



Ramsar Information Sheet

Published on 1 July 2022

Update version, previously published on : 1 January 2013

Australia

Moulting Lagoon



Designation date	16 November 1982
Site number	251
Coordinates	42°02'11"S 148°11'19"E
Area	4 507,00 ha

Color codes

Fields back-shaded in light blue relate to data and information required only for RIS updates.

Note that some fields concerning aspects of Part 3, the Ecological Character Description of the RIS (tinted in purple), are not expected to be completed as part of a standard RIS, but are included for completeness so as to provide the requested consistency between the RIS and the format of a 'full' Ecological Character Description, as adopted in Resolution X.15 (2008). If a Contracting Party does have information available that is relevant to these fields (for example from a national format Ecological Character Description) it may, if it wishes to, include information in these additional fields.

1 - Summary

Summary

The Moulting Lagoon Ramsar site is situated on the central east coast of the state of Tasmania, approximately 6 km north-west of the township of Coles Bay. The lagoon is a large estuary at the mouths of the Swan and Apsley Rivers. The lagoon contains areas of shallow and deep water and is surrounded by periodically exposed mudflats and saltmarsh. The plant communities around the site reflect the wide diversity of terrain and soil drainage patterns. Aquatic vegetation in the estuary is largely composed of seagrasses. Succulent saline herbland and saline sedgeland and rushland saltmarsh communities, surround the lagoon. Extensive areas of saltmarsh and seagrass make this an important site for carbon sequestration. Vegetation in the shallower areas, mainly beaded glasswort and sea rush, provides nesting, roosting and feeding habitat for resident waterfowl. The Ramsar site is an important breeding area for black swan and an important staging area for waterfowl species in Tasmania, with particularly large summer concentrations of Australian shelduck and chestnut teal. The area was historically used for the harvest of waterfowl and their eggs by Indigenous people who lived around the lagoon. Current use of the Ramsar site includes recreational activities such as fishing and hunting, and commercial activities such as aquaculture and tourism.

The site meets criteria 1, 2, 3, 4, 6 & 8:

- 1: The site includes Little Bay, a drowned deflation basin, and associated lunettes which are representative of significant geomorphic features at the bioregional scale, being a product of a drier palaeoclimate. The mosaic of wetland habitats is representative of saltmarsh communities and morphology within the bioregion (Tasmania).
- 2: Subtropical and temperate coastal saltmarsh, a nationally threatened ecological community is supported by the site.
- 3: The site supports a high diversity of waterbirds including shorebirds and waders, threatened saltmarsh communities, substantial populations of fish and a number of plant species that are threatened at state level.
- 4: Moulting Lagoon provides a resting and feeding ground for many species of migratory birds and is the prime site for black swan breeding in Tasmania.
- 6: The site regularly supports over 1% of global populations for black swan, pied oystercatcher and Pacific gull.
- 8: The site supports regular migrations of short-finned eels on their seaward journey to breed and returning juveniles, are reported.

2 - Data & location

2.1 - Formal data

2.1.1 - Name and address of the compiler of this RIS

Responsible compiler

Institution/agency	Department of Agriculture, Water and the Environment
Postal address	Department of Agriculture, Water and the Environment GPO Box 858 Canberra ACT 2601 Australia

National Ramsar Administrative Authority

Institution/agency	Department of Primary Industries, Parks, Water and Environment
Postal address	Department of Primary Industries, Parks, Water and Environment (DPIPWE) GPO Box 44 HOBART Tasmania 7001 Australia

2.1.2 - Period of collection of data and information used to compile the RIS

From year

To year

2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish)

2.1.4 - Changes to the boundaries and area of the Site since its designation or earlier update

(Update) A. Changes to Site boundary Yes No

(Update) B. Changes to Site area No change to area

(Update) For secretariat only. This update is an extension

2.1.5 - Changes to the ecological character of the Site

(Update) 6b i. Has the ecological character of the Ramsar Site (including applicable Criteria) changed since the previous RIS? Uncertain

(Update) Optional text box to provide further information

There are reduced numbers of some migratory shorebirds recorded at the site. This is most likely due to factors outside the site boundaries.

Whilst there has been no notifiable change in ecological character, the site has been subject to a changing climate. Australia has warmed by just over 1°C since 1910, with most warming since 1950. It is projected to experience further increase in temperatures, with more extremely hot days and fewer extremely cool days over the coming decades under all emissions scenarios. Warming over Australia is projected to be slightly higher than the global average. Oceans around Australia have warmed by around 1 °C since 1910, contributing to longer and more frequent marine heatwaves. Sea levels are rising around Australia, increasing the risk of inundation and the oceans around Australia are acidifying. (BOM and CSIRO, State of the Climate 2018). These conditions will affect the critical components, processes and services of the site. The adaptive capacity and resilience of the site will be tested.

2.2 - Site location

2.2.1 - Defining the Site boundaries

b) Digital map/image

<2 file(s) uploaded>

Former maps

Boundaries description

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. Geographical coordinates for the approximate centre of the site: Latitude: 42°02' 00" S; Longitude: 148°10' 00" E"

2.2.2 - General location

- a) In which large administrative region does the site lie?
- b) What is the nearest town or population centre?

2.2.3 - For wetlands on national boundaries only

- a) Does the wetland extend onto the territory of one or more other countries? Yes No
- b) Is the site adjacent to another designated Ramsar Site on the territory of another Contracting Party? Yes No

2.2.4 - Area of the Site

Official area, in hectares (ha):

Area, in hectares (ha) as calculated from GIS boundaries

2.2.5 - Biogeography

Biogeographic regions

Regionalisation scheme(s)	Biogeographic region
Other scheme (provide name below)	East Coast Region. Tasmanian Drainage Division

Other biogeographic regionalisation scheme

Australian Hydrological Geospatial Fabric (Geofabric): Topographic Drainage Divisions and River Regions (BOM 2012) – East Coast Region, Tasmanian Drainage Division.

3 - Why is the Site important?

3.1 - Ramsar Criteria and their justification

- Criterion 1: Representative, rare or unique natural or near-natural wetland types

Moulting Lagoon lies within the Tasmanian Drainage Division. Wetland habitats found within the site include extensive saltmarsh communities, intertidal and subtidal flats and islands connected by subtidal channels and a seawater channel, tidal and subtidal sand banks, salt pans, beaches and dunes.

Other ecosystem services provided

The saltmarshes of Moulting Lagoon are one of the largest temperate saltmarsh areas in Tasmania. Subtropical and Temperate Saltmarsh is listed as a vulnerable ecological community under the national Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The mosaic of wetland habitats is representative of saltmarsh communities and morphology within the bioregion (Tasmania). Nationally, the Coastal Saltmarsh ecological community provides extensive ecosystem services such as: filtering surface water prior to it entering the sea; carbon sequestration; coastal productivity; nursery habitat for a range of fisheries species; provision of food and nutrients for a wide range of adjacent marine and estuarine communities, including migratory shorebirds; and stabilising the coastline and providing a buffer from waves/storms. Importantly, saltmarshes are among the most efficient ecosystems globally at sequestering carbon, although different areas of saltmarsh will vary in capacity (Australian Government, 2020). Saltmarsh and intertidal areas of Moulting Lagoon are important Blue Carbon systems contributing to climate change mitigation and adaptation.

The lower estuary is dominated by the wetland habitat of estuarine waters and subtidal aquatic beds. These habitats consist of the seagrass *Zostera muelleri*, *Heterozostera tasmanica* and *Ruppia* spp., which occur in the middle estuary and around the delta of the Swan River. The main lagoon is almost entirely dominated by *Ruppia* spp.

Other reasons

Moulting Lagoon lies within the Tasmanian Drainage Division and falls within an area of high regional geoconservation significance (Tasmanian Geoconservation Database v6.0, 2008). The site includes Little Bay, a drowned deflation basin, and associated lunettes which are representative of significant geomorphic features at the bioregional scale, being a product of a drier palaeoclimate.

Overall, Moulting Lagoon is a good example of a coastal estuarine lagoon system, relatively unimpacted by urban development and upstream river abstractions (Hale and Butcher, 2011).

- Criterion 2 : Rare species and threatened ecological communities

- Criterion 3 : Biological diversity

Moulting Lagoon is one of the largest and most significant wetland areas in Tasmania and supports considerable biodiversity. Moulting Lagoon supports large numbers and a high diversity of waterbirds including shorebirds and waders. Twenty-two species of resident and migratory waders have been recorded onsite, with nine species regularly using the area. The site supports a number of state listed threatened species, one nationally listed threatened species, and one nationally listed threatened ecological community. The estuary supports substantial populations of fish and diverse floristic communities. The fish fauna of Great Swanport estuary is similar to those of other open lagoon estuaries in Tasmania, with a total of 37 species from within its limits representing about 60% of all species found in open lagoons in Tasmania (Edgar et al. 1999). Wetland vegetation is dominated by two key types: saltmarsh and seagrass. These vegetation associations are critical components of the site's ecological character playing central roles in the provision of physical habitat for aquatic species as well providing key food resources, particularly for the waterbirds.

Justification

Species which are listed nationally under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) are:

- eastern curlew (*Numenius madagascariensis*), which is listed as critically endangered, marine and migratory (CMS, JAMBA, CAMBA & ROKAMBA);
- common greenshank (*Tringa nebularia*) listed as Marine and Migratory (CMS, JAMBA, CAMBA & ROKAMBA);
- Pacific gull (*Larus pacificus*) listed as Marine; and
- white-bellied sea eagle (*Haliaeetus leucogaster*) listed as Marine.

The great crested grebe (*Podiceps cristatus*) is listed as threatened under the Tasmanian Species Protection Act. 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 clubssedge (*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.

Moulting Lagoon supports one of the largest temperate coastal saltmarshes areas in Tasmania, listed as a vulnerable ecological community (Subtropical and Temperate Saltmarsh) under the EPBC Act.

Two migratory fish species, black bream (*Acanthopagrus butcheri*) and short-finned eel (*Anguilla australis*) use the site.

Criterion 4 : Support during critical life cycle stage or in adverse conditions

Criterion 6 : >1% waterbird population

Criterion 8 : Fish spawning grounds, etc.

Justification

Moulting Lagoon and the Apsley Marshes (an upstream, connected Ramsar site) 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). 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) have also been recorded in the river upstream and although no data is available to confirm, they may use the site as a migratory route during breeding. Including the above, a total of 36 species of fish have been recorded within the estuary system.

3.2 - Plant species whose presence relates to the international importance of the site

Phylum	Scientific name	Criterion 2	Criterion 3	Criterion 4	IUCN Red List	CITES Appendix I	Other status	Justification
Plantae								
TRACHEOPHYTA / LILIOPSIDA	<i>Amphibromus neesii</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	Tasmania Threatened species Protection Act: Rare	Rare in Tasmania
TRACHEOPHYTA / LILIOPSIDA	<i>Bolboschoenus caldwellii</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	Tasmania Threatened Species Protection Act: Rare	Rare in Tasmania
TRACHEOPHYTA / LILIOPSIDA	<i>Lepilaena patentifolia</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	Tasmania Threatened Species Protection Act: Rare	Rare in Tasmania
TRACHEOPHYTA / LILIOPSIDA	<i>Ruppia megacarpa</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	LC	<input type="checkbox"/>	Tasmania Threatened Species Protection Act: Rare	Rare in Tasmania; IUCN Redlist
TRACHEOPHYTA / MAGNOLIOPSIDA	<i>Viminaria juncea</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	Tasmania Threatened Species Protection Act: endangered	Endangered in Tasmania

Each of the species listed above is rare or threatened within the state of Tasmania. *Ruppia megacarpa*, the largefruit seatassel is also IUCN listed as Least Concern on the IUCN Red List. *Ruppia* is a key food source for Moulting Lagoon's population of black swans. Moulting Lagoon is the only reserved site in Tasmania for golden spray (*Viminaria juncea* – endangered, TSPA)

3.3 - Animal species whose presence relates to the international importance of the site

Phylum	Scientific name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
		2	4	6	9	3	5	7	8								
Fish, Mollusc and Crustacea																	
CHORDATA / ACTINOPTERYGII	<i>Acanthopagrus butcheri</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>				LC	<input type="checkbox"/>	<input type="checkbox"/>		Travels through the site for spawning.
CHORDATA / ACTINOPTERYGII	<i>Anguilla australis</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>				NT	<input type="checkbox"/>	<input type="checkbox"/>		Seaward migration to breed and return as juveniles.
Birds																	
CHORDATA / AVES	<i>Anas castanea</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC	<input type="checkbox"/>	<input type="checkbox"/>		Critical late summer staging area; feeding and resting.
CHORDATA / AVES	<i>Cygnus atratus</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17276	2020	1.7	LC	<input type="checkbox"/>	<input type="checkbox"/>		The site provides year round habitat as well as breeding and moulting habitat. It is also important drought refuge. Based on twice yearly counts 2010-2019 average count is 7,219 (Department of Primary Industries, Parks, Water and Environment, 2020). Highest count was 17,276 in 2017. Using the Wetlands International (WPE - 2008) population estimate (of 100,000), and the highest site count (of 17,219) the site supports up to 1.7% of the Australian population. Based on the average site count (of 7,219), the site supports at least 0.72% of the population in other years. The 1% threshold is met in 3/10 years.

Phylum	Scientific name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
		2	4	6	9	3	5	7	8								
CHORDATA/ AVES	<i>Haematopus longirostris</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	153	2020	1.39	LC	<input type="checkbox"/>	<input type="checkbox"/>		This species uses the site for breeding and feeding. Based on twice yearly counts 2010-2019 average count is 153 (Department of Primary Industries, Parks, Water and Environment, 2020). Highest count was 327 in 2010. Using the Wetlands International (WPE - 2008) population estimate (of 11,000), and the highest site count (of 327), the site supports 2.97% of the Australian population. Based on the average site count (of 153), the site supports at least 1.39 % of the population. The 1% threshold is met all years.
CHORDATA/ AVES	<i>Haliaeetus leucogaster</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC	<input type="checkbox"/>	<input type="checkbox"/>	State listed (Tasmanian Species Protection Act): Vulnerable	Species nests at the site (Woehler and Ruoppolo, 2014). This species contributes to the biodiversity of the site.
CHORDATA/ AVES	<i>Larus pacificus</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	74	2020	1.48	LC	<input type="checkbox"/>	<input type="checkbox"/>		Based on twice yearly counts 2010-2019 average count is 74 (Department of Primary Industries, Parks, Water and Environment, 2020). Highest count was 172 in 2013. Using the Wetlands International (WPE - 2008) population estimate (of 4,950), and the highest site count (of 172), the site supports 3.44% of the Australian population. Based on the average site count (of 74), the site supports at least 1.48% of the population. The 1% threshold is met is met all years.
CHORDATA/ AVES	<i>Numenius madagascariensis</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				EN	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Nationally listed (EPBC): critically endangered, migratory. State listed (Tasmanian Species Protection Act): Endangered	Nationally listed threatened and migratory species (EPBC). Uses the site for non-breeding habitat and as a stopover point on southward and northward migration.
CHORDATA/ AVES	<i>Podiceps cristatus</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC	<input type="checkbox"/>	<input type="checkbox"/>	State listed (Tasmanian Species Protection Act): Vulnerable	Threatened species in Tasmania. This species contributes to the biodiversity of the site.
CHORDATA/ AVES	<i>Tadorna tadornoides</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC	<input type="checkbox"/>	<input type="checkbox"/>		The site is an important staging area for this species in late summer.
CHORDATA/ AVES	<i>Tringa nebularia</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC	<input type="checkbox"/>	<input type="checkbox"/>	Nationally listed (EPBC): migratory	Nationally listed migratory species (EPBC). Uses the site for non-breeding habitat and as a stopover point on southward and northward migration.

1) Percentage of the total biogeographic population at the site

3.4 - Ecological communities whose presence relates to the international importance of the site

Name of ecological community	Community qualifies under Criterion 2?	Description	Justification
Subtropical and Temperate Coastal Saltmarsh	<input checked="" type="checkbox"/>	See text box below for detail	Listed as vulnerable under the EPBC Act

Optional text box to provide further information

Wetland habitats found within the site include extensive saltmarsh communities, intertidal and subtidal flats and islands connected by subtidal channels and a sea water channel, tidal and subtidal sand banks, salt pans, beaches and dunes. This mosaic of wetland habitats is representative of saltmarsh communities and morphology within the bioregion (Tasmania). Moulting Lagoon contains one of the most extensive areas of saltmarsh in Tasmania (Pralhad and Pearson, 2013).

The Coastal Saltmarsh ecological community in Australia consists mainly of salt-tolerant vegetation (halophytes) including grasses, herbs, sedges, rushes and shrubs. Succulent herbs, shrubs and grasses generally dominate, and vegetation is generally of less than 0.5 m height (with the exception of some reeds and sedges) (Adam, 1990). Many species of non-vascular plants are found in saltmarsh, including epiphytic algae, diatoms and cyanobacterial mats (Adam, 2002; Fotheringham and Coleman, 2008; Green et al., 2012; Millar, 2012).

Southern Tasmanian coastal saltmarshes form a crucial 'link' between terrestrial and marine systems, providing critical ecological functions that support a range of ecosystem services and biodiversity values. Close to a half of these important coastal ecosystems have already been lost or degraded due to land use change and impacts (including grazing and trampling by livestock), sporadic and variable management approaches and lack of broad awareness of the important values provided by these habitats. In addition, future climate change and sea level rise projections leave these ecosystems in a precarious position given that they occupy shores within 1 m of high water (Pralhad and Pearson, 2013).

4 - What is the Site like? (Ecological character description)

4.1 - Ecological character

The critical components and processes for Moulting Lagoon Ramsar Site are:

Hydrology: Flow regime is largely natural. Hydrologic inputs include precipitation, ground water discharge, and surface or near surface inflow sourced potentially from tides, flow from river and stream channels and from higher water table levels in the wetland (Brinson 1993). Mean annual runoff is comparable, with those of semi-arid regions in Australia.

Wetland vegetation: Vegetation associations which support other components of the site are seagrass / *Ruppia* beds and salt marsh. A diversity of aquatic plants are found in the small areas of freshwater around the main lagoon (for example *Triglochin procerum*, *Myriophyllum* spp. and *Eleocharis sphacelata*). Thirteen plant species listed under the Tasmanian Threatened Species Protection Act occur in and around Moulting Lagoon, which is recognised as being important for the conservation of some of these species.

Fish: The estuarine environment provides habitat for a range of fish communities and species (Last 1983). The fish fauna of the estuary is similar to those of other open lagoon estuaries in Tasmania, with a total of 36 species recorded at the site. The communities respond to differing salinity regimes and benthic substrates. Black bream (*Acanthopagrus butcheri*) inhabit the lower reaches of the Swan River and the drains in the Apsley Marshes as adults migrate upstream to spawn. Native short finned eel (*Anguilla australis*) have been seen in Moulting Lagoon.

Waterbirds: 53 species of waterbirds have been recorded at Moulting Lagoon, with 17 species listed under JAMBA, ROKAMBA and/or CAMBA. Three waterbird species are listed under the national Environment Protection and Biodiversity Conservation Act or the Tasmanian Threatened Species Protection Act:

- white-bellied sea eagle (*Haliaeetus leucogaster*; vulnerable, Tas);
- eastern curlew (*Numenius madagascariensis*; critically endangered, EPBC Act); and
- great-crested grebe (*Podiceps cristatus*; vulnerable, Tas).

Waterfowl, notably black swans, occur in large numbers, while migratory waders feed in shallow intertidal areas in the summer months. Other species use the marshland, saltmarshes, woodland and adjacent pastures, while gulls and seabirds use the area to feed and roost.

Critical services for the site are:

Supports near natural wetland types: Moulting Lagoon is an extensive and complex estuarine ecosystem with relatively few anthropogenic disturbances.

Provides physical habitat for waterbird breeding, roosting and feeding: These habitats include swan breeding areas; and feeding and roosting sites for other waterbirds such as pelicans, ducks and migratory waders.

Provides drought refuge: Large numbers of waterbirds, particularly black swans (*Cygnus atratus*) and Australian shelducks (*Tadorna tadornoides*), are supported at key stages of their lifecycles.

Supports biodiversity: Moulting Lagoon is an important area for the maintenance and conservation of biodiversity in the Tasmanian bioregion.

Ecological connectivity: Moulting Lagoon connects with Apsley Marshes and inland freshwater environments acting as a migratory route for diadromous fish species.

Natural variability: The Swan and Apsley Rivers provide freshwater input to Moulting Lagoon and both of these rivers have highly variable flow (DPWE 1998). Fluctuations in flow significantly affect salinity in parts of Moulting Lagoon. The site's geomorphic history, along with continuing change and renewal provided by tidal and riverine flows, creates a context for the development and maintenance of diverse geomorphic features and processes. These geomorphic process, and the site's hydrology, create a suite of different habitats including benthic, intertidal, foreshore vegetation and pelagic.

Current changes: reduced numbers of migratory shorebirds at the site is most likely due to factors outside the site boundaries.

4.2 - What wetland type(s) are in the site?

Marine or coastal wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type	Justification of Criterion 1
B: Marine subtidal aquatic beds (Underwater vegetation)	Great Swanport Estuary	2		Representative
E: Sand, shingle or pebble shores	Great Swanport Estuary - King Bay, Pelican Bay	0		
F: Estuarine waters	Moulting Lagoon	1	2492	Representative
G: Intertidal mud, sand or salt flats	Little Bay	3		Representative
H: Intertidal marshes		4		Representative
J: Coastal brackish / saline lagoons				

Inland wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type	Justification of Criterion 1
Fresh water > Flowing water >> M: Permanent rivers/ streams/ creeks		0		
Saline, brackish or alkaline water > Lakes >> R: Seasonal/ intermittent saline/ brackish/ alkaline lakes and flats				
Fresh water > Marshes on peat soils >> U: Permanent Non-forested peatlands	Charlie Dilgers Hole	1		

(ECD) **Habitat connectivity** Moulting Lagoon connects with the Apsley Marshes Ramsar site and provides a migratory route for diadromous fish species. Most migrations are for feeding or breeding.

4.3 - Biological components

4.3.1 - Plant species

Other noteworthy plant species

Phylum	Scientific name	Position in range / endemism / other
TRACHEOPHYTA/LILIOPSIDA	<i>Eleocharis sphacelata</i>	Important food source for waterfowl.
TRACHEOPHYTA/LILIOPSIDA	<i>Zostera muelleri</i>	Important food source for waterfowl. Covers 2200ha of the site.

Invasive alien plant species

Phylum	Scientific name	Impacts	Changes at RIS update
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Lycium ferocissimum</i>	Actual (minor impacts)	No change
TRACHEOPHYTA/LILIOPSIDA	<i>Typha latifolia</i>	Actual (minor impacts)	No change
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Ulex europaeus</i>	Actual (minor impacts)	No change

Optional text box to provide further information

The site 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 approximately 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).

Saltmarsh communities serve a critical ecological function and are at risk due to their low reservation status.

Invasive plant species within the site include South African boxthorn (*Lycium ferocissimum*), which is established on Sabinas Island. This species outcompetes the native *A. verticillata* overstorey and reduces the nesting habitat available to black swans (PWS 2007). Bulrush (*Typha latifolia*), blackberry (*Rubus fruticosus*), and gorse (*Ulex europaeus*) are other invasive plant species of concern for the Ramsar site (PWS 2007).

4.3.2 - Animal species

Other noteworthy animal species

Phylum	Scientific name	Pop. size	Period of pop. est.	% occurrence	Position in range /endemism/other
CHORDATA/AVES	<i>Euseyornis melanops</i>				Nests on beaches within the site
CHORDATA/AVES	<i>Hydroprogne caspia</i>				Nests on beaches within the site

Invasive alien animal species

Phylum	Scientific name	Impacts	Changes at RIS update
ARTHROPOD/MALACOSTRACA	<i>Carcinus maenas</i>	- Please select a value -	No change

4.4 - Physical components

4.4.1 - Climate

Climatic region	Subregion
C: Moist Mid-Latitude climate with mild winters	Cfb: Marine west coast (Mild with no dry season, warm summer)

Tasmania has four distinct seasons with the warmest months being December to March. The average maximum daily summer temperatures are between 17 and 23°C and winter daily temperatures sit between 3 and 11°C. Rainfall varies across the state. The general rainfall pattern is evenly spread throughout the year, with slightly higher falls in the summer months (December to February) when the evaporation rate is high. During the last 30 years, changes to the climate and weather of the Southern Tasmania region have included:

- A shift in monthly rainfall – summer rainfall has decreased by 10mm per year from 251mm to 241mm; and winter rainfall has decreased by 40mm per year from 334mm to 294mm.
- More hot days – in the last 30 years eight days per year above 30°C compared to six days in the previous 30 years. (BOM Regional Weather and Climate Guide 2019).

4.4.2 - Geomorphic setting

a) Minimum elevation above sea level (in metres)

a) Maximum elevation above sea level (in metres)

Entire river basin

Upper part of river basin

Middle part of river basin

Lower part of river basin

More than one river basin

Not in river basin

Coastal

Please name the river basin or basins. If the site lies in a sub-basin, please also name the larger river basin. For a coastal/marine site, please name the sea or ocean.

Swan-Apsley Basin, Tasmanian Drainage Division.

Moulting Lagoon is primarily a wave dominated estuary (Edgar et al. 1999; Ryan et al. 2003). It is episodically flushed by two rivers, the Apsley and Swan, and by intermittent flows from adjacent streams. Moulting Lagoon is comprised of two distinct hydro-geomorphic systems: a northern low energy central basin, and a long narrow high energy estuary, which are connected by a topographically constrained narrow neck with channels up to 4m deep (Mount et al. 2005). A barrier (mid-bay spit) at the head of Great Oyster Bay protects the estuarine system from storm waves and slows flushing. There are a series of major geomorphic features, including the Swan River delta, low energy shallow basins, fluvial deposits on the periphery of water bodies and 15 islands occupied by saltmarsh communities, intertidal and subtidal flats connected by subtidal channels, sea water channel, tidal and subtidal sand banks, salt pans, beaches and dunes.

4.4.3 - Soil

Mineral

(Update) Changes at RIS update No change Increase Decrease Unknown

No available information

Are soil types subject to change as a result of changing hydrological conditions (e.g., increased salinity or acidification)? Yes No

Please provide further information on the soil (optional)

The majority of the low-lying land around Moulting Lagoon is of recent alluvial or aeolian origin. The underlying rocks are predominantly Jurassic dolerite and Permian and Triassic sediments.

4.4.4 - Water regime

Water permanence

Presence?	Changes at RIS update
Usually permanent water present	No change
Usually seasonal, ephemeral or intermittent water present	No change

Source of water that maintains character of the site

Presence?	Predominant water source	Changes at RIS update
Water inputs from surface water	<input checked="" type="checkbox"/>	No change
Water inputs from precipitation	<input type="checkbox"/>	No change
Water inputs from groundwater	<input type="checkbox"/>	No change

Water destination

Presence?	Changes at RIS update
Marine	No change

Stability of water regime

Presence?	Changes at RIS update
Water levels fluctuating (including tidal)	No change

Please add any comments on the water regime and its determinants (if relevant). Use this box to explain sites with complex hydrology:

Moulting Lagoon receives a largely natural flow regime with minimal impact from water allocation in terms of the flow regime components that influence the hydrological character.

Hydrologic inputs include precipitation, ground water discharge, and surface or near surface inflow sourced potentially from tides, flow from river and stream channels and from higher water table levels in the wetland (Brinson 1993). Hughes (1987) reported that the mean annual runoff for the Swan and Apsley catchments at 142 mm, is comparable, with those of semi-arid regions in Australia and the world, where the UNESCO classification for semi-arid regions is 50 – 250 mm.

The Swan River (catchment area: 682 square kilometres) and Apsley River (catchment area: 228 square kilometres) provide freshwater input to Moulting Lagoon and both of these rivers have highly variable flow (DPIWE 1998). Fluctuations in flow significantly affect salinity in parts of Moulting Lagoon (DPIWE 1998).

(ECD) Connectivity of surface waters and of groundwater	Groundwater contributes to the hydrologic inputs of Moulting Lagoon
(ECD) Stratification and mixing regime	The water column is well mixed, salinity stratification is not known to occur.

4.4.5 - Sediment regime

Sediment regime unknown

Please provide further information on sediment (optional):

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.

(ECD) Water turbidity and colour	Turbidity is generally low (less than 5 NTU)
----------------------------------	--

4.4.6 - Water pH

Circumneutral (pH: 5.5-7.4)

(Update) Changes at RIS update No change Increase Decrease Unknown

Alkaline (pH>7.4)

(Update) Changes at RIS update No change Increase Decrease Unknown

Unknown

Please provide further information on pH (optional):

Typically pH levels are similar to that of marine waters ranging from 7.5 to 8.3 (Temby and Crawford 2008). However, in winter 2007, elevated pH levels of up to 9.5 were recorded, indicating alkaline conditions. The potential causes of the anomaly remain unknown, but conditions returned to normal in spring.

4.4.7 - Water salinity

Mixohaline (brackish)/Mixosaline (0.5-30 g/l)

(Update) Changes at RIS update No change Increase Decrease Unknown

Euhaline/Eusaline (30-40 g/l)

(Update) Changes at RIS update No change Increase Decrease Unknown

Unknown

Please provide further information on salinity (optional):

Salinity is variable in areas adjacent to river inflows (Swan and Apsley River deltas) where water can be brackish (as low as 5 parts per thousand) during later winter and early spring when river flow is greatest (Temby and Crawford 2008), but near sea water (30 parts per thousand) during late summer and autumn (Murphy et al. 2002). Conversely, salinity near the mouth varies little and remains on average, approximately 35 parts per thousand year round (Murphy et al. 2002). Hypersaline conditions (45 parts per thousand) have been observed in areas such as Sherbourne Bay, which are distant from both tidal exchange of the mouth and river inflows (Temby and Crawford 2008). Despite the variability in salinity, the water column remains well mixed and salinity stratification is not known to occur.

(ECD) Dissolved gases in water

Dissolved oxygen can also vary seasonally and spatially. Anoxic conditions were observed near Apsley Marshes during summer of 2007/2008, which coincided with a large amount of decaying organic matter (seagrass wrack and cygnet carcasses) at the site. In contrast, dissolved oxygen levels at sites with better/higher flushing capability (such as lower Moulting Lagoon) were relatively stable and generally remained higher than 80% saturation (Temby and Crawford 2008).

4.4.8 - Dissolved or suspended nutrients in water

Unknown

Please provide further information on dissolved or suspended nutrients (optional):

Modelling indicates that grazing, cropping and horticulture contribute to nutrients loads in the catchment (Kelly, 2018). The Swan and Apsley Rivers discharge nutrients into the Ramsar site, resulting in a pattern of increased nutrients following peaks in river flow (Hughes 1987; Temby and Crawford 2008). Despite this, chlorophyll-a concentrations remained stable year round during 2007 and 2008 and for the most part were less than five micrograms per litre (Temby and Crawford 2008). The exception to this was adjacent to the Apsley Marshes where chlorophyll-a peaked at over 130 micrograms per litre during December 2007 (Temby and Crawford 2008).

4.4.9 - Features of the surrounding area which may affect the Site

Please describe whether, and if so how, the landscape and ecological characteristics in the area surrounding the Ramsar Site differ from the site itself: i) broadly similar ii) significantly different

Surrounding area has greater urbanisation or development

Surrounding area has higher human population density

Surrounding area has more intensive agricultural use

Surrounding area has significantly different land cover or habitat types

Please describe other ways in which the surrounding area is different:

Moulting Lagoon catchment is dominated by green space, including native vegetation (62%). The upper catchment is forested, with a mix of green space and native production forest, which accounts for 14% of the catchment area. Lower catchment areas are dominated by grazing (19% of the catchment) mostly for wool. There are also significant areas of cropping and horticulture in this modified landscape, together accounting for 2% of the catchment. Horticulture consists of viticulture and walnuts. Rural residential areas account for another 2% of the catchment, with a significant community of Dolphin sands, along the foreshore of Great Oyster Bay, east of Swansea, and additional rural residential areas on the eastern side of the catchment, near the inlet and Lagoon foreshore areas (Kelly, 2018).

4.5 - Ecosystem services

4.5.1 - Ecosystem services/benefits

Provisioning Services

Ecosystem service	Examples	Importance/Extent/Significance
Food for humans	Sustenance for humans (e.g., fish, molluscs, grains)	Low
Wetland non-food products	Livestock fodder	Low

Regulating Services

Ecosystem service	Examples	Importance/Extent/Significance
Erosion protection	Soil, sediment and nutrient retention	Medium
Pollution control and detoxification	Water purification/waste treatment or dilution	Medium

Cultural Services

Ecosystem service	Examples	Importance/Extent/Significance
Recreation and tourism	Nature observation and nature-based tourism	Medium
Recreation and tourism	Picnics, outings, touring	Medium
Spiritual and inspirational	Cultural heritage (historical and archaeological)	Low
Scientific and educational	Major scientific study site	Low

Supporting Services

Ecosystem service	Examples	Importance/Extent/Significance
Biodiversity	Supports a variety of all life forms including plants, animals and microorganisms, the genes they contain, and the ecosystems of which they form a part	High

Have studies or assessments been made of the economic valuation of ecosystem services provided by this Ramsar Site? Yes No Unknown

4.5.2 - Social and cultural values

- i) the site provides 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) the site has exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland
- iii) the ecological character of the wetland depends on its interaction with local communities or indigenous peoples
- iv) 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

<no data available>

4.6 - Ecological processes

(ECD) Nutrient cycling	Moulting Lagoon plays a role in cycling and discharge of nutrients from the Swan and Apsley catchments.
(ECD) Carbon cycling	Saltmarsh and seagrass are long-term carbon sinks (blue carbon ecosystems).
(ECD) Animal reproductive productivity	The site supports waterbird breeding, in particular for large numbers of black swans.
(ECD) Notable aspects concerning migration	The site is used by migratory birds. 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 (<i>Anguilla australis</i>) occur.
(ECD) Pressures and trends concerning any of the above, and/or concerning ecosystem integrity	There is a declining trend in migratory shorebird numbers at Moulting Lagoon consistent with elsewhere in Tasmania, most notably for Eastern curlew, Red-necked stint and Bar-tailed godwit (Woehler and Ruoppolo, 2014).

5 - How is the Site managed? (Conservation and management)

5.1 - Land tenure and responsibilities (Managers)

5.1.1 - Land tenure/ownership

Public ownership

Category	Within the Ramsar Site	In the surrounding area
Provincial/region/state government	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Private ownership

Category	Within the Ramsar Site	In the surrounding area
Other types of private/individual owner(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Provide further information on the land tenure / ownership regime (optional):

The entire area of Moulting Lagoon is Crown Land, variously protected under successive reserve designations since 1918. In 1988 it was designated as Game Reserve under the management of the Tasmanian Parks and Wildlife Service (PWS). The boundary of the Game Reserve includes an area of land to the north east of Moulting Lagoon, which is not included in the Ramsar site. The Game Reserve is an area used on an annual basis for recreational duck shooting, controlled under the provisions of the Wildlife Regulations 1999 of the Nature Conservation Act 2002, Tasmania. The northern basin of the main lagoon is known as 'the Sanctuary' and is designated as an area where shooting is prohibited. Land adjacent to Moulting Lagoon is privately owned with land uses including grazing, viticulture, nature conservation, tourism and semi-urban developments.

5.1.2 - Management authority

Please list the local office / offices of any agency or organization responsible for managing the site:

Department of Primary Industries, Parks, Water and Environment (DPIPWE), HOBART Tasmania

Provide the name and/or title of the person or people with responsibility for the wetland:

Natural and Cultural Heritage Division, Department of Primary Industries, Parks, Water and Environment

Postal address:

Department of Primary Industries, Parks, Water and Environment (DPIPWE)
GPO Box 44
HOBART Tasmania 7001

E-mail address:

kathryn.lambert@dpiwwe.tas.gov.au

5.2 - Ecological character threats and responses (Management)

5.2.1 - Factors (actual or likely) adversely affecting the Site's ecological character

Water regulation

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Drainage	unknown impact	unknown impact	<input type="checkbox"/>	unknown	<input checked="" type="checkbox"/>	unknown

Agriculture and aquaculture

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Marine and freshwater aquaculture	Low impact		<input checked="" type="checkbox"/>	No change	<input type="checkbox"/>	No change

Biological resource use

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Unspecified	unknown impact	unknown impact	<input checked="" type="checkbox"/>	unknown	<input type="checkbox"/>	unknown
Logging and wood harvesting	unknown impact	unknown impact	<input type="checkbox"/>	No change	<input checked="" type="checkbox"/>	unknown
Gathering terrestrial plants	unknown impact	unknown impact	<input type="checkbox"/>	No change	<input checked="" type="checkbox"/>	unknown

Human intrusions and disturbance

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Recreational and tourism activities	Medium impact	Medium impact	<input checked="" type="checkbox"/>	No change	<input type="checkbox"/>	No change

Natural system modifications

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Dams and water management/use	unknown impact	unknown impact	<input type="checkbox"/>	No change	<input checked="" type="checkbox"/>	unknown

Invasive and other problematic species and genes

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Invasive non-native/ alien species	unknown impact	unknown impact	<input checked="" type="checkbox"/>	unknown	<input checked="" type="checkbox"/>	unknown

Pollution

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Unspecified	unknown impact	unknown impact	<input checked="" type="checkbox"/>	unknown	<input checked="" type="checkbox"/>	unknown

Climate change and severe weather

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Habitat shifting and alteration	unknown impact	unknown impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	unknown
Temperature extremes	unknown impact	unknown impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	unknown
Storms and flooding	unknown impact	unknown impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	No change

Please describe any other threats (optional):

Grazing has a serious impact on saltmarsh vegetation from browsing and trampling. It is estimated that it takes around 20 years for *Tecticornia arbuscula* to re-establish in suitable locations following exclusion of stock. The presence of isolated *Tecticornia arbuscula* shrubs around much of the shoreline, interspersed within *Sarcocornia* species patches, may be indicative of previous grazing, or may be a response to past or current tidal or aeolian influences (Hale and Butcher, 2011).

Invasive plant species within the site include South African boxthorn (*Lycium ferocissimum*), which is established on Sabinas Island. This species outcompetes the native *A. verticillata* overstorey and reduces the nesting habitat available to black swans (PWS 2007). Bulrush (*Typha latifolia*), blackberry (*Rubus fruticosus*), and gorse (*Ulex europaeus*) are other invasive plant species of concern for the Ramsar site (Hale and Butcher, 2011).

Recreational use of the site, in particular evidence of the use of vehicles on sensitive claypan areas, is known to have caused some damage which may impact shorebird nesting success (Woehler & Ruoppolo, 2014).

Commercial aquaculture of oysters is practiced in Moulting Lagoon in shallow areas with a high degree of flushing by tidal action. There is no evidence of adverse effects on sea life, birds or water quality (PWS, 2007). The industry is regulated and water quality testing is regularly carried out to ensure both product safety and environmental health (Hale and Butcher, 2011; DPIPWE, 2020b).

With continued global warming, projections for the Southern slopes Tasmania east NRM region in which the Moulting Lagoon Ramsar site is located, are for continued temperature rises in all seasons, more hot days, less rainfall in spring and possible changes to summer and autumn rainfall (although these are less clear), increased intensity of rainfall events, a continued rise in mean sea level, increase in extreme sea level events and harsher fire weather (Climate Change in Australia, BOM and CSIRO, 2020).

5.2.2 - Legal conservation status

National legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
game reserve		https://parks.tas.gov.au/Documents/moultinglagoonpdf.pdf	whole

Non-statutory designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Important Bird Area	Moulting Lagoon	http://datazone.birdlife.org/sitefactsheet/moulting-lagoon-iba-australia	whole

5.2.3 - IUCN protected areas categories (2008)

- Ia Strict Nature Reserve
- Ib Wilderness Area: protected area managed mainly for wilderness protection
- II National Park: protected area managed mainly for ecosystem protection and recreation
- III Natural Monument: protected area managed mainly for conservation of specific natural features
- IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention
- V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation

VI Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems

5.2.4 - Key conservation measures

Legal protection

Measures	Status
Legal protection	Implemented

Habitat

Measures	Status
Catchment management initiatives/controls	Implemented

Human Activities

Measures	Status
Fisheries management/regulation	Implemented
Regulation/management of recreational activities	Implemented
Communication, education, and participation and awareness activities	Implemented

Other:

Moulting Lagoon is part of a designated Game Reserve.

NRM South is the relevant catchment management authority. This organisation undertakes, research, management activities and educational and awareness activities from time to time as funding permits.

Recreational duck hunting occurs in Moulting Lagoon and is regulated.

Aquaculture - oyster farming occurs in Moulting Lagoon and is regulated.

5.2.5 - Management planning

Is there a site-specific management plan for the site? Yes

Has a management effectiveness assessment been undertaken for the site? Yes No

If the site is a formal transboundary site as indicated in section Data and location > Site location, are there shared management planning processes with another Contracting Party? Yes No

5.2.6 - Planning for restoration

Is there a site-specific restoration plan? Yes, there is a plan

Further information

See Section 6.1.2.

5.2.7 - Monitoring implemented or proposed

Monitoring	Status
Birds	Implemented
Plant community	Implemented
Water quality	Implemented

6 - Additional material

6.1 - Additional reports and documents

6.1.1 - Bibliographical references

A full list of Bibliographic references is attached under Section 6.1.2.

6.1.2 - Additional reports and documents

i. taxonomic lists of plant and animal species occurring in the site (see section 4.3)
<no file available>

ii. a detailed Ecological Character Description (ECD) (in a national format)
<1 file(s) uploaded>

iii. a description of the site in a national or regional wetland inventory
<no file available>

iv. relevant Article 3.2 reports
<no file available>

v. site management plan
<1 file(s) uploaded>

vi. other published literature
<2 file(s) uploaded>

6.1.3 - Photograph(s) of the Site

Please provide at least one photograph of the site:



Moulting Lagoon Ramsar site aerial view (*MMcAuley, 2009*)



Moulting Lagoon Ramsar site black swans (*McAuley, 2009*)



Moulting Lagoon Ramsar site Ramsar interpretive sign (*V Prahalad, 2012*)



Moulting Lagoon Ramsar site saltmarsh (*V Prahalad, 2012*)

6.1.4 - Designation letter and related data

Designation letter
<1 file(s) uploaded>

Date of Designation **1982-11-16**