

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

This Ramsar Information Sheet has been converted to meet the 2009 – 2012 format, but the RIS content has not been updated in this conversion. The new format seeks some additional information which could not yet be included. This information will be added when future updates of this Ramsar Information Sheet are completed. Until then, notes on any changes in the ecological character of the Ramsar site may be obtained from the Ecological Character Description (if completed) and other relevant sources.

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

Compiled by the Western Australian Department of Conservation & Land Management (DCLM) in 1990. Updated by Roger Jaensch, Wetlands International – Oceania, on behalf of DCLM, in 1998, and by DCLM staff in 2000 and 2003.

FOR OFFICE USE ONLY.

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Designation date

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Site Reference Number

All inquiries should be directed to:

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2. Date this sheet was completed/updated:

October 2003

3. Country:

Australia

4. Name of the Ramsar site:

The precise name of the designated site in one of the three official languages (English, French or Spanish) of the Convention. Alternative names, including in local language(s), should be given in parentheses after the precise name.

Vasse – Wonnerup System, Western Australia

5. Designation of new Ramsar site or update of existing site:

Vasse – Wonnerup System was designated on 7 June 1990

The previous RIS was dated 1998

This RIS is for (tick one box only):

a) Designation of a new Ramsar site ; or

b) Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area

The Ramsar site boundary and site area are unchanged:

or

If the site boundary has changed:

- i) the boundary has been delineated more accurately ; or
- ii) the boundary has been extended ; or
- iii) the boundary has been restricted**

and/or

If the site area has changed:

- i) the area has been measured more accurately ; or
- ii) the area has been extended ; or
- iii) the area has been reduced**

Please see explanation at Item 9.

** **Important note:** If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site:

Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

- i) a **hard copy** (required for inclusion of site in the Ramsar List): ;
- ii) an **electronic format** (e.g. a JPEG or ArcView image) ;
- iii) a **GIS file providing geo-referenced site boundary vectors and attribute tables** .

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park, etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

8. Geographical coordinates (latitude/longitude, in degrees and minutes):

Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

Latitude: 33° 35' S to 33° 39' S; Longitude: 115° 22' E to 115° 28' E.

9. General location:

Include in which part of the country and which large administrative region(s) the site lies and the location of the nearest large town.

Vasse – Wonnerup System is in the Shire of Busselton (local authority) in the State of Western Australia (population ca. 1.95 million in 2003). It is immediately east of the town of Busselton (Shire population ca. 25,250 in 2003).

The Ramsar Site as originally nominated in February 1990 consisted of non-freehold wetland (including the Vasse Estuary portion of Reserve 31188) within the boundaries of the Vasse and Wonnerup estuaries and Wonnerup Inlet, and an adjoining area of non-freehold wetland (formerly part of Wonnerup Estuary) between Wonnerup Estuary and Forrest Beach Road. The Vasse, Sabina, Abba and Ludlow Rivers and the Deadwater were not included in the Site. Dryland parts of Sabina Nature Reserve (Reserve 31188) and dryland parts of Unallocated Crown Lands that extended into the estuaries were also not included.

In November 2000, the Site was extended to include:

- the remainder of Reserve 31188, which includes a part of the Sabina River;
- those parts of Tuart Forest National Park (Reserve 40250) that are between the Vasse – Wonnerup System Ramsar Site as originally nominated and Tuart Drive. This extension includes a length of the Abba River; however road reserves are not included.
- Nature Reserve 41568, which includes a substantial part of the northern shore of Vasse Estuary.

10. Elevation: (in metres: average and/or maximum & minimum)
Approximately 0 – 6 m (Australian Height Datum)

11. Area: (in hectares)
1115 ha

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

An extensive, shallow, nutrient-enriched, wetland system with widely varying salinities. Water levels in its two principal components, the Vasse and Wonnerup lagoons (former estuaries), are managed through the use of weirs (flood gates) with the aim of minimising flooding of adjoining lands and largely excluding seawater. The Site supports tens of thousands of resident and migrant waterbirds of a wide variety of species and the largest regular breeding colony of Black Swan in south-western Australia. The Site's close proximity to residential, farming and tourism areas presents a range of management issues and opportunities.

13. Ramsar Criteria:

Tick the box under each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11). All Criteria which apply should be ticked.

1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

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

[Formerly listed as **Criterion 3(a)** under the Pre-1999 Criteria]

More than 33,000 waterbirds have been counted (January 1986) at Vasse-Wonnerup System. Waterbird data indicate that more than 20,000 waterbirds use the Site each year. Thus the Site “regularly supports 20,000 waterfowl”.

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.

[Formerly listed as **Criterion 3(c)** under the Pre-1999 Criteria]

At least 1% of the Australian population of Black-winged Stilt *Himantopus himantopus* and at least 1% of the world population of Red-necked Avocet *Recurvirostra novaehollandiae* use Vasse-Wonnerup System in most years.

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Swan Coastal Plain

b) biogeographic regionalisation scheme (include reference citation):

Interim Biogeographic Regionalisation for Australia (IBRA) Version 5.1 (Cummings and Hardy 2000)

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

The Wonnerup and Vasse Estuaries are no longer true estuaries because inflow of seawater is largely prevented by floodgates installed on their outlet channels. The Estuaries now act as compensating basins for water discharging from the Ludlow, Sabina, Abba and Vasse Rivers. When the water level in the Estuaries rises above sea level, hydrostatic pressure opens the floodgates and allows water to flow out to Wonnerup Inlet and the sea. When the level drops the gates close, thereby preventing ingress of seawater.

The Vasse-Wonnerup System is shallow; almost all the wetland area has a maximum water depth of less than 1 metre and large areas dry out in late summer.

Water in the Vasse-Wonnerup System is fresh in winter and becomes saline in summer due to leakage past the floodgates and, since 1988, some seawater being allowed to enter (principally the Vasse Estuary). Groundwater flow might also contribute. Salinity in the Estuaries is generally less than 5 parts per thousand from June to August (due to river inflow), increasing during spring to reach about 15 parts per thousand by December/January, and seawater (35 parts per thousand) by February. In March/April the water in the estuaries can become hypersaline (sometimes exceeding 40 parts per thousand) due to evaporation (Sinclair Knight Merz 2003).

The Vasse-Wonnerup System experiences periods of extremely poor water quality, particularly during summer and autumn, when large phytoplankton blooms (sometimes of toxic cyanophyta) necessitate the erection of public health warning signs (Sinclair Knight Merz 2003). The nutrient enriched conditions in the system fuel a cycle of phytoplankton blooms followed by bloom collapses which deplete dissolved oxygen during the decomposition process, often to critical levels for the aquatic biota. Periods of oxygen depletion exacerbate the water quality problems by increasing the release of further nutrients from the sediment (particularly phosphorous), contributing to further phytoplankton blooms. As the predominant phytoplankton in the system is often nitrogen fixing cyanobacteria, phosphorous is usually the limiting nutrient for phytoplankton growth. A coordinated approach is being undertaken to address the water quality problems in the system (see item 27).

The Vasse-Wonnerup System consists of broad expanses of open water (except when dry) with fringing samphire and rushes. In some areas *Melaleuca* woodlands occur behind the samphire and eucalypt woodlands are found on higher ground. However all the area has been severely disturbed at various times in the past and much of it is currently cleared for agriculture.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

The site is situated in the Perth Basin, on a narrow, flat plain of marine and alluvial sediments, and is separated from the ocean by a narrow system of low dunes. The urban area of Busselton, including a large canal estate residential subdivision, surrounds much of the Vasse Estuary, particularly on the northern side, while some land to the southern side of the Site retains remnant Tuart *Eucalyptus gomphocephalus* Forest vegetation. The remaining areas are mostly freehold agricultural land used primarily for cattle grazing.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

The Vasse and Wonnerup Estuaries have an important role (artificial) in flood mitigation.

19. Wetland Types

a) presence:

Circle or underline the applicable codes for the wetland types of the Ramsar "Classification System for Wetland Type" present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines*.

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K • Zk(a)

Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp • Ts • U • Va •
Vt • W • Xf • Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

b) dominance:

List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

J, Ss, N, Xf

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

Remnant natural vegetation of the system is fairly uniform in arrangement. The samphire belt is dominated by *Sarcocornia blackiana* and *Halosarcia pergranulata*. The rush and sedge zone is dominated by *Juncus kraussii* but *Lepidosperma* cf. *leptostachyum* and *Carex divisa* are also common. The tree zone behind the rushes comprises *Melaleuca raphiophylla*, *M. hamulosa* and *M. cuticularis* in either single-species or mixed stands. *Gahnia trifida* and *Juncus pallidus* occur in the understorey. *Melaleuca* woodlands often give way to open woodlands of *Eucalyptus rudis*.

The vegetation of Tuart Forest National Park is dominated by open-forest of mature tuart *Eucalyptus gomphocephala*. Tall shrubs and small trees of Western Australian peppermint *Agonis flexuosa* occur as understorey in the forest. There are also some very small areas (< 1ha) of seasonal freshwater *Melaleuca* swamp. *Eucalyptus rudis* trees and some sedges occur along the Sabina and Abba Rivers.

The Tuart Forest National Park and Nature Reserves that were added to the Site in 2001 have contributed substantially to the conservation values of the Site by providing protected buffer zones for the Site's wetlands and some seasonal feeding habitat for waterbirds. Tree hollows in these areas

provide important breeding sites for Australian Wood Duck *Chenonetta jubata*, Australian Shelduck *Tadorna tadornoides* and possibly other duck species. Adult ducks have been observed moving their young from the forest to the wetlands.

The Vasse-Wonnerup system provides an important coastal habitat for waterbirds: 33 000 were counted there in January 1986. The wetlands supported 10 056 ducks and swans in 1984-85 and over 12 000 in 1985-86. More than 80 species of waterbird have been recorded in the system (exceeded in Western Australia only at the Swan Canning and Peel Harvey Estuaries), including five darters and cormorants, 13 herons and allies, 11 ducks and allies, eight rails, 27 shorebirds and six gulls and terns. Numbers of six species are higher than has been recorded elsewhere in south-western Australia. The following species are particularly abundant:

Black Swan	<i>Cygnus atratus</i>	3 460 Nov 1976
Australian Shelduck	<i>Tadorna tadornoides</i>	6 108 Nov 1989
Pacific Black Duck	<i>Anas superciliosa</i>	4264
Grey Teal	<i>A. gracilis</i>	14 000 Jan 1989
Red-necked Avocet	<i>Recurvirostra novaehollandiae</i>	4 000 Jan 1986
Wood Sandpiper	<i>Tringa glareola</i>	61 Jan 1986
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	2 300 Jan 1986
Long-toed Stint	<i>C. subminuta</i>	44 Jan 1986
Curlew Sandpiper	<i>C. ferruginea</i>	1 200 Jan 1986
Black-winged Stilt	<i>Himantopus himantopus</i>	5 000 Jan 1986

Other species occurring in significant numbers include:

Australian Pelican	<i>Pelecanus conspicillatus</i>	750 Feb 1986
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	350 Feb 1986
Great Egret	<i>Ardea alba</i>	237 Feb 1985
Yellow-billed Spoonbill	<i>Platalea flavipes</i>	140
Eurasian Coot	<i>Fulica atra</i>	4 000 Jan 1986
White-faced Heron	<i>Egretta novaehollandiae</i>	250
Australasian Shoveler	<i>Anas rhynchos</i>	500
Whiskered Tern	<i>Chlidonias hybridus</i>	180
White-winged Black Tern	<i>C. leucopterus</i>	70

Thirteen waterbird species are known to breed at the site, including the largest regular breeding colony of Black Swans in south-western Australia (see **item 20**).

Waterbird count data are from Royal Australasian Ornithologists Union (now Birds Australia) and Western Australian Department of Conservation and Land Management ground and aerial surveys 1981-91, Tingay et al. (1977), Jaensch et al. (1988), Lane (1990, 1997a, 1997b, 2002), and R. Jaensch, unpublished data (1989).

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14, Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

There are no nationally rare, threatened or endemic wetland plants known at the Site. Problematic exotic plants including Bulrush *Typha orientalis* and Arum Lily *Zantedeschia aethiopica* are established in and around the Sabina and Abba Rivers.

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

The Site supports the largest regular breeding colony of Black Swan *Cygnus atratus* in south-western Australia. More than 150 pairs of swans nest in most years and breeding is often successful. The system frequently supports >1% of the regional (and Australian) population of Red-necked Avocets *Recurvirostra novaehollandiae* and Black-winged Stilts *Himantopus himantopus*. Another five shorebirds have been recorded in numbers greater than 1% of the national population: Wood Sandpiper *Tringa glareola*, Sharp-tailed Sandpiper *Calidris acuminata*, Long-toed Stint *C. subminuta*, Curlew Sandpiper *C. ferruginea* and Common Greenshank *Tringa nebularia* (see item 18). The Site's migratory shorebirds are listed under the Japan – Australia Migratory Bird Agreement (JAMBA) and the China – Australia Migratory Bird Agreement (CAMBA) and are specially protected by the Commonwealth *Environment Protection and Biodiversity Conservation Act* (1999).

The native water rat *Hydromys chrysogaster* has been recorded at the Site, in several locations.

23. Social and cultural values:

a) Describe if the site has any general social and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

The major social value is that parts of the wetland are used for summer grazing by cattle; this is considered compatible with maintaining the ecological character of the wetland.

The Ludlow Tuart Forest is of historical interest because it was among the first areas to be gazetted as State Forest in Western Australia, and was the site of the first formal training school for forest managers in the State. Several historic buildings are situated beside the wetland, notably Wonnerup House (National Trust).

Floodgates were installed on the outlet channels of the Vasse and Wonnerup Estuaries in 1908 and were replaced in 1927. They are scheduled for replacement again in 2004. The heritage value of the 1927 structures has been recognised, and their construction shall be documented and photographed prior to their demolition, and parts will be saved for inclusion in a proposed interpretive centre (Sinclair Knight Merz 2003).

The Sabina and Abba Rivers are listed as important mythological Aboriginal heritage sites associated with the Waugal and specially protected by the Western Australian Aboriginal Heritage Act (1972).

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning?

If Yes, tick the box and describe this importance under one or more of the following categories:

- i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:
- ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:
- iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

- iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

a) within the Ramsar site:

The Site as originally nominated included the Vasse estuary wetland portion of Sabina Nature Reserve (Res 31188); an area of Crown leasehold land at the north-eastern end of the Site, and wetland portions of some Unallocated Crown Lands. Areas of freehold land that extended into the estuaries were not included.

Land added to the Site in 2001 comprised Nature Reserve (the remainder of Sabina Nature Reserve; and all of Reserve 41568) and National Park (part of Tuart Forest National Park: Reserve 40252). The Nature Reserves and National Park are vested in the Conservation Commission of Western Australia (appointed by the State Government). The purpose of Reserves 31188 and 41568 is "Conservation of Flora and Fauna" and the purpose of Reserve 40250 is "National Park".

b) in the surrounding area:

Surrounding areas include freehold (privately owned) land, Unallocated Crown Land and Crown Reserves for purposes other than conservation.

25. Current land (including water) use:

a) within the Ramsar site:

The principal land use at the Site is nature conservation and education (see item 30). The Site also plays a vital role in flood protection for the town of Busselton.

b) in the surroundings/catchment:

A major residential canal estate is being developed on the northern side of Vasse Estuary and there are residential subdivisions on the southern side. The remainder of Vasse Estuary and most Wonnerup Estuary is surrounded by farmland used principally for cattle grazing and potato cropping (Wonnerup Estuary). There is little recreational use of the wetlands.

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

a) within the Ramsar site:

Past management of water levels in the system has been largely satisfactory for waterbirds.

Excessive algal blooms in the lower estuary channels have at times resulted in sudden, mass fish deaths, mostly during the summer period. The principal cause of the deaths is thought to be temporary declines in dissolved oxygen concentrations due to night-time respiration of algal blooms (Lane et al., 1997). A coordinated approach is being undertaken to address this problem (see **Item 27**).

The existing timber floodgates have been in operation since 1927 and are due to be replaced in 2004. The new reinforced concrete floodgates will be constructed within about 20 m of the current positions. To ensure that construction does not impact on the Site's ecological character, an environmental management plan has been prepared (Sinclair Knight Merz 2003).

b) in the surrounding area:

Urban (housing estate) development has continued to expand in the immediate vicinity of the Site and there is continual pressure to allow land developments that may impact on the Site.

There is a proposal to mine titanium minerals in a section of State Forest adjoining Tuart Forest National Park (Cable Sands Pty. Ltd., 2003; EPA 2003).

27. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

Part of the wetland is included in Nature Reserve 31188. In addition, since the Site was originally nominated in February 1990, one new Nature Reserve (41568) on the edge of Vasse Estuary has been declared and additional reserves are in the process of being gazetted.

Parts of the Site are listed on the Register of the National Estate.

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate):

Ia ; Ib ; II ; III ; IV ; V ; VI

c) Does an officially approved management plan exist; and is it being implemented?:

No management plan or interim management guidelines currently exist for Reserves 41568 and 31188, and there is no formal management plan for Tuart Forest National Park (see item 26).

d) Describe any other current management practices:

In 1997, community concern about sudden, mass fish deaths, death of fringing vegetation and loss of pasture production on adjoining land led to the formation of the Vasse Estuary Technical Working Group, which has reviewed the history of the management of the estuaries, and made a number of recommendations to reduce mass fish deaths in an environmentally acceptable manner (Lane et al., 1997). To reduce the incidence and severity of fish deaths, several measures have been used in the past: artificial openings of the Wonnerup Inlet sand bar each summer, increased harvesting of fish by professional netters, and partial openings of the flood gates to allow fish to escape and to raise water level. Since 1997, daily visual monitoring of fish behaviour and water quality in the lower reaches of the system has occurred during the spring and summer period to anticipate and prevent mass fish deaths (White, 1999; Elscot, 2000).

A monitoring program that aims to detect changes in the distribution and health of fringing vegetation of the Vasse Estuary, relative to the water regime and salinity (which is affected by floodgate openings), has been developed and permanent transect areas have been established (Froend, 1999; Froend et al., 2000).

Land Conservation District Committees and individual landowners are taking action to reduce nutrient discharge from farmland in the catchment. Action Plans have been prepared to guide landowners undertaking revegetation and rehabilitation along the upper Vasse River and the Sabina and Ludlow Rivers (GeoCatch Network Centre, 2000; GeoCatch, 2002). Guidelines for the management of farmland adjacent to the wetlands have also been developed (Oldfield 2002).

The Geographe Catchment Council (GeoCatch), The Department of Environment (formerly the Water and Rivers Commission) and the Shire of Busselton are working cooperatively, with community support, to implement the Lower Vasse River Cleanup Program. The program, which aims to improve the ecological health of the Lower Vasse River (which is located immediately upstream of the Site), involves a number of key components including: rehabilitation and revegetation to restore river ecology; dredging to remove nutrient rich sediment; use of a modified clay product to reduce phosphorous availability in the system thereby limiting algal blooms; and the implementation of best management practices for stormwater. The program will assist to improve water quality within the Site.

Control of feral animals (foxes *Vulpes vulpes* and rabbits *Oryctolagus cuniculus*) is undertaken regularly within the Site, notably monthly fox baiting in Tuart Forest National Park and Reserve 31188 to reduce fox predation on ducks that nest in the tuart forest and walk their young to the wetlands. A program has been established to control the spread of Arum Lily *Zantedeschia aethiopica*.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

A conservation strategy has been prepared for the Busselton wetlands, which includes the Site (Western Australian Planning Commission 2003). There are plans to reserve further areas adjacent to the Site. A management plan for Tuart Forest National Park will be prepared as part of the implementation of the proposed Ludlow Titanium Minerals Mine if the proposal is approved (Cable Sands Pty. Ltd., 2002; EPA, 2003).

29. Current scientific research and facilities:

e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

The Western Australian Department of Conservation & Land Management and the Department of Environment (formerly the Water and Rivers Commission) are collaboratively monitoring waterbirds, water quality and fish behaviour in the estuaries. There are no research facilities. See also item 26.

30. Current communications, education, participation and awareness (CEPA) activities related to or benefiting the site:

e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

A bird hide at Malbup Creek has been upgraded and a self-guided walk-trail commencing from Layman Picnic Area runs parallel to Malbup Creek and partially along the lower reaches of the Abba River within the Tuart Forest National Park. Interpretive signage located at the Layman Picnic area provides information on the extent and importance of the wetlands while interpretive signs describe the ecology of the rare Western Ringtail Possum *Pseudocheirus occidentalis*, which is present at the site. Pamphlets describing the birdlife of the estuaries have been prepared (Lane 1997a,b).

A school-based education program, led by the Western Australian Department of Conservation & Land Management (DCLM), exploring - among other things - the forest/wetland interface, has been in place since 1994. In the past, DCLM has also conducted waterbird identification and "Frog Watch" activities at the Site.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

The Site is used for low-impact, nature-based recreation activities, predominantly bird watching. Wonnerup Inlet is a popular recreational fishing location. See also item 30.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept of Agriculture/Dept. of Environment, etc.

Territorial: The State Government of Western Australia.

Functional: The National Parks and Nature Conservation Authority (vesting) and the Western Australian Department of Conservation & Land Management (management).

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

The Blackwood District (based in Busselton) of the Central Forest Region, Western Australian
Department of Conservation & Land Management.

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

- Cable Sands Pty Ltd. (2002). Ludlow Titanium Minerals Mine: Environmental Review and Management Program. Cable Sands Pty Ltd (WA), Bunbury.
- Cummings, B. and Hardy, A. (2000). Revision of the Interim Biogeographic Regionalisation for Australia (IBRA) and Development of Version 5.1 – Summary Report. Environment Australia, Canberra. (Also available online at <http://www.ea.gov.au/parks/nrs/ibra/version5-1/summary-report/index.html>).
- Elscot, S.V. (2000). Monitoring of fish behaviour in the lower reaches of the Vasse-Wonnerup wetland system during the summer of 1999/2000. Unpublished technical report for the Department of Conservation & Land Management and the Geographe Catchment Council, Busselton.
- EPA (1999). Proposal to construct a road across Vasse Estuary (Ford Road), Shire of Busselton: Report and recommendations of the Environmental Protection Authority, Bulletin 940.
- EPA (2000). Proposal to construct a road across Vasse Estuary (Ford Road), Shire of Busselton: Advice to the Minister for the Environment from the Environmental Protection Authority under Section 44 of the Environmental Protection Act 1986, Bulletin 975.
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Attachment A: Maps



