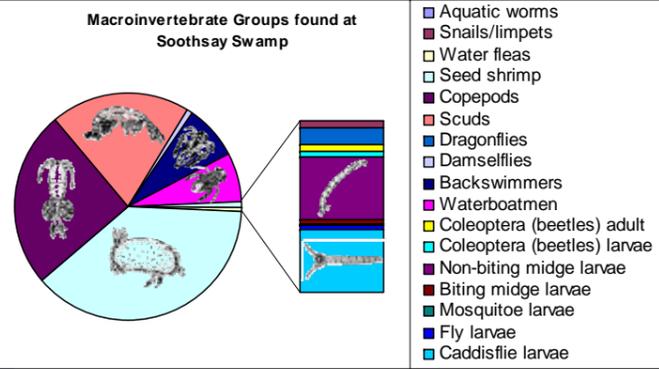
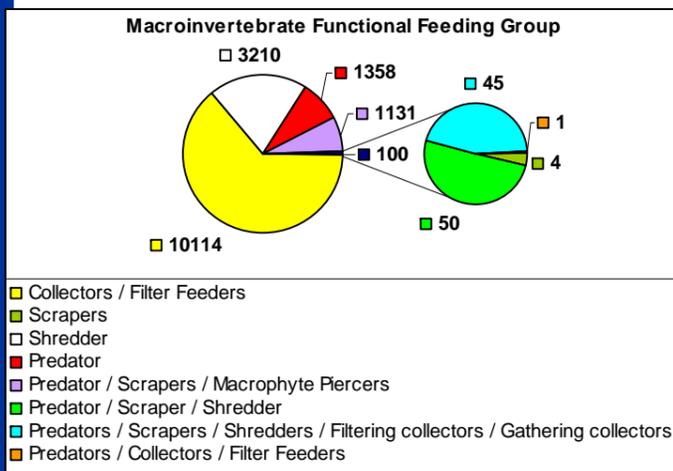


Soothsay Swamp



Each group of Macroinvertebrate play a different role in the food chain, some feed on organic material (Shredders), others feed on fine organic particles (Collectors/filter feeders), others graze on algae (Scrapers), some feed on each other (Predators), others are parasitic (Parasites) and some are Macrophyte piercers that feed off living plants and algae fluids. These groups are called Functional Feeding Groups (FFG). Some Macroinvertebrates fit into more than one of these groups, for example the Water Boatman is a Predator, a Scraper and a Macrophyte piercer.

A healthy wetland should have a representative of each functional feeding group. A loss or dominance in a particular group may indicate a change in ecology of the wetland. The composition of these groups at Soothsay Swamp are displayed in the below graph. There appears to be a high number of collectors / filter feeders which could relate to high amount of suspended decomposing fine particulate organic matter in the wetland. The high number of shredders may be due to the availability of vegetation in the wetland eg, rushes, sedges and algae etc.



Conclusion

Soothsay Swamp ranges from moderately saline to saline. The swamp is fed by surface runoff, sub surface flow and creek line that drains secondary salinities land to the north east. Nutrient concentrations in the swamp were consistently high which allows for high primary productivity although high colour content may limit algal growth to some extent..

Some knowledge gaps were identified during the investigation, monitoring and data analysis for this wetland which should be addressed to improve understanding of the water quality and biodiversity and to detect changes over time. The monitoring period was relatively short and some effects of previous and current land use change and management may not yet be evident.

Macroinvertebrates would need to be identified to family or species level to allow more detailed analysis of ecological condition and relationship to other wetland characteristics. The hydrology of the wetland and its catchment is not fully understood or monitored, particularly the interaction between groundwater and surface water. A future monitoring program should be developed to address these issues.

Acknowledgements

The Department of Water would like to sincerely thank and acknowledge the following people for their assistance and contribution toward the South Coast Wetland Monitoring Program and production of this report.

- Wendy and Timothy Compagnoni for their support of the project and allowing access to the lake on their property.
- John Simons (Department of Agriculture and Food, Esperance) for providing knowledge of the hydrogeology associated with Soothsay Swamp and editing assistance.
- Ania Lorenz, Sherrie Randall, Kevin Hopkinson, and Albany Department of Water team who conducted the monitoring.
- Kevin Hopkinson, Naomi Arrowsmith, Andrew Maughan and others for their support and editing assistance.
- Sherrie Randall and Tracy Calvert for data analysis and report compilation.

For further information please contact Tracy Calvert at the Department of Water Albany (08) 9842 5760.

Soothsay Swamp

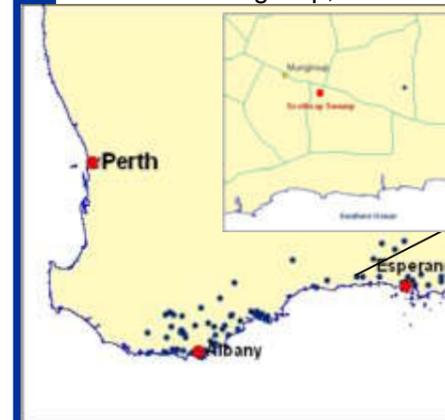
This report card summarises the current state of knowledge of physical, chemical and biological characteristics of Soothsay Swamp based on the knowledge gained from investigation and monitoring conducted by the Department of Water through the South Coast Wetland Monitoring Program.

Accompanying this document are appendices that provide more detailed information about the wetland monitoring program, terminology of wetland classification, parameters monitored, methodology and the ANZECC&ARMCANZ guidelines used in this report.

Funding for this program has been provided through South Coast Natural Resource Management Inc. - supported by the Australian Government and the Government of Western Australia.

About Soothsay Swamp

Soothsay Swamp is located approximately 6.5km east of Munglinup, Western Australia, within the Oldfield Inlet catchment and the smaller sub-catchment of the Munglinup River.



The wetland lies at approximately 95m AHD (Australian Height Datum). The area receives an annual average rainfall of 550mm.

Soothsay Swamp is located on privately owned land, within a small catchment of approximately 25.4km². The Lake lies within an unfenced wetland vegetation buffer zone that ranges between approximately 10-855m from the wetland edge.

Vegetation predominantly consists of *Melaleuca cuticularis* (Saltwater paperbark) in the mid to upper storey with the understorey consisting of *Baumea articulata* and various rushes. There are a number of dead trees in the centre of the lake and some regenerating *Melaleuca cuticularis*.



Soothsay Swamp

Wetland Suite	GPS Location Coordinates		
	Easting	Northing	MGA Zone
Soothsay Suite	307354	6265855	51



Soothsay Swamp

Approximately 90% of the catchment area has been cleared for farming practices including livestock. There are small Bluegum plantations to the south and west of the Swamp. The central part of the swamp has been excavated which is used to provide water to livestock during dry years.

Water quality monitoring commenced on the 10/01/2006 and included physical, chemical and biological parameters as outlined in the appendices.

Soothsay Swamp

South Coast Wetland Monitoring Project

June 2008

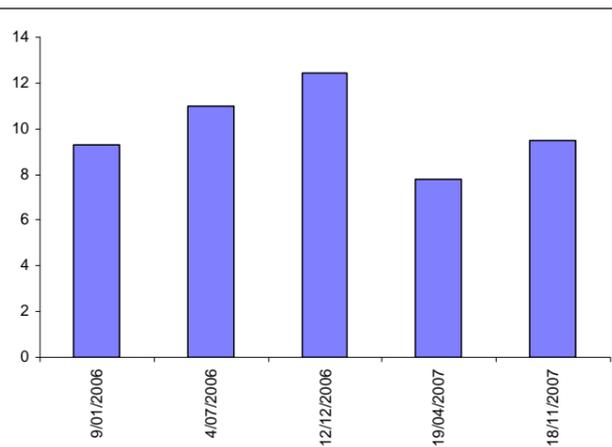
Wetland Classification

Wetland type	Water Salinity	Consistency of Salinity	Size (Metres)	Shape
Lake	Hyposaline	Stasohaline	Microscale 280 x 185	Irregular

Classification of Soothsay Swamp has been evaluated on the basis of guidelines developed by V & C Semeniuk Research Group (1997). For further explanation please refer to the appendices.

Salinity

Salinity over the sample period was moderately saline to saline ranging between 7.7-12.4mS/cm. Fluctuations in salinities relate to fluctuations in rainfall, evaporation rates and hence water level variations. Salinities may also alter in response to surface flow through the creek line which drains secondary salinised land from the north east to south west through the wetland towards the Munglinup River.



Salinities (mS/cm) over the sample period

Measurement of groundwater levels and salinities taken from a nearby Department of Agriculture and Food bore SD13 on the 12/12/2003 indicated there is connection between the groundwater and the wetland. The water level in the bore measured 2.2m below ground surface corresponding to 108m AHD in comparison to the wetland which is lower in the landscape at 95m AHD. Groundwater salinities were also comparable to the wetland ranging between 7.8-16.25mS/cm.

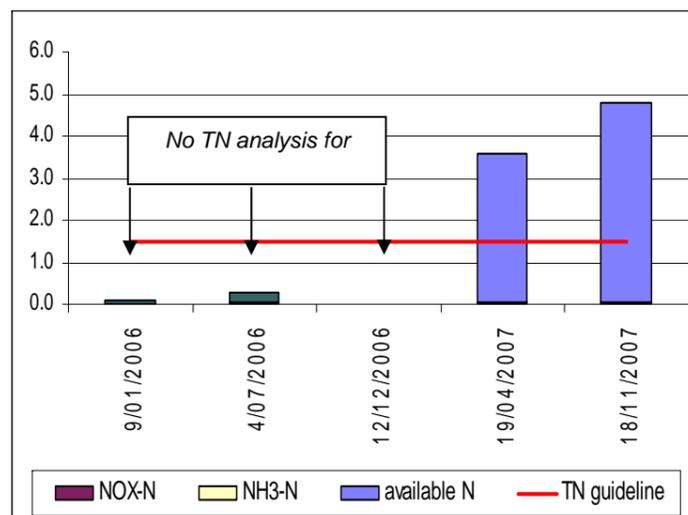
Although further investigations are required to confirm current wetland groundwater connection, salinities in private production bores on the property at approximately 6-9m below ground

level ranged from marginal (1.5 mS/cm) to brackish (2.1mS/cm). The salinity of the wetland may be a product of fresher local groundwater diluting more saline waters delivered through catchment runoff.

Nutrients

Total Nitrogen (TN) concentrations were high ranging from 3.6-4.8mg/L. TN concentrations on all sampling occasions exceeded the guidelines developed for ecosystem protection for southwest Australian wetlands for slightly disturbed systems of 1.5mg/L. Note: No TN data was collected on the 9/01/2006, 4/07/2006 and 12/12/2006.

Dissolved inorganic nitrogen fractions of ammonia (NH₃-N) ranged from 0.015-0.27 mg/L and total oxidised nitrogen (NO_x-N) ranged between 0.01-0.03mg/L. NH₃-N fractions exceeded the recommended guideline value of 0.04mg/L on two of the four sample occasions. The NO_x-N fraction did not exceed the recommended value of 0.1mg/L on any sample occasion.



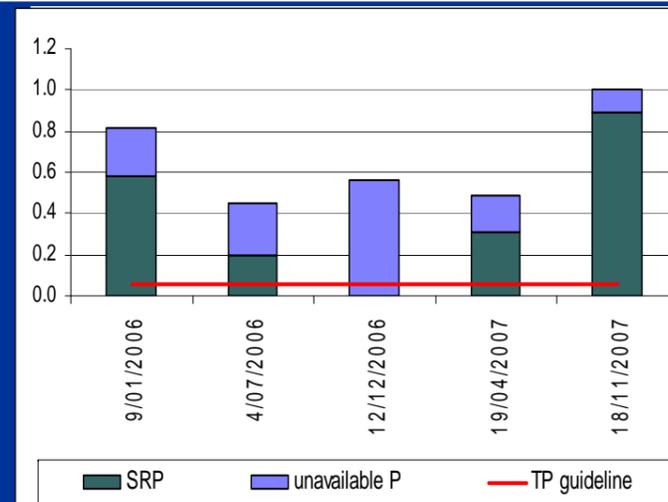
Nitrogen fractions in mg/L over the sample period with TN guideline illustrated

Low proportions of available nitrogen can indicate the majority of nitrogen is being readily taken up by plants and animals while the remainder may be bound up in organic matter, or as dirt or dead cells.

Soothsay Swamp

South Coast Wetland Monitoring Project

June 2008



Phosphorus fractions in mg/L over the sample period with TP guideline illustrated

Total Phosphorus (TP) concentrations ranged from 0.45-1.0mg/L and exceeded water quality guidelines of 0.06mg/L on all sample occasions.

Soluble Reactive Phosphorus (SRP) (form of phosphorus available for uptake by plants) ranged from 0.2-0.89mg/L. In relation to water quality guidelines SRP exceeded the recommended value of 0.03mg/L on all sample occasions. Of the total phosphorus there was a very high percentage (44-89%) of available phosphorus (SRP) on all sampling occasions.

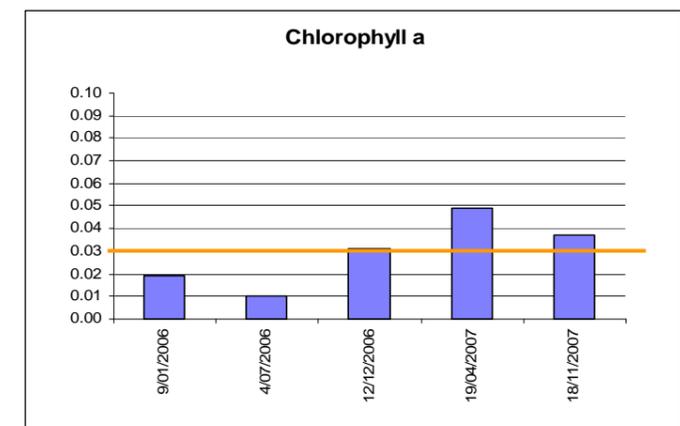
Nutrients are recycled naturally through the lake due to uptake and assimilation of nutrients by plants and animals and through release of nutrients for example through microbial breakdown of organic material. Nutrients stores in catchment sediments may also enter Soothsay Swamp through surface and sub surface flow from the surrounding land and upper catchment via the creek line.

Chlorophyll a

Chlorophyll a concentrations over the sample period ranged from 0.015-0.064mg/L and exceeded the water quality guideline of 0.03mg/L on three of the five sampling occasions. A higher concentration of chlorophyll a is indicative of high nutrient content which could provide an adequate food source for algal growth in Soothsay Swamp. Soothsay Swamp water was highly coloured ranging from 200-450 true colour units which, despite high available phosphorus concentrations, may reduce algal growth to some extent by limiting light penetrating through the water column.



Highly coloured water of Soothsay Swamp contributed by the input of tannins from flooded and fringing vegetation.



Chlorophyll a (mg/L) over sample period in comparison to recommended guideline value of 0.03mg/L

Macroinvertebrates

Seventeen groups of macroinvertebrates were found at Soothsay Swamp during the monitoring period of which the most abundant included; Ostracoda (seed shrimp), Copepoda (copepods), Amphipoda (scuds), Notonectidae (backswimmers), Corixidae (waterboatmen), Zygoptera (damselflies), and Cladocera (water fleas).

Other groups of less abundance were found including; Trichoptera (caddisfly larvae), Chironomidae (non-biting midge larvae), Ephemeroptera (dragonflies), Gastropoda (snails/limpets), Coleoptera (beetles) adult, Coleoptera (beetles) larvae, Ceratopogonidae (biting midge larvae), Culicidae (mosquito larvae), Other Diptera (fly larvae), and Oligochaeta (aquatic worms).

The diversity of macroinvertebrates found over the sample period ranged between ten to seventeen groups with a median of thirteen, which rates as average based on the Ribbons of Blue Wetland Habitat Score.