

# **THE RAMSAR CONVENTION ON WETLANDS – WHERE DOES IT FIT IN MULTIPLE-USE FOREST MANAGEMENT?**

- OPPORTUNITIES FOR THE RIVERAIN RED GUM FORESTS OF THE CENTRAL MURRAY \*

Water Wood & Wildlife: Opportunities for the riverain red gum forests of the central Murray.

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Living Working River - Living Working Forest

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## **SUMMARY**

The Convention on Wetlands signed in Ramsar, Iran, in 1971, is an intergovernmental treaty which provides the framework for national action and international co-operation for the conservation and wise use (sustainable use) of wetlands and their resources.

The original emphasis upon the conservation and wise use of wetlands was primarily as habitat for waterbirds.

**Over the years the Convention has broadened its scope to now cover all aspects of wetland conservation and wise use, recognising wetlands as ecosystems that are extremely important for biodiversity, conservation AND FOR THE WELL BEING OF HUMAN COMMUNITIES.**

*“Wise use”, first outlined in Article 3.1 of the [RAMSAR] convention (1971) and defined in 1987 as the ‘sustainable utilization of wetland resources in such a way as to benefit the human community while maintaining their potential to meet the needs and aspirations of future generations’ ...conservation ... is still vitally important to the future of our planet. In 1990 and 1993 the Contracting Parties articulated “guidelines” and “additional guidance” for the implementation of the wise use concept, but these are fairly general, and have evolved to the present time.*

## **Ramsar handbooks for the wise use of wetlands, 3rd edition.**

*Handbook 1 [see Appendix 1] provides the over-arching guidance on the use of the whole set of Ramsar Wise Use Handbooks.*

*The principles of “wise use” and the maintenance of “ecological character” of wetlands lie at the very heart of the Ramsar Convention.*

*But what precisely is meant by the terms “wise use” and “ecological character”? A definition of “wise use” was first adopted by Contracting Parties at COP3 in 1987. Subsequently, the Convention’s Scientific & Technical Review Panel (STRP) developed definitions of “ecological character” and “change in ecological character” which were adopted by COP7 in 1999.*

*Since the adoption of the “wise use” definition, the language of environmental conservation has evolved and changed, with new terminologies such as in the 1987 Brundtland Commission report on sustainable development, the 1992 Convention on Biological Diversity’s (CBD) use of the terms “ecosystem approach” and “sustainable use”, and most recently the Millennium Ecosystem Assessment’s (MA) definitions and descriptions of the characteristics of ecosystems and of “ecosystem services”. In order to ensure that the Ramsar definitions are up-to-date and in line with such current language, in 2002 Parties requested the STRP to review the definitions and propose updated definitions as necessary. This Handbook provides these updated definitions, as adopted by COP9 in 2005 as Resolution IX.1 Annex A.*

*Importantly, in undertaking this work the STRP recognized that the Convention lacked an overall framework for its implementation of “wise use”. The conceptual framework for ecosystems and human well-being developed by the MA proved to be highly relevant in this context, particularly as it speaks directly to the Ramsar Convention’s recognition of the interdependence of people and their environment. This conceptual framework links indirect and direct drivers of change with biodiversity, ecosystems and their services **AND THEN WITH HUMAN WELL-BEING***

**AND POVERTY REDUCTION.** Under this framework, Ramsar's "wise use" equates with the maintenance of ecosystems and the continued delivery of ecosystem services to maintain human well-being.

On the basis of the above criteria, sustainable multiple-use forest management is entirely compatible under the Ramsar Convention on Wetlands. This is not new for these forests were progressively accepted for listing from 1982 to 2003. The Convention makes it quite clear that there are indirect and direct drivers of change with biodiversity, ecosystems and their services to maintain human well being.

Provision of human well being clearly goes far beyond non-productive use as evidenced by many Ramsar listings in both developing and developed countries. The fact that there are deliberate recommendations by VEAC, notwithstanding that these are Draft Proposals, to significantly reduce human well being and deliberately and premeditatedly foreshadow poverty in sections of the community is in direct conflict with Ramsar principles. Accordingly, the investigation on this issue alone should be terminated. Council has demonstrated that it is not up to the task to make balanced recommendations.

## **ABOUT THE FORESTS.**

Barmah Forest (29,000 ha) and Gunbower Forest (19,931 ha) [among others in Australia] were listed as Ramsar wetlands on 15 December 1982.

NSW Central Murray river red gum State forests received Ramsar listing on 20 May 2003.

All 3 forests are icon sites of the Living Murray Initiative and have been under sustainable multiple use management since the early 1900s. Their multiple use management is a major contributor to the social, economic and environmental well being of the Murray Darling Basin.

The most threatening process to the continuing sustainability of these Ramsar sites is the altered water regimes. Pest animals, resource utilisation, recreation and fire are regarded as moderate risks. Of these Victoria (and NSW) recognises that timber production meets the Ramsar definition of sustainable utilisation when conducted in accordance with the Code of Forest Practices for Timber Production, Victoria (and relevant guidelines applicable to NSW).

The need for assigning \$ values on wetland attributes to society for valid comparison with other goods and services is discussed. Valuing ecosystem services is seen by a growing number of economists and scientists as a promising field.

### **Footnote:**

There are a number of flora and fauna species and some processes listed as threatened under the Victorian Flora and Fauna Guarantee Act (1988). Some species are also considered nationally threatened under the Commonwealth's Environment Protection and Biodiversity Convention Act (1999). Note that current operating rules applying to the Murray river storage and flow management and use of environmental water allocation (Barmah-Millewa Forest) are deliberately designed to exclude water from 50% plus of the forest, other than in now atypical large flood years. Such action is arguably a threatening process but one that land and water management agencies *conveniently* do not recognise.

On the one hand some "scientists" and "managers" use the Flora and Fauna Guarantee Act (1988) to put serious constraints on timber production without taking action on the most significant "threatening process" to the whole Ramsar-listed wetland – altered water regimes. These people frequently mis-use THE PRECAUTIONARY PRINCIPLE to underpin their cause. A separate FACTS SHEET has been developed on the Precautionary Principle.

On the other hand, community-based groups have so far been unsuccessful in getting Commonwealth and State Authorities to take the necessary steps to resolve issues concerning effective flooding to meet Ramsar's well documented functions and values of forests and wetlands.

## **QUESTIONS AND ANSWERS**

### **1. Q. WHAT IS THE RAMSAR CONVENTION?**

A. The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use (sustainable use) of wetlands and their resources. There are presently 152 Contracting Parties to the Convention, with 1606 wetland sites, totaling 140 million hectares, designated for inclusion in the Ramsar List of Wetlands of International Importance. Australia has 64 Ramsar sites totalling 7.4m hectares [Note: Site numbers as at June 2006].

The official name of the treaty, ***The Convention on Wetlands of International Importance especially as Waterfowl Habitat***, reflects the original emphasis upon the conservation and wise use of wetlands primarily as habitat for waterbirds. Over the years, however, the Convention has broadened its scope to cover **all aspects** of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation and for the well-being of human communities. For this reason, the increasingly common use of the short form of the treaty's title, the "Convention on Wetlands", is entirely appropriate. (Changing the name of the treaty

requires amending the treaty itself, a cumbersome process that for the time being the Contracting Parties are not willing to undertake.

## 2. Q. WHAT IS THE PURPOSE (MISSION) OF LISTING A WETLAND UNDER THE RAMSAR CONVENTION?

A. "The Convention's mission is the conservation and wise use of all wetlands through local, regional and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world" (Ramsar COP8, 2002).

## 3. Q. WHAT ARE THE KEY CRITERIA FOR IDENTIFYING WETLANDS OF INTERNATIONAL IMPORTANCE?

A. **Criteria for Identifying Wetlands of International Importance**  
Adopted by the 7th (1999) and 9th (2005) Meetings of the Conference of the Contracting Parties, superseding earlier Criteria adopted by the 4th and 6th Meetings of the COP (1990 and 1996), to guide implementation of Article 2.1 on designation of Ramsar sites.

### **Group A of the Criteria.** Sites containing representative, rare or unique wetland types

**Criterion 1:** A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

### **Group B of the Criteria.** Sites of international importance for conserving biological diversity Criteria based on species and ecological communities

**Criterion 2:** A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

**Criterion 3:** A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.

**Criterion 4:** A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

### **Specific criteria based on waterbirds**

**Criterion 5:** A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.

**Criterion 6:** A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

### **Specific criteria based on fish**

**Criterion 7:** A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.

**Criterion 8:** A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

### **Specific criteria based on other taxa.**

**Criterion 9:** A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent non-avian animal species.

## 4. Q. HOW ARE WETLANDS DEFINED AND WHAT ARE THE MAIN TYPES OF WETLANDS?

A. Wetlands are areas where water is the primary factor controlling the environment and the associated plant and animal life. They occur where the water table is at or near the surface of the land, or where the land is covered by shallow water.

The Ramsar Convention takes a broad approach in determining the wetlands which come under its aegis. Under the text of the Convention (Article 1.1), wetlands are defined as:

***"areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres".***

In addition, for the purpose of protecting coherent sites, Article 2.1 provides that wetlands to be included in the Ramsar List of internationally important wetlands:

***"may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands".***

Five major wetland types are generally recognized:

- **marine** (coastal wetlands including coastal lagoons, rocky shores, and coral reefs);
- **estuarine** (including deltas, tidal marshes, and mangrove swamps);
- **lacustrine** (wetlands associated with lakes);
- **riverine** (wetlands along rivers and streams); and
- **palustrine** (meaning "marshy" - marshes, swamps and bogs).

In addition, there are **human-made wetlands** such as fish and shrimp ponds, farm ponds, irrigated agricultural land, salt pans, reservoirs, gravel pits, sewage farms and canals. The Ramsar Convention has adopted a Ramsar Classification of Wetland Type which includes 42 types, grouped into three categories: Marine and Coastal Wetlands, Inland Wetlands, and Human-made Wetlands.

## **5. Q. WHAT ARE THE RAMSAR-LISTED WETLANDS IN THE VEAC STUDY AREA AND WHEN WERE THEY LISTED?**

A. The Barmah State Forest of 29,000ha was listed on 15<sup>th</sup> December 1982. Acting on the recommendations of the Land Conservation Council, the Victorian Government proclaimed 7,900ha of the Barmah Forest as Barmah State Park in 1987. Two reference areas totalling 280ha were also declared.

Timber production was permitted in the State Park under joint guidelines with the National Parks Service and DNRE until withdrawn by the government in June 2003.

The Gunbower State Forest of 19,931ha was also listed on 15<sup>th</sup> December 1982. (Kerang Wetlands [9,419ha], Hattah-Kulkyne Lakes [955ha] and Lake Albacutya [5,731ha] were also listed on 15<sup>th</sup> December 1982.)

It is also notable that the NSW Central Murray (River Red Gum) State Forests [84,028ha] received Ramsar listing on 20<sup>th</sup> May 2003.

It is significant that 3 icon sites under the Living Murray Initiative have Ramsar listing and that all three Forests and Wetlands at the time of listing met Ramsar criteria whilst under sustainable multiple-use forest management.

## **6. Q. WHAT ARE THE KEY FUNCTIONS OF WETLANDS?**

A. The interactions of physical, biological and chemical components of a wetland, such as soils, water, plants and animals, enable the wetland to perform many vital functions, for example:

- water storage;
- storm protection and flood mitigation;
- shoreline stabilization and erosion control;
- groundwater recharge (the movement of water from the wetland down into the underground aquifer);
- groundwater discharge (the movement of water upward to become surface water in a wetland);
- water purification;
- retention of nutrients;
- retention of sediments;
- retention of pollutants;
- stabilization of local climate conditions, particularly rainfall and temperature.

## **7. Q. WHAT ARE THE KEY VALUES OF WETLANDS?**

A. Wetlands frequently provide tremendous economic benefits, for example:

- water supply (quantity and quality);
- fisheries (over two thirds of the world's fish harvest is linked to the health of wetland areas);
- agriculture, through the maintenance of water tables and nutrient retention in floodplains;
- timber and other building materials;
- energy resources, such as peat and plant matter;
- wildlife resources;
- transport;
- a wide range of other wetland products, including herbal medicines;
- recreation and tourism opportunities.

In addition, wetlands have special attributes as part of the cultural heritage of humanity - they are related to religious and cosmological beliefs and spiritual values, constitute a source of aesthetic and artistic inspiration, yield invaluable

archaeological evidence from the remote past, provide wildlife sanctuaries, and form the basis of important local social, economic, and cultural traditions.

These functions, values, and attributes can only be maintained if the ecological processes of wetlands are allowed to continue functioning.

**Note:** The key threatening process to the forests and wetlands in the VEAC study area is altered flood regimes adversely impacting on their biodiversity and productivity: i.e. adversely affecting functions and values – listed.

## 8. Q. HOW CAN WETLANDS BE VALUED AND WHAT ECOSYSTEM SERVICES DO BARMAH AND GUNBOWER FORESTS AND WETLANDS PROVIDE?

A. Policy- and decision-makers frequently make development decisions based upon simple calculations of the monetary pros and cons of the proposals before them - the importance of wetlands for the environment and for human societies has traditionally been under-rated in these calculations because of the difficulty of assigning dollar values to the wetland ecosystem's values and benefits, goods and services. Thus, more and more economists and other scientists are working in the growing field of the valuation of ecosystem services.

The Central Murray river red gum forests provide a range of ecosystem services including: conservation of biodiversity, water purification, flood mitigation and climate stabilisation. The market related to climate stabilisation – carbon sequestration/trading carbon emissions - is closely allied with one of the major economic values of the forests – timber production.

Murtough et al (2002) identify three key issues facing policy makers in designing ecosystem service markets:

- \* scientific uncertainty;
- \* market liquidity;
- \* the role of regulation.

With respect to flood plain forests it is argued that such concerns are more easily resolved because the forests:

- are in public ownership under the stewardship of Government regulated management;
- provide key ecosystem services that are of regional and national benefit:
  - conservation of biodiversity (of national/international significance);
  - flood mitigation (major natural flood control reservoir serving Victoria, NSW and South Australia);
  - climate stabilisation (the forests can continue to play a role in carbon sequestration with the sustainable removal of biomass in the form of wood products)
- have been widely studied so that their ecosystem processes are well understood, particularly in relation to the impact of forest and water management practices on flood mitigation, natural flooding cycles/modified flooding cycles, growth habitats of river red gum and sustainable biomass removals (yield of wood products).

## 9. Q. WHAT GOVERNING PRINCIPLES GUIDE HUMAN ACTIVITIES IN RAMSAR-LISTED WETLANDS?

A. Under Article 3.1 of the Convention, Contracting Parties agree to **"formulate and implement their planning so as to promote the conservation of the wetlands included in the List, and as far as possible the wise use of wetlands in their territory"**. Through this concept of "wise use", which was pioneering when the Convention was drafted, THE CONVENTION CONTINUES TO EMPHASIZE THAT HUMAN USE ON A SUSTAINABLE BASIS IS ENTIRELY COMPATIBLE WITH RAMSAR PRINCIPLES AND WETLAND CONSERVATION IN GENERAL. The Ramsar wise use concept applies to all wetlands and water resources in a Contracting Party's territory, not only to those sites designated as Wetlands of International Importance. Its application is crucial to ensuring that wetlands can continue fully to deliver their vital role in supporting maintenance of biological diversity and human well-being.

As this term "wise use" gained currency within the Ramsar community and was used elsewhere for different purposes, the Conference of the Parties recognized the need for greater precision and adopted the following definition at its 3rd meeting in Regina, Canada, in 1987:

***"The wise use of wetlands is their sustainable utilization for the benefit of mankind in a way compatible with the maintenance of the natural properties of the ecosystem."***

At the same time, "sustainable utilization" of a wetland was defined as:

***"Human use of a wetland so that it may yield the greatest continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations."***

"Natural properties of the ecosystem" were defined as:

***"Those physical, chemical and biological components, such as soil, water, plants, animals and nutrients, and the interactions between them."***

The 'Wise Use Guidelines' call upon Contracting Parties to:

- **adopt national wetland policies**, involving a review of their existing legislation and institutional arrangements to deal with wetland matters (either as separate policy instruments or as part of national environmental action plans, national biodiversity strategies, or other national strategic planning);
- **develop programmes** of wetland inventory, monitoring, research, training, education and public awareness; and
- **take action at wetland sites**, involving the development of integrated management plans covering every aspect of the wetlands and their relationships with their catchments.
- The Wise Use Guidelines emphasize the benefits and values of wetlands for sediment and erosion control; flood control; maintenance of water quality and abatement of pollution; maintenance of surface and underground water supply; support for fisheries, grazing and agriculture; outdoor recreation and education for human society; and climatic stability.

The Wise Use Guidelines and Additional Guidance are available on the Ramsar Web site and in hard copy from the Secretariat and have been reprinted as volume one of the 'Ramsar Toolkit', the **Handbooks for the Wise Use of Wetlands**. *Towards the Wise Use of Wetlands* (Ramsar, 1993) is available from the IUCN Publication Services Unit, 219c Huntingdon Road, Cambridge CB3 0DL, UK (fax +44 1223 277175, e-mail info@books.iucn.org) and has also been reprinted on the Ramsar Web site.

The continuing work of the STRP in elaborating and refining the concept of wise use can be found in many of the substantial guidance documents that have been adopted by the COP (see Appendix 3, References).

**Note:** The "wise use" principle inscribed in Article 3.1 of the Convention in 1971, and its definition and application by the Conference of the Contracting Parties, have been established and have evolved completely independently from the so-called "wise use movement" that has emerged in recent years in North America. The use of the same term does not necessarily indicate that there is a commonality of understanding and/or purpose.

## 10. Q. **WHAT ACTIONS ARE REQUIRED AND WHAT RANGE OF HUMAN ACTIVITIES ARE LISTED TO ENSURE SUSTAINABLE UTILIZATION MEETS PRESENT AND FUTURE NEEDS?**

### A. **Action at particular wetland sites**

#### **(a) Ecological aspects**

Maintenance of the ecological functioning of a wetland requires an integrated, catchment approach to management, incorporating the different uses and activities that are compatible with sustainability.

Such management must take an interdisciplinary approach drawing upon the principles of biology, economics, policy, and social sciences. Global concerns must also be considered, namely, for example, shared wetland systems, shared species, and the issue of global climate change.

#### **(b) Human activities**

To achieve the wise use of a wetland so that present and future generations may enjoy its benefits, a balance must be attained that ensures maintenance of the wetland type. Activities may vary between:

- strict protection with no resource exploitation;
- a small amount of resource exploitation;
- large-scale sustainable resource exploitation; or
- active intervention in the wetland, including restoration.

Management can be adapted to suit local conditions, sensitive to local cultures and respectful of traditional uses.

#### ***Guidelines for establishing and strengthening local communities' and indigenous peoples' participation in the management of wetlands***

In Recommendation 6.3 (1996), the Contracting Parties acknowledged that **local** and **indigenous** people have a particular interest in ensuring that the wetlands within their region are managed wisely and, in particular, that indigenous people may have distinct knowledge, experience and aspirations in relation to wetland management. They also noted that the wise use of wetlands will benefit the quality of life of **local** and **indigenous** people and that these people, in addition to their involvement in site management, should derive the benefits that result from conservation and wise and sustainable use of wetlands.

**NOTE:** The Recommendation called upon the Parties to make specific efforts to encourage active and informed participation of local and indigenous people, at Ramsar listed sites and other wetlands and their catchments, as well as their direct involvement through appropriate mechanisms, in wetland management, and to recognize the value of the knowledge and skills of local and indigenous people in relation to wetland management, making special efforts to encourage and facilitate their participation in the development and implementation of wetland policies and programmes.

## 11. Q. **WHAT ARE THE KEY PROVISIONS OF RAMSAR SITE MANAGEMENT PLANS DEVELOPED FOR THE BARMAH AND GUNBOWER FORESTS?**

### 1. BACKGROUND.

- A (i) DSE advised on 28 October 2003 the Hon. John Thwaites had released final Ramsar site strategic management plans for the Barmah Forest Ramsar Site (43 pages) and the Gunbower Forest Ramsar Site (35 pages).
- (ii) The Plans were published in September 2003 after consideration of public submissions on draft plans made available for public comment in 2002.
- (iii) Disclaimers included that the plans were prepared:
- Without prejudice to any future negotiated outcomes between the Government/s and Victorian Aboriginal communities;
  - Views and opinions expressed in the documents are those of the authors and do not necessarily reflect the views and opinions of the Commonwealth Government of Australia, the Federal Minister for Environment and Heritage or the Department of Environment and Heritage.

### 2. KEY PROVISIONS OF BARMAH FOREST SITE STRATEGIC MANAGEMENT PLAN.

- (i) Background.  
(Parks Victoria developed the plan in conjunction with DSE and key stakeholders and co-ordinated the public comment process on the draft document.)

The Barmah Forest Ramsar site is located on the Murray River floodplain. It is in the Victorian Riverina bioregion (Murray Fans subregion) covers 28,515 ha and is predominantly River Red Gum open forest and woodland.

The majority of Barmah Forest functions as a single floodplain wetland system that is 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 or grassland (Moirra Grass) communities; to a gradational series of River Red Gum forest or woodland communities with wetland understorey's determined largely by flooding frequency and duration. Box woodland communities occur above the normal high flood level.

To be listed as a Wetland of International Importance, or 'Ramsar site', wetlands must meet one or more internationally accepted criteria in relation to their zoology, botany, ecology, hydrology or limnology and importance to waterbirds. The Ramsar Convention updated the criteria in 1999. The new criteria will be applied to Barmah Forest when the site Ramsar Information Sheet is next updated in 2005.

Parks Victoria and the Department of Sustainability and Environment manage the Barmah Forest Ramsar site under the provisions of relevant legislation. Barmah State Park covers an area of 7,900 ha proclaimed under the *National Parks Act 1975* and is managed by Parks Victoria.

The Barmah Forest Ramsar site contains two reference areas, Top Island (177 ha) and Top End (124 ha). These areas are proclaimed under the *Reference Areas Act 1978* and are managed by Parks Victoria.

Barmah State Forest, area of 21,320 ha reserved under the *Forests Act 1958*, is managed by the Department of Sustainability and Environment.

State Forests are required to be managed in accordance with the following Government approved recommendations of the LCC:

- produce hardwood timber;
- conserve native plants and animals, and provide opportunities for the development of wildlife conservation techniques;
- provide opportunities for open-space recreation (including hunting) and education;
- provide for flood mitigation; and
- produce honey, forage, gravel, sand, and other forest produce such as charcoal (LCC 1985).

The Murray River Reserve follows the Murray River as well as the major anabranches. It consists of a 60-metre wide public purposes reserve and is reserved under the *Crown Land (Reserves) Act 1978* and managed by Parks Victoria.

Barmah Forest and the adjacent Millewa Forest in New South Wales form an ecological unit. The Murray-Darling Basin Commission (MDBC), the Department of Sustainability and Environment (DSE), Goulburn-Murray Water, State Forests

of NSW and the NSW Department of Infrastructure, Planning and Natural Resources work together with other stakeholders to improve water management of the Barmah-Millewa Forest, especially in relation to the use of environmental water allocations.

### **Purpose of the Strategic Management Plan**

The primary purpose of the Strategic Management Plan (SMP) for the Barmah Forest Ramsar site is to facilitate conservation and wise use of the site so as to maintain, and where practical restore, the ecological values for which it is recognised as a Ramsar wetland. This will be achieved by implementing site-specific management strategies under each of the 10 key objectives (derived from the Strategic Directions Statement).

### **The Management Objectives outlined by the Strategic Directions Statement are as follows:**

1. Increase the scientific understanding of wetland ecosystems and their management requirements.
2. Maintain or seek to restore appropriate water regimes.
3. Address adverse processes and activities.
4. Manage Ramsar sites within an integrated catchment management framework.
5. Manage resource utilisation on a sustainable basis.
6. Protect, and where appropriate enhance, ecosystem processes, habitats and species.
7. Encourage strong partnerships between management agencies.
8. Promote community awareness and understanding and provide opportunities for involvement in management.
9. Ensure recreational use is consistent with the protection of natural and cultural values.
10. Develop ongoing consistent programs to monitor ecological character.

**Note:** It is stated that the site is predominately River Red gum open forest and woodland. The river red gum type is predominately OPEN FOREST with 51-80% crown cover. Open forest was not generally subject to clearing for agriculture because it was often flooded for 3-4 months in most years.

### **(a) Values.**

#### **Wetland representativeness**

In Victoria, wetlands are classified into eight categories. The Barmah Forest Ramsar site includes areas of four of these wetland types including areas of the State's most depleted wetland habitats and wetlands least represented in Victoria's protected area network. Of note the Barmah Forest Ramsar site represents approximately 15% of the remaining freshwater meadow in the State, and 13% of the remaining shallow freshwater marsh in the State.

**Note:** It is said that the site represents 15% of the remaining freshwater meadow in Victoria. A meadow is defined as:

*Oxford – low well watered ground especially near river.*

*Macquarie – a low level tract of uncultivated ground, as along a river, producing coarse grass.*

In this particular case the area of freshwater "meadow" in Barmah Forest of 18,323 ha is also classified as OPEN FOREST, some of which is in State Park and the majority in State Forest. Furthermore, it does NOT require reservation in a National Park to protect Ramsar values because the Ramsar listing in December 1982 accepted that the area was under "wise use" and being sustainably managed.

#### **Flora and fauna**

More than 553 species of indigenous flora and 273 species of indigenous fauna have been recorded at the Barmah Forest Ramsar site (Loyn et al. 2002). Of these, 35 are listed under the Victorian *Flora and Fauna Guarantee Act 1988*. These include 7 flora species and 28 fauna species.

A total of 32 flora species and 49 fauna species that are considered threatened in Victoria have been recorded at the Barmah Forest Ramsar site (DSE 2003b; DSE 2002a). In addition, 5 flora species and 3 fauna species are considered to be threatened in Australia under the *Environment Protection and Biodiversity Conservation Act 1999*.

The Barmah Forest Ramsar site also has the most extensive areas of Moira Grass plains in Victoria, which are of State significance. Moira Grass plains constitute about 5.5% of the forest area (DCE 1992).

The Barmah Forest Ramsar site supports a significant proportion of the Victorian population of Superb Parrot, which is endangered in Victoria and nationally vulnerable and listed under the Victorian *Flora and Fauna Guarantee Act 1988*.

A Facts sheet has been prepared on the Superb Parrot.

#### **Waterbirds**

The Barmah Forest Ramsar site provides important feeding, resting and breeding habitat for waterbird species.

Rare waterbirds recorded for Barmah include Freckled Duck and Latham's Snipe (Chesterfield et al. 1984).

The Barmah Forest Ramsar site provides one of Victoria's largest waterfowl breeding areas supporting large breeding colonies of Sacred Ibis and Straw-necked Ibis, with smaller breeding colonies of Great, Intermediate and Little Egret and Yellow-billed Spoonbill. Several species colonise in a limited number of sites for breeding and roosting, and include Great Cormorant, Little Pied Cormorant, Darter, Rufous (Nankeen) Night Heron and Royal Spoonbill. Although most nesting sites are associated with water bodies, some occur in areas of regularly flooded forest.

The Barmah Forest Ramsar site also provides drought refuge for waterbirds, reflecting the prevalence of permanent water within the wetland system.

### **Natural function**

The majority of Barmah Forest functions as a single floodplain wetland and is dependent on regular river flooding. Wetlands within the system range from permanent lakes and billabongs to shallow basins. The Barmah Forest Ramsar site provides habitat for a large number and diverse range of plants and animals. Other functions include organic carbon storage, water supply, groundwater recharge, maintenance of flow regimes and flood control (e.g. Barmah Forest forms a natural flood retardation basin with an estimated holding capacity of 32,100 ML).

### **Cultural heritage**

The Barmah Forest Ramsar site contains many sites of cultural significance to the Aboriginal people. Yorta Yorta community identified 182 sites in the forest and suggests that the total number of sites in Barmah could exceed 2000. Sites identified include occupation sites, burial grounds, mounds, middens, scarred trees and stone artefact scatters (Bonhomme 1990).

### **Scenic**

The Barmah Forest Ramsar site has high scenic values because of its large size and the diversity of natural and cultural landscape features contained in it.

### **Economic**

Direct economic values of the Barmah Forest Ramsar site derive from timber production, domestic stock grazing, apiculture, extractive industry and the use of the area for recreation and tourism. In contrast, the natural functions of the Barmah Forest Ramsar site have important indirect measurable values that support or protect economic activities that have direct measurable values. The indirect economic values provided by the Barmah Forest Ramsar site include flood and flow control, nutrient retention, and water quality maintenance.

### **Education and interpretation**

Information, interpretation and education assist enjoyment and foster understanding, appreciation and protection of Ramsar sites and their values.

The Barmah Forest Ramsar site receives a large number of visitors and is well suited to school camps. The Dharnya Centre, within the Barmah Forest Ramsar site, includes a visitor centre with an information display on cultural heritage, fauna, flora, and hydrology.

In addition, an interpretive sign is located near the Dharnya Centre produced as part of the Victorian Ramsar Wetlands Interpretation Project, which aims to promote understanding and gain community support for Ramsar sites and wetlands.

### **Recreation and tourism**

The Barmah Forest Ramsar site attracts approximately 100,000 visitor days per year. The majority of visitors are attracted to the river environs. A wide range of activities including boating, fishing, scenic driving, 4WD driving, trail bike riding, cycling, horse riding and bushwalking are popular. Orienteering, picnicking, camping, canoeing, bait collection, duck shooting, hunting of feral animals and nature study are also undertaken (CFL 1990). The Barmah Forest is also a popular bird-watching site. Interpretive cruises of the lakes and forest highlight the abundant birdlife along with the ecology and history of the area.

### **Scientific**

A number of research studies have been or are being undertaken at the Barmah Forest Ramsar site, particularly in the fields of forest ecology, floodplain ecology and hydrology. Parts of the State forest have been set aside from logging activities to conserve areas of undisturbed natural forest or areas with rare fauna and flora. They provide a comprehensive sampling of the river red gum ecosystem (MDBC 1992).

### **Condition**

#### **Vegetation**

Changes in the vegetation of the forest have been well documented (for example: Chesterfield 1986; Bren and Gibbs 1988; Leitch 1989) and have been deduced by examination of historical and recent evidence. The main factors influencing vegetation changes within the Barmah Forest Ramsar site have been the following:

- \* a reduction in frequency of burning following the displacement of Aboriginal tribes from the area;
- \* intense grazing by rabbits from the 1880s until their control by myxomatosis;
- \* grazing by domestic stock; and
- \* the effect of river regulation.

The condition of the flood plain vegetation is strongly influenced by flood timing, frequency, duration and depth.

The site quality of red gum provides a good indication of water availability under natural conditions, as many of the mature trees grew before regulation of Murray flows reduced their water supply. The distribution and condition of the shorter-lived understorey species are more strongly influenced by recent watering conditions.

Moirra Grass occurs in all mainland states of Australia and extends throughout Asia (Willis 1970). The Moirra Grass plains occur most extensively in Barmah Forest.

Changes in the Moirra Grass plains have been one of the more significant longer-term ecological changes in the forest.

Prior to 1934, Moira grassland plains covered 13.5% of the forest area.

They had been reduced to only 5.2% in 1988 (Bren and Gibbs 1988). Some former Moira Grass plains have developed into rushlands because of prolonged flooding resulting from higher river levels in summer and autumn; whereas others have been encroached upon by river red gum seedlings where regulation has caused a reduction in flood frequency (MDBC 1987). Grazing by domestic stock and rabbits are other factors that may be implicated in the reduction of the Moira Grass plains in the forest.

**(b) Management risks.**

**1. Altered water regimes**

Alteration to natural flow regimes of rivers and streams has been listed as a potentially threatening process under the *Flora and Fauna Guarantee Act 1988*.

Hydrologic changes have adversely affected, to various degrees, habitats within the forests and associated fauna. Problems caused in some parts of the forest include poor tree health and growth rates and changes to the composition of rushlands, grasslands and forests.

The Forest Commission map of Barmah drawn in 1930 estimated that 13.5% (4,050 ha) of the area was open Moira Grass plain. The area mapped in 1979-80 by Chesterfield (1986) shows a loss of approximately 2,400 ha. Chesterfield (1986) estimates that 1,200 ha of the Moira Grass plain has been lost to Red Gum regeneration and the remaining 1,200 ha to Giant Rush encroachment. In 1992, Bren noted that the Moira Grass plains have continued to decline in extent in the 12 years since Chesterfield's assessment.

Hydrological changes have reduced fish and waterbird populations and their breeding habitats, particularly those species dependent upon the flood waters. A decline in both the numbers and species of birds breeding has been documented, particularly over the last 30 years (Chesterfield et al. 1984, Leslie 1988). Much of this change has been attributed to changed hydrological conditions, as flooding is required to provide suitable conditions for nesting, and also sufficient productive feeding areas for successful rearing of young. It must be noted that the lack of flooding is not the only impact that has occurred on colonially nesting birds. The lack of a drying phase in some of the low lying wetlands, and the consequent change in vegetation, has disadvantaged many species.

The site has a complex water distribution, and further study is necessary to determine water movement throughout the forest. Such studies would assist in the management of environmental water allocations used in the forest.

Successful management of water regimes in Barmah Forest will require ongoing understanding of several issues: the complex pattern of water movement; the relation of flood levels to water volumes; the importance of connectivity between the river and the floodplain; and the responses of plant and animal communities to flooding regimes.

**2. Pest plants and animals.**

The flora of the Barmah Forest Ramsar site consists of more than 550 recorded species, of which approximately 30% are exotics. Both the former Land Conservation Council (1983) and the Department of Conservation and Environment (1992) recognised that the distribution of weeds within Barmah State Forest is widespread.

The pest plants reduce opportunities for regeneration of indigenous flora through competitive growth and by changing soil conditions required for successful germination and growth and provide harbour for pest animals and invertebrates that may feed on or predate indigenous flora and fauna.

A number of introduced animals have been recorded in the Barmah Forest Ramsar site. Problem species include rabbits, foxes, horses, wild pigs, cats, and carp.

Predation of native wildlife by foxes and cats are listed as threatening processes under the *Flora and Fauna Guarantee Act 1988*.

**3. Resource utilization.**

The *National Parks Act 1975* and the *Forests Act 1958* allow for resource utilisation in the Ramsar site. Such utilisation includes forestry for timber (in the State Forest), grazing and apiculture.

**Timber harvesting**

Extensive logging has been carried out in the Barmah Forest Ramsar site since the 1860s. Timber harvesting was allowed within the State Park up until June 2003.

Past timber harvesting and silvicultural practices in the Barmah Forest have altered the age structure of the forest. Loss of hollow-bearing trees and habitat fragmentation are threatening processes of particular relevance to the forests of the central Murray region (Bennett et al. 1994).

Under the Forest Management Plan for the Mid-Murray Forest Management Area (NRE 2002b), Special Protection Zones (SPZ) and Special Management Zones (SMZ) have been established in Barmah State Forest to protect natural and cultural values. SPZ are managed for conservation and timber harvesting is excluded. Sustainable timber production is permitted in SMZ but under modified conditions directed towards conserving natural or cultural values. A SPZ has been established along several creeks and on some wetlands in Barmah Forest. A SMZ with a 50 metre wide buffer covers other water bodies and natural open wetland areas, such as the Moira Grass plains.

The remainder of the State Forest is a General Management Zone managed for the ecologically sustainable production of timber and other forest products. Timber harvesting is conducted in accordance with the 'Code of Forest Practices for Timber Production. Revision No. 2' (NRE 1996).

Fallen timber is a major habitat structural element for plants and animals. A recent study on the depletion of fallen timber (MacNally et al. 2002) found that fallen timber volumes have decreased significantly from natural levels in River Red Gum Forests of the southern Murray-Darling Basin and that this has negative implications for biodiversity. The study suggests restoration targets of 40-50 tonnes per hectare.

**Note:** Comment that the amount of fallen timber has decreased significantly does not add up in relation to other records about past aboriginal burning NOR about the forests' fire history. Suggesting restoration targets of 40- 50 tonnes per hectare, unless this is made up of a few large logs, demonstrates ignorance of factors controlling forest fire behaviour. Unless properly managed, it is a recipe for feral fires destroying large areas of forest.

#### **4. Grazing**

Grazing is carried out within the Ramsar site according to grazing licences issued under the *Forests Act 1958* and a water frontage licence issued under the *Land Act 1958* (DCE 1992).

Cattle quotas for summer and winter seasons are determined by DSE on the advice of the Barmah Forest Grazing Advisory Committee, which was established under Section 32F of the *National Parks Act 1975*. Agistees grazed between 1,000 - 2,000 cattle in summer and 300 - 700 cattle in winter.

Grazing areas in Barmah Forest contain environmentally sensitive sites such as wetlands, riverbanks, sandhills and box woodlands. A strategy for native forests in the Riverina in NSW (SFNSW 2000), which would be applicable to Barmah Forest, outlined measures to more fully protect these areas,

The Forest Management Plan for the Mid-Murray Forest Management Area establishes guidelines and actions for managing grazing in the State Forest.

#### **5. Recreation.**

The Barmah Forest Ramsar site is a popular destination for people from Melbourne and regional centres in the Murray Valley such as Shepparton and Echuca. The major attraction is the Murray River, which is the focus for most recreational activities. The wetlands and River Red Gum forests are other features of recreational importance.

The importance of the forest to tourism and recreation is reflected in the number of visitors. Annual visitor statistics calculated in camper nights is 60,000 for Barmah Forest.

The impact of recreational activities is influenced seasonally and some activities pose a threat to the environmental values of the wetlands.

Contamination of wetlands from the accumulation of lead shot is listed as a threatening process under the *Flora and Fauna Guarantee Act 1988*. Lead shot was prohibited for duck hunting in Victoria in 2002 but can still be used for hunting quail, pest animals and for clay target shooting. The extent of the lead contamination in the Barmah Forest Ramsar site is not known.

Other indirect but localised impacts from hunting include litter (including spent shells) and disturbance to shoreline vegetation from camping, trampling and hide construction.

Trail bike riding throughout the forest causes some localised damage to soil and vegetation.

The risks associated with recreation are being addressed through a range of measures.

#### **6. Erosion.**

Erosion of the banks of the Murray River has been identified as a particular risk for the longer-term management of water in the forest, requiring water operations to minimise the problem and development of management actions to prevent further erosion. Erosion has the potential to impact negatively on Aboriginal cultural values as well as natural values.

At many locations along the river, erosion of the bank appears to be occurring at an unnaturally rapid rate.

Whether this process has been caused by changes in the flow regime or other agencies of human origin is unknown.

Boat wash has been implicated as a major contributing factor to increased erosion rates along the Murray River (DCE 1992).

**NOTE: No mention of harvesting or silvicultural operations causing erosion.**

#### **7. Fire.**

Fire management on public land in Victoria is governed by the Code of Practice for Fire Management on Public Land.

Under the Fire Protection Plan the Barmah Forest Ramsar site is classified as Zone 3 for fire fuel management purposes. Zone 3 and 4 areas are managed specifically to provide an irregular mosaic of areas of fuel reduction to complement works in Zones 1 and 2 to reduce the severity of wildfires, and for broad ecological management objectives.

Intense fire can be catastrophic for River Red Gums, which rely on seasonal flooding rather than fire for regeneration. The two reference areas within the Ramsar site are classified as Zone 5, which excludes prescribed burning where there would be a high potential for economic, ecological or cultural loss if they were subject to fire.

**8. Level of risk to Ramsar values.**

The goal of the integrated management framework is to facilitate the maintenance of ecological character at Victoria's Ramsar sites by minimising risks to values. This goal will be achieved through the implementation of strategically prioritized management actions.

The main risks to the environmental values and ecological character of the Barmah Forest Ramsar site are summarised in Table 5.1. It should be noted that the level of risk has not been assessed against the effort currently being applied to mitigating the risk.

Table 5.1 Level of risk to the ecological character of Barmah Forest Ramsar site

	Risks								
	Altered water regimes	Salinity	Pollution	Pest plants	Pest animals	Resource utilisation	Recreation	Fire	Erosion
Barmah Forest Ramsar Site	◆◆◆	◆	◆	◆◆	◆◆	◆◆	◆◆	◆◆	◆

- ◆◆◆ Higher priority risk – risks that currently or may potentially result in the significant loss of the site's environmental values and ecological character.
- ◆◆ Medium priority risk – risks that currently or may potentially result in the moderate loss of the site's environmental values and ecological character
- ◆ Lower priority risk – risks that currently of may potentially result in the minor loss of the site's environmental values and ecological character.

**(c) Site Management Strategies.**

A number of Site Management Strategies have been developed under 10 Management Objectives.

Note: Only Management Objective 5 – Manage Resource Utilisation on a sustainable basis is reproduced below.

Section 5.4 states that – ensure resource utilisation is conducted according to the code of Forest Practices for Timber Production and in conformity with sustainable forest management principles.

**Management Objective 5**

Manage resource utilisation on a sustainable basis

		Lead agency	Priority
5.1	Where practicable, construct fences to prevent access by stock to areas of significant cultural and environmental value. Ensure fence design is developed in consultation with the Yorta Yorta Nations and other relevant stakeholders. If fencing is not practicable, manage grazing regimes to minimise impact on the most sensitive environmental and cultural values.	DSE, PV	Higher
5.2	Review grazing licences and develop grazing management strategies for licensed areas in consultation with licensees and in accordance with the Mid-Murray Forest Management Plan and Barmah State Park and Forest Plan.	DSE, PV	Higher
5.3	Develop a routine assessment process to assess the ecological condition of the grazing areas to improve the ability to manage stock numbers if seasonal conditions or ecological requirements dictate.	DSE, PV	Higher
5.4	Ensure timber resource utilisation is conducted in accordance with the Code of Forest Practices for Timber Production, the Forest Management Plan for the Mid-Murray Forest Management Area and ecologically sustainable forest management principles.	DSE	Higher
5.5	Manage apiculture in accordance with standard licence conditions and according to the Mid-Murray Forest Management Plan	DSE, PV	Medium

### 3. KEY PROVISIONS OF GUNBOWER FOREST RAMSAR SITE STRATEGIC MANAGEMENT PLAN.

Much of this 35 page document published in September 2003 by DSE, but developed by parks Victoria in conjunction with DSE, mirrors the Barnah forest Ramsar plan. The general text is applicable to both forests. Some data specific to Gunbower is presented.

The Gunbower Forest Ramsar site is located on the Murray River floodplain between Torrumbarry and Koondrook and covers 19,450 ha dominated by River Red Gum open forest and woodland.

The Gunbower Forest Ramsar site includes areas of four wetland types under this system: Deep Freshwater Marsh (95 ha), Freshwater Meadow (9,209 ha), Permanent Open Freshwater (6 ha) and Shallow Freshwater Marsh (545 ha); totalling 9,855 ha.

Gunbower State Forest covers an area of 17,108 ha and is reserved under the *Forests Act 1958* and is managed by the Department of Sustainability and Environment. The State Forest is required to be managed in accordance with the following Government approved recommendations of the former Land Conservation Council (LCC):

- \* extract hardwood timber products;
- \* conserve native plants and animals, and provide opportunities for the development of wildlife conservation techniques;
- \* provide opportunities for open-space recreation (including hunting) and education;
- \* provide for flood mitigation; and
- \* produce honey, forage, gravel, sand, and other forest produce such as charcoal (LCC 1985).

Approximately 2,096 ha of the Murray River Reserve falls within the Gunbower Forest Ramsar site is required to be managed in accordance with management objectives derived from recommendations of the former LCC including:

- \* provide opportunities for informal recreation (including camping) in a riverine environment for large numbers of people;
- \* conserve and protect ecosystems to the extent that is consistent with the above;
- \* apiculture be permitted;
- \* allow flood mitigation and streambank protection;
- \* use of existing and licensed pump and pumpline sites be permitted to continue;
- \* hunting of game birds be permitted during the declared hunting period in areas specified by the land manager where conflict with other recreational users such as camping does not occur; and
- \* stock access to water and grazing be permitted at the discretion of the land manager where it is compatible with zone management goals. (LCC 1985).

Managed by Parks Victoria the Spence's Bridge Education Area covers 230 ha and is reserved under the *Forests Act 1958* to be managed in accordance with the following Government approved recommendations of the former LCC for students of all ages to:

- \* study the nature and functioning of reasonably natural ecosystems in a manner such that the integrity of these ecosystems is maintained as far as practicable;
- \* compare the ecosystems within education areas with other nearby natural and modified systems;
- \* observe and practice the methods of environmental analysis, and the field techniques of natural sciences; and
- \* conduct simple long-term experiments aimed at giving an understanding of the changes occurring in an area with time (LCC 1985).

Gannawarra and Campaspe Shires have produced Municipal Strategic Statements that cover the Gunbower Forest Ramsar site. Although these Statements address a number of important land management and environmental issues, they do not emphasise the environmental values of the Gunbower Forest Ramsar site and its catchment or the risks to these values.

The key environmental values of the Gunbower Forest Ramsar site for which it was listed (representativeness, flora and fauna and waterbirds) are summarised below. Other values described include natural function, cultural heritage, scenic, economic, education and interpretation, recreation and tourism, and scientific.

#### **Wetland representativeness**

The Gunbower Forest Ramsar site includes areas of four wetland types including areas of the State's most depleted wetland habitats and wetlands least represented in Victoria's protected area network represents approximately 8% of the remaining freshwater meadow in the State.

#### **Flora and fauna**

More than 210 species of indigenous flora and 143 species of indigenous fauna have been recorded at the Gunbower Forest Ramsar site. Of these, three flora and one fauna species are considered to be nationally threatened under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*.

A total of 18 flora species and 40 fauna species considered to be threatened in Victoria have been recorded at the Gunbower Forest Ramsar site. Twenty three of the species recorded are also listed under the *Flora and Fauna Guarantee Act 1988* (Vic).

A total of three bird species listed under the Japan Australia Migratory Birds Agreement (JAMBA) and five species listed under the China Australia Migratory Birds Agreement (CAMBA) have been recorded at the Gunbower Forest Ramsar site.

The Forest Red Gum Grassy Woodland ecological community occurring in the Gunbower Forest Ramsar site has been listed under Schedule 2 of the *Flora and Fauna Guarantee Act 1988*.

### **Waterbirds**

The Gunbower Forest Ramsar site provides important feeding, resting and breeding habitat for more than 22 waterbird species.

There is little data available on the number of waterbirds supported by the Gunbower Forest Ramsar site. The extent of the forest and nature of the wetland habitat after flooding is such to suggest that the Forest is likely to support large numbers of waterbirds.

During flood periods, the Gunbower Forest Ramsar site becomes a large waterbird breeding area. Of note the forest supports the only breeding colony of the Intermediate Egret in Victoria.

### **Natural function**

The Gunbower Forest Ramsar site provides a suite of important functions including fish and wildlife habitat, organic carbon storage, water supply and purification, groundwater recharge, flood control and maintenance of flow regimes.

### **Cultural heritage**

The site contains a cultural landscape that reflects both Aboriginal and European activities.

The site contains many sites of cultural significance to the Aboriginal people.

The most up to date information from the site register at Aboriginal Affairs Victoria (2003) shows a total of 186 sites.

The locations of many places, such as burial or natural sacred sites, may not yet be listed on the Aboriginal Affairs Victoria site register but are known to members of local Aboriginal communities.

The range of historic places in the Gunbower Forest Ramsar site reflects a number of different phases of European activity in the area. Scattered around the Forest are relics of early settlement, however most of the historical value is in the events that took place and the effect they had rather than what remains.

The Gunbower Island State Forest is being assessed for listing on the Register of the National Estate (Australian Heritage Commission) in recognition of its natural values as a waterfowl breeding area.

### **Scenic**

The Gunbower Forest Ramsar site has high scenic values because of its large size and the diversity of natural and cultural landscape features.

### **Economic**

The components, functions and attributes of the Gunbower Forest Ramsar site provide a variety of direct and indirect economic values to the area. The direct economic values provided by the Gunbower Forest Ramsar site include timber production, domestic stock grazing, apiculture and the use of the area for recreation and tourism. In contrast, the natural functions of the Gunbower Forest Ramsar site also have important indirect values, which support or protect economic activities including flood and flow control, nutrient retention, water quality maintenance and flood control.

### **Education and interpretation**

The site offers a range of opportunities for education and interpretation. Spence Bridge, an area of 230 ha, has been set aside as an Education Area.

### **Recreation and tourism**

The site is a popular place to visit in the summer months with visitation dropping significantly during winter. The main activities undertaken by visitors are fishing, camping, pleasure driving, four wheel driving, trail bike riding, cycling, horse riding and bushwalking. Orienteering, picnicking, canoeing, boating, bait collection, duck shooting, hunting of feral animals and nature study are also undertaken.

The most popular areas are adjacent to the Murray River and at Torrumbarry Weir.

### **Scientific**

The site has been an important site for research studies in the fields of hydrology and ecology. A recent scientific study investigated the ecology and hydrology of Gunbower Forest, in particular it assessed the responses of floodplain communities to different flooding parameters. Results have been applied to water management strategies to fine tune water management in the Forest and conserve ecological diversity.

### **Condition**

#### **Vegetation**

River Red Gum, Black Box and Grey Box communities dominate the Gunbower Forest Ramsar site. Some Riverine Grassland and Northern Plain Grassland communities occur within the Forest.

These communities, largely River Red Gum, have been intensively harvested since early settlement resulting in a much younger, and in places denser forest. Changed flooding regimes have reduced the distribution and abundance of flood dependent species and changed vegetation patterns.

Pressure from grazing has reduced the cover and abundance of more palatable species.

## Hydrology

Gunbower Island is a depositional basin, which contains a number of still water channels and miscellaneous floodplain depressions. The lowest and therefore major entry point for water into the forest is Spur Creek, which commences to flow at the rate of 13,700 ML/day when the Murray River height is 4 m at Echuca and 3.96 m below Torrumbarry Weir. As the Murray River rises other effluents begin to flow, until the forest is entirely inundated. At a river height of approximately 8 m at Echuca and 6.4 m below Torrumbarry Weir, the flow is 27,800 ML/day.

Water depth on the island can vary from a few centimetres on high ground to 6 m in creeks and billabongs in the centre of the forest during flood.

The key risks to the maintenance of environmental values of the Gunbower Forest Ramsar site are **Altered water regimes**.

The alteration to the natural flows of rivers and streams has been listed as a potentially threatening process under the *Flora and Fauna Guarantee Act 1988*.

These hydrological changes have reduced the distribution and recruitment of flood-dependent flora species, including River Red Gum. Water stress between flood events has also resulted in their death.

The hydrological changes are also likely to have altered faunal habitat and contributed to lower recruitment rates due to the loss of the natural breeding and nesting signals for native, fish, birds, plant and aquatic insects.

The Gum-leaf Skeletoniser is a major defoliant of River Red Gum in the Mid-Murray area and outbreaks are linked to inappropriate water regimes.

Infestations occur when the absence of flooding coincides with the larval stage.

Up to 40,000 ha has been defoliated on at least two occasions in the Murray area.

The Department of Sustainability and Environment, North Central Catchment Management Authority, Goulburn-Murray Water and Parks Victoria formed to identify options for improving management of environmental water in the Gunbower Forest. Improvements in the integration of cross-border water management arrangements would facilitate management of Gunbower and the neighbouring Koondrook and Perricoota Forests in NSW as a single ecological unit.

Due to the complexity of water distribution in the forest, studies are required to determine water movement and predict the relationship between volumes and flooding extent to facilitate the management of environmental water allocations.

## Salinity

Groundwater salinity within Gunbower Forest is generally moderate to high. There is also a persistently high watertable along the southwestern edge of the forest presumably due to irrigation of the nearby farmland. Given the relatively high groundwater salinities in the region, the long term prognosis for the forest is considered unfavourable.

Within another 20 years or so, the forest is expected to be showing severe die back due to the unsustainable concentration of salts where the watertable is within three metres depth.

## Pollution

There are a number of effluent creeks and drains flowing into the Gunbower Forest Ramsar site from surrounding agricultural land. These creeks and drains introduce nutrients, sediments and agricultural chemicals that degrade the aquatic and terrestrial habitats of the Forest.

The risk of pollution is addressed through the implementation of the Draft Loddon Catchment Water Quality Strategy (2002) and the Loddon Murray Surface Water Management Strategy (2001).

## Pest plants and animals

Introduced flora species recorded in the Gunbower Forest Ramsar site include Blackberry, Sweet Briar, Prairie Ground Cherry, Paterson's Curse, Bathurst Burr, Noogoora Burr, Box Thorn and Horehound.

These species harbour for pest animals including foxes, feral cats, rabbits and introduced birds that prey upon or compete with native fauna for food and habitat.

Noogoora Burr exists on the flood-prone areas along the Murray River and its associated tributaries within the Forest.

A number of introduced animals have been recorded within the Gunbower Forest Ramsar site. Species include rabbits, foxes, wild pigs, cats and carp.

Predation of native wildlife by foxes and cats are listed as threatening processes under the *Flora and Fauna Guarantee Act 1988*. The following categories of native fauna are considered to be at risk from fox and cat predation in the Gunbower Forest Ramsar site:

- \* arboreal mammals including Brushtail and Ringtail possums;
- \* bird species that spend much of their time at or near the ground nesting and/or feeding including the Latham's Snipe, Masked Lapwing and Banded Lapwing; and
- \* reptiles such as the Carpet Python.

Grazing by rabbits has contributed to the loss of native perennial flora from the ground layer and reduced River Red Gum and shrub regeneration.

Populations of feral pigs exist in Gunbower Forest are considered to be very low, but no accurate figures are available.

The impacts associated with pest plants and animals are being addressed through a range of measures including rabbit harbour destruction, fox baiting programs and spraying programs to contain, and as far as possible eradicate, pest plants from the Ramsar site.

### Resource utilisation

Under the *Crown Land (Reserves) Act 1978* and the *Forests Act 1958* utilisation of the forest for timber, grazing, apiary and other purposes is permitted.

### Timber harvesting

Victorian River Red Gum forests, including Gunbower Forest, have been harvested since early settlement and were heavily cut between 1860 and 1880 to service river transport along the Murray River and the expansion of the State's railway system. Timber production has been controlled to ensure future supplies since the 1920s.

The range of wood products derived from the forest includes heavy construction timbers, railway sleepers, house stumps, furniture timbers, flooring, feature panelling, poles, fence posts, firewood and charcoal. River Red Gum is the only species harvested. Yellow Box, Grey Box and Black Box are not harvested (NRE 2002b). Sawlogs are supplied in accordance with the sustainable yield rate for the Mid-Murray Forests.

Previous timber harvesting and silvicultural practices used within the Gunbower Forest Ramsar site have altered the age structure of the forest. Loss of hollowbearing trees and habitat fragmentation are threatening processes of particular relevance to the forests of the central Murray region. These processes have been listed under the *Flora and Fauna Guarantee Act 1988*. The Forest Management Plan for the Mid-Murray Forest Management Area outlines enhancement measures for structural diversity by way of protecting hollow-bearing trees, low intensity harvesting using single tree or group selection and the continuation of special protection zones where timber harvesting is not undertaken.

Under the Mid-Murray Forest Management Plan, special protection zones (SPZ) and special management zones (SMZ) have been established in Gunbower State Forest to protect natural and cultural values. SPZs are managed for conservation and timber harvesting is excluded. Sustainable timber production is permitted in SMZs but under modified conditions directed towards conserving natural or cultural values.

The remainder of the State Forest is General Management Zone and is managed for the ecologically sustainable production of timber and other forest products. Timber harvesting is conducted in accordance with the 'Code of Forest Practices for Timber Production. Revision No. 2'.

Fallen timber is a major habitat structural element for plants and animals. A recent study on the depletion of fallen timber (MacNally et al. 2002) found that fallen timber volumes have decreased significantly from natural levels in River Red Gum Forests of the southern Murray-Darling Basin and that this has negative implications for biodiversity. The study suggests restoration targets of 40-50 tonnes of woody debris per hectare. The Mid-Murray Forest Management Plan includes guidelines for firewood harvesting and collection to minimise depletion of woody debris.

**Note:** Comment that the amount of fallen timber has decreased significantly does not add up in relation to other records about past aboriginal burning NOR about the forests' fire history. Suggesting restoration targets of 40- 50 tonnes per hectare, unless this is made up of a few large logs, demonstrates ignorance of factors controlling forest fire behaviour. Unless properly managed, it is a recipe for feral fires destroying large areas of forest.

### Grazing

Stock grazing is carried out according to grazing licences issued under the *Forests Act 1958* and water frontage licences issued under the *Land Act 1958*.

Potential impacts associated with stock grazing in the Gunbower Forest Ramsar site include:

- \* alteration of the species composition with perennial species being replaced with ephemeral or annual species;
- \* structural changes in growth form and changes in age class representation; and
- \* changes in function of the landscape contributing to leaky soils, water logging, salinity and acidity problems.

Stock grazing is also considered a major threat to the habitat of woodland birds, amphibians and ground invertebrates.

A strategy for native forests in the Riverina in NSW (SFNSW 2000), which would be applicable to Gunbower Forest, outlined measures to more fully protect these areas, including:

- \* fencing of environmentally sensitive sites to exclude stock grazing;
- \* where fencing is not practicable, the grazing regime should be set by the most sensitive environmental factors; and
- \* the grazing of wetlands should not be undertaken until sediments are dry and water plants have flowered and set seed.

### Apiculture

Apiculture is permitted within the Gunbower Forest Ramsar site. Sites in the Forest are administered under the *Forests Act 1958* and provides for Bee Farm and Range sites and temporary bee sites.

Studies suggest that honeybees may both adversely and positively affect native ecosystems (Paton 1996), although the degree of these effects has not been evaluated.

**Recreation**

The Gunbower Forest Ramsar site is a popular destination for people from Melbourne and regional centres. The major attraction is the Murray River and Gunbower Creek. Visitor use is concentrated along the Murray River at numerous picnic and camping areas and along access roads. Overuse of some areas and the adhoc creation cause loss of habitat for small fauna, soil compaction, erosion of riverbanks and issues associated with rubbish disposal. Closure of unnecessary and poorly sited tracks in the Gunbower Forest is required in order to ensure long term sustainability of the road network and lessen the impacts of habitat fragmentation. Driving in wet conditions impacts negatively on four-wheel drive tracks and roadside vegetation. Parks Victoria’s (PV) Draft Statewide Road Framework (2002) develops a long term and sustainable approach to the future management of PV managed roads accessed by the public. The existing road and track infrastructure managed by PV is unsustainable when evaluated against currently available measures. Hunting (inclusive of duck, fox, rabbit and pigs) is permitted within some areas of the Gunbower State Forest. The impacts of hunting on site values have not been determined. Contamination of wetlands from the accumulation of lead shot is listed as a threatening process under the *Flora and Fauna Guarantee Act 1988*. Recreational fishing is a popular activity at the Gunbower Forest Ramsar site has lead to localised problems associated with litter, fires, discarded fishing line entangling waterbirds, human waste and disturbance to shoreline vegetation. Trail bike riding throughout the Forest causes some localised damage to soil and vegetation. The risks associated with recreation are being addressed through a range of measures.

**Erosion**

At many locations along the Murray River, erosion of the bank appears to be occurring at an accelerated rate. A 1988 study based on bed and bank surveys carried out in 1876 and 1976 suggests that the river is in general becoming broader and shallower (Loder and Bayley 1988). Whether this process has been caused by changes in the flow regime or the continually higher river levels necessary to satisfy irrigation demands is unknown.

NSW is responsible for managing in-stream river issues, and Victoria is restricted to addressing erosion issues from the Victorian border (i.e. top of the southern bank).

**Fire**

Fire management on public land in Victoria is governed by the Code of Practice for Fire Management on Public Land. The Regional Fire Protection Plan for the Bendigo Fire District defines fire protection objectives, strategies and practices to be adopted in the management of wildfires and prescribed burning. Fuel Management Zone 5 applies to the entire Gunbower Forest Ramsar site. Zone 5 areas provide for the exclusion of prescribed burning from areas where there would be potential for economic, ecological or cultural loss.

**Level of risk to Ramsar values**

The goal of the integrated management (incorporating the Strategic Directions Statement and Strategic Management Plans) is to facilitate the maintenance of ecological character at Victoria’s Ramsar sites by minimising risks to values.

The main risks to the environmental values and ecological character of the Gunbower Forest Ramsar site are summarised in Table 5.1. It should be noted that the level of risk has not been assessed against the effort currently being applied to mitigating the risk.

Table 5.1 Level of risk to Ramsar values at the Gunbower Forest Ramsar Site

	Risks								
	Altered water regimes	Salinity	Pollution	Pest animals	Pest plants	Resource utilisation	Recreation	Fire	Erosion
Gunbower Forest Ramsar Site	◆◆◆	◆	◆	◆◆	◆	◆◆	◆◆	◆◆	◆

- ◆◆◆ Higher priority risk – risks that currently or may potentially result in the significant loss of the site’s environmental values and ecological character.
- ◆◆ Medium priority risk – risks that currently or may potentially result in the moderate loss of the site’s environmental values and ecological character

- ◆ Lower priority risk – risks that currently of may potentially result in the minor loss of the site's environmental values and ecological character.

## Management Objective 2

Maintain or seek to restore appropriate water regimes

		Lead agency	Priority
2.1	Complete the flood enhancement study for Gunbower Forest Ramsar site and implement priority actions.	NCCMA	Higher
2.2	Develop a formal management process for the surplus flows identified for environmental purposes and for rain rejection flows.	DSE, GMW NCCMA	Higher
2.3	Ensure environmental assessments are carried out for licenced drainage systems and that they are designed, constructed and managed to protect Ramsar values, in line with the Loddon-Murray surface Water Management Strategy.	NCCMA, Shires GMW	Higher

For detailed information refer to Water, Wood & Wildlife RRG Chapter 3. Pages 71-83

## Management Objective 5

Manage resource utilisation on a sustainable basis

	Site Management Strategy	Lead agency	Priority
5.1	Where practicable, construct fences to prevent access by stock to areas of significant cultural and environmental value. Ensure fence design is developed in consultation with the Yorta Yorta Nations and other relevant stakeholders. If fencing is not practicable, manage grazing regimes to minimise impact on the most sensitive environmental and cultural values.	DSE, PV	Higher
5.2	Review grazing licences and develop grazing management strategies for licensed areas in consultation with licensees and in accordance with the Mid-Murray Forest Management Plan.	DSE, PV	Higher
5.3	Develop a routine assessment process to assess the ecological condition of the grazing areas to improve the ability to manage stock numbers if seasonal conditions or ecological requirements dictate.	DSE, PV	Higher
5.4	Ensure timber resource utilisation is conducted in accordance with the Code of Forest Practices for Timber Production, the Forest Management Plan for the Mid-Murray Forest Management Area and ecologically sustainable forest management principles and minimises loss of Ramsar site values.	DSE	Higher
5.5	Manage apiculture in accordance with standard licence conditions and according to the Mid-Murray Forest Management Plan.	DSE	Lower

FOR MORE DETAILED INFORMATION ON BARMAH AND GUNBOWER FORESTS SEE:

A partnership of Industry (NAFI, VAFI, FPA-NSW) and Timber Communities Australia recently delivered a report titled – Water, Wood & wildlife – opportunities for the Riverain Red Gum Forests of the Central Murray (October 2005) to the Victorian Environment Assessment Commission which is currently conducting investigations into Central Murray red gum forests.

The report outlines the history of the forests since settlement, identifies issues and avenues for improving water management, habitat restoration, biodiversity and forest productivity.

## Appendix 1

### Ramsar's wise use definition in relation to sustainable use, sustainable development and ecosystem approaches

(from Ramsar COP9 DOC. 16, paragraphs 14-20: Rationale for proposals for *A Conceptual Framework for the wise use of wetlands* and the updating of wise use and ecological character definitions)

As part of its definition of the wise use of wetlands, COP3 also defined "sustainable utilisation" as:

"human use of a wetland so that it may yield the greatest continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations".

Also in 1987, the Brundtland Commission defined "sustainable development" as:

"development that meets the needs of the present without compromising the ability of future generations to meet their own needs". (UN World Commission on Environment and Development. 1987. *Our common future*.)

Ramsar COP3 also recognized that both wise use policy and actions at site management levels are integral parts of sustainable development. Since the terms of the Brundtland definition and the Ramsar COP3 definition of "sustainable utilisation" are very similar, it follows that rather than equating wise use simply with sustainable utilisation (use), it is now more appropriate and relevant to define wise use in the context of sustainable development.

Furthermore, wise use as a sustainable development mechanism has subsequently been recognized by the Ramsar Convention in 1996 (COP6) through its adoption of the Convention's mission statement in the Strategic Plan 1997-2002, reaffirmed by this amended mission statement in the Strategic Plan 2003-2008 (COP8 Resolution VIII.25):

"the conservation and wise use of all wetlands through local, regional and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world".

The Convention on Biological Diversity (CBD) has described its "ecosystem approach" as that Convention's overarching approach for its implementation. CBD has described (in Decision V/6; COP5, 2000) the "ecosystem approach" (see also Appendix 2) as:

"a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Thus, the application of the ecosystem approach will help to reach a balance of the three objectives of the Convention: conservation; sustainable use; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

An ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organization, which encompass the essential structure, processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of many ecosystems".

Thus the CBD's overarching "ecosystem approach" can be regarded as congruent with Ramsar's overarching concept of "wise use". In addition, the "Addis Ababa Principles and Guidelines for the sustainable use of biodiversity", adopted by the Convention on Biological Diversity in 2004 (CBD COP7 decision VI/12), focus attention on the sustainable use of components of biological diversity. These guidelines cover a similar range of implementation interventions at similar levels of detail to the original Ramsar Wise Use Guidance of COP4 and COP5. Hence the CBD's sustainable use guidelines also equate to the Ramsar 'toolkit' of guidelines for delivering wise use through maintaining the ecological character of wetlands.

In addition to the CBD's description of "ecosystem approach", there are a number of other definitions and descriptions in current use. These include the definition used by the OSPAR and Helsinki Commissions (Declaration of the First Joint Ministerial Meeting of the Helsinki and OPSAR Commissions, June 2003) and the description and eleven principles applied by the US Fish and Wildlife Service.

## Appendix 2

### References

References are to the Ramsar Web site (<http://ramsar.org>) and to Ramsar print publications, ([http://www.ramsar.org/lib/lib\\_handbooks2006\\_e.htm](http://www.ramsar.org/lib/lib_handbooks2006_e.htm)) especially the third edition of the "Ramsar Toolkit" (2007), ***The Ramsar Handbooks for the Wise Use of Wetlands***.

#### Guidelines on the wise use of wetlands

- Handbook 1**    **Wise use of wetlands** [2.4MB]  
A Conceptual Framework for the wise use of wetlands
- Handbook 2**    **National wetland Policies** [1.7MB]  
Developing and implementing National wetland Policies
- Handbook 6**    **Water-related guidance** [1.5MB]  
An Integrated Framework for the Convention's water-related guidance
- Handbook 7**    **River basin management** [3.7MB]  
Integrating wetland conservation and wise use into river basin management
- Handbook 8**    **Water allocation and management** [2.4MB]  
Guidelines for the allocation and management of water for maintaining the ecological functions of wetlands
- Handbook 16**    **Managing wetlands** [2.8MB]  
Frameworks for managing Ramsar sites and other wetlands