

# Information Sheet on Ramsar Wetlands (RIS)

*Categories approved by Recommendation 4.7, as amended by Resolution VIII.13 of the Conference of the Contracting Parties.*

## Note 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. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Bureau. Compilers are strongly urged to provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of maps.

---

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

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

FOR OFFICE USE ONLY.

DD MM YY

--	--	--

Designation date

--	--	--	--	--	--

Site Reference Number

---

### 2. Date this sheet was completed/updated:

June 2005

---

### 3. Country:

Australia

---

### 4. Name of the Ramsar site:

Lavinia

---

### 5. Map of site included:

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

a) **hard copy** (required for inclusion of site in the Ramsar List): *yes*  -or- *no*

b) **digital (electronic) format** (optional): *yes*  -or- *no*

---

### 6. Geographical coordinates (latitude/longitude):

Latitude: 39 degrees 45' 00"; Longitude: 144 degrees 05' 00"

---

### 7. General location:

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

Lavinia Ramsar Site is situated on the north-east coast of King Island, Bass Strait Tasmania, approximately 36 km north-east of the town of Currie. The site lies between Boulder Point in the north and Cowper Point in the south, with the northern section extending approximately 8km inland. The site is in the King Island municipality. The population of King Island was 1724 in 2001 (Australian Bureau of Statistics 2004).

---

### 8. Elevation: (average and/or max. & min.)

Maximum elevation is 20 m ASL

---

### 9. Area: (in hectares)

7034 hectares\*

\*The boundary of the site follows low water mark but the digital coverage used in 1996 was high water mark as low water mark was not available. In 2001, the boundary of the Lavinia Ramsar site was mapped more accurately using an updated coverage of the low water mark. The area was recalculated to 7034 ha.

---

### 10. Overview:

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

This site is comprised of what is currently known as the Lavinia State Reserve. It includes the Sea Elephant River estuary and associated samphire mud flats, coastal swamps, lagoons and areas of drier marsh inland from the coast. The area is an important refuge for a collection of state and nationally threatened species. The reserve is accessible by two-wheel drive vehicles.

---

## 11. Ramsar Criteria:

Circle or underline 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).

1 • 2 • 3 • 4 • 5 • 6 • 7 • 8

---

## 12. Justification for the application of each Criterion listed in 11. 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).

**Criteria 1** - The reserve is one of the few largely unaltered areas of native vegetation remaining on King Island and is therefore a very important area of habitat for both flora and fauna. The site provides excellent examples of, and interaction between, a variety of coastal and inland wetland types for the King Biogeographic Region of Tasmania. The dunes along the coastal strip of the site are of outstanding geoconservation significance for Tasmania (Dixon 1996). The Sea Elephant River estuary is recognised as a Tasmanian estuary with high conservation significance (Edgar, Barrett and Graddon 1999).

**Criterion 2** - The site supports species and communities which are threatened in Australia under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC). The nationally threatened Orange-bellied parrot (*Neophema chrysogaster*, Endangered, EPBC and vulnerable, Tasmanian *Threatened Species Protection Act 1995* (TSPA)) uses the site during its annual migration. Another endangered bird on the island is the King Island subspecies of the Brown thornbill (*Acanthiza pusilla archibaldi*, Endangered, EPBC). The Green and Gold Frog (*Litoria raniformis*) is known to occur on the site (Vulnerable, EPBC and vulnerable, TSPA) (Karyl Michaels pers. comm.). The nationally Endangered Scrambling ground fern (*Hypolepis distans*, Endangered, EPBC and vulnerable, TSPA) occurs in Nook Swamps within the site (Schahinger 2005), with Lavinia State Reserve is the only reserved site for this species in Tasmania.

**Criterion 3** – Lavinia supports six fauna species listed as threatened under the Tasmanian *Threatened Species Protection Act 1995*. These include the White-bellied sea eagle (*Haliaeetus leucogaster*, vulnerable, TSPA). A terrestrial snail, the Southern hairy red snail (*Austrochloritis victoriae*, rare, TSPA), previously thought to be extinct in Tasmania, was rediscovered in the nature reserve in November 1996. Lavinia contains two of the three key sites for the survival of this species. Six of the eleven Tasmanian frog species occur within the reserve, including the Striped marsh frog (*Limnodynastes peroni*, rare, TSPA). A number of threatened flora species listed as rare in Tasmania (TSPA) occur on the site including; Tiny caladenia (*Caladenia pusilla*), Trithuria (*Trithuria submersa*), Banded greenhood (*Urochilus sanguineus*) and Blueberry ash (*Elaeocarpus reticulatus*). Lavinia is recognised as a key site for the survival of two threatened flora species both listed as rare in Tasmania (TSPA); Small trigger plant (*Stylidium despectum*) and Erect sneezeweed (*Centipeda cunninghamii*). Starwort (*Callitriche sonderi*, rare, TSPA), which occurs on the Australian mainland, but is only known in Tasmania from the Sea Elephant River in Lavinia. Seven flora species endemic to Tasmania occur on the site including Western scrub sheoak (*Allocasuarina zephyrea*) and Brooker's gum (*Eucalyptus brookeriana*). Cowper Point has a high beach nesting and migratory shorebird diversity and is recognised as a priority site for resident shorebirds, with eight recorded resident species (Bryant 2002).

**Criterion 4** - The area provides a critical feeding site for the endangered Orange-bellied parrot (*Neophema chrysogaster*) during its annual migration between south-eastern Australia and Tasmania. This species is listed on the Japan - Australia Migratory Bird Agreement (JAMBA). Three rookeries of the JAMBA listed Short-tailed shearwater (*Puffinus tenuirostris*) are located within the reserve. Overall the site supports nine migratory birds listed on the China - Australia Migratory Bird Agreement (CAMBA) and nine species listed on the JAMBA. These species include: Cattle egret (*Ardea ibis*), Great egret (*Ardea alba*), Ruddy turnstone (*Arenaria interpres*), Sharp-tailed sandpiper (*Calidris acuminata*), Red-necked stint (*Calidris ruficollis*), White-throated needletail (*Hirundapus caudacutus*), Caspian tern (*Sterna caspia*) and Greenshank (*Tringa nebularia*). The extensive beaches of the site support many beach nesting shorebirds; Fairy tern (*Sterna nereis*, rare, TSPA) and Hooded plover (*Thinornis rubricollis*) and Cowper Point is recognised as a priority site for the Little tern (*Sterna albifrons*, rare, TSPA) (Bryant 2002). The site also supports breeding populations of the Little penguin (*Eudyptula minor*).

---

**13. 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:** King

**b) biogeographic regionalisation scheme** (include reference citation): Interim Biogeographic Regionalisation for Australia version 5.

---

**14. Physical features of the site:**

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

The Sea Elephant River, the largest river on King Island, drains into Bass Strait midway along the east coast. The river mouth, which has been migrating north for the last 45 years is recognised as a site of geoconservation significance for Tasmania (Dixon 1996). The shifting sands of the river mouth have caused a substantial back-up of brackish water, creating the saltmarsh which extends up to five kilometres inland. The coastal strip of the area is sand dunes and beaches with Quaternary coastal calcareous sands. Further inland are Quaternary sand plains with mostly deep organic sandy soils. Outcrops of Precambrian granite occur west of Lake Martha Lavinia, on the coastline near Pennys Lagoon and near the junction of Sea Elephant River and Saltwater Creek. The present landscape is the result of several distinct episodes of dune formation. The extensive Nook Swamps, which run roughly parallel to the coast along much of the reserve's length, occupy a flat depression which separates the new system of parallel dunes from the old parabolic dunes further inland.

Nook Swamps and the surrounding wetlands contain extensive peatlands developed in two contexts. Firstly, fibrous peats of up to one metre in depth, are found associated with Melaleuca forests. These soils are likely to be many thousands of years old. Secondly, shallower humic peats have developed in surrounding wetlands in depressions on the plains. The fibrous peats in particular are sensitive to fire, and significant effects on surface and groundwater hydrology may be expected following major peat fires (Houshold pers. comm.).

Within the Swamps, the permanent waters have a maximum depth of about 1.5 m with a pH of 7.5 and a conductivity of 2700 EC.

---

### 15. Physical features of the catchment area:

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

The water catchment draining into the reserve has an area of approximately 280 square kilometres and covers nearly a third of King Island. A wide range of activities occur in this area and therefore water entering the reserve may have an altered chemical, nutrient and turbidity level. The reserve is comprised of an assortment of water features including the Sea Elephant River Estuary, areas of coastal swamp, and lagoons. On private land adjacent to the northern section of the reserve drains have been constructed to lower the water table. Water has been directed into the nature reserve via these drains.

The climate of King Island is temperate maritime and the average annual rainfall of the area is 750 -1000 mm.

---

### 16. Hydrological values:

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

In general, the hydrology of this wetland is controlled by surface flows from granite outcrops to the west, which both provide water through surface channels and through the groundwater system after sinking into adjacent permeable sands. As much of the catchment is sand, a considerable proportion of the groundwater will also be maintained by direct infiltration of rain. Surface channel flows have been increased since European settlement through construction of artificial drains from upstream agricultural land. Outflows from the system are controlled by the bar at the mouth of the Sea Elephant River, along with seepage through the young parallel dune systems to the east. Beach springs occur where this water resurges (Houshold pers comm.).

Many smaller lagoons form independent hydrological systems with wetlands perched on impermeable organic horizons in the sand. Local catchments provide inflows, whilst slow seepage and evaporation control losses. Being independent of regional groundwater systems these small wetlands are vulnerable to mechanical activity which may disrupt the organic 'plugs', allowing increased seepage rates (Houshold pers comm.).

Artificially high pulses of nutrients and sediments to the wetlands may be expected from the upstream drains during storm events. To some extent these are attenuated by fringing vegetation. Little direct input of sediment and nutrients to Nook Swamps would be expected from nearby farms, however small, perched wetlands may be significantly affected (Houshold pers comm.).

---

### 17. 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, G, H, E, M, Sp, Ts, Xf, W, O and K

---

### 18. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site.

The major wetlands in the reserve are the Sea Elephant River estuary area, Lake Martha Lavinia, Penny's Lagoon, and the Nook Swamps. There are also numerous smaller wetland areas, most of which are seasonally inundated. Much of King Island once supported massive *Eucalyptus* forests, however wildfires and large scale clearing have meant that very few mature trees remain today, the Island being dominated by pasture and rapidly diminishing scrub/heathland. The Lavinia State Reserve is one of the few largely unaltered areas of the island and contains much of the remaining native vegetation on King Island. The freshwater areas of the Nook Swamps are dominated by swamp forest, the closed canopy of which exceeds 30 m height in places.

---

### 19. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. 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 vegetation communities present on the site include; Succulent saline herbland, Coastal grass and herbfield, Coastal scrub and King Island *Eucalyptus globulus* woodland as well as the following communities recognised as threatened in Tasmania; Lacustrine herbland, Seabird rookery complex, *Melaleuca squarrosa* scrub, *Melaleuca ericifolia* swamp forest and Scrub complex on King Island.

Within Tasmania, Saltmarsh vegetation communities, one of which occurs on the site, qualify for two of the Biodiversity Criteria developed by Joint ANZECC (Australia and New Zealand Environment and Conservation Council)/MCFFA (Ministerial Council on Forestry, Fisheries and Aquaculture) 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.

Other species considered rare but not listed under the *Threatened Species Protection Act 1995* include; Bog clubmoss (*Lycopodiella serpentina*), Tiny selaginella (*Selaginella gracillima*), Sticky daisy bush (*Olearia glutinosa*), Purple cudweed (*Gamochaeta purpurea*), Hyssop loosestrife (*Lythrum hyssopifolia*) and Violet (*Viola cleistogamoides*).

The Lavinia Nature Reserve Draft Management Plan 2000 contains a flora species list for the site (Tasmanian Parks and Wildlife Service 2000).

---

### 20. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

The Orange-bellied parrot is listed as nationally endangered because the total population is presently estimated to be as low as 100-200 birds. Flocks of up to 40 juveniles are heavily dependent upon the samphire plant (*Sarcocornia quinqueflora*), which occurs in the saltmarsh vegetation community, for food during migration. They also roost at night in the trees and scrub surrounding the Sea Elephant River estuary and south of it. Their movements during the day encompass areas north of the estuary, possibly as far as Nook Swamps.

Several species of birds which use the reserve are rarely observed on the Tasmanian mainland, these include; the Dusky Moorhen (*Gallinula tenebrosa*), the Nankeen or Australian kestrel (*Falco cenchroides*), the Rufous night heron (*Nycticorax caledonicus*) and the Golden-headed cisticola (*Cisticola exilis*). The Masked woodswallow (*Artamus personatus*) and Rainbow lorikeet (*Trichoglossus haematodus*) have bred on the island but are thought to have been vagrants.

The Lavinia Nature Reserve Draft Management Plan 2000 contains a fauna species list for King Island (Tasmanian Parks and Wildlife Service 2000).

---

**21. Social and cultural values:**

e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

The largely unspoiled nature of this reserve and its variety of interesting features make it an important area for scientific study, recreation and education. It is thought that there may be archaeological sites connected with colonial whaling and sealing operations in the area around Cowper's Point. Two sites of Aboriginal significance are located within the Lavinia State Reserve, one is located near Martha Lavinia and the other at Penny's Lagoon.

---

**22. Land tenure/ownership:**

(a) within the Ramsar site: The area within the present boundary was proclaimed a Nature Reserve in 1988 and changed to a State Reserve in 2001. This area includes the previous Lavinia Wildlife Sanctuary and the Sea Elephant Nature Reserve, plus additional surrounding areas.

(b) in the surrounding area: Previously unallocated Crown land to the north has recently been added to the Lavinia Nature Reserve, the balance of surrounding land is Private freehold and Conservation Areas with Councillor Island to the east of Cowper Point, recently proclaimed as a Nature Reserve.

---

**23. Current land (including water) use:**

(a) within the Ramsar site: Nature conservation and recreation (boating, fishing, camping, off-road driving).

(b) in the surroundings/catchment: Livestock grazing, nature conservation, mineral exploitation and mining.

---

**24. 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: An inappropriate fire regime is one of the main threats to vegetation. The root rot fungus, *Phytophthora cinnamomi*, is present along access tracks in the reserve and is also a threat to components of some vegetation communities. Off-road vehicles and motorbikes have caused considerable damage to the saltmarsh community along the Sea Elephant River estuary.

An Oyster farm is located within the site toward the mouth of the Sea Elephant River. On two occasions the lessee has been granted permission to excavate a channel through the beach to facilitate tidal flushing and maintain oyster health, as the mouth of the river naturally opens and closes. The oyster farm, its associated infrastructure and vehicular access over saltmarsh community, and especially the requirement to maintain tidal flow, interfere with the natural processes of the river, upstream catchment, surrounding vegetation and many species the site supports.

The Chytrid fungus has recently been confirmed in Tasmania. It is a fungal parasite of amphibian skin and has been implicated in the decline and extinction of frog species on the Australian mainland. A monitoring program is currently underway and a threat abatement plan is being developed.

(b) in the surrounding area: Large-scale sand mining is to occur on land to the south of the Lavinia Nature Reserve. This was opposed by the Tasmanian Department of Primary Industries, Water and the Environment and a buffer zone has been negotiated in an attempt to protect the values of the Nature Reserve. Proposals for sand mining and large residential development on land to the south of the reserve would cause large-scale disturbance in that area and would potentially impact upon the reserve. Other threats to the ecological values of the site are draining or altering the drainage of surrounding land, addition and subsequent runoff of fertilisers, herbicides and chemicals from land within the catchment and large scale clearing or other ground disturbance increasing the sediment load.

---

**25. Conservation measures taken:**

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

The site is listed on the Convention on Wetlands (Ramsar, Iran, 1971). Land south of the Sea Elephant River mouth has been added to the State Reserve, and some private land adjacent to the reserve has also been acquired and incorporated into the Reserve. Regular trapping of feral cats is undertaken. A draft management plan has been written for the area and is undergoing revision.

No netting is allowed upstream of the mouth of Sea Elephant River (Tasmanian *Fisheries (Scalefish) Rules 2004*).

---

**26. Conservation measures proposed but not yet implemented:**

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

It is proposed that the ranger employed by the Tasmanian Parks and Wildlife Service receive an increased level of funding so that Lavinia State Reserve can be appropriately managed.

---

**27. Current scientific research and facilities:**

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

There is ongoing monitoring of Orange-bellied parrots and their habitat availability by staff of the Nature Conservation Branch of the Department of Primary Industries, Water and Environment and the Tasmanian Parks and Wildlife Service. There are no facilities provided.

---

**28. Current conservation education:**

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

Onsite interpretive information on Orange-bellied parrots is present in the area, the wetland also features in educational leaflets developed by the Tasmanian Department of Primary Industries, Water and the Environment. Two interpretive signs have been erected to explain the importance of the area and The Convention on Wetlands.

---

**29. Current recreation and tourism:**

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

Information signs, a picnic area and facilities have recently been erected in the Penny's Lagoon region and a picnic area. Roads in this and the Lake Martha Lavinia vicinity have been upgraded.

---

**30. Jurisdiction:**

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

Territorial: King Island Municipal Council. Functional: Director, Parks and Wildlife Service.

---

**31. 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 and Wildlife Service  
GPO Box 1751  
HOBART, Tasmania, 7001

---

### 32. Bibliographical references:

scientific/technical references only. If biogeographic regionalisation scheme applied (see 13 above), list full reference citation for the scheme.

Australian Bureau of Statistics (2004). *Regional Population Growth, Australia and New Zealand* (cat. no. 3218.0). Australian Bureau of Statistics, Canberra.

Buchanan, A.M. (2004). *A Census of the Vascular Plants of Tasmania*. Tasmanian Herbarium, Tasmanian Museum and Art Gallery, Sandy Bay.

Brown, P.B. and Wilson, R.J. (1984). *Orange-bellied parrot recovery plan: Management recommendations to the Governments of Tasmania, Victoria and South Australia*. Parks and Wildlife Service, Tasmania.

Bryant, Dr S. (2002). *Conservation assessment of beach nesting and migratory shorebirds in Tasmania*. Nature Conservation Branch, Department of Primary Industries, Water and Environment, Hobart.

Dixon, Grant (1996) A reconnaissance inventory of sites of geoconservation significance on Tasmanian Islands. Parks and Wildlife Service and Australian Heritage Commission, Tasmania.

Dunn, H. (2005). *Assessing the Condition and Status of Tasmania's Wetlands and Riparian Vegetation*. Nature Conservation Branch, Department of Primary Industries, Water and Environment, Hobart.

Edgar, G.J., Barrett, N.S. and Graddon, D.J. (1999) A Classification of Tasmanian Estuaries and Assessment of their Conservation Significance using Ecological and Physical Attributes, Population and Land Use.

Harris, S. & Kitchener, A. (Eds) (2004) *Tasmania's vegetation, A technical manual for TASVEG: Tasmania's Vegetation Map*. Version 1.0. Nature Conservation Branch. DPIWE. Hobart.

<http://www.anca.gov.au/enviro/m/wetlands/tas.htm>

<http://www.parks.tas.gov.au/manage/parksres/reserves.html>

Joint ANZECC (Australia and New Zealand Environment and Conservation Council)/MCFFA (Ministerial Council on Forestry, Fisheries and Aquaculture) National Forest Policy Statement Implementation Sub-committee (JANIS). (1997). *Nationally Agreed Criteria for the Establishment of a Comprehensive, Adequate and Representative Reserve System for Forests in Australia*. Environment Australia and Department of Primary Industries and Energy, Canberra.

Naarding, J.A. (1980). *Study of the Short-tailed Shearwater (*Puffinus tenuirostris*) in Tasmania*. National Parks and Wildlife Service, Tasmania.

Schahinger, R. (2005). Security actions for the scrambling ground fern (*Hypolepis distans* Hook.) in Tasmania. Threatened Species Unit, Department of Primary Industries, Water and Environment, Hobart.

*Tasmanian Fisheries (Scalefish) Rules 2004*. [www.thelaw.tas.gov.au](http://www.thelaw.tas.gov.au)

Tasmanian Parks and Wildlife Service. (2000). *Lavinia Nature Reserve Management Plan*. Parks and Wildlife Service, Department of Primary Industries, Water and the Environment, Hobart.

Threatened Species Unit. (2003). *Threatened Flora of Tasmania*. Nature Conservation Branch, Department of Primary Industries, Water and Environment, Hobart.

**Personal Communications:**

Blackhall, S. (2005) Wildlife Biologist, Fauna Section, Nature Conservation Branch, Department of Primary Industries, Water and Environment.

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

Michaels, K. (2005) Project Officer, Vegetation Benchmarking and Condition Assessment Project, Nature Conservation Branch, Department of Primary Industries Water and Environment.

---

Please return to: **Ramsar Convention Bureau, Rue Mauverney 28, CH-1196 Gland,  
Switzerland**

Telephone: +41 22 999 0170 • Fax: +41 22 999 0169 • e-mail: [ramsar@ramsar.org](mailto:ramsar@ramsar.org)