible the species is more widespread than is currently known.
Spotted microcaddis-fly	This species is known from only two locations in Tasmania—Wedge River in southwest Tasmania, and Sucklinks Creek on the Tasman Peninsula. Surveys conducted in 1998 and 1999 in western Tasmania failed to locate further specimens.
Miena microcaddis-fly	This species is known from only two locations in Tasmania—Ouse River near Great Lake, and a small creek on Scotts Peak Road. Surveys conducted in 1998 and 1999 in western Tasmania failed to locate further specimens.
Lyell's caddis-fly	This species was first recorded in the TWWHA in 1998 as part of survey for threatened caddis-flies in the TWWHA. Specimens were found near Nelson Falls on the Lyell Highway. The species is also known from Hellyer Gorge, Little Florentine River and an unspecified site on the King River.

