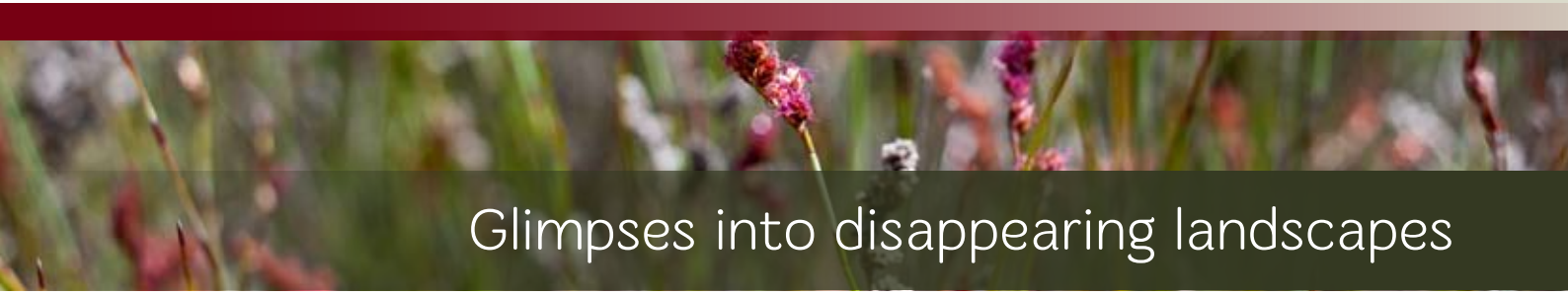
Glimpses into disappearing landscapes

Nationally Listed Threatened Ecological Communities of the South West Region.



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SWCC south west catchments council

CARING FOR OUR COUNTRY

Department of Environment and Conservation
Our environment, our future

Author	South West Catchments Council (SWCC) and Department of Environment and Conservation (DEC)
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Editor	Jodie Deeley, SWCC
Design	Gumption
Cover Photo	Tim Swallow Photography

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Contents

Introduction

The South West Catchments Council (SWCC) is a community based not-for-profit organisation that undertakes natural resource management (NRM) projects and coordination in the South West NRM Region.

Our boundary includes a diverse landscape including the Swan Coastal Plain from Serpentine to Busselton, the forests from Dwellingup to Manjimup, and the Wheatbelt out to Narrogin, Dumbleyung and Katanning. We are committed to the conservation and protection of the natural assets of the region which includes all biodiversity such as bushland, wetlands, plants and animals.

This publication aims to improve the understanding of these unique ecological communities to support our efforts in conserving them. The communities described in this booklet are those that occur within the SWCC region that are in danger of extinction from a number of threatening processes.

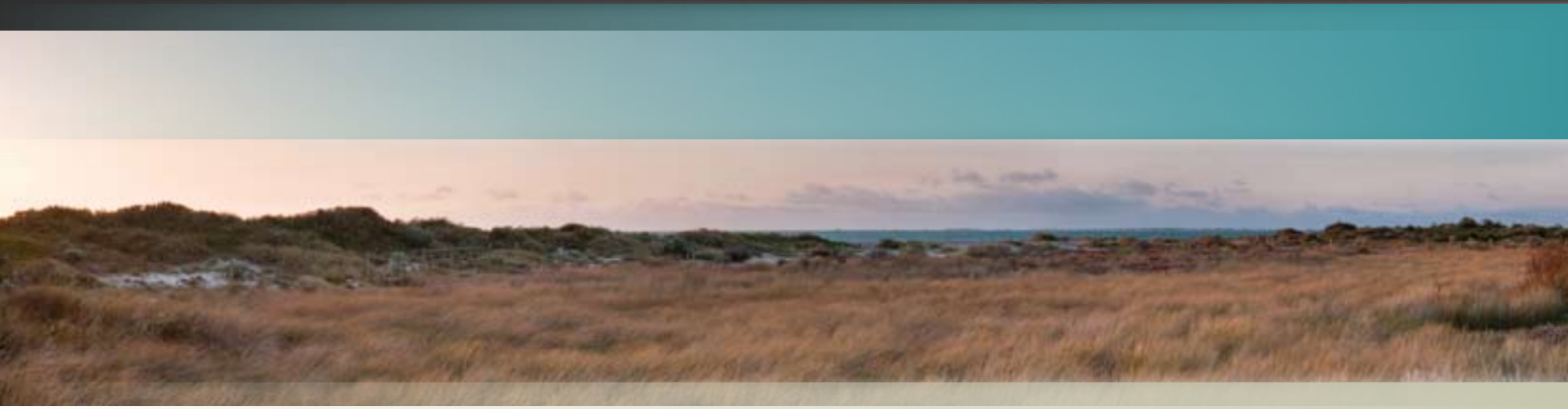
An *ecological community* is a naturally occurring group of plants and/or animals (or other living things such as microbes) that occur in a particular type of habitat.

A *threatened ecological community* (TEC) is one that has been recognised by the State, or under Commonwealth legislation as being under threat of being destroyed or highly modified across much of its range.

Those that are listed as being *'critically endangered'* are recognised nationally as facing an extremely high risk of extinction in the wild in the immediate future. If the community at the time of listing is not considered to be *'critically endangered'*, but is still facing a very high risk of extinction in the wild in the near future it is listed nationally as being *'endangered'*. Use of the terms *'critically endangered'* and *'endangered'* refer to current commonwealth status.

We recognise the significant values of each of these communities and where possible work in partnership with the Department of Environment and Conservation (DEC), local governments, private landholders and community groups to help protect and conserve these assets. TECs are recognised under State of Western Australia legislation as *'Environmentally Sensitive Areas'* and as such DEC have a legal responsibility for management.

From the Photographer, Tim Swallow



For Tim Swallow, photography is a lifestyle as much as an occupation. Raised in South Western Australia, it has allowed him to travel the world and earn a respectable living from his passion.

Utilising the best natural light and conditions, Tim primarily photographs early mornings and late evenings with a variety of specific lens and camera equipment to achieve the best results. His extensive knowledge and discipline has gained him various awards.

Tim's ongoing excitement and energy enables him to use photography to explore a variety of artistic worlds. www.timswallow.com

Read more of Tim's thoughts about his involvement in this project within.

Toolibin Lake

ENDANGERED

Perched wetlands of the Wheatbelt region with extensive stands of living swamp sheoak and paperbark across the lake floor (Toolibin Lake).

Toolibin Lake is a seasonal wetland located within the Upper Blackwood River catchment, 200 km south east of Perth. It occurs within a low rainfall area of the Wheatbelt and only contains water at certain times.

The wetland provides important habitat for a large number of waterbirds such as the freckled duck, great egret and yellow-billed spoonbills. It is also very important as the largest healthy remaining example of a freshwater wetland with extensive woodlands of living swamp sheoak *(Casuarina obesa)* and paperbark *(Melaleuca strobophylla)* across the wetland floor. When the lake contains water, this vegetation is partly underwater.

This type of wetland used to be common throughout the Wheatbelt but most have now become saline and the type of wetland vegetation that occurs at Toolibin Lake has all but disappeared.

"Photographing Toolibin Lake gave me a great sense of isolation and solitude. After days of shooting the area I would find myself fixating on the smallest of things - the shifting light, a particular pattern on a flower, the way the light flickered through the trees. I worked with the harshness of the area to portray its beauty." ***Tim Swallow - Photographer***



THREATS

The type of wetland vegetation that occurs at Toolibin Lake has been reduced in extent by at least 90 percent due to a number of threats. The main threats to the health of the vegetation that occurs in these valley floor wetlands in the Wheatbelt is increased soil waterlogging, and increased salinity from rising groundwater and surface water flows. A lot of effort has already gone into stopping saline water from reaching the wetland floor. Pumps remove saline ground water and a diversion channel and inflow structures only allow fresh water to reach the wetland floor. Other threats include weed invasion and grazing by sheep.

Lake Clifton thrombolites

CRITICALLY ENDANGERED

Thrombolite (microbialite) community of a coastal brackish lake (Lake Clifton)

Lake Clifton, which is located south-west of Mandurah within the Yalgorup National Park, has odd, rock-like structures that can be seen close to the shoreline. These thrombolites are a type of microbialite and are formed by photosynthetic microbes that result in precipitation of calcium carbonate (limestone). Lake Clifton's thrombolites are thought to have begun forming 1950 years ago and as such are relatively young. These, and similar structures, are evidence of the oldest life on earth.

Worldwide, microbialites are restricted to a few areas including the Bahamas and Bermuda internationally and several other locations along the Australia's south-west coastline. Each of these communities is distinct and all are very significant in terms of their history and structure.

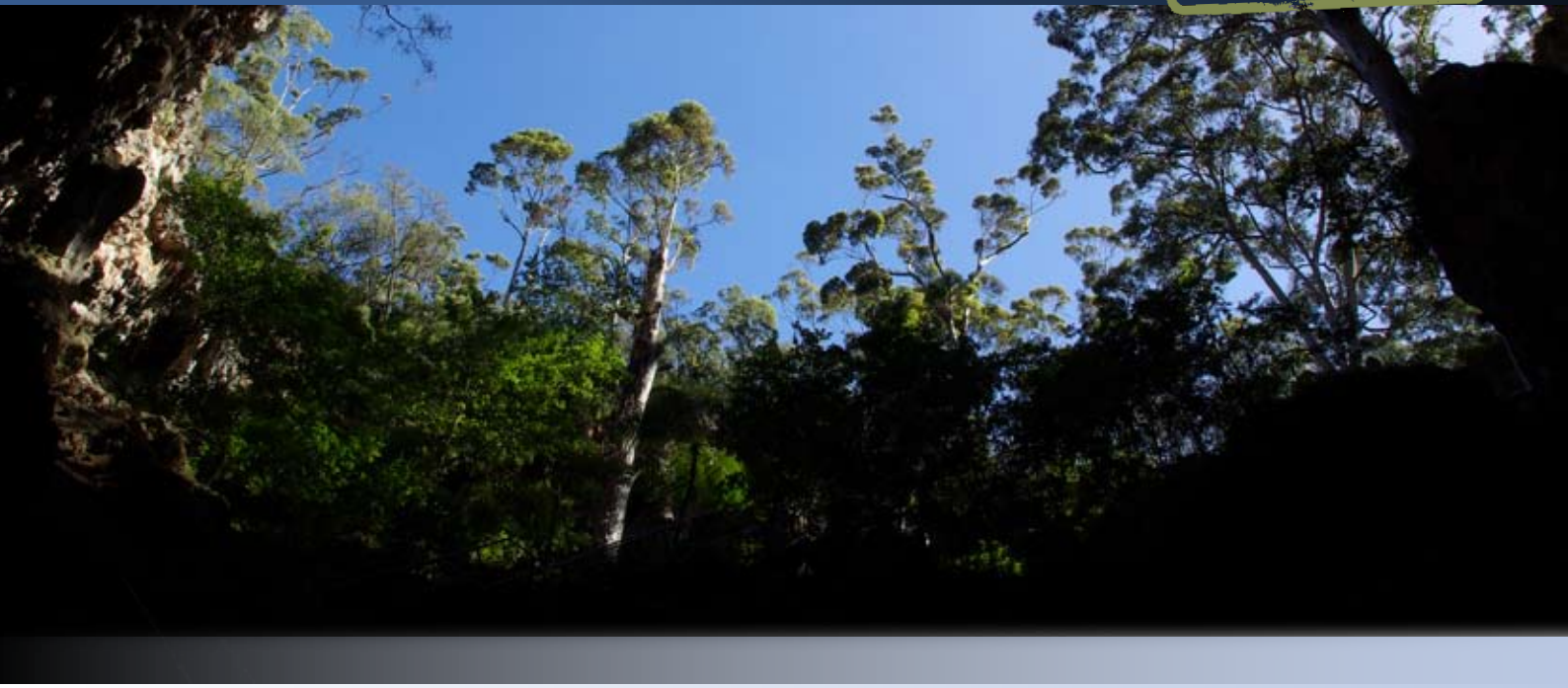
Lake Clifton supports the largest known examples of living non-marine microbialites in the southern hemisphere. They grow continuously and depend on an on-going input of fresh groundwater into their habitat that is carbonate-rich.

"The Thrombolites was probably the most intriguing place I photographed. It was fascinating to shoot a location that transformed from minute to minute, making each shot more mysterious than the last. As the late afternoon light was disappearing, there was almost a sense of timelessness." ***Tim Swallow - Photographer***

THREATS

Threats to the Lake Clifton thrombolites include altered groundwater quality, increased salinity and declining alkalinity due to changing land uses in the surrounding areas, pollution, crushing by visitors or stock, introduction of exotic fauna such as snails and fish, and smothering by weeds or by sediment. To address the threat of crushing a boardwalk has been built to allow visitors a closer look at the thrombolites without impacting on them or their habitat.

Aquatic root mats



Aquatic root mat communities of caves of the Leeuwin Naturaliste Ridge

Aquatic Root Mats

are found in several caves within the Augusta-Margaret River area, on what is known as the Leeuwin-Naturaliste Ridge. These root mats support rich aquatic communities including crustaceans, worms, snails and mites that are highly specialised to subterranean life.

Tree species including karri, marri and peppermint trees extend their roots into the caves where they branch out forming root mats within cave streams or pools.

These root mats provide a constant and abundant source of food and are able to support a remarkably high number and diversity of aquatic fauna species. The root mats within the caves of the Leeuwin-Naturaliste Ridge can support over 20 species of invertebrates, which is greater than that more commonly found in other cave systems around the world.

The invertebrate species and water quality varies greatly from cave to cave, so the root mat communities of each cave are considered distinct from each other.

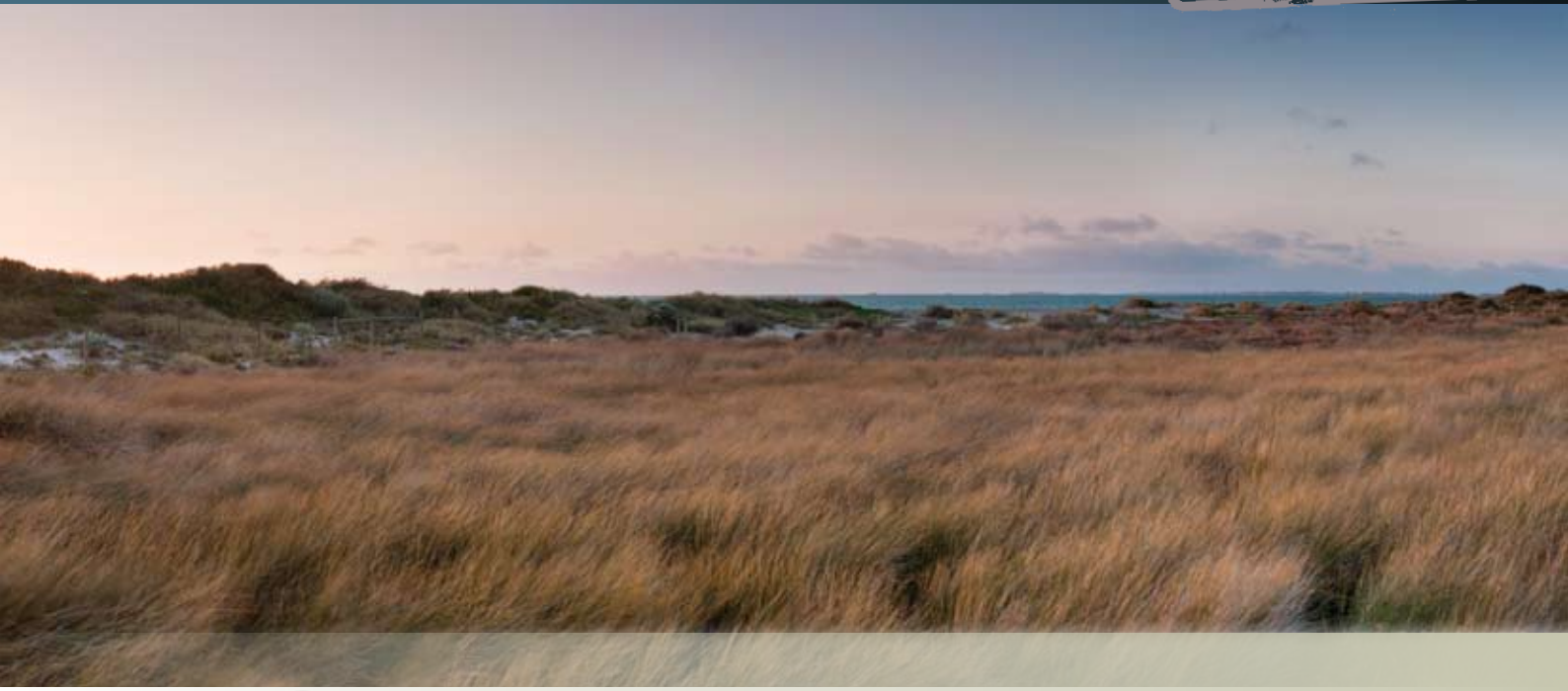
The amphipod crustacean (Uroctena n. sp.) shown in the picture to the right is a rare and unique species, living only in the Jewel Cave karst system near Augusta, where it is in danger of extinction due to declining groundwater levels.
www.subterraneanecology.com.au ***Stefan Eberhard - Photographer***

THREATS

As the root mat communities are highly restricted and depend on the presence of permanent water in the caves, they are threatened by a drying climate which is leading to reduced groundwater and stream flows into the caves. Other threats are pollution of the water sources and loss of the trees that provide root mat habitat and food for the communities.

Sedgelands

ENDANGERED



Sedgelands in Holocene dune swales of the southern Swan Coastal Plain.

The Sedgelands community occurs in wetland hollows (swales) between parallel dunes formed as a result of a retreating coastline. The wetlands occur within the swales where the water table is close to or at the ground surface in the wetter months of the year.

A number of areas of the sedgeland community are known to exist along the south-west Australian coastline from Yanchep through to Capel, with a suite of them known in the Rockingham Becher Point area. Each of these vary, with their vegetation makeup likely to be related to the age of the wetland, and how close the water table is to the surface.

Typical and common native species to this community are the shrubs climbing lignum *(Muehlenbeckia adpressa)*, orange wattle *(Acacia saligna)* and grass tree *(Xanthorrhoea preissii)*; the sedges bare twigrush *(Baumea juncea)*, *Ficinia nodosa* and the grass *Poa porphyroclados*. A sub-type of the community includes an overstorey of trees such as tuart *(Eucalyptus gomphocephala)*, paperbark *(Melaleuca preissiana)* or swamp Banksia *(Banksia littoralis)*.

"Located at the foot of the coast, I could visibly see how the pristine beauty of this reserve is being tainted by the impact of human use. The late afternoon light at the Sedgelands and ocean background formed the perfect setting for photographing this precious environment."
Tim Swallow - Photographer




THREATS

Many of the sedgeland communities occur close to suburban areas. People-related threats include: vegetation loss through clearing for development, trampling from recreational activities, changes to groundwater (levels and quality), too frequent fires, weed invasion, and grazing by cattle and rabbits.

Busselton Ironstones

ENDANGERED

Shrublands on southern Swan Coastal Plain Ironstones (Busselton area).

The Busselton Ironstone community is characterised by very unusual soil and an equally remarkable plant community. The ironstone soils are extremely restricted in distribution on the Swan Coastal Plain. These soils are thought to have historically been bogs with the iron being deposited by water percolating through the soil followed by evaporation to create a very hard stony habitat. The ironstone is associated with seasonal waterlogging from ponding due to impeded drainage over the wetter months.

The Busselton Ironstone community is restricted to the eastern side of the Swan Coastal Plain along the base of the Whicher Scarp near Busselton. As this area contains heavy soils that are particularly good for agriculture, this highly restricted community has suffered from extensive clearing with less than 10 per cent of its original extent remaining.

The community contains a number of declared rare flora and priority flora that are restricted to the ironstone soils. Typical and common native species in the community are the shrubs *Kunzea* aff. *micrantha*, swamp teatree *(Pericalymma ellipticum)*, *Hakea oldfieldii*, snakebush *(Hemiandra pungens)* and swishbush *(Viminaria juncea)*, and the herbs *Aphelia cyperoides* and pointed centrolepis *(Centrolepis aristata)*.

"I was looking forward to photographing the Ironstones. The colours and texture moved from vibrant flowers to dark red, gravelly textures. It seemed amazing that in such a harsh landscape anything, let alone anything beautiful, could grow in such abundance. A spectacular afternoon sunset played the scene for a stunning panorama." ***Tim Swallow - Photographer***

THREATS

Historically the biggest threat to the community was clearing, with now only a few isolated locations remaining. Many of the plant species within the community are also highly restricted in distribution and are Phytophthora dieback susceptible and/or obligate seeders (only seed after fire). The major threats to the community are therefore dieback, clearing, too frequent fire (plants are killed before they are mature enough to set seed), weed invasion (especially from grass species from surrounding farmland), grazing by cattle and rabbits, drought caused by a drying climate and possibly salinisation.

Marri - grass tree woodlands and shrublands

ENDANGERED

Marri *(Corymbia calophylla)* - grass tree *(Xanthorrhoea preissii)* woodlands and shrublands (Swan Coastal Plain Community type 3c - Gibson ***et al.*** 1994)

The marri - grass tree (or Balga) community is one of three unique woodlands occurring on heavy soils on the eastern side of the Swan Coastal Plain, between Waterloo (near Bunbury) and Bullsbrook. These woodlands contain particular assemblages of plant species that have been extensively cleared. They are believed to have been some of the most extensive plant communities on the eastern side of the Swan Coastal Plain, but through widespread clearing they are now considered rare and endangered.

The marri - grass tree community is the driest of the three woodland communities, although the soils are still relatively wet. The community is dominated by marri *(Corymbia calophylla)*, and occasionally wandoo *(Eucalyptus wandoo)*; the shrubs grass tree *(Xanthorrhoea preissii)*, prickly moses *(Acacia pulchella)*, honeypot dryandra *(Banksia dallanneyi)*, *Gompholobium marginatum* and white myrtle *(Hypocalymma angustifolium)*; and the herbs milkmaids *(Burchardia congesta)*, *Cyathochaeta avenacea* and foxtail mulga grass *(Neurachne alopecuroidea)*.

"It was the perfect time of year to photograph this site. The wildflowers were in full bloom following gradual winter's rain and the rich shrublands depicted a healthy community. Shooting at mid-morning allowed the natural colours to dominate the images."
Tim Swallow - Photographer

THREATS

The most significant threat to the community is clearing as very few of those remaining are located within secure conservation reserves. Phytophthora dieback is also a threat as are invasion by weeds, too frequent fires and human use pressures such as inappropriate recreational use, illegal rubbish dumping and firewood cutting.

Marri - Kingia woodlands

ENDANGERED

Marri *(Corymbia calophylla)* - Kingia *(Kingia australis)* woodlands on heavy soils (Swan Coastal Plain Community type 3a - Gibson *et al.* 1994)

The marri - Kingia community is another one of three unique marri dominated woodlands and occurs on heavy soils on the eastern side of the Swan Coastal Plain, between Waterloo (near Bunbury) and Bullsbrook. This type has also been extensively cleared with around 150 hectares of the community remaining and many occurrences not in conservation reserves.

The marri - Kingia community is the wettest of the three marri woodland communities and is found across a number of different soil types, all of which contain a watertight clay layer that acts as a barrier to drainage of water through the soil. A number of the plant species found in the community are characteristic of seasonally wet clay soils.

The community is dominated by marri *(Corymbia calophylla)*; the shrubs Kingia *(Kingia australis)*, honeypot dryandra *(Banksia dallanneyi)*, pepper and salt *(Philotheca spicata)* and grass tree *(Xanthorrhoea preissii)*; and the herbs *Cyathochaeta avenacea*, common Dampiera *(Dampiera linearis)*, *Haemodorum laxum, Desmocladus fasciculatus,* semaphore sedge *(Mesomelaena tetragona)* and *Tetraria octandra*.

"I found the Marri - Kingia woodlands to be the most surprising community I photographed. The odd relationship between the trees and the Kingia provided a beautiful contrast when shooting. To depict the height and scale of the trees, it was necessary to use the sky as a backdrop. I was lucky enough that the days I spent shooting gave me dramatic blues and cirrus clouds." ***Tim Swallow - Photographer***

THREATS

As with the marri – grass tree community, the most significant threat to this community is clearing as very few of the remaining areas are located within secure conservation reserves. Phytophthora dieback is also a threat as are invasion by weeds, too frequent fires and human use pressures such as inappropriate recreational use, illegal rubbish dumping and firewood cutting

Clay pan communities

Clay pan communities of the Swan Coastal Plain
Nominated for listing under the Commonwealth EPBC Act (July, 2011)

Clay pan wetlands were once widespread across the Swan Coastal Plain but it is estimated that more than 90 per cent of them have been cleared. Many were cleared, filled or drained for agriculture, or for housing due to their location close to the coast.

The clay pan communities are a series of wetlands found on clay soils that rely on winter rainfall to fill, and then dry to hard water-resistant clay pans in summer. The wetlands are characterised by the flowering of different groups of plant species as the wetlands dry.

The clay pan wetlands are the most species rich of the Swan Coastal Plain seasonal wetlands. Due to the amount lost however, the plant communities of these wetlands are amongst the most threatened in Western Australia.

There are four main distinct threatened clay pan communities recognised to date on the Swan Coastal Plain. Each vary in plant composition due to differences in soil type and where they sit in the landscape which influences the depth and the amount of time the community is flooded by water. The herb rich saline shrublands have heavy clay soils and hold water generally from winter to mid-summer. The herb rich shrublands in clay pans occur in low lying flat areas with a clay layer allowing for seasonal flooding. The dense shrublands on clay flats occur very low in the landscape and as such hold water for a very long time. The shrublands on dry clay flats are the most rapidly drying of the communities.

"Photographing the clay pan communities in spring is essential in order to capture the many varieties of wildflower in full bloom. Growing out from a clay base, it was remarkable the way all the different colours mingled together - reds, pinks, purples, whites. It was easy to forget that in a few weeks this vibrant landscape would disappear, leaving only the sun-cracked surface of the clay bed." ***Tim Swallow - Photographer***

THREATS

The clay pan communities of the Swan Coastal Plain are threatened by a number of different factors, mainly because they occur in the most densely populated parts of coastal Western Australia and on some of the most productive agricultural soils in that landscape. Changes to the natural water flows through housing development, vegetation clearing and drought are a significant threat, with many of the plant species relying on the filling and gradual drying of the wetlands at the appropriate times of the year to survive.

Other threats include rising saline groundwater, invasion from weeds, too frequent fires, feral animals, illegal recreational activities, rubbish dumping and Phytophthora dieback. Many of the wetlands occur as very small isolated patches and as such the threats above can have severe consequences over a very short period of time.

Glossary

Acronymns

DEC: Department of Environment and Conservation

EPBC Act: Environment Protection and Biodiversity Conservation Act 1999

NRM: Natural Resource Management

SWCC: South West Catchments Council

TEC: threatened ecological community

Ecological Community: a naturally occurring group of plants and/or animals (or other living things such as microbes) that occur in a particular type of habitat.

Threatened Ecological Community: an ecological community that has been recognised in the State and/or under Commonwealth legislation as being under threat of being destroyed or highly modified across much of its range. Threatened is an umbrella term that includes critically endangered, endangered and vulnerable ranked ecological communities.

Critically endangered: facing an extremely high risk of extinction in the wild in the immediate future.

Endangered: not considered to be 'critically endangered' but is still facing a very high risk of extinction in the wild in the near future.

Vulnerable: not considered to be 'critically endangered' or 'endangered' but is still facing a high risk of extinction in the wild in the medium-term future.

Declared rare flora: plant taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection.

Glossary

Environmentally Sensitive Area: areas declared in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005* (Government of Western Australia, 2005) including but not limited to conservation category wetlands, vegetation containing rare flora, threatened ecological communities and Bush Forever sites.

Phytophthora dieback: refers to the introduced plant pathogen Phytophthora cinnamomi that infects the roots of over 2300 susceptible native plant species, killing the individual plant and altering the composition of the plant community that they are a part of.

Habitat: the place where an organism or a group of organisms normally lives.

Holocene: the name given to the time period which includes the last 10,000 years.

Invertebrate: an animal without a back-bone.

Microbialite: structures formed by microbial communities through the precipitation of calcium carbonate (limestone). Two types of microbialite include thrombolites and stromatolites.

Natural Resource Management: the ecologically sustainable management of the land, water, air and biodiversity resources for the benefit of existing and future generations, and for the maintenance of life.

Obligate seeders: plants that regenerate from seed almost exclusively after fire.

Priority flora: plant taxa that are under consideration as threatened flora but need further survey to adequately determine their status.

Swan Coastal Plain: a 30 km wide strip on the Indian Ocean coast directly west of the Darling Scarp uplands running from Cape Naturaliste in the south to north of Perth.

Thrombolite: a calcareous mound built up of layers of lime-secreting microbes and sediment. A form of stromatolite but with a clotted internal structure rather than a layered structure.

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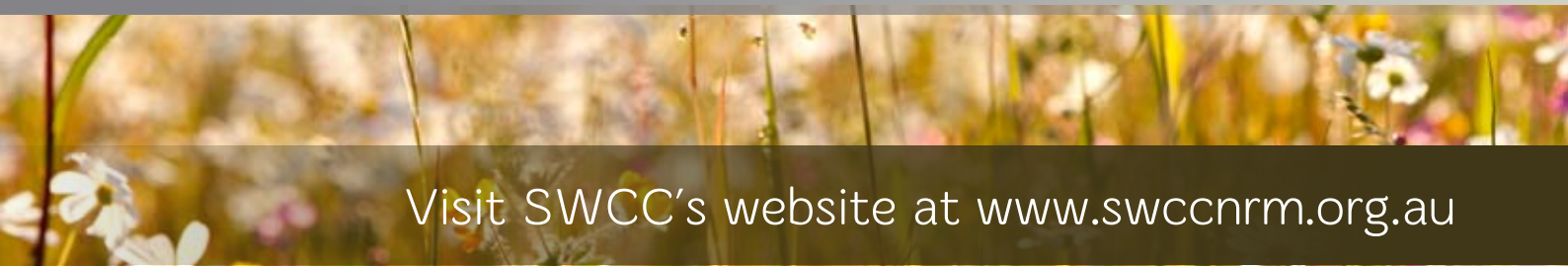
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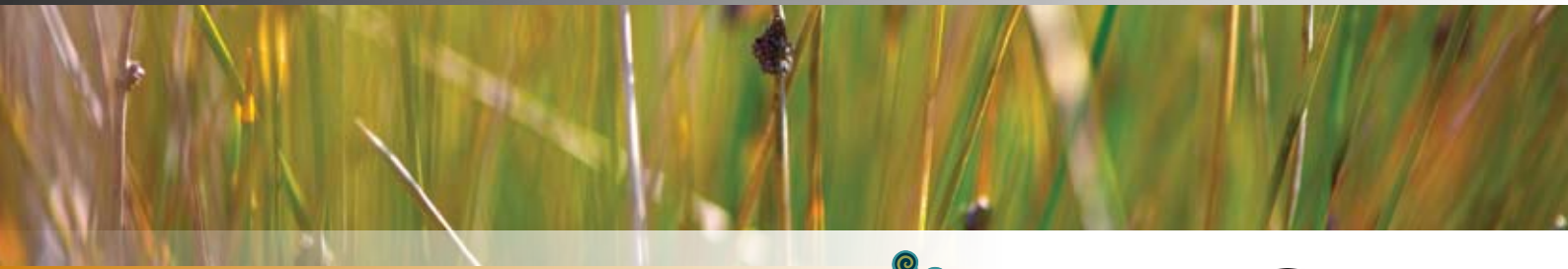

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