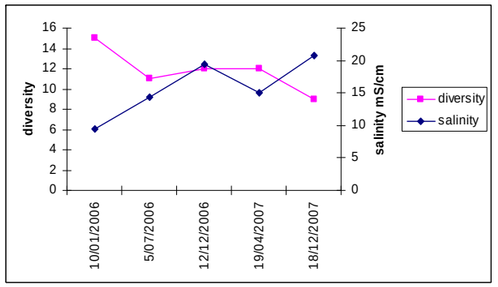
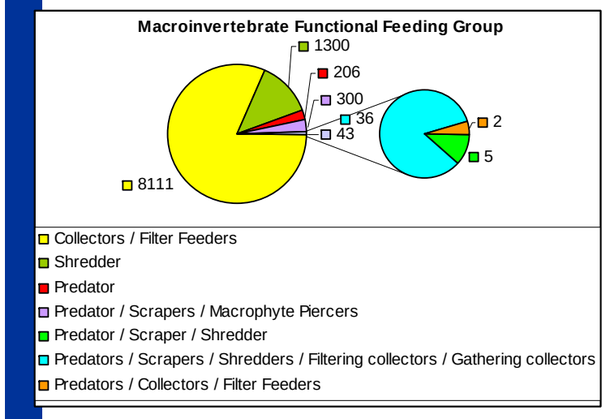
Tallerack Swamp



Salinities (mS/cm) vs. Diversity

Each group of Macroinvertebrates 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 Tallerack 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.

Conclusion

Tallerack Swamp ranges from moderately saline to highly saline. The swamp is fed by surface runoff and sub surface flow from the surrounding catchment. Nutrient concentrations are high and, although the available forms of nitrogen and phosphorus are generally low, the wetland has high productivity as indicated by high chlorophyll *a* levels. The degree of influence from groundwater is unknown however rising groundwater table may be an issue.

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.

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- 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.

Tallerack Swamp

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

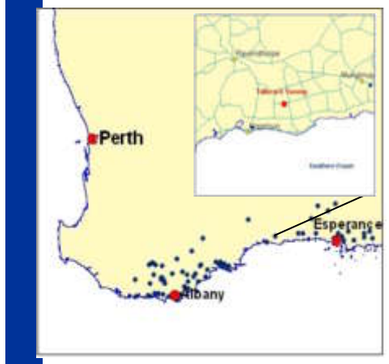
Accompanying this document are appendices that provide more detailed information about the wetland monitoring program, terminology of wetland classification, parameters monitored, methodology and the ANZECC&ARMCANZ guidelines used in this report.

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 Tallerack Swamp

	GPS Location Coordinates		
Wetland Suite	Easting	Northing	MGA Zone
Para-Nama Suite	256157	6254767	51

Tallerack Swamp is located approximately 26.7km east of Hopetoun Western Australia within the sub-catchment of the Yallobup Creek. The wetland lies at approximately 70m AHD (Australian Height Datum). The area receives an annual average rainfall of 530mm.



Tallerack Swamp is located on privately owned land within a small catchment of approximately 30km^2. The wetland lies within a fenced wetland vegetation buffer zone that ranges between approximately 143-430m from the wetland edge.

Tallerack Swamp

Vegetation surrounding Tallerack Swamp

Vegetation predominantly consists of *Eucalyptus occidentalis* (Yate) in the outer perimeter and *Melaleuca cuticularis* (Saltwater paperbark) through the wetland and on the edges with the understorey consisting of *Billardiera heterophylla.* There are a number of dead trees in flooded areas on the fringes of the lake along with regenerating *Melaleuca cuticularis.* Significant numbers of wetland birds have been observed frequenting the swamp.

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Tallerack Swamp

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Approximately 75% of the catchment area has been cleared for farming practices including livestock and cropping. In December 1991 to the end of summer 1992 the lake was used for drought relief and a 2.2m deep drain was excavated for pumping water. The program was stopped however due to a cyanobacteria bloom (*Anaebena sp.)* which was followed by another bloom of *Nodularia sp.*

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

the wetland would be required to discern groundwater connectivity.

Flooded dead trees in Tellerack Swamp may be indicative of increased inundation and salinity through groundwater rise. Note: the high water line and birdlife on the background.

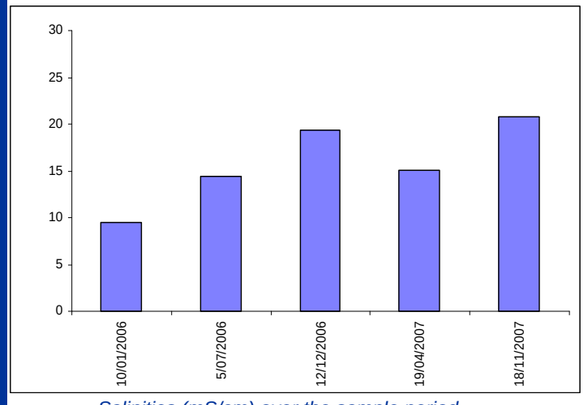
Wetland Classification

Wetland type	*Water Salinity*	*Consistency of Salinity*	*Size (Metres)*	*Shape*
Lake	Hyposaline	Stasohaline	Microscale 320 x 290	Round

Classification of Tallerack 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 (9.45mS/cm) to highly saline (20.8mS/cm). Fluctuations in salinities relate to rainfall, evaporation rates and hence water level variations.



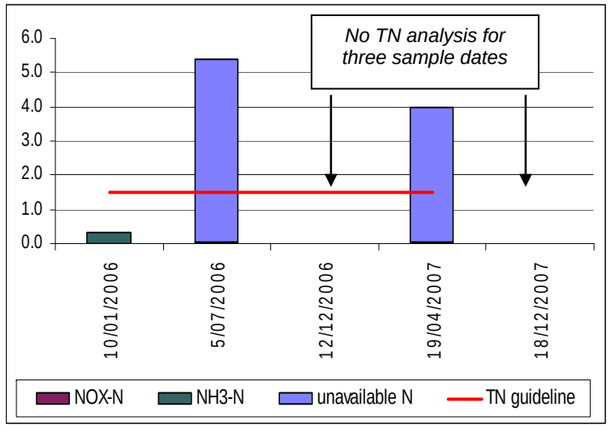
Salinities (mS/cm) over the sample period

In 1994, following the drought relief program, wetland salinities were brackish recording 2.6mS/cm. Further monitoring of groundwater salinities and water levels for comparison with

Nutrients

Total Nitrogen (TN) concentrations were high ranging from 03.8-5.0mg/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.

Dissolved inorganic nitrogen fractions of ammonia (NH_3-N) ranged from 0.01-0.34mg/L and total oxidised nitrogen (NOx-N) ranged between 0.01-0.014mg/L. NH_3-N fractions exceeded the recommended guideline value of 0.04mg/L on one sample occasion (9/02/2006). 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

Tallerack Swamp

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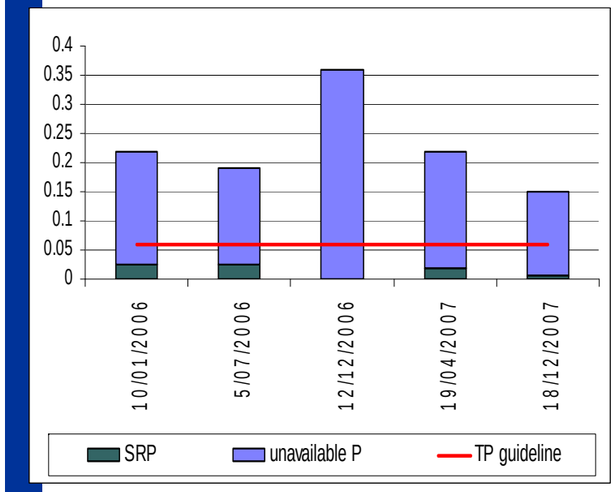
Low proportions of available nitrogen can indicate the majority of nitrogen is being readily taken up by plants and animals while the remainder may be bound up in organic matter, or as dirt or dead cells that contain nitrogen.

Total Phosphorus (TP) concentrations ranged from 0.15-0.36mg/L. TP concentrations exceeded the water quality guideline of 0.06mg/L) on all sample occasions.

Soluble Reactive Phosphorus (SRP) (form of phosphorus available for uptake by plants) ranged from 0.005-0.026mg/L. In relation to water quality guidelines SRP did not exceed the recommended value of 0.03mg/L on any sample occasion.

Low proportions of available phosphorus may relate to adsorption to clay particles and uptake by plants.

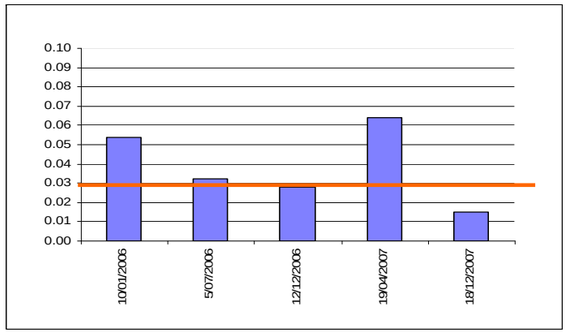


Phosphorus fractions in mg/L over the sample period with TP guideline illustrated

Chlorophyll a

Chlorophyll *a* concentrations over the sample period ranged from 0.015-0.064mg/L. Chlorophyll *a* exceeded the water quality guideline of 0.03mg/L on 3 sampling occasions. A higher concentration of chlorophyll *a* is indicative of high nutrient content providing adequate food source for algal growth in the wetland.

Substrate photo of algal growth at Tallerack Swamp



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

Macroinvertebrates

Fiveteen groups of macroinvertebrates were found at Tallerack Swamp during the monitoring period of which the most abundant included; Ostracoda (seed shrimp), Copepoda (copepods), Amphipoda (scuds), Notonectidae (backswimmers), Corixidae (waterboatmen), and Chironomidae (non-biting midge larvae).

Other groups of less abundance were found including; Zygoptera (damselflies), Trichoptera (caddisflie larvae), Other Diptera (fly larvae), Ceratopogonidae (biting midge larvae), Coleoptera (beetles) adult, Epiproctophora (dragonflies), Acarina (spiders/mites), Coleoptera (beetles) larvae, and Culicidae (mosquitoe larvae).

The diversity of macroinvertebrates found over the sample period ranged between nine to fifteen groups with a median of eleven, which rates as average based on the Ribbons of Blue Wetland Habitat Score. Macroinvertebrate diversity was highest when salinities were lowest as illustrated in the graph below.