

Approved Conservation Advice for the Swamps of the Fleurieu Peninsula ecological community

(s266B of the *Environment Protection and Biodiversity Conservation Act 1999*)

This Conservation Advice has been developed based on the best available information at the time this Conservation Advice was approved; this includes existing plans, records or management prescriptions for this species.

Description

The Swamps of the Fleurieu Peninsula (hereafter referred to as Fleurieu Swamps or the ecological community) comprise semi-permanent to permanent swamps or wetlands generally in high rainfall areas of the Fleurieu Peninsula. The ecological community occurs as densely vegetated patches on peat, silt, peat silt or black clay soils, in and adjacent to waterlogged areas near low-lying creeks and flats. The ecological community typically has a reedy or heathy appearance with patches showing considerable variation in floristic composition and structure. The variation, to some extent, depends on the disturbance and management history of a patch.

The Fleurieu Swamps exhibit the following characteristics:

Landscape

- Occurs in the Kanmantoo and Flinders Lofty Block IBRA Bioregions¹, on the Fleurieu Peninsula of South Australia.
- Situated in and adjacent to waterlogged areas, such as near low-lying creeks and flats.
- Mainly occurs in areas of relatively high rainfall.
- The substrate is typically peat, silt, peat silt or black clay soils with high levels of organic matter.

Biota

Characteristic plant species that occur in the ecological community are listed in Table 1. The ecological community also supports a range of animal species, including small mammals, birds, skinks, snakes, frogs, fish and a large range of invertebrates. Some typical vertebrate species present in the ecological community are noted in Table 2. The ecological community provides shelter, food and nesting sites for these animals, which in turn play important roles in the ongoing function of the ecosystem. The composition of plant and animal species varies among individual swamps or wetlands and will be influenced by patch size, recent environmental conditions, local disturbance history, and site-specific geographic and topographic features.

Table 1. Characteristic plant species of the Swamps of the Fleurieu Peninsula ecological community. The flora species list for the ecological community is not comprehensive. Plant species may be present in the ecological community either in the seed bank, or as above-ground individuals. Not every species will be present at every site, and some may occur in very low densities. CR = Critically Endangered (EPBC Act); E = Endangered (EPBC Act).

¹ IBRA refers to the Interim Biogeographic Regionalisation for Australia. IBRA Version 7, which was current at the time this conservation advice was approved, categorises Australia into 85 large, geographically distinct areas of similar climate, geology, landform, vegetation and animal communities, known as bioregions.

Scientific name	Common name
<i>Baumea rubiginosa</i>	soft twigrush
<i>Baumea tetragona</i>	square twigrush
<i>Carex appressa</i>	
<i>Centrolepis fascicularis</i>	bristlewort
<i>Deyeuxia quadriseta</i>	
<i>Drosera binata</i>	forked sundew
<i>Eleocharis gracilis</i>	
<i>Empodisma minus</i>	spreading rope rush
<i>Euphrasia collina</i> subsp. <i>osbornii</i> (E)	Osborn's eyebright
<i>Gahnia sieberiana</i>	sword grass, sawsedge
<i>Gleichenia microphylla</i>	scrambling coral-fern, coral-fern, umbrella fern
<i>Goodenia ovata</i>	hop goodenia
<i>Isolepis inundata</i>	
<i>Lepidosperma longitudinale</i>	pithy sword-sedge
<i>Leptospermum continentale</i>	prickly tea-tree
<i>Leptospermum lanigerum</i>	woolly tea-tree
<i>Patersonia occidentalis</i>	purple flag
<i>Prasophyllum murfettii</i> (CR)	Fleurieu leek-orchid, Murfet's Leek-orchid, Denzel's leek-orchid
<i>Schoenus carsei</i>	wiry bog rush
<i>Sprengelia incarnata</i>	pink swamp-heath
<i>Viminaria juncea</i>	golden spray, native broom
<i>Xyris operculata</i>	

Table 2. Fauna species likely to occur in the ecological community. As for the flora species, the list of fauna species is not comprehensive and may include other species not listed. Not every species will be present at every site, and some may occur in very low densities or be transitory though the ecological community.

Scientific name	Common name
<i>Acanthiza pusilla</i>	brown thornbill
<i>Acrocephalus stentoreus</i>	clamorous reed-warbler
<i>Antechinus flavipes</i>	yellow footed antechinus
<i>Bassiana duperreyi</i>	a skink
<i>Crinia signifera</i>	common froglet
<i>Christinus marmoratus</i> (formerly <i>Phyllodactylus marmoratus</i>)	southern marbled gecko
<i>Cisticola exilis</i>	golden-headed cisticola
<i>Dryolimnas pectoralis</i>	Lewin's rail
<i>Epthianura albifrons</i>	white-fronted chat
<i>Eulamprus heatwolei</i>	yellow bellied water skink
<i>Gaffirallus philippensis</i>	buff-banded rail
<i>Hemiergis decresiensis</i>	three-toed yellow bellied skink
<i>Hemiergis peronii</i>	four-toed yellow bellied skink
<i>Lampropholis guichenoti</i>	garden skink
<i>Litoria ewingi</i>	brown tree frog
<i>Limnodynastes tasmaniensis</i>	spotted grass frog
<i>Macropus fuliginosus</i>	western grey kangaroo

Scientific name	Common name
<i>Malurus cyaneus</i>	superb fairy-wren
<i>Megalurus gramineus</i>	little grassbird
<i>Phylidonyris novaehollandiae</i>	New Holland honeyeater
<i>Phylidonyris pyrrhoptera</i>	crescent honeyeater
<i>Rattus fuscipes greyii</i>	bush rat
<i>Rattus lutreolus lutreolus</i>	swamp rat
<i>Sericornis frontalis</i>	white-browed scrubwren
<i>Stipiturus malachurus intermedius</i> (E)	Mount Lofty Ranges southern emu-wren
<i>Tachyglossus aculeatus</i>	short beaked echidna
<i>Zosterops lateralis</i>	silveryeye

A description of the ecological community is also available in the Listing Advice which is available on the Internet at:

www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl

Conservation Status

The Swamps of the Fleurieu Peninsula are listed as critically endangered. This ecological community is eligible for listing as critically endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 21 March 2003 as, the Minister considered the Threatened Species Scientific Committee's (TSSC) advice and amended the list under section 184 to include the Swamps of the Fleurieu Peninsula ecological community.

The TSSC determined that this ecological community met criteria 1 and 2 of the eligibility criteria for listing as endangered because:

- it has undergone a substantial decline in geographic distribution; and
- it has a very restricted geographic distribution and the nature of its distribution makes it likely that the action of a threatening process could cause it to be lost in the immediate future.

Distribution

The Swamps of the Fleurieu Peninsula ecological community occurs on the Fleurieu Peninsula of South Australia (SA). The ecological community ranges from Yundi/Kuitpo in the north, Deep Creek in the south, east to the mouths of Currency Creek and the Finnis River and to Gulf St Vincent in the west. It is present in the Tookayerta, Hindmarsh, Parawa, Myponga, Yankalilla, Onkaparinga, Currency Creek and Finnis localities and catchment areas.

Changes have occurred to the Interim Biogeographic Regionalisation of Australia (IBRA) bioregions since the Fleurieu Swamps were listed in 2003. IBRA version 4.1, which was current at the time of listing, determined the ecological community to occur in the Lofty Block bioregion. Since then the bioregions of the Fleurieu region have been reviewed. IBRA version 7 (current at 2013) identifies the ecological community to occur in the Kanmantoo and Flinders-Lofty Block bioregions.

The ecological community is likely to occur in the following Catchment Management Authorities (CMAs) / Natural Resource Management (NRM) Regions:

- Adelaide and Mount Lofty Ranges NRM
- SA Murray Darling Basin NRM

Hydrology and Hydrogeology

The Fleurieu Swamps are localised water-dependent ecosystems, that are typically freshwater, but which may become slightly brackish in some areas, such as near the mouth of the Finniss River. The ecological community is typically associated with hydric soils that are seasonally or permanently saturated and generally have a permanently wet core. The ecological community mainly occurs where the mean annual rainfall is 700 to 900 mm per annum, but may also occur in areas with a lower rainfall such as in lower elevations and on the eastern plains. Within intact swamps the core is generally well vegetated but does not always contain open water.

A few streams on the Fleurieu Peninsula i.e. Currency and Tookayerta Creeks and Finniss River, ultimately flow into the River Murray and Lake Alexandrina. These streams and their associated riparian vegetation flow are part of the River Murray and associated wetlands, floodplains and groundwater systems, from the junction of the Darling River to the sea ecological community. The Fleurieu Swamps can occur as discrete vegetation patches within or adjacent to these streams. The majority of swamps are not part of the Lower Murray system. In the few circumstances where they have a hydrological connection, the Fleurieu Swamps are regarded as a distinct ecological community.

The Fleurieu Swamps can be broadly grouped by hydrogeological settings:

1. Higher areas of the Fleurieu Peninsula where swamps are perched above the watertable due to impermeable sub-surface layers. Patches largely rely on surface and subsurface water flow from the surrounding landscape.
2. Below the perched uplands of the Fleurieu Peninsula where swamps are reliant on both surface and subsurface water from the surrounding landscape. These systems are in contact, to varying degrees, with the underlying fractured rock aquifer.
3. Broad valleys on the Fleurieu Peninsula where swamps are interconnected with the watertable. These swamps rely upon water from surface and subsurface water from the surrounding landscape as well as from the watertable itself.

Additional considerations

Surrounding environmental and landscape context

It is important to consider the broader environment surrounding the ecological community as this can provide some landscape context for determining if any actions may have a significant impact on an ecological community and require approval under the EPBC Act. The following indicators should be considered when assessing the impacts of actions or proposed actions under the EPBC Act, or when considering recovery, management and funding priorities for a particular wetland:

- Large size and/or large area to boundary ratio – larger area/boundary ratios are less exposed and more resilient to edge effects such as weed invasion and other human impacts;
- Higher native species richness as shown by the variety of native flora and fauna species that are present;
- Areas where weed/exotic species invasion and feral animal activities are minimal or can be easily managed;
- Presence of listed threatened species (Federal and State);

- Connectivity or proximity to other natural features (e.g. native vegetation remnants, other water bodies) or restoration works. In particular, a wetland in an important position between (or linking) other wetlands in the landscape;
- Water allocation arrangements e.g. extraction limits within localised Water Management Zones; and/or
- Wetlands that occur in those areas in which the ecological community has been most heavily cleared and degraded or that are on the natural edge of its range.

Buffer zone for the ecological community

A buffer zone is a contiguous area adjacent to the wetland that is important for protecting its integrity and can be important in supporting and re-establishing key swamp plant species. As the buffer zone lies to the outside, around the wetland, it is not part of the national ecological community and is not formally protected as a matter of national environmental significance. However, practical application of a buffer zone is strongly recommended and should be considered when determining significant impacts. Determination of wetland buffer zones can be complex and should be determined on a case by case basis, taking site-specific features such as the localised catchment area of the wetland into account.

Threats

The land tenure within which the Swamps of the Fleurieu Peninsula ecological community occurs is primarily private land and the main land use is agriculture, such as grazing and horticulture. Approximately 44 ha (approximately 8%) of the ecological community are located within Conservation Parks and other reserves. The ecological community typically exists as small swamps or wetland patches (75% are less than five ha in size) that are surrounded by agricultural land.

The main threats to the Swamps of the Fleurieu Peninsula ecological community include: clearance, physical disturbance and fragmentation; hydrological disturbance (e.g. draining of wetlands, changes in wetting and drying regimes, duration and season); altered water quality (e.g. higher nutrient loads, pollution); invasion by exotic species (e.g. weeds, pathogens); and inappropriate management practices for wetlands.

The potential threats to the Swamps of the Fleurieu Peninsula ecological community are dieback from *Phytophthora cinnamomi* and climate change, particularly predictions of continuing decline in rainfall and shifts away from regular patterns of rainfall. There are indications that changes in seasonal rainfall patterns are likely to affect the Swamps of the Fleurieu Peninsula ecological community through lower rainfall and higher temperatures.

The following EPBC Act listed Key Threatening Processes are most relevant to the *Swamps of the Fleurieu Peninsula* ecological community:

- Land clearance;
- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants;
- Infection of amphibians with chytrid fungus resulting in chytridiomycosis;
- Novel biota and their impact on biodiversity;
- Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases; and
- Dieback caused by the root-rot fungus (*Phytophthora cinnamomi*).

Research Priorities

Research and monitoring priorities that would inform future regional and local priority actions include:

- Design and implement a monitoring program or, if appropriate, support and enhance existing programs to determine:
 - environmental flow requirements and adequacy of current and projected water regimes to maintain swamps into the future, and
 - changes in species composition and hydrology in response to changing climate
- Support and enhance existing surveys to identify and map the ecological community, particularly swamps of high conservation priority, and to gain a better understanding of variation (including vegetation succession) and condition across the ecological community.
- Determine the resilience and responses of the ecological community to variations in climate (very wet seasons as well as prolonged droughts).
- Support ongoing research, including trials, on the biology, ecology and integrated management of invasive species, e.g. weeds. Monitor sites for the introduction and spread of invasive species.
- Investigate landscape scale gene flow and its implications for management of remnants, associated plant and animal interactions and longer term ecological function. This includes research into optimal distances between remnants and remnant sizes that are crucial for a range of flora and fauna movements.
- Investigate the impact of disturbances and appropriate management regimes to restore long term ecological function and biodiversity, including for listed threatened and migratory species, and other important species such as aquatic invertebrates, that inhabit the ecological community. Disturbances can include inappropriate fire regimes, water extraction or stock access.
- Support research into the biology and ecological roles of aquatic invertebrates that inhabit the ecological community.
- Identify appropriate buffer zones to minimise impacts upon the Fleurieu Swamps ecological community.

Priority Actions

The following priority recovery and threat abatement actions can be done to support the recovery of *Swamps of the Fleurieu Peninsula*.

Habitat Loss, Disturbance and Modification

- Avoid clearance of native vegetation directly within the ecological community and its immediate surrounds. Where possible, minimise clearing and other disturbances in the wider catchment area that could indirectly impact upon the ecological community, e.g. by increasing sediment delivery into patches.
- Prevent or manage any changes to hydrology that may result in changes to natural patterns of inundation and overland flows, water table levels, or water quality e.g. sedimentation, turbidity, pollution from pesticides and herbicides.

- Minimise disruptions to the local landscape that would prevent swamps from regenerating, e.g. smoothing out depressions or creating banks/levees to divert or store water.
- Investigate formal conservation arrangements, management agreements and covenants to protect good quality remnants on private land.
- Incorporate exceptional and high quality remnants into the reserve system, where possible.
- Implement appropriate management regimes to maintain long term ecological function and biodiversity including for listed threatened and migratory species, and other important species such as aquatic invertebrates, that inhabit the ecological community.
- Monitor the progress of recovery, through improved mapping, estimates of extent and condition assessments of the ecological community, and effective adaptive management actions.
- Liaise with planning authorities to ensure that planning takes the protection of remnants into account, with due regard to principles for long-term conservation.
- Ensure that networks of swamps/remnant native vegetation that serve as refugia or linkages for wildlife and their habitat are maintained across the landscape.
- Create, maintain and restore wildlife corridors or linkages and ensure that areas of particularly high quality, connectivity or importance in a landscape context, are carefully managed and considered for inclusion in reserve tenure, where possible.

Invasive Species

- Eradicate or manage weed infestations within and close to the ecological community using appropriate methods, especially at wetlands where new weed incursions are establishing.
- Ensure chemicals, or other mechanisms used to manage weeds, do not have significant adverse, non-target impacts on the ecological community.
- Manage introduced pest animals to allow natural regeneration and recovery of habitats and any threatened species, at known sites through coordinated landscape-scale control programs.

Trampling, Browsing or Grazing

- Develop and implement appropriate grazing regimes (if any) that take into account: type of stock e.g. cattle, sheep, goats; stocking density; duration of grazing; when the soils are too wet or soft that trampling causes pugging of the surface; and when plants are too stressed to withstand grazing.
- Where appropriate, prevent grazing or manage total grazing pressure at important or significant wetlands through exclusion fencing or other barriers. Ensure that any fences are sited around rather than through swamps.

Fire

- Implement appropriate fire regimes for priority sites, if they require fire for biodiversity conservation. Fire management should take into account results from any research and the requirements of both flora and fauna in the ecological community. The approach should ensure that a representative spread of age classes and post-fire stages of the ecological community are maintained in the landscape.

- Manage fires or fuel loads in the ecological community and surrounds, to minimise the risk of inappropriate fire regimes affecting the ecological community.
- Negotiate appropriate standing procedures with local fire brigades, in relation to establishing fire control lines in native vegetation areas, to avoid unnecessary destruction of the ecological community.

Conservation Information

- In consultation with land managers, develop best practice adaptive management guidelines and technical material to help and advise land managers of remnants on public and private land about matters such as: appropriate fire regimes; invasive animal management; weed management; and maintaining healthy and diverse vegetation and habitats.
- In consultation with land managers, develop or support existing education programs, information products and signage to help the public recognise the presence and importance of the ecological community, and their responsibilities under state and local regulations and the EPBC Act.
- Raise awareness about the benefits of the wetlands and native biodiversity, and programs and funding opportunities to support landholders with environmental protection.

Enable Recovery of Additional Sites

- Consider priority conservation funding for restoring occurrences of Fleurieu swamps in consultation with local and state authorities, non-government organisations and Landcare groups.
- Ensure local flora species are planted for any revegetation and recovery actions.
- Investigate options to maintain and improve connectivity, including the protection of adjoining vegetation and the replanting of key local flora species.
- Support seed harvesting and propagation techniques (having acquired the necessary permits and land access permission required) for Fleurieu Swamp species not already available from nurseries to facilitate the species diversity in revegetation sites.
- Ensure that any revegetation is undertaken in an appropriate manner (e.g. with no significant detrimental impacts on local hydrology or threatened species).

This list does not necessarily encompass all actions that may be of benefit to *Swamps of the Fleurieu Peninsula*, but highlights those that are considered to be of highest priority at the time of preparing the Conservation Advice.

Existing Plans/Management Prescriptions that are Relevant to the Ecological Community

Department for Environment and Heritage (2009). Reserves of the South-western Fleurieu Peninsula Fire Management Plan, Adelaide, South Australia.

Duffield R and Hill B (2002). Swamp Management Guidelines for the Fleurieu Peninsula. Conservation Council of South Australia, Adelaide.

Mount Lofty Ranges Southern Emu-wren Recovery Team (1998). Recovery Plan for the Mt Lofty Ranges Southern Emu-wren *Stipiturus malachurus intermedius*: 1999–2003. Report to the Regional Wildlife Programs Section, Wildlife Australia. Conservation Council of South Australia, Adelaide.

Mount Lofty Ranges Southern Emu Wren and Fleurieu Peninsula Swamps Recovery Team (2006). Protecting Fleurieu Peninsula swamps and the Mount Lofty Ranges Southern Emu-wren. A guide for landowners, land advisors, property planners and developers. Available on the internet at:

<http://www.ccsa.asn.au/files/emuwren/Protecting%20FPS%20MLRSEW%20booklet%20100307.pdf>

Mount Lofty Ranges Southern Emu Wren and Fleurieu Peninsula Swamps Recovery Team (2007). Recovery Statement for the Fleurieu Peninsula Swamps 2007 – 2011. Conservation Council of South Australia Inc, Adelaide.

Phytophthora Technical Group (2007). Phytophthora Management Guidelines. Department for Environment and Heritage: South Australia.

These prescriptions were current at the time of publishing; please refer to the relevant agency's website for any updated versions.