

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

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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.

Lake Warden System, Western Australia

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

Lake Warden 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** ☐

**** 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: (approx.) 33° 47' S to 33° 50' S; Longitude: (approx.) 121° 51' E to 122° 01' 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.

The Lake Warden System is in the Shire of Esperance (local authority) in the State of Western Australia (population ca. 1.95 million in 2003). It is located approximately 5 km north to north-east of the town of Esperance (Shire population ca. 13,100 in 2003).

10. Elevation: (in metres: average and/or maximum & minimum)

Approximately 4 – 5 m AHD (Australian Height Datum)

11. Area: (in hectares)

1 999 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.

A system of saline lakes and marsh areas behind beach-front dunes. The lakes support large numbers of waterbirds, including a significant proportion of the global Hooded Plover population.

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
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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 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.

[Formerly listed as **Criterion 1(a)** under the Pre-1999 Criteria]

The Site is a good example of saline coastal lakes typical of the south coast of Western Australia.

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 30,000 waterbirds have been recorded using the Lake Warden System. The number of individual waterbirds that use the lake probably exceeds 20,000 regularly, and the annual data on water depth suggest that conditions are suitable for use by 20,000 waterbirds at least several times within a 25 year period; in the context of wetland availability in Western Australia this is considered sufficient evidence of regular use by 20,000 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.

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

The Site supports more than 1% of the global population of Hooded Plover *Thinornis rubricollis*. The global population of this species, which is restricted to southern Australia, is less than 10,500 individuals, while the Western Australian population numbers less than 6000 individuals (Wetlands International 2002). Over 240 have been recorded on one occasion at Lake Warden (February 1985), which constitutes 2.4% of the global population and 4% of the Western Australian population.

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:

Esperance Plains

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.

Water in the lakes ranges from moderately to very saline; water regimes range from almost permanent (only drying out occasionally at the end of summer) to ephemeral. There are also some springs which give rise to small, shallow, brackish wetlands such as that at the eastern end of the wetland area. The lakes contain either completely open water or dead trees around the periphery: there is no emergent vegetation although trees and rushes grow on the shorelines around the lakes. The lakes are supplied by a mixture of groundwater and surface run-off (see item 18). Mullet Lake and wetlands to the east of it are located in a large samphire marsh. Wheatfield Lake and wetlands westwards occur in stabilised sand-dunes which support low woodland on the higher ground between the lakes.

17. Physical features of the catchment area:

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

Water flows into Wheatfield Lake and, in wetter years, into Lake Warden from Coramup Creek, which originates 45 kilometres north. Lake Warden also receives flow from creeks originating 9 and 14 kilometres north-northwest (Melijinup, Buckenerup and Monjingup Creeks). Water flows into Mullet and Station Lakes from Neridup Creek and Bandy Creek, which originates 60 kilometres north. In wetter years, Mullet and Station Lakes overflow into the Southern Ocean (DCLM 1999). The catchment of the Lake Warden System encompasses a total area of approximately 171,000 ha, of which more than 80% is cleared agricultural land.

18. Hydrological values:

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

A detailed study of the hydrology of the system is currently being undertaken by the Department of Conservation & Land Management in collaboration with the University of Western Australia. Preliminary results indicate that Lake Warden is primarily groundwater fed and water levels decline through evaporation. In contrast, Lakes Windabout, Woody and Wheatfield are driven by a combination of groundwater and surface water while Mullet and Station Lakes are surface water driven. The groundwater system under the lakes is complex, with two main aquifers present: the shallow, perched Pallinup aquifer, and the deeper Werrilup aquifer. The Lake Warden system is hydrologically very complex with seven main, large lakes and over 90 satellite lakes driven to varying degrees by groundwater flow and surface inflows resulting in a very high diversity of wetland habitats.

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 • I • 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.

R, J, Q

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.

The chain of lakes provides important habitat for waterbirds: 16,719 were counted in Lake Warden in November 1982, 6,775 in Windabout Lake in May 1985 and 2,680 in Station Lake in January 1983. The Lake Warden wetlands regularly support more than 10,000 ducks: 5,500 Australian Shelducks *Tadorna tadornoides* and 3,500 Black Swans *Cygnus atratus* were counted in Lake Warden in November 1982 and 5,500 Grey Teal *Anas gracilis* in Windabout Lake in May 1985. Up to 10,000 Banded Stilts *Cladorhynchus leucocephalus* have been recorded in Lake Warden (September 1982). Over 160 Freckled Duck *Stictonetta naevosa*, 1100 Musk Duck *Bizuria lobata*, 290 Pink-eared Duck *Malacorhynchus membranaceus*, 1400 Hardhead *Aythya australis*, 1200 Hoary-headed Grebe *Poliiocephalus poliocephalus*, 160 Australian Pelican *Pelecanus conspicillatus*, and 50 Yellow-billed Spoonbill *Platalea flavipes* were recorded at Lake Warden Nature Reserve during February 2003 when drought conditions prevailed Australia wide (A. Clarke, DCLM, unpublished data). A total of 59 waterbird species have been recorded using the Lake Warden wetlands, including 17 migratory species listed under the Japan – Australia Migratory Bird Agreement (JAMBA) and the China – Australia Migratory Bird Agreement (CAMBA) which are specially protected by the Commonwealth *Environment Protection and Biodiversity Conservation Act* (1999), with at least 5 species breeding within the system (Jaensch et al. 1988).

Melaleuca cuticularis trees grow down to the water in all the wetlands although in some places there are narrow zones of rushes, principally *Baumea juncea*. Other rushes and sedges, including *Juncus kraussii*, *Isolepis nodosa* and *Gahnia trifida*, also grow around the shoreline in the tree zone. In some wetlands towards the eastern end of the system, *Melaleuca preissiana* grows in the fringing tree zone as well as *M. cuticularis*. At the western end *Acacia cyclops* frequently grows behind *Melaleuca cuticularis* as the land rises, before it is replaced by low woodland of *Banksia speciosa* or by mallee and scrub. At the eastern end of the system the fringing tree vegetation gives way to samphire species, especially *Halosarcia pterygosperma*, *H. pergranulata* and *Sarcocornia blackiana*, as the ground drops away from the embankment around the wetland. In higher parts of the marsh the grass *Stipa luncifolia* grows profusely and in areas fed by springs *Suaeda australis* occurs.

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, endangered or threatened species known at the site.

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.*

In terms of numbers of birds occurring there, the Lake Warden wetlands are among the most important sites in south-western Australia for Chestnut Teal *Anas castanea* (300 at Lake Warden in July 1981). They are also an important site for Hooded Plovers *Thinornis rubicollis* a rare species restricted to southern Australia (240 birds were recorded in Lake Warden in February 1985). Hooded Plovers regularly breed at Station Lake and the Lake Warden wetlands support well over 1% of the population of this species in south-western Australia; the entire Australian population is estimated to be less than 10 500 birds (Wetlands International 2002). Data are from Jaensch et al. (1988).

More than 30,000 individual waterbirds were recorded using the Lake Warden System between 1981 and 1985 (Jaensch et al. 1988), and though no other counts have reached 20,000, the number of individual waterbirds that use the system regularly probably exceeds 20,000.

The Recherche Cape Barren Goose *Cereopsis novaehollandiae grisea*, which is listed as a vulnerable species that is specially protected by the Commonwealth Environment Protection and Biodiversity Conservation Act (1999), was recorded at Lake Warden Nature Reserve in surveys undertaken between 1981-85 (Jaensch et al. 1988).

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 the use of Windabout and Woody Lakes for water-skiing and sailing.

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 Ramsar site is contained in Lake Warden Nature Reserve (32257), Woody Lake Nature Reserve (15231) and part of Mullet Lake Nature Reserve (23825), which are vested in the Conservation Commission and managed by the Department of Conservation & Land Management. No freehold land is included in the Ramsar site.

b) in the surrounding area:

The surrounding area includes freehold land, leasehold land and Recreation and Nature Reserves.

25. Current land (including water) use:

a) within the Ramsar site:

Windabout and Woody Lakes are used for water-skiing and sailing. The area around the lakes is used for horse-riding and there is an extensive network of vehicle tracks.

b) in the surroundings/catchment:

Much of the surrounding land is used for agriculture, primarily cereal cropping and grazing. The urban area of the Esperance townsite lies to the south of the site, and a golf course is located immediately south of Lake Warden Nature Reserve.

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:

The extensive vehicular use around the wetlands and frequent fires are leading to degradation of the environment and efforts are being made to restrict access. Water-skiing and, to a lesser extent, sailing may have an adverse effect on the use of the lakes by birds. The Department of Conservation & Land Management continues to monitor these activities, which are restricted to Woody and Windabout Lakes.

b) in the surrounding area:

There is evidence that the saline groundwater table is rising in the surrounding catchment at rates of between 10-30 cm each year (Short et al. 1995).

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.

The wetlands are contained within Nature Reserves 32257, 15231 and 23825. The Lake Warden System is listed as a 'Natural Diversity Recovery Catchment' under the State Salinity Action Plan (Government of Western Australia 1996).

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?:

A management plan has been prepared for the Esperance Lakes Nature Reserves which include the Lake Warden Ramsar Site (DCLM 1999).

d) Describe any other current management practices:

As part of the Salinity Action Plan's wetland vegetation monitoring program, four permanent vegetation monitoring transects have been installed at Wheatfield Lake and a number of water monitoring bores have been installed in and around the Woody Lake Nature Reserve (DCLM 1999). The Department of Conservation and Land Management has prepared a 'Recovery Farm Kit' to assist rural landholders within the catchment to implement strategies aimed at conserving and enhancing natural diversity and improving the quality of water entering the Lake Warden System wetlands (Massenbauer 2000). Other 'Recovery Catchment' initiatives include: the establishment of over 1000 ha of revegetation to act as biodiversity corridors, buffers and water quality filters; over 350 km of fencing to protect revegetation and remnant vegetation (75% of the catchment's remnant vegetation is now fenced).

The Department of Conservation & Land Management is monitoring the spread of dieback disease caused by *Phytophthora cinnamomi* within the Reserves. A Limited Rural Strategy which provides a framework of land capability criteria under which potential subdivisions will be assessed has been adopted by the Esperance Shire Council for lands to the north of the Lake Warden System (DCLM 1999). The Esperance Land Conservation District Committee has prepared a catchment planning strategy for the Esperance Region which includes the catchment of the Lake Warden System (Platt et al. 1996). The strategy aims to facilitate the best use of water resources and to minimise land and water degradation due to changes in the catchment water balance; the development and implementation of 'sustainable', high water use farming systems is integral to the strategy. The Lake Warden, Woody Lake and Mullet Lake Nature Reserves are listed on the Register of the National Estate.

28. Conservation measures proposed but not yet implemented:

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

The Department of Conservation and Land Management is preparing a recovery catchment plan for the Lake Warden System. Two freehold properties totalling 440 ha have been purchased and are proposed for addition to the Ramsar Site.

29. Current scientific research and facilities:

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

Duck numbers were monitored at least twice yearly by the Royal Australasian Ornithologists Union (now Birds Australia) and the Department of Conservation & Land Management during the 1980s and early 1990s. A conceptual model of the hydrogeology of the catchment of the Lake Warden System has been developed to assist in the preparation of a catchment water balance model being developed to assist in regional catchment and farm management planning (Short 2000). The Water and Rivers Commission has installed automatic water quality and flow recording stations outside the reserves to collect data on the quantity and quality of water flowing into Lake Warden (DCLM 1999). The Department of Conservation and Land Management, in collaboration with the University of Western Australia, has been investigating the surface and groundwater processes operating in the Lake Warden System catchment between 2000 and 2003. The study gathered a large dataset which included: electromagnetic surveys of wetland hydrology, bathymetric surveys for lake volume calculations, weekly lake bed depth gauging, automated water quality and flow gauging, monthly groundwater depth and water quality monitoring, and fortnightly lake water quality monitoring. Since 1994, the Esperance Senior High School, in conjunction with the Department of Conservation & Land Management, has monitored the health of the wetlands under a 'Ribbons of Blue' project. In summer 2003, the Department of Conservation and Land Management undertook a survey of waterbird usage of these wetlands (and others in the Esperance region) during drought conditions that prevailed Australia-wide (Department of Conservation and Land Management unpublished data).

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 range of information, interpretation and education programs are being developed for the Site by the Department of Conservation and Land Management (DCLM 1999). Signs indicating the system's Recovery Catchment and Ramsar Wetland status have been erected at the site. A 3.6 km interpretive walk trail with 20 information panels has been installed and an information brochure about the trail (known as the Kepwari trail) has been prepared. The Department of Conservation and Land Management has also prepared a Lake Warden student curriculum package for upper primary and lower secondary school students.

31. Current recreation and tourism:

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

Windabout and Woody Lakes are used for water-skiing and sailing. The area around the lakes is used for horse-riding and there is an extensive network of vehicle tracks.

32. Jurisdiction:

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

Territorial: State Government of Western Australia.

Functional: The Conservation Commission (vesting) and the Western Australian Department of Conservation & Land Management (management on behalf of the Conservation Commission).

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 Esperance District of the South Coast Region of the 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.

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>).

DCLM. 1999. Esperance Lakes Nature Reserves Management Plan 1999-2009. Department of Conservation and Land Management and the National Parks and Nature Conservation Authority, Perth.

Government of Western Australia. 1996. Western Australian Salinity Action Plan. Prepared by Agriculture Western Australia, Department of Conservation and Land Management, Department of Environmental Protection, and Water and Rivers Commission for the Government of Western Australia.

Jaensch, R.P., Vervest, R.M. and Hewish, M.J. (1988). Waterbirds in nature reserves of south-western Australia, 1981-1985: reserve accounts. Royal Australasian Ornithologists Union Report 30, 1-290.

Massenbauer, T. 2000. Lake Warden Recovery Farm Kit. Department of Conservation and Land Management, Esperance (South Coast District).

Platt, J., Nicholas, B., Short, R. and Gee, S. 1996. Esperance Region Catchment Planning Strategy. A project of the Esperance Land Conservation District Committee supported by the National Landcare Program and Agriculture Western Australia, Esperance.

Short, R. and Skinner, G. 1995. Hydrology and Geology in Relation to Salinity on the South Coast of Western Australia. CLIMA Technical Report 4.

Short, R. 2000. A conceptual hydrogeological model for the Lake Warden recovery catchments, Esperance, Western Australia. Prepared for the National Land and Water Resource Audit Dryland Salinity Theme – Project 3 by Agriculture Western Australia, Esperance.

Wetlands International. 2002. Waterbird Population Estimates – Third Edition. Wetlands International Global Series Number 12. Wageningen, The Netherlands.

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