Information Sheet on Ramsar Wetlands (RIS) – 2009-2012 version

Available for download from http://www.ramsar.org/ris/key_ris_index.htm.

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).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 14, 3rd edition). A 4th edition of the Handbook is in preparation and will be available in 2009.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

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

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

Department of Primary Industries, Parks, Water and Environment (DPIPWE)
GPO Box 44
HOBART Tasmania 7001
Australia
Ph: +61 3 6233 8011

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2. Date this sheet was completed/updated:
July 2012

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3. Country:
Australia

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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.
Moulting Lagoon

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

This RIS is for (tick one box only)**:**
a) Designation of a new Ramsar site ❑; or
b) Updated information on an existing Ramsar site ☑

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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:

There has not been any change in the ecological character of the site.

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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

The boundary of Moulting Lagoon Ramsar site is shown as Lot 1 on Central Plan Register Number (CPR) 5649 from the Tasmanian Information and Land Services, Department of Primary Industries, Water and Environment. CPR 5649 horizontal datum is Australian Geodetic Datum (AGD66) Universal Transverse Mercator Projection Australian Map Grid (UTM AMG66) and Australian Height Datum (Tasmania) for vertical datum. The boundary of Moulting Lagoon Ramsar site is aligned to Moulting Lagoon Game Reserve S.R. 235 of 1988 LD951, excluding the separate land parcel referenced as LPI HVJ29 located to the north east of the main land parcel of Moulting Lagoon Game Reserve..

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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: 42°02' 00" S; Longitude: 148°10' 00 E"

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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.
Moulting Lagoon is situated on the central east coast of Tasmania, between the townships of Swansea and Bicheno and approximately 6 km north-west of the township of Coles Bay. Moulting Lagoon is a large estuary at the mouths of the Swan and Apsley Rivers adjacent to, and contiguous with, the Apsley Marshes (another Ramsar site). The estuary lies at the head of Great Oyster Bay where the Freycinet Peninsula extends offshore. The lagoon, plus several sections of coastal reserve surrounding it, and an additional area of dry land 1 km north, comprises the Moulting Lagoon Game

Reserve. The site is in the Glamorgan Spring Bay municipality which had a population of 3,989 in 2001 (Australian Bureau of Statistics 2005).

10. Elevation: (in metres: average and/or maximum & minimum)
The majority of the site is less than 20 m ASL.

11. Area: (in hectares)
4,507 hectares

12. General overview of the site:
Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

Moulting Lagoon is a large estuary at the mouths of the Swan and Apsley Rivers adjacent to, and contiguous with, the Apsley Marshes (another Ramsar site). The lagoon, plus several sections of coastal reserve surrounding it, and an additional area of dry land 1 km north, comprises the Moulting Lagoon Game Reserve. The estuary is recognised as one of high conservation significance for Tasmania (Edgar et al. 1999). The site provides an important resting and breeding ground for about one hundred resident and migratory birds species, and an important drought refuge.

The lagoon supports a number of species and communities which are rare or vulnerable in Tasmania. It is a significant site for the Common greenshank (*Tringa nebularia*) which is listed under both the China - Australia Migratory Bird Agreement (CAMBA) and the Japan - Australia Migratory Bird Agreement (JAMBA). The lagoon regularly supports the largest known Tasmanian flock of the migratory Greenshank. The site supports one waterbird species listed as threatened in Tasmania, the Eastern curlew (*Numenius madagascariensis*, endangered, Tasmanian *Threatened Species Protection Act 1995* (TSPA)) a migratory wader. The site also supports a number of flora species listed as threatened in Tasmania; Golden spray (*Viminaria juncea* – endangered, TSPA) for which Moulting Lagoon is the only reserved site in Tasmania; Sea clubsedge *(Bolboschoenus caldwellii* – rare, TSPA)); Southern swamp grass (*Amphibromus neesii* – rare, TSPA); Largefruit seatassel (*Ruppia megacarpa* - rare, TSPA); and Spreading watermat (*Lepilaena patentifolia* – rare, TSPA) for which the lagoon is recognised as a key site.

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 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.
Moulting Lagoon is an excellent example of a large estuary formed behind a bayhead sandspit. It is one of only two such areas in the Tasmanian Drainage Division. The estuary is recognised as one of high conservation significance for Tasmania (Edgar et al. 1999). The site forms part of the Moulting Lagoon – Great Oyster Bay long-lived graben system (Houshold pers. comm.), possibly related to Gondwanan break-up and possibly structurallyand geomorphologically still active. The site is also recognised as a wetland in good condition for Tasmania (Dunn 2005).

Criterion 3: Supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.
The lagoon supports a number of species and communities which are rare or vulnerable in Tasmania. It is a significant site for the Common greenshank (*Tringa nebularia*) which is

listed under both the China - Australia Migratory Bird Agreement (CAMBA) and the Japan - Australia Migratory Bird Agreement (JAMBA). The lagoon regularly supports the largest known Tasmanian flock of the migratory Greenshank. The site supports one waterbird species listed as threatened in Tasmania, the Eastern curlew (*Numenius madagascariensis*, endangered, Tasmanian *Threatened Species Protection Act 1995* (TSPA)) a migratory wader. The site also supports a number of flora species listed as threatened in Tasmania; Golden spray (*Viminaria juncea* – endangered, TSPA) for which Moulting Lagoon is the only reserved site in Tasmania, Sea clubsedge *(Bolboschoenus caldwellii* – rare, TSPA)), Southern swamp grass (*Amphibromus neesii* – rare, TSPA), Largefruit seatassel (*Ruppia megacarpa* - rare, TSPA) and Spreading watermat (*Lepilaena patentifolia* – rare, TSPA) for which the lagoon is recognised as a key site.

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.
The site provides an important resting and breeding ground for about one hundred species of resident and migratory birds, and an important drought refuge. During the year 2002, the driest summer for Tasmania in 100 years, counts recorded significantly higher numbers of Black swan and Australian shelduck (*Tadorna tadornoides*) (Blackhall pers. comm). The number of Black swans in 2002 was 18,788, which was more than double the long term average of 8,000 birds. The number of Australian shelducks in 2002 was 2,688, which was also double the long term average number of birds. The lagoon is an important breeding area for Black swan (*Cygnus atratus*) with approximately 80% (approximately 1,000 pairs) of the Tasmanian population breeding there (Hemsley 1973).

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.

Please set out this information in the table below (see also sample information in table)

English Name	Scientific Name	Count (year)	1% Threshold
Black Swan	*Cygnus atratus*	Black swan (*Cygnus atratus*) counts have exceeded this threshold (10,000 individuals) in eight years of the 19 years of record (1992 – 2010), with an average maximum count of 10,350 individuals.	10,000
Pied oystercatcher	*Haematopus longirostris*	Pied oystercatcher (*Haematopus longirostris*) counts have exceeded this threshold (110 individuals) in 14 of the 19 years of record (1992 – 2010), and the average maximum count is 162 individuals.	110
Pacific gull	*Larus pacificus pacificus*	Pacific gull (*Larus pacificus*) Victorian/Tasmanian subspecies counts have exceeded this threshold (50 individuals) in 11 of the 19 years of record (1992 – 2010), and the average maximum count is 60 individuals.	50

Moulting Lagoon regularly supports 1% of the individuals of 3 waterbird species (Wetlands International 2002):

- Black swan (*Cygnus atratus*) – Counts of this species at the site have exceeded 1% of the Australian population estimate of 300,000-400,000, in each of the previous 10 years.
- Pied oystercatcher (*Haematopus longirostris)* – Counts have exceeded 1% of the Australian population estimate of 11,000, in 8 of the past 10 years.
- Pacific gull (*Larus pacificus pacificus*) – Counts have exceeded 1% of the Victorian/Tasmanian subspecies population estimate of 4,950, in 5 of the past 10 years.

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.

Moulting Lagoon and the Apsley Marshes provide a linkage between the inland waters of the Apsley River and the Southern Ocean. Regular migrations of short-finned eels (*Anguilla australis*), both on their seaward migration to breed as well as returning juveniles, are reported (Hale and Butcher 2011). In addition, black bream (*Acanthopagrus butcheri*) are known to travel up the drains, via Moulting Lagoon into the Apsley Marshes Ramsar Site in order to spawn. Australian grayling (vulnerable, EPBC Act and TSPA) have also been recorded in the river upstream and presumably would use the site as a migratory route during breeding. Including the above, a total of 36 species of fish has been recorded within the estuary system,

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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:

Tasmanian Drainage Division, Australian Drainage Divisions

b) biogeographic regionalisation scheme (include reference citation):Commonwealth of Australia (Bureau of Meteorology), 2011, Australian Hydrological Geospatial Fabric. For more info on the Geofabric see - http://www.bom.gov.au/water/geofabric/.

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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.

Moulting Lagoon formed due to the partial closure of the mouths of the Swan and Apsley Rivers, due to the creation of a Holocene bayhead spit and associated dunefield between 10,000 and 6,000 years ago. The lagoon is a complex estuarine system where sediment delivered by the Swan River, and to a much lesser extent the Apsley River, is redistributed throughout by tidal flows. Distinct tidal channels are found between Swanwick and Barney Wards Bay, upstream of which a submerged tidal delta is found (Houshold pers. comm).

A well developed alluvial delta is found at the mouth of the Swan River. The Apsley River mouth is no longer actively prograding as most sediment is trapped in the marshes. Distinct tidal channels at the southern end of the marshes suggest that it is being eroded to some extent by tidal flows. Sediment accumulation rates in the lagoon have undoubtedly increased since European settlement. In recent years earthmoving machinery has been used to channelise rivers and construct levees in the Swan catchment. Deep channelisation and leveeing of the Wye River has caused significant erosion of streambed and adjacent floodplain sediments. The finer fractions are presently adding to the Swan River's suspended load, and there is a possibility that coarser material may reach the Swan as headcuts erode more material from the lower Wye River floodplain (Houshold pers. comm).

At the mouth of Pelican Bay is what appears to be a relic bayhead spit partially blocking a previous river course. The age of this feature requires assessment (Houshold pers. comm).

The underlying bedrock is predominantly Jurassic dolerite.

The maximum depth of water is 8 m at the mouth of the Swan River, but a typical depth in the lagoon is only 1-1.5 m. The pH is 7. The average annual rainfall of the area is 500 - 625 mm, the average annual rainfall recorded at Swansea being 614 mm.

17. Physical features of the catchment area:
Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

Catchment areas of the two rivers that flow into Moulting Lagoon total just over 900 square kilometres; 228 square kilometres for the Apsley River and 682 square kilometres for the Swan River. Both rivers are subject to intense flooding with flow rates varying considerably during the year (Rivers and Water Supply Commission 1983). The surrounding area is one of the earliest areas to be settled in Tasmania. Consequently it was cleared and has been manipulated for agricultural purposes for a long period.

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

The hydrology of the lagoon is generally dominated by estuarine processes; however, during peak flows these may be overridden by freshwater inputs, particularly from the Swan River catchment. Peak flows from the Apsley River are likely to be attenuated in the Apsley Marshes. Most major floods occur in late summer when easterly depressions cause heavy storms in the upper catchments. Whilst the majority of nutrient and sediment pulses to the lagoon would arrive during floods in the Swan catchment, remaining bank-side vegetation is valuable in attenuating pulses from surrounding farmlands (Houshold pers. comm.).

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.

F, B, G, H, R, M, J, U and E.

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 lagoon contains areas of both shallow and deep water and is surrounded by periodically exposed mudflats and saltmarsh. The western shore has largely been cleared and is used for livestock grazing and intensive agriculture, while the eastern shore is relatively undisturbed and covered with native vegetation. The plant communities around Moulting Lagoon reflect the wide diversity of terrain and consequent soil drainage patterns. Aquatic vegetation in the estuary is largely composed of seagrasses. Succulent saline herbland and saline sedgeland and rushland, both saltmarsh communities, surround the lagoon. The immediate edge of the lagoon supports an almost continuous belt of *Sarcocornia quinqueflora* (a succulent saline herbland). Behind that is a fringe of *Juncus kraussii* (a saline sedgeland) and beyond in wet areas is *Melaleuca ericifolia, Acacia dealbata,* and small stands of *Callitris rhomboidea* with scattered *Allocasuarina* species, *Banksia marginata* and *Acacia dealbata* on the few rocky outcrops.

The vegetation in the shallower areas (*Sarcocornia quinqueflora* and *Juncus kraussii*) provides important nesting, roosting and feeding habitat for the numerous resident waterfowl. Seasonal fluctuations in numbers of birds correspond with rainfall patterns. Moulting Lagoon regularly supports approximately 8,000 Black swan (*Cygnus atratus*) and more than 18,000 have been recorded in dry periods.

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.*

The site also supports a number of flora species listed as threatened in Tasmania; Golden spray (*Viminaria juncea* – endangered, TSPA) for which Moulting Lagoon is the only reserved site in Tasmania; Sea clubsedge *(Bolboschoenus caldwellii* – rare, TSPA)); Southern swamp grass (*Amphibromus neesii* – rare, TSPA); Largefruit seatassel (*Ruppia megacarpa* - rare, TSPA); and Spreading watermat (*Lepilaena patentifolia* – rare, TSPA) for which the lagoon is recognised as a key site.

Aquatic vegetation in the estuary is largely composed of seagrasses, covering appoximately 2,492 hectares of the lagoon substrate (Rees 1993). *Zostera muelleri* dominates the lower more saline reaches. In the upper reaches of the lagoon and in King Bay, where freshwater enters from the Apsley and Swan Rivers respectively, salinity is lower and species of *Ruppia* (an aquatic herb) replace *Zostera* and form nearly continuous beds along the bottom. As well as the rooted vegetation, large quantities of algae are produced in seasonal blooms. Many other aquatic plants are found in the fresh water dams and lagoons around the main lagoon. These species, such as *Triglochin procerum, Myriophyllum* spp. and *Eleocharis sphacelata* plus the *Ruppia, Zostera* and algae form a large part of the diet of the waterfowl in the area (Blackhall 1984).

Within Tasmania, saltmarsh vegetation communities, two of which occur on the site, qualify for two of the Biodiversity Criteria developed by the Joint ANZECC/MCFFA National Forest Policy Statement Implementation Sub-committee (JANIS). Criteria (1); as less than 3% of the pre-1750 distribution of saltmarsh vegetation, is protected in the Comprehensive Adequate and Representative (CAR) reserve system, and Criteria (5); as they are a habitat for migratory species which are also often rare, vulnerable or endangered. Though saltmarsh communities are not currently listed as threatened within Tasmania, these communities serve a critical ecological function and are at risk due to their low reservation status.

Overall, invasive species are not considered a major problem within the Ramsar site. Invasive plant species within the site include South African boxthorn (*Lycium ferocissimum*), which is established on Sabinas Island. This species outcompetes the native *A. verticilata* overstorey and reduces the nesting habitat available to Black swans (PWS 2007). Bulrush (*Typha latifolia*), blackberry (*Rubus fruticosis*), and gorse (*Ulex europaeus*) are other invasive plant species of concern for the Ramsar site (PWS 2007).

PWS (2007) states that root-rot fungus *Phytophthora cinnamomi* that causes dieback and/or death of a wide range of native plant species, most likely occurs within the Ramsar site. The fungus occurs throughout the east coast and has been recorded in nearby Freycinet Peninsula and Schouten Island (PWS 2007).

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.*

Moulting Lagoon is an important breeding area for Black swan (*Cygnus atratus*) and an important staging area for all the other species of waterfowl in Tasmania, with particularly large summer concentrations of Australian shelduck (*Tadorna tadornoides*) and Chestnut teal (*Anas castanea*). It also supports the largest known Tasmanian flocks of Greenshank (*Tringa nebularia*),which is listed

under both the China - Australia Migratory Bird Agreement (CAMBA) and the Japan - Australia Migratory Bird Agreement (JAMBA). The site supports one waterbird species listed as threatened in Tasmania, the Eastern curlew (*Numenius madagascariensis*, endangered, Tasmanian *Threatened Species Protection Act 1995* (TSPA)), a migratory wader. See **Appendix 1** for a full bird species list for Moulting Lagoon.

A recent conservation assessment of beach nesting and migratory shorebirds in Tasmania found Moulting Lagoon to have high species diversity and be a priority site for resident species. These include the beach nesting shorebirds; Black-fronted dotterel *(Elseyornis melanotus*), Caspian tern (*Hydroprogne caspia*) and Pied oystercatcher (*Haematopus astralegus*) (breeding) and migratory shorebirds; Eastern curlew (*Numenius madagascariensis*), Bar-tailed godwit (*Limosa lapponica*) and Double banded plover (*Charadrius bicinctus*). All these species were assessed as being of conservation concern due to either declining populations, low numbers or small population size (Bryant 2002).

The threatened Green and gold frog (*Litoria raniformis,* vulnerable TSPA and vulnerable *Environment Protection and Biodiversity Conservation Act 1999*) is known to occur in the nearby Cherry Tree Lagoon (Janet Smith pers. comm).

Animal pest species of concern include the toxic dinoflagellate *Gymnodinium catanatum,* the North Pacific seastar (*Asterias amurensis*), and the European shore crab (*Carcinus meanusI*) (PWS 2007). Feral cats are recorded within the site, however the impacts on wildlife, in particular waterbirds, is not known (PWS 2007) and remains a knowledge gap for the site.

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:
Moulting Lagoon is a highly valued recreation area. The area has been used for fishing and the hunting of waterfowl since European settlement, and for the harvest of waterfowl and their eggs by Aboriginal groups living around the lagoon for an unknown length of time prior to this. The reserve also has commercial value to the local tourism industry and aquaculture operators. For these reasons, Moulting Lagoon and the surrounding area have both Aboriginal and European cultural significance.

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:
All of the area below mean high water (M.H.W) mark is Crown land as well as approximately one half of the foreshore to a width of between 30 and 150 metres. Approximately 4,760 hectares,

consisting of all of the estuary plus the adjacent Crown foreshore, was declared a Game Reserve in December 1988. Not all of the Game Reserve is included in the Ramsar site.

b) in the surrounding area:
All of the remaining foreshore and the surrounding land is privately owned and is mostly contained in five large pastoral properties.

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25. Current land (including water) use:
a) within the Ramsar site:
Recreational shooting (about 150 hunters use the area in a season), recreational fishing and boating, aquaculture (Pacific oysters at Pelican Bay and Point Meredith), and off-road driving.

b) in the surroundings/catchment:
Grazing, residential development, mining, aquaculture and recreation.

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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:
Recreational shooting has resulted in the contamination of bottom sediments of the lagoon by lead shot pellets. Foreshore access to off-road vehicles is contributing to vegetation loss around the lagoon. Grazing and trampling by stock around the edges of the lagoon has caused damage to vegetation, soil structure and alteration of plant community composition. Clearing of native vegetation has resulted in increased run-off, eutrophication and invasion by weeds. There is threat of further degradation by agricultural runoff, development encroachment and over-use as a shooting and fishing resource. The numbers of sailboards and shallow draft jet boats being used in shallow protected waterways has increased significantly in other parts of the state and this type of activity would cause disturbance to roosting and feeding birds in this area. Feral cats (*Felis catus*) are a potential threat to the lagoon's waterbirds, however there is no data regarding their impact on the bird fauna at the site.

b) in the surrounding area:
In the wider catchment, land clearance for agriculture, forestry operations and the development of residential areas are contributing to siltation and eutrophication. Several introduced species are present in the area, including both terrestrial and aquatic plants, feral cats, toxic dinoflagellates, and the European Shore Crab (*Carcinus meanus*). Plans to build a water catchment reservoir on the upper Swan River would influence water regimes in the reserve. The plans have been postponed for economic reasons, but are likely to be reconsidered in the future. The root-rot fungus, *Phytophthora cinnamomi*, is present in the nearby Freycinet National Park and is a potentially significant threat to the flora surrounding the lagoon.

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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.
Moulting Lagoon is listed under the Convention on Wetlands (Ramsar, Iran, 1971) and also on the Register of the National Estate. It is a designated Game Reserve.

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate): Equivalent in this case to IUCN Protected Area category VI

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

c) Does an officially approved management plan exist; and is it being implemented?:
The management plan was published in 2003 but there is no revision scheduled. Netting is prohibited within the lagoon and approximately 10 km of foreshore has been fenced to exclude livestock. Four signs have been erected to explain the Convention on Wetlands and further interpretive displays are

planned for the general public. Weed control work has been carried out by Conservation Volunteers Australia under the Revive Program. The use of lead shot has been banned as of 2005.

d) Describe any other current management practices: Other activities include wildlife ranger patrols carried out for enforcement purposes especially during the hunting season. Minor land management interventions such as track maintenance occur as required.

28. Conservation measures proposed but not yet implemented:
e.g. management plan in preparation; official proposal as a legally protected area, etc.

The Tasmanian Land Conservancy is acquiring a large block of private property on the western shore to protect the conservation values of the area and intends to remove invasive weeds.

29. Current scientific research and facilities:
e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Waterbirds are counted by the Nature Conservation Branch of DPIWE, the Parks and Wildlife Service and volunteers twice each year in mid winter and mid summer. A brief study was undertaken to determine the occurrence and distribution of lead shot pellets and their effect on birds. Results of the lead shot study were compiled in 1995 and revealed that blood lead levels, bone lead levels, number of ingested shot pellets and number of pellets in the surface layers of bottom sediments all met or exceeded international guidelines at that time.

Accommodation for field studies is available in the nearby Freycinet National Park.

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.

The area is frequently visited by amateur bird observers. Interpretive displays are planned for the general public. Four signs describing the Convention on Wetlands have been erected at prominent points.

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

Approximately 150 duck shooters and several hundred sport anglers use the Moulting Lagoon area. The nearby Freycinet Peninsula is one of Tasmania's prime tourist destinations, being utilised for bushwalking, family holidays, water recreation and fishing. Visitor figures for Freycinet National Park were 198,000 in 2003/2004.

The number of entries to the park increased by an average of 7% per year since the beginning of the 1990s, and was the highest rate of all of Tasmania's National Parks. Moulting Lagoon has recently been included in the ecotourism program based at Freycinet Lodge and a sea kayak business also visits the area.

There were 188,000 visitors in 2011/12. Vvisitor numbers have been declining since 2007/2008.

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

Territorial: Glamorgan Spring Bay Council.
Functional: Director, Parks & Wildlife Service, Tasmania.

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.

Director, Parks & Wildlife Service

GPO Box 1751
HOBART 7001 Tasmania

34. Bibliographical references:

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

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Houshold, I. (2005) Karst Geomorphologist, Nature Conservation Branch, Department of Primary Industries, Water and Environment.

Smith, J. (2005) Conservation Officer, Private Forest Reserve Program, Nature Conservation Branch, Department of Primary Industries, Water and Environment.

Appendix 1. Birds Recorded in Moulting Lagoon Ramsar Site

Common Name	Code	Scientific Name
ORDER ANSERIFORMES		
lack swan		*Cygnus atratus*
Australian shelduck		*Tadorna tadornoides*
black duck		*Anas superciliosa*
grey teal		*Anas gracilis*
chestnut teal		*Anas castanea*
Australasian shoveler		*Anas rhynchotis*
hardhead		*Aythya australis*
blue-billed duck		*Oxyura australis*
musk duck		*Biziura lobata*
Cape Barren goose		*Cereopsis novaehollaniae*
ORDER PODICIPEDIFORMES		
Australasian grebe		*Tachypaptus novaehollandiae*
hoary-headed grebe		*Poliocephalus poliocephalus*
great crested grebe	r	*Podiceps cristatus*
ORDER PELICANIFORMES		
Australian pelican		*Pellecanus conspicillatus*
black-faced cormorant		*Leucocarbo fuscescens*
great cormorant		*Phalacrocorax carbo*
little pied cormorant		*Phalacrocorax melanoleucos*
little black cormorant		*Phalocrocorax sulcirostris*
ORDER CICONIIFORMES		
white-faced heron		*Egretta novaehollandiae*
great egret	J,C	*Ardea alba*
intermediate egret		*Ardea intermedia*
little egret		*Egretta garzetta*
cattle egret	J,C	*Ardea ibis*
Australasian bittern		*Botaurus poiciltilus*
Royal spoonbill		*Platalea regia*
ORDER FALCONIFORMES		
white-bellied sea-eagle	v C	*Haliaeetus leucogaster*
wedge-tailed eagle	e EN	*Aquila audax*
swamp harrier		*Circus approximans*
peregrine falcon		*Falco peregrinus*
brown falcon		*Falco berigora*
ORDER GRUIFORMES		
purple swamphen		*Porphyrio porphyrio*
Eurasian coot		*Fulica atra*
Tasmanian native hen		*Gallinula mortierii*
ORDER CHARADRIIFORMES		
pied oystercatcher		*Haematopus ostralegus*
sooty oystercatcher		*Haematopus fuliginpsus*
masked lapwing		*Vanellus miles*
lesser sand plover	m,J,C	*Charadrius mongolus*
Pacific golden plover	m	*Pluvialis fulva*
double-banded dotterel	m	*Charadrius bicinctus*
red-capped dotterel		*Charadrius ruficapillus*
black-fronted dotterel		*Elseyornis melanops*
Common Name	**Code**	**Scientific Name**
ruddy turnstone	m,J,C	*Arenaria interpres*
eastern curlew	m,J,C	*Numenius madagascariensis*
ORDER CHARADRIIFORMES (continued)		
whimbrel	m,J,C	*Numenius phaeopus*

common greenshank	m,J,C	*Tringia nebularia*
marsh sandpiper	m,J,C	*Tringia stagnatilis*
Latham's snipe	m,J,C	*Gallinago hardwickii*
bar-tailed godwit	m,J,C	*Limosa lapponica*
red knot	m,J,C	*Calidris canutus*
grey-tailed tattler	m	*Heteroscelus brevipes*
sharp-tailed sandpiper	m,J,C	*Calidris acuminata*
red-necked stint	m,J,C	*Calidris ruficollis*
long-toed stint	m	*Calidris subminuta*
curlew sandpiper	J,C	*Calidris ferruginea*
silver gull		*Larus novaehollandiae*
Pacific gull		*Larus pacificus*
kelp gull		*Larus dominicanus*
caspian tern	J,C	*Hydroprogne caspia*
crested tern		*Sterna bergii*
ORDER PSITTACIFORMES		
green rosella		*Platycercus caledonicus*
eastern rosella		*Platycerus eximius*
yellow-tailed black cockatoo		*Calyptorhynchus funere*
musk lorikeet		*Glossopsitta concinna*
blue-winged parrot		*Neophema chrysostoma*
swift parrot	e EN	*Lathamus discolor*
ORDER CUCULIFORMES		
pallid cuckoo		*Cuculus pallidus*
fan-tailed cuckoo		*Chrysococcyx lucidus*
ORDER STRIGIFORMES		
southern boobook		*Ninox novaeseelandiae*
ORDER APODIFORMES		
white-throated needletail		*Hirundapus caudacutus*
ORDER CORACIIFORMES		
laughing kookaburra	i	*Dacelo novaeguineae*
ORDER PASSERIFORMES		
superb fairy wren		*Malurus cyaneus*
spotted pardalote		*Pardalotus punctatus*
striated pardalote		*Pardalotus striatus*
yellow-rumped thornbill		*Acanthiza chrysorrha*
Tasmanian thornbill		*Acanthiza magnus*
brown thornbill		*Acanthiza ewingii*
yellow wattlebird		*Anthochaera paradoxa*
little wattlebird		*Anthochaera chrysoptera*
noisy miner		*Manorina melanocephala*
crescent honeyeater		*Phylidonyris pyrrhoptera*
New Holland honeyeater		*Phylidonyris novaehollandiae*
striated fieldwren		*Calamanthus fuliginosus*
white-fronted chat		*Ephthianura albifrons*
eastern spinebill		*Acanthorhynchus tenuirostris*
scarlet robin		*Petroica vittata*
dusky robin		*Petroica multicolor*
spotted quail-thrush		*Cinclosoma punctatum*
grey shrike-thrush		*Colluricinla harmonica*
ORDER PASSERIFORMES (continued)		
grey fantail		*Rhipidura fuliginosa*
black-faced cuckoo-shrike		*Coracina novaehollandiae*
dusky woodswallow		*Artamus cyanopterus*
grey butcher bird		*Cracticus torquatus*
Australian magpie		*Gymnorhina tibicen*

grey currawong		*Streptera versicolor*
black currawong		*Strepera fuliginosa*
forest raven		*Corvus tasmanicus*
skylark	i	*Alauda arvensis*
Australian pipit		*Anthus novaeseelandiae*
welcome swallow		*Hirundo neoxena*
little grassbird		*Megalurus gramineus*
tree martin		*Petrochelidon nigricans*
European greenfinch	i	*Chloris chloris*
silvereye		*Zosterops lateralis*
golden whistler		*Pachycephala pectoralis*
common blackbird	i	*Sturnus vulgarus*
common starling	i	*Turdus merula*

i = introduced to Tasmania
r, v, e = listed in the schedules of the *Threatened Species Protection Act 1995* as rare, vulnerable or endangered respectively
EN = listed on the schedules of the *Environment Protection and Biodiversity Conservation Act 1999* as Endangered
m = migratory species
J = listed on the Japan-Australia Migratory Bird Agreement (JAMBA)
C = listed on the China-Australia Migratory Bird Agreement (CAMBA)
Bird species names follow the taxonomy of Christidis and Boles (1994)
List adapted from Blackhall 1985, Schokman 1987, Schokman 1991, Christidis and Boles 1994