

Information Sheet on Ramsar Wetlands

Categories approved by Recommendation 4.7 of the Conference of the Contracting Parties.

1. Date this sheet was completed/updated:

May 1999

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Designation date

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Site Reference Number

2. Country:

Australia

3. Name of wetland:

Barmah Forest, Victoria

4. Geographical coordinates:

Latitude: (approx) 35°50' to 36°01'S ; Longitude: (approx) 144°56' to 145°20'E

5. Altitude:

Approx 90 metres

6. Area:

28,515 hectares

Note: This is a revised area figure based on GIS Mapping (1995) and does not represent any change to the Ramsar Site boundary.

7. Overview:

The Barmah Forest consists of the section of the Murray River floodplain within Victoria (i.e. south of the main river channel) between the downstream end of the Ulupna Island and Barmah Township. The area includes the Barmah State Park, which was proclaimed in 1987, and the Barmah State Forest. It is an area of River Red Gum *Eucalyptus camaldulensis* forest, subject to periodic inundation. The forest features a variety of permanent and temporary wetlands, including lakes, swamps, lagoons and flooded forest. These wetlands provide habitat for a large number of bird species.

8. Wetland Type:

marine-coastal: A B C D E F G H I J K
inland: L M (N) (O) P Q R Sp Ss Tp (Ts)
U Va Vt W (Xf) Xp Y Zg Zk
man-made: 1 2 3 4 5 6 7 8 9

9. Ramsar Criteria:

(1a) 1b 1c 1d | 2a (2b) 2c 2d | (3a) (3b) (3c) | 4a 4b

Please specify the most significant criterion applicable to the site:

10. Map of site included? Please tick *yes* -or- *no*

11. Name and address of the compiler of this form:

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12. Justification of the criteria selected under point 9, on previous page.

1(a) The wetland is a particularly good representative example of a natural or near-natural wetland characteristic of the appropriate biogeographic region.

The Barmah-Millewa forest is a good example of, and the largest, River Red Gum (*Eucalyptus camaldulensis*) forest in the state (CFL 1990).

2(b) A wetland is of special value maintaining the generic and ecological diversity of a region because of the quality and peculiarities of its flora and fauna.

Barmah is of special value for maintaining the genetic and ecological diversity of the region because of its size, variety of communities and its high productivity. Barmah Forest also has the most extensive areas of Moira grasslands in Victoria (CFL 1990).

3(a) Regularly supports 20,000 waterfowl

After flood periods, Barmah Forest is one of Victoria's largest waterfowl breeding areas, supporting ducks (particularly Black Duck and Maned Duck), Great Cormorants, Little Black Cormorants, Little Pied Cormorants, White-Faced Herons, Pacific Herons and Rufous Night Herons, Yellow-billed Spoonbills, crakes and rails (ANCA 1996).

3(b) Regularly supports substantial numbers of waterfowl from particular groups

The forest is an important breeding area for ibis in some years, up to 100,000 nested in the Barmah Area during the 1973-75 flood.

3(c) Regularly supports 1% on the individuals in a population of one species or subspecies

During 1979-80, 1000 Sacred Ibis (3.0% of the State population) and 1700 Straw-necked Ibis (2.2% of the State population) nested in Barmah Forest. Higher numbers have occurred in some years (i.e. an estimated 100,000 ibis nested in the Barmah area during the 1973-75 flood).

13. General location:

Murray River, Victoria, Australia.

14. Physical features:

The Forest, particularly the western section, contains all the characteristic geomorphological elements of the Riverine Plains including the prior streams, lakes, lunettes, ancestral rivers, source-bordering dunes, and deltaic features. Erosional and depositional fluvial, lacustrine and aeolian processes are evident. Many ancestral geomorphic features are relatively well preserved.

The soils of the forest consist of a mottled clay subsoil and a bleached hard-setting topsoil. The predominant light grey clays often contain patches of reddish-yellow ferric oxide, indicative of regular waterlogging. In places the clay layers overly sand drifts, which can also form a sandy loam on higher ridges within the forest.

Natural waterways in the forest are all anabranches of the Murray River. A section of the river known as the Barmah Choke has a relatively low capacity, so water flowing down this channel spills over, via a series of effluent creeks into the forest and wetlands. Under natural conditions Barmah Forest was extensively flooded in winter/spring of most years. It has been estimated that 70% of the forest was flooded for an average of 2.9 months in 78% of years. Since regulation of Murray River flows, this level of flooding is only experienced for an average of 1.3 months in 37% of years.

The majority of Barmah Forest functions as a single floodplain wetland system dependent on regular river flooding. Component wetlands vary considerably in their seasonality, characteristics and size. Wetlands range from permanent lakes, billabongs and ponding effluents; through shallow basins with prolonged

seasonal flooding which support rushland (*Juncus ingens*) or grassland (Moira Grass - *Pseudoraphis spinescens*) communities; to a gradational series of River Red Gum forest/woodland communities with wetland understories determined largely by flooding frequency and duration. Box woodland communities are above the normal high flood level.

15. Hydrological values:

Barmah Forest forms a natural flood retardation basin with an estimated holding capacity of 32100 ML.

16. Ecological features:

Adjoining the Barmah Forest is the Millewa group of forests in New South Wales, and together they form the largest River Red Gum (*Eucalyptus camaldulensis*) forest in Australia. Seasonal inundation of the Red Gum forest by the River Murray is an ecological requirement for regeneration of this forest and maintenance of its biota. Considerable modification of natural flooding cycles has occurred during the past five decades, influencing the health of this wetland. Barmah Forest features Red Gum, Grey Box (*Eucalyptus microcarpa*), Yellow Box (*Eucalyptus melliodora*) and Black Box (*E. largiflorens*) woodlands, grasslands and various wetland vegetation.

The forest is an important breeding area for ibis in some years. During 1979-80, 1000 Sacred Ibis (3.0% of the State population) and 1700 Straw-necked Ibis (2.2% of the State population) nested here. Higher proportions are likely in some years (i.e. an estimated 100,000 ibis nested in the Barmah area during the 1973-75 flood). Other colonially nesting species (e.g. cormorants, egrets, spoonbills also nest in years of flood.

17. Noteworthy flora:

556 species of vascular plants have been recorded in Barmah Forest. Of these, 354 are indigenous and 202 are exotic. Around one third of these species are found only within Box woodland areas.

Threatened Species

| | |
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| <i>Acacia osswaldii</i> (Umbrella Wattle) | depleted |
| <i>Allocasuarina luehmannii</i> (Buloke) | depleted |
| <i>Amphibromus fluitans</i> (River Swamo Wallby-grass) | vulnerable |
| <i>Amyema linophyllum</i> (Buloke Mistletoe) | vulnerable |
| <i>Austrostipa setacea</i> (Corkscrew Spear-grass) | rare |
| <i>Brachyscome chrysoglossa</i> (Yellow-tongue Daisy) | vulnerable |
| <i>Brachyscome muelleroides</i> (Mueller Daisy) | endangered |
| <i>Brachyscome readeri</i> (Reader's Daisy) | rare |
| <i>Cardamine tenuifolia</i> (Slender Bitter-cres) | insufficiently known |
| <i>Cullen parvum</i> (Small Scurf-pea) | endangered |
| <i>Cymbonotus lawsonianus</i> (Bear's Ears) | rare |
| <i>Cypres eragrostis</i> (Downs Flat-sedge) | vulnerable |
| <i>Cyperus flaccidus</i> (Flaccid Flat-sedge) | vulnerable |
| <i>Danthonia procera</i> (Tall Wallaby-grass) | insufficiently known |
| <i>Desmodium varians</i> (Slender Tick-trefoil) | rare |
| <i>Digitaria ammophila</i> (Silky Umbrella Grass) | vulnerable |
| <i>Eleocharis minuta</i> (Variable Spike-sedge) | endangered |
| <i>Eragrostis tenellula</i> (Delicate Love-grass) | rare |
| <i>Fimbristylis velata</i> (Veiled Fringe-sedge) | rare |
| <i>Gratiola pumilo</i> (Dwarf Brooklime) | insufficiently known |
| <i>Haloragis glauca forma glauva</i> (Bluish Raspwort) | vulnerable |
| <i>Helipterum strictum</i> (Upright Sunray) | endangered |
| <i>Hypsela tridens</i> (Hypsela) | vulnerable |
| <i>Leptorhynchus panaetioides</i> (Woolly Buttons) | rare |
| <i>Lipocarpha microcephala</i> (Button Rush) | vulnerable |
| <i>Lotus cruentus</i> (Red Bird's-foot Trefoil) | depleted |
| <i>Maireana microphylla</i> (Small-leaf Bluebush) | vulnerable |
| <i>Menkea crassa</i> (Fairy Spectables) | endangered |
| <i>Minuria integerrima</i> (Smooth Minuria) | rare |
| <i>Myoporum acuminatum</i> (Waterbush) | rare |

| | |
|--|---|
| <i>Psoralea parva</i> (Small Psoralea) | endangered in Australia, endangered in Victoria |
| <i>Rhodenthe stricta</i> (Slender Sunray) | endangered |
| <i>Swainsona microcalyx</i> (Violet Swainson-pea) | Poorly known in Australia, vulnerable in Victoria |
| <i>Templetonia stenophylla</i> (Leafy Templetonia) | depleted |

18. Noteworthy fauna:

31 species have been recorded, including 7 exotic species and 12 bat species. At least 5 additional species were formerly present.

Threatened Species

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|--|---------------|
| Squirrel Glider (<i>Petaurus norfolcensis</i>) | rare |
| Tuan (<i>Phascogale tapoatafa</i>) | rare |
| Large-footed Myotis (<i>Myotis adversus</i>) | indeterminate |

REPTILES

16 species have been recorded. An additional 2 species are possible.

Threatened Species

| | |
|--|------------|
| Hooded Scaly-foot (<i>Pygopus nigriceps</i>) | rare |
| Curl Snake (<i>Suta suta</i>) | rare |
| Bandy Bandy (<i>Vermicella annulata</i>) | vulnerable |
| Carpet Python (<i>Morelia spilota variegata</i>) | vulnerable |

AMPHIBIANS

8 species have been recorded.

Threatened Species

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|--|----------------------|
| Long-thumbed Frog (<i>Limnodynastes fletcheri</i>) | insufficiently known |
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FISH

21 species are likely to occur in Barmah Forest, including 6 exotic species.

Threatened Species

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|--|---------------|
| Blue-nosed Cod (<i>Maccullochella macquariensis</i>) | endangered |
| Murray Cod (<i>Maccullochella peeli</i>) | vulnerable |
| Silver Perch (<i>Bidyanis bidyanis</i>) | vulnerable |
| Macquarie Perch (<i>Macquaria australasica</i>) | vulnerable |
| Golden Perch (<i>Macquaria ambigua</i>) | rare |
| Blackfish (<i>Gadopsis marmoratus</i>) | indeterminate |
| Freshwater Hardyhead (<i>Craterocephalus stercusmuscarum</i>) | indeterminate |
| Flat-headed Galaxias (<i>Galaxias rostratus</i>) | indeterminate |
| Bony Bream (<i>Nematolosa erebi</i>) | rare |
| Crimson-spotted Rainbow Fish (<i>Melanotaenia fluviatilis</i>) | rare |
| Freshwater Catfish (<i>Tandanus tandanus</i>) | vulnerable |

19. Social and cultural values:

A large number (hundreds) of aboriginal sites within Barmah have only been partially surveyed and registered. These sites include burial grounds, mounds, middens, and scarred trees. Barmah Forest was one of the more densely populated areas of Australia prior to European settlement. The descendants of the local tribes maintained close links with the Barmah Forest through the nearby Cummeragunja reserve in N.S.W. and through intermittent settlement in the Forest. The present day descendants refer to themselves as the Yorta Yorta, and have a close involvement with planning, management and interpretation at Barmah.

Barmah has a rich and colourful history of European settlement although few relics or artefacts remain. Place names dating from early grazing and logging days provide the most accessible link. Remaining relics of the European heritage include:

- an old sawmill boiler

- old wooden fences
 - canal cuttings
 - stumps with springboard holes
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20. Land tenure/ownership:

In 1987, 7900 hectares of the Barmah Forest were proclaimed as Barmah State Park. There are also two Reference Areas covering 280 hectares. The remaining area is classified as State Forest.

21. Current land use:

The Land Conservation Council (1985) defined the major functions of each land-use category as follows:

State Park:

- to provide opportunities for recreation and education associated with the enjoyment and understanding of natural environments;
- to conserve and protect natural ecosystems; and
- to act as part of the river regulation and flood mitigation system of the Murray River.

Reference Areas:

- to maintain natural ecosystems as a reference to which those concerned with studying land for particular comparative purposes may be permitted to refer, especially when attempting to solve problems arising from the use of land; and
- to prohibit activities (such as grazing, exploration for minerals and gold, mining, logging, and beekeeping) that conflict with the purposes of a reference area).

State Forest:

- to produce hardwood timber;
 - to conserve native plants and animals, and provide opportunities for the development of wildlife conservation techniques;
 - to provide for open-space recreation and education;
 - to provide for flood mitigation;
 - to produce honey, forage, sand and other forest produce such as charcoal; and
- to protect values in identified nature conservation and historic sites by implementation of management prescriptions.
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22. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land use and development projects:

Long term changes in ecological character in Barmah Forest are primarily attributed to changed water regimes, timber harvesting and cattle grazing. Further ecological change has not generally been significant since listing in 1982.

The forest has evolved on land which, under natural conditions, is flooded in the spring months of most years but are rarely flooded in the summer months. Since construction of upstream water storages such as Lake Hume in 1934 and Lake Dartmouth in 1980, spring flooding has decreased and summer flooding increased. Thus the amount and timing of water flowing into the forest has been changed.

Factors affecting the ecological character of selected areas within the site:

- altered hydrological conditions within wetlands;
 - rising saline groundwater levels;
 - drainage water inflow;
 - stock grazing; and
- timber harvesting.
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23. Conservation measures taken:

Reservation of part of the forest as a State Park and of some areas as Reference Areas provide for the protection of natural values;

The Barmah State Park and Barmah State Forest Management Plan (1992) outlines strategies to manage the Forest and protect environmental values.

The Interim Water Management Strategy for the Barmah Forest 1993 formulated hydrological management options for Barmah Forest.

Action Statements under the Flora and Fauna Guarantee Act 1988 have been produced for the following fauna species that occur in the Ramsar site. They outline conservation measures for the species.

- Small Psoralea (1991)
- Superb Parrot (1992)
- White-bellied Sea-eagle (1994)
- Grey-crowned Babbler (1995)

Regent Honeyeater (1994)

24. Conservation measures proposed but not yet implemented:

The proposed Mid Murray Forest Management Plan is close to finalisation. The plan includes strategies for ecologically sustainable management of timber production, grazing, recreation and other uses of the part of the site that is State Forest.

In 1993, an annual 100 GL environmental water allocation was made for Barmah Forest and the adjoining Millewa Forest in New South Wales. An environmental water entitlement is close to finalisation with an additional 50 GL annual entitlement sought for Barmah/Millewa and negotiations proceeding with New South Wales to allow the allocation to be accumulated for more than one year, allowing more flexibility in managing the watering regime..

A business plan for water management in the Barmah Millewa Forest is due to be finalised by the end of 1998. The plan will outline strategies for management of the environmental water entitlement.

In an integrated approach to planning at Ramsar sites, management strategies are being prepared for all Ramsar sites in Victoria, including Barmah Forest, to provide general strategic direction and site specific strategies. The strategies will be completed by June 1999.

25. Current scientific research and facilities:

A number of studies have been, or are being, undertaken, particularly in the fields of forest ecology, floodplain ecology and hydrology.

Barmah probably provides one of the best examples in Australia for studies within an extensive River Red Gum floodplain forest system.

Investigations of Superb Parrot numbers and breeding areas.

26. Current conservation education:

The Dharnya Centre within Barmah Forest includes a visitor centre with an information display on aspects of fauna, flora, hydrology and heritage. A number of interpretative leaflets and other publications are available.

The Dharnya Centre has bunkhouse accommodation for up to 56 people and a kitchen/dining area. These facilities are used by university, school and other groups. A part-time teacher is available to assist with education and interpretation. Aboriginal rangers are available to assist with interpretation of natural history and aboriginal culture.

27. Current recreation and tourism:

An estimated 100,000 visitor days were spent in Barmah Forest during 1988. Visitation is highly seasonal, concentrated during the warmer months and particularly over Christmas and Easter. Access during winter and spring can be difficult due to flooding.

Recreational activities focus on the Murray River frontage, with some spread across the whole Forest. Recreational opportunities from semi-remote to semi-developed are available. Barmah provides the best semi-remote opportunities within an extensive agricultural region. In the Barmah State Park and Barmah State Forest Management Plan (1992), Dharnya/The Gap, The Gulf, and Morgan's Beach have been zoned for intensive recreation.

Recreational activities engaged in within Barmah include: pleasure driving, 4WD driving, trail bike riding, cycling, horse riding, bushwalking, orienteering, picnicking, camping, canoeing, boating, fishing, duck shooting hunting of feral animals, and nature study.

28. Jurisdiction:

Government of Victoria.

29. Management authority:

Managed under the Department of Natural Resources and Environment Parks Program by Parks Victoria - 8,251 Ha (28%)

Natural Resources and Environment - 21,264 Ha (72%)

30. Bibliographical references:

Department of Conservation, Forests and Lands. (1990). Proposed Barmah Management Plan - Barmah State Park and Barmah State Forest. Benalla Region, National Parks and Wildlife Division and Lands and Forest Division, Department of Conservation, Forests and Lands, Victoria.

Webster, R. (1988). The Superb Parrot: a survey of the breeding distribution and habitat requirements. ANPWS, Canberra.
