

Gippsland Lakes

Ramsar site

Ecological Character Description

March 2010

Chapters 8-9

Other chapters can be downloaded from:

[www.environment.gov.au/water/publications/environmental/wetlands/21-ecd.html](http://www.environment.gov.au/water/publications/environmental/wetlands/21-ecd.html)

# References

Aldrick, J.M., Hook, R.A., van de Graaff, R.H.M., Nicholson, B.M., O’Beirne, D.A. and Schoknecht, N.R. (1984) A Study of the land in the catchment of the Gippsland Lakes, TC-17, Volume 1. Land Protection Division: East Melbourne.

Alongi, D.M. (1990) The ecology of tropical soft-bottom benthic ecosystems. Oceanography and Marine Biology Annual Review 28, 381-496.

ANCA (1995) Ramsar Fact Sheet: Wetlands are Important. Australian Nature Conservation Agency, Canberra.

ANZECC/ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Environment and Conservation Council, and Agriculture and Resource Management Council of Australia and New Zealand, Canberra

ASFB - Australian Society of Fish Biology (2001) 'Conservation Status of Australian Fishes - 2001.' Australian Society of Fish Biology Threatened Species Committee Report.

AWSG (2003) Australasian Wader Studies Group Shorebird count database. Birds Australia, Melbourne.

Backhouse, G., Jackson, J. and O’Connor, J. (2008) National Recovery Plan for the Australian grayling *Prototroctes maraena*. Department of Sustainability and Environment, Melbourne.

Bamford, M, D. Watkins, W. Bancroft, G. Tischler and J. Wahl. (2008) Migratory Shorebirds of the East Asian - Australasian Flyway; Population Estimates and Internationally Important Sites. Wetlands International - Oceania. Canberra, Australia.

Barrett, G., Silcocks, A., Barry, S., Cunningham, R., and Poulter, R. (2003) The New Atlas of Australian Birds. Birds Australia (Royal Australian Ornithological Union), Hawthorn East.

Barter, M. (1995) For the record - large numbers of Red-necked Stint and Banded Stilt at Lake Reeve, Gippsland, Victoria. The Stilt 26: 36.

Beardall, J. (2008) Blooms of Synechococcus: An analysis of the problem worldwide and possible causative factors in relation to nuisance blooms in the Gippsland Lakes. A report prepared for the Gippsland Lakes Taskforce.

Bek, P. and Bruton, G. (1979) Gippsland Lakes and streams hydrochemistry, p.281. Caulfield Institute of Technology.

Bird, E.C.F. (1961). The coastal barriers of East Gippsland, Australia. Geographical Journal 127: 460-468.

Bird, E.C.F. (1967) Coastal lagoons in Southeastern Australia. In J. N. Jennings, J. A. Mabbutt (eds.) ‘Landform Studies from Australia and New Guinea’, pp. 365-385. ANU Press, Canberra.

Bird, E.C.F. (1986) The past, present and future of the Gippsland Lakes. In M.W. Pitt and T.P. Synan (eds) ‘The Past, Present and Future of the Gippsland Lakes’. pp. 1-8. Save the Gippsland Lakes Committee, Sale.

Bird, E.C.F and Rosengren, N (1971) The disappearing Mitchell Delta. Proceedings of the Royal Society of Victoria 84. 153-158.

Birds Australia (2009) Orange-bellied Parrot Mainland Recovery Project Website. [Online]. Available from: http://www.birdsaustralia.com.au/our-projects/orange-bellied-parrot-mainland-recovery.html.

Boon, PI, Raulings, EJ, Roache, M, Morris, K. and Bailey, PC. (2007) Managing water regimes in high-value wetlands: general approaches, emerging technologies and specific applications. Monash University and Victoria University. 17 pp booklet.

Boon, PI, Raulings, EJ, Roache, M, and Morris, K. (2008) Vegetation Changes Over a Four Decade Period in Dowd Morass, a Brackish-Water Wetland of the Gippsland Lakes, South-Eastern Australia. Proceedings of the Royal Society of Victoria 120: 403-418

Bureau of Meteorology (BOM) Website: www.bom.gov.au

Calder, D.M., Cropper, S.C. and Tonkinson, D. (1989) The ecology of *Thelymitra epipactoides* F. Muell. (Orchidaceae) in Victoria, Australia, and the implications for management of the species. Australian Journal of Botany 37, 19-32.

Carter, O. and Walsh, N. (2008) National recovery plan for the dwarf kerrawang *Rulingia prostrata*. Department of Sustainability and Environment, Melbourne.

Casanelia, S. (1999). Gippsland Lakes, Victoria - 21. Information Sheet on Ramsar Wetlands (RIS) Obtained from http:\\\www.environment.gov.au.

Clemann, N. and G.R. Gillespie (2004) Draft Recovery Plan for Litoria raniformis 2004-2008. Canberra, Department of the Environment and Heritage.

Coastal Engineering Solutions (2003) Lakes Entrance bar and channel dynamics, sand management study, final report. (Gippsland Ports: Bairnsdale). URL: http://www.gippslandports.vic.gov.au/reports.htm (Accessed 29 September 2007.)

Coles, R., McKenzie, L., and Campbell, S. (2003) The seagrasses of eastern Australia. In E.P. Green and F.T. Short (eds) ‘World Atlas of Seagrasses.’ pp. 119-133. University of California Press: Berkeley.

Cook, P., Holland, D., Longmore, A. (2008) Interactions between phytoplankton dynamics, nutrient loads and the biogeochemistry of the Gippsland Lakes. A report prepared for the Gippsland Lakes Taskforce.

Corrick, A.H., and Norman, F.I. (1980) Wetlands and waterbirds of the Snowy River and Gippsland Lakes catchment. *Proceedings of the Royal Society of Victoria* 91: 1-15.

Cropper, S.C. and Calder, D.M. (1990) The floral biology of *Thelymitra epipactoides* (Orchidaceae), and the implications of pollination by deceit on the survival of this rare orchid. Plant Systematics and Evolution 170, 11-27.

Crossco (2002) Gippsland Lakes Shore Erosion and Revegetation Strategy. Gippsland Coastal Board: Bairnsdale.

CSIRO. (1998) Gippsland Lakes Environmental Audit. Prepared by Harris *et. al.* for the Gippsland Coastal Board. CSIRO, Project Office, Melbourne. 34 pp.

CSIRO. (2001) Gippsland Lakes Environmental Study: Assessing Options for Improving Water Quality and Ecological Function - Final Report. Prepared by Webster *et. al.* for the Gippsland Coastal Board. 83 pp.

Davis, R. A. and Fitzgerald, D. (2004) Beaches and Coasts. John Wiley & Sons, 448 pp.

Day, J.H. (1967) A monograph on the polycheaeta of southern Africa - Part I Errantia. Trustees of the British Museum (Natural History) - London, viii-374.

Day, J.W., Hall, C.A.S., Kemp, W.M., Yanez-Arancibia, A. (1989) Estuarine Ecology. John Wiley & Sons: New York.

DCE (1991) Gippsland Lakes Coastal Action Plan. Gippsland Coastal Board. (Department of Conservation and Environment and Office of the Environment: Melbourne.)

Department of Conservation and Natural Resources (DCNR) (1995) Draft Gippsland Lakes Fisheries Management Plan. Victoria.

DEWHA (2008) National Framework and Guidance for Describing the Ecological Character of Australian Ramsar Wetlands. Canberra: 64pp.

DEWHA (2009) *Litoria aurea* in Species Profile and Threats Database, Department of the Environment, Water, Heritage and the Arts, Canberra.

DPI (2008) Fisheries Victoria Commercial Fish Production Information Bulletin 2008. (Department of Primary Industries, Primary Industries Research Victoria (PIRVic), Queenscliff, Victoria, Australia).

DSE (2003) Gippsland Lakes Ramsar Site: Strategic Management Plan. Department of Sustainability and Environment, Victoria.: 49pp.

DSE (2009) Fauna database extract based on Gippsland Lakes: Latitude - 37 degrees 49 minutes to 38 deg 12 min S, Longitude: 147 deg 04 mins to 148 deg 08 mins E. Department of Sustainability and Environment, Victoria.

DSE (2010) Biodiversity Interactive Map – 3.1. Accessed 26 October 2010. Department of Sustainability and Environment, Victoria.

Earthtech (2003) Thomson River – Environmental Water Requirements and Options to Manage Flow Stress. Report prepared for the WGCMA, DSE, Melbourne Water and Southern Rural Water. Melbourne.

Ecos. Gippsland Lakes Ecological Character Description. Volumes 1 and 2. 220 pp. Unpublished Draft Report prepared by the Ecos Consortium for the West Gippsland Catchment Management Authority. Report provided to the Project Team by the Department of Sustainability, Environment, Water, Population and Communities.

Environment Australia (EA) (2001) A Directory of Important Wetlands in Australia, 3rd edn. Environment Australia: Canberra.

Fisheries Victoria. (2007) Lake Tyers Fisheries Reserve Management Plan. Management Report Series No. 43. 58 pp.

Froend, R. H., Heddle, E. M., Bell, D. T., and McComb, A. J. (1987) Effects of salinity and waterlogging on the vegetation of Lake Toolibin, Western Australia. Australian Journal of Ecology 12, 281–298.

Garnett, S.T. and G.M. Crowley (2000) The Action Plan for Australian Birds 2000. [Online]. Canberra: Environment Australia and Birds Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/action/birds2000/index.html

GCB (Gippsland Coastal Board). (2006) Gippsland Estuaries Action Plan. Published by the GCB. 122 pp.

Geering, A., Agnew, L., and Harding, S. (2007) Shorebirds of Australia. CSIRO Publishing, Collingwood.

Gillespie, G.R. (1996) Distribution, habitat and conservation status of the Green and Golden Bell Frog *Litoria aurea* (Lesson 1829) (*Anura:Hylidae*) in Victoria. Australian Zoologist. 30(2):199-207.

Gippel, CJ., and Stewardson. MJ. (1995) Development of an environmental flow management strategy for the Thomson river, Victoria, Australia. Published Article within Regulated Rivers: Research & Management. Volume 10 Issue 2-4, Pages 121 - 135

Grayson, R., Tan, K. S. and Western, A. (2001) Estimation of Sediment and Nutrient Loads into the Gippsland Lakes, Final Report. Gippsland Lakes Environmental Study Technical Report, Report to the CSIRO/MU Project Team, CEAH Report 2/01, September. Centre for Environmental Applied Hydrology, Department of Civil and Environmental Engineering, University of Melbourne: Parkville.

Halse, S. A. (1987) Probable effect of increased salinity on the waterbirds of Lake Toolibin. Western Australian Department of Conservation and Land Management, Technical Report No. 15.

Hamer, A. and Organ, A. (2006) Distribution, Habitat Use, Movement Patterns and Conservation Management of the growling grass frog *Litoria raniformis* throughout the Pakenham Area, Pakenham, Victoria. Report for Department of Sustainability and Environment. Ecology Partners Pty Ltd.

Harris, G., Batey, G., Webster, I., Molloy, R. and Fox, D. (1998) Gippsland Lakes environmental audit. Review of water quality and status of the aquatic ecosystems of the Gippsland Lakes, October. Gippsland Coastal Board: Bairnsdale and CSIRO Environmental Projects Office: Melbourne.

Hart, B. T., Bailey, P., Edwards, R., Hortle, K., James, K., McMahon, A., Meredith, C., and Swadling, K. (1990) Effects of salinity on river, stream and wetland ecosystems in Victoria, Australia. Water Research 24, 1103–1117.

Heard, G., P. Robertson and M. Scroggie (2004) The Ecology and Conservation Status of the growling grass frog (*Litoria raniformis*) within the Merri Creek Corridor: Report to the Department of Natural Resources and Environment, East Melbourne, Victoria.

Hindell, J. (2005) Movement patterns and habitat preferences of black bream in the Gippsland Lakes. *Fisheries Notes*. FN0583, Victorian Department of Primary Industries.

Hindell, J. (2008) Fish populations and seagrass condition of the Gippsland Lakes. Arthur Rylah Institute for Environmental Research: Department of Sustainability and Environment (DSE). Report Number 2008/94. 31 pp.

HLA-Envirosciences. (2007) Biodiversity Assessment and Strategies for Dutson Range. Prepared for Spotless P&F Pty Ltd (on behalf of the Department of Defence). 27 pp.

Howarth, R.W., Jensen, H.S., Marino, R., Postman, H. (1995) Transport to and processing of P in near-shore and oceanic waters. In Tiessen H. [ed.], Phosphorus in the global environment. John Wiley and Sons.

IUCN (2010) IUCN Red List of Threatened Species. Version 2010.4. <www.iucnredlist.org>. Downloaded 25 November 2010.

Jensen, H.S., Mortensen, P.B., Andersen F.O., Rasmussen, E. and Jensen, A. (1995) Phosphorus cycling in a coastal marine sediment, Aarhus Bay, Denmark. Limnology and Oceanography. 40: 908-917.

Jesz Flemming and Associates (2004) Gippsland Port - Lakes Entrance sand management study. (Gippsland Ports: Bairnsdale). URL: http://www.gippslandports.vic.gov.au/reports.htm (Accessed 29 September 2007.)

Kailoa, P.; Williams, M.J., Stewart, P.C., Reichelt;R.E., McNee, A. and Grieve, C. (1993) Australian Fisheries Resources. Bureau of Resource Sciences, Canberra. 422pp.

Keogh, M.J. and Jenkins, G.P (1995) Seagrass meadows and their inhabitants. In ‘Coastal Marine Ecology of Temperate Australia.’ (Ed. A.J. Underwood. and M.G. Chapman.) pp. 221-239. (UNSW Press: Sydney.)

King, R.J. (1981) Mangroves and saltmarsh plants. In M.N. Clayton and R.J. King (eds) ‘Marine Botany: an Australian Perspective’. pp. 308-328. Longman Cheshire: Melbourne.

Kingsford, R.T. and Norman F.I. (2002) Australian waterbirds – products of the continent’s ecology. Emu, 102, pp. 47-69.

Lawson and Treloar (2004) Lakes Entrance Sand Management Study. Gippsland Ports: Bairnsdale. Source: [www.gippslandports.vic.gov.au](http://www.gippslandports.vic.gov.au).

Longmore, A.R., Roberts, S. (2006) Importance of sediment nutrients in the Gippsland Lakes. A report to the Gippsland Task Force. 24pp.

Longmore, A. (2007) Fish and seagrass – determining the links that drive fisheries production in Corner Inlet. Fisheries Notes 0600, 30 September 2007.

Loyn, R.H., Norman, I., Papas, P., Potts, J., and Dixon, B. (2006) Possible effects of increased salinity on waterbirds, invertebrates and phytoplankton at the old lagoons (85W, 145W and Walsh’s Lagoon), Western Treatment Plant. Arthur Rylah Institute: Melbourne.

Marchant, S. and P.J. Higgins (Eds) (1990) Handbook of Australian, New Zealand and Antarctic Birds. Volume One - Ratites to Ducks. Melbourne: Oxford University Press.

Marchant, S. and Higgins, P.J. (1993) Handbook of Australian and New Zealand Birds. Volume II. Raptors to Lapwings. Oxford University Press, South Melbourne.

McDowall, R. M. (Ed.) (1996) 'Freshwater Fishes of South-Eastern Australia.' (Reed Books: Chatswood, NSW)

McInnes, KL., Macadam, I. and Hubbert G.D. (2006) Climate Change in Eastern Victoria. Stage 3 Report. Project undertaken for the Gippsland Coastal Board. 38pp.

Minister for Tourism and Major Events (2007) Media Release: Gippsland Tourism Funding Boost. Victorian Government access via www.legislation.vic.gov.au

Monbet, P., McKelvie, I.D., Worsfold, P.J. (2007) Phosphorus speciation, burial and regeneration in coastal lagoon sediments of the Gippsland Lakes (Victoria, Australia). Environmental Chemistry 4: 334-346.

Murphy, B. and Timbal, B. (2007) Analysis of historical climate. Annual review meeting of the South Eastern Australian Climate Initiative, Canberra, Australia.

National Oceans Office (2002) South East Marine Plan. National Oceans Office, Hobart.

NPS (1995) Victorian Ramsar Sites: Definition and Boundary Classification Project Report. National Parks Service, Victoria.

NSW Department of Environment and Conservation (NSW DEC) (2005a) Southern Bell Frog (Litoria raniformis) Draft Recovery Plan. [Online]. Sydney, NSW Department of Environment and Conservation (DEC). Available from:

http://www.environment.nsw.gov.au/resources/nature/recoveryplanDraftSouthernBellFrog.pdf.

Nybakken, J.W. (1982) Marine Biology: an Ecological Approach. Harper & Row Publishers: New York.

Paerl, H. (2008) Chapter 10: Nutrient and other environmental controls of harmful cyanobacterial blooms along the freshwater-marine continuum, p. 217-237. Cyanobacterial Harmful Algal Blooms: State of the Science and Research Needs. Advances in Experimental Medicine and Biology.

Parks Victoria (compiler). (1999) Ramsar Information Sheet for the Gippsland Lakes Ramsar site (#21). Accessed from the Australian Wetlands Database [www.environment.gov.au](http://www.environment.gov.au)

Parks Victoria (1997) ‘Lake Wellington Wetlands. Draft Management Plan’. Parks Victoria.

Parks Victoria (1998) The Lakes National Park and Gippsland Lakes Coastal Park management plan. Parks Victoria, Kew.

Parks Victoria. (2003) Macleod Morass and Jones Bay Wildlife Reserves Draft Management Plan. Parks Victoria, Melbourne.

Parks Victoria. (2008). Lake Wellington Wetlands: Management Plan 2008. Parks Victoria: Melbourne.

Poore, G.C.B. (1978) Benthic communities of the Gippsland Lakes, Victoria. Australian Journal of Marine and Freshwater Research 33, 901-915.

Port of Melbourne Authority (1990). Assessment of coastal regime Lakes Entrance Bar. Port Authority Gippsland Region: Bairnsdale.

Pyke, G.H. and White, A.W. (1996). Habitat requirements for the Green and Golden Bell Frog Litoria aurea (Anura:Hylidae). Australian Zoologist. 30(2):224-232.

Pyke, G.H., White, A.W., Bishop, P.J. and B. Waldman (2002) Habitat use by the Green and Golden Bell Frog Litoria aurea in Australia and New Zealand. Australian Zoologist. 32(1):12-31.

Ramm, D.C. (1986) An ecological study of the ichthyoplankton and juvenile fish of the Gippsland Lakes, Victoria. University of Melbourne: Melbourne.

Ramsar Convention Secretariat (2007) Ramsar Handbooks for the Wise Use of Wetlands 3rd Edition. Accessed from [www.ramsar.org](http://www.ramsar.org). Refer Handbook 14 - Designating Ramsar Sites.

Rogers, D., I. Hance, S. Paton, C. Tzaros, P. Griffioen, M. Herring, R. Jaensch, L. Oring, A. Silcocks and Weston, M. (2005). The breeding bottleneck: breeding habitat and population decline in the Australian Painted Snipe. In: Straw, P., ed. Status and Conservation of Seabirds in the East Asian-Australasian Flyway. Pp. 15-23.

Roob, R. and Ball, D. (1997) Victorian Marine Habitat Database, Seagrass Gippsland Lakes. A report for Fisheries Victoria, Department of Natural Resources and Environment. Marine and Freshwater Resources Institute, Queenscliff.

Rosengren, N.J. (1984) Sites of Geological and Geomorphological Significance in the Gippsland Lakes Catchment. Environmental Studies Series no. 402. Department of Conservation, Forests and Lands, Melbourne.

Saddlier, S., Jackson, J. and Hammer, M. (2008) National Recovery Plan for the dwarf galaxias Galaxiella pusilla. Department of Sustainability and Environment, Melbourne.

Sjerp, E., Riedel, P., Martin, B. and Bird, E.C.F. (2002) Gippsland Lakes shore erosion and revegetation strategy, final report, June. Crossco Australia Pty Ltd, Coastal Engineering Solutions, Shearwater Associates Pty Ltd and Geostudies. (Gippsland Coastal Board: Bairnsdale.)

SKM (2004) Hydrology and Management of Lake Reeve. Report by SKM for Parks Victoria. pp. 40

SKM (Harrington, A.) (2009) Groundwater interaction with the Gippsland Lakes. Part of a Review provided within the Gippsland Lakes Environmental Water Requirements Technical Report prepared by the Ecos Consortium.

State of Victoria, Commissioner for Environmental Sustainability (2008) *State of the Environment Victoria 2008*. Melbourne.

Stephens, A., Biggins, N. and Brett, S. (2004) Algal bloom dynamics in the estuarine Gippsland Lakes. Scientific report. EPA Victoria.

State of Victoria, Department of Sustainability and Environment (2010). Draft Gippsland Region Sustainable Water Strategy. Melbourne. Chapter 8: The Catchments of the Gippsland Lakes. Pp 156-189.

Tilleard, J.W., O’Connor, N. and Boon, P.I. (2009) Understanding the environmental water requirements of the Gippsland Lakes system: Scoping Study, report by Moroka Pty Ltd, Ecos Environmental Consulting and Dodo Environmental for the East and West Gippsland Catchment Management Authorities.

Tilleard, J.W. and Ladson A.R. (2010) Understanding the environmental water requirements of the Gippsland Lakes system: Stage 2: Input to the Gippsland Region Sustainable Water Strategy. Report by Moroka Pty Ltd for the East and West Gippsland Catchment Management Authorities.

Thomson Macalister Environmental Flows Task Force (2004) Environmental Flow Options for the Thomson and Macalister Rivers: Summary of Technical Information. Thomson Macalister Environmental Flows Task Force, Traralgon.

Tourism Victoria (2007) Gippsland Market Profile Year Ending December 2007. Sourced from www.tourismvictoria.vic.gov.au

Victorian Government Department of Sustainability and Environment. (2004) Securing Our Water Future Together – White Paper. Melbourne.

Victorian Government Department of Sustainability and Environment. (2005) State Water Report 2003/2004. Melbourne. pp 160 – 216.

Victorian Government Department of Sustainability and Environment. (2007) State Water Report 2005/2006. Melbourne. pp 160 – 216.

Victorian Government Department of Sustainability and Environment. (2010) Victorian Water Accounts 2007/2008: A statement of Victorian water resources. Melbourne.

Victorian Ministry for Conservation. (1980) Letter to RJ Grose from GL Swartz regarding the Convention on Wetlands of International Importance Especiall [sic] as Waterfowl Habitat). Copy of Letter provided from Archive by the DSE.

WBM and Dodo Environmental (2005) Effectiveness and sustainability of wetlands and riparian corridors in reducing nutrient loads entering the Gippsland Lakes. Report prepared for the West Gippsland Catchment Management Authority. 251pp.

West Gippsland Catchment Management Authority. (2007) Wetlands Plan. Parts A – Background and Method and B – Management Programmes and Actions Plan.

Wetlands International (2006) Waterbird Population Estimates 4th Edition. Delany, S., and Scott, D. (eds). Wetland International, Wageningen, The Netherlands.

# Glossary of Terms

**Acceptable change**, means the variation that is considered acceptable in a particular measure or feature of the ecological character of the wetland. Acceptable variation is that variation that will sustain the service, component or process to which it refers.

**Angiosperm**, means a flowering plant.

**Aquatic/marine fauna**, the context of this report relates to fauna species that spend all or the majority of their life cycle in or underwater. As such this grouping primarily relates to fish, marine reptiles, aquatic mammals such as dugong and cetaceans, and aquatic/marine invertebrates.

**Berm**, means a nearly horizontal or landward-sloping portion of a beach, formed by the deposition of sediment by storm waves.

**Charophytes**, are a group of green algae that are the most closely related algae to flowering plants.

**Congener**, means species within the same genus.

**Ecological character**, defined under Resolution IX.1 Annex A: 2005 of the Ramsar Convention as, the combination of the ecosystem components, processes and benefits/services that characterise the wetland at a given point in time.

**Epiphytes**, means algae, larger in size than periphyton, that grows on seagrass leaves.

**IMCRA bioregion**, refers to the Interim Marine and Coastal Regionalisation for Australia (Mesoscale) to the 200 meter isobath and derived from biological and physical data, (for example, coastal geomorphology, tidal attributes, oceanography, bathymetry and intertidal invertebrates).

**Microphytobenthos**, means the surface biofilms of photosynthetic micro-algae and bacteria.

**National ECD Framework**, refers to the document entitled, ‘National Framework and Guidance for Describing the Ecological Character of Australia’s Ramsar Wetlands – Module 2 of the National Guidelines for Ramsar Wetlands – Implementing the Ramsar Convention in Australia’ (DEWHA 2008) and its successive documents as endorsed by the Natural Resource Management (NRM) Ministerial Council.

**Parapatry** speciation, is a form of speciation that occurs due to variations in mating frequency of a population within a continuous geographical area.

**Periphyton**, means thin biofilms of microbes growing on seagrass leaves.

**Ramsar Nomination Criteria**, refers to the nine criteria for the listing of a site as internationally significant under the provisions of the Ramsar Convention. Also referred throughout the report as the nomination criteria for the site.

**Resident species**, in the context of waterbirds, are species that remain permanently in Australia but undertake localised migrations often in response to seasonal or climatic events.

**Sedimentation**, means the process of deposition of sediment of any size. This is often colloquially referred to as siltation, but this term implies that only silt-sized material is deposited.

**Shorebirds,** as used in this report, refers to both resident and migratory species which are ecologically dependent upon wetlands from the following families: Scolopacidae; Burhinidae; Haematopodidae; Recurvirostridae; Charadriidae; and Glareolidae. Shorebirds form a sub-set of the waterbird grouping.

**Values**, means the perceived benefits to society, either direct or indirect that result from wetland functions. These values include human welfare, environmental quality and wildlife support.

**Waterbirds,** as used in this report, refers to those species which are ecologically dependent upon wetlands from the following families: Anseranatidae, Anatidae, Podicipedidae, Anhingidae, Phalacrocoracidae, Pelecanidae, Ardeidae, Threskiornithidae, Ciconiidae, Gruidae, Rallidae, Scolopacidae, Rostratulidae, Jacanidae, Burhinidae, Haematopodidae, Recurvirostridae, Charadriidae, Glareolidae, Laridae and Sternidae (after Kingsford and Norman 2002; Wetlands International 2006). Only those species of gulls (Laridae) and terns (Sternidae) which make extensive use of shallow, inshore waters or inland wetlands are included. Whilst at least some other species of other families traditionally regarded as “seabirds” (that is, Spheniscidae, Phaethontidae, Sulidae, Fregatidae, Stercorariidae and Alcidae) also make use of shallow, inshore waters (and thus could be therefore be considered as waterbirds), these have not been included in the waterbird group (following precedent within Wetlands International 2006).

**Wetlands**, is used in this report in the context of the definition under the Ramsar Convention which includes, areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres.

**Wetland-dependent terrestrial fauna**, in the context of this report relates to fauna species that occur within or otherwise are dependent on wetland habitats but do not spend the majority of their life cycle underwater (for example, non-aquatic species). As such this grouping primarily relates to birds, amphibians such as frogs, non-aquatic mammals such as water mouse, non-aquatic reptiles and terrestrial invertebrates.

**Wetland flora**, in the context of this report relates to flora species that are characterised as wetland or wetland-dependent species or populations.

**Wetland ecosystem components**, as defined in the National ECD Framework, are the physical, chemical and biological parts or features of a wetland.

**Wetland ecosystem processes**, as defined in the National ECD Framework, are the dynamic forces within the ecosystem between organisms, populations and the non-living environment. Interactions can be physical, chemical or biological.

**Wetland ecosystem benefits or services** (includes the term ecosystem services), as defined in the National ECD Framework, are the benefits that people receive from wetland ecosystems. In general, benefits and services are based on or underpinned by wetland components and processes and can be direct (for example, food for humans or livestock) or indirect (for example, wetland provides habitat for biota which contribute to biodiversity).