

Worrongerup Swamp

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 Worrongerup Swamp are displayed in the below graph.

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

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- 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.



Surveying water levels at Worrongerup Swamp

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Conclusion

Worrongerup Swamp is very shallow and is perched approximately 2m above the regional groundwater table. The wetland is fresh and there is no current connection between the wetland and groundwater however with rising groundwater levels in the area there is a potential risk for saline groundwater rise to affect the wetland. Nutrient levels were slightly elevated however the available forms of nitrogen and phosphorus were generally low. The main issue to consider is to maintain the integrity of this fresh water system as there are few remaining in the area.

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

Worrongerup Swamp

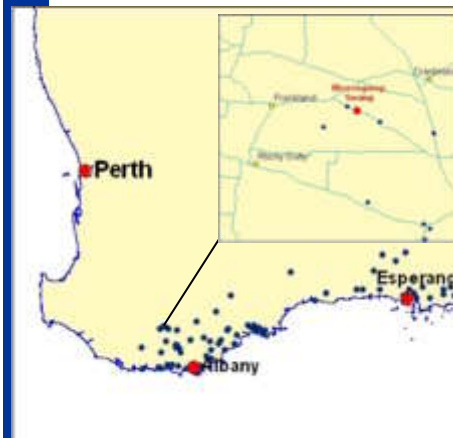
This report card summarises the Department of Water's current state of knowledge of the physical, chemical and biological characteristics of Worrongerup Swamp based on the knowledge gained from investigation and monitoring conducted by the Department of Water through the South Coast Wetland Monitoring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

Accompanying this document are appendices which 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 Worrongerup Swamp

Worrongerup Swamp is located approximately 42km north west of Mount Barker Western Australia within the Irwin Inlet Catchment and the sub-catchment of the Kent River. The wetland is at approximately 235m AHD (Australian Height Datum) and the area receives an annual average rainfall of 520mm.



Wetland Suite	GPS Location Coordinates		
	Easting	Northing	MGA Zone
Unicup Suite	531017	6196089	50



Worrongerup Swamp

Worrongerup Swamp is located on free-hold land owned by the Department of Water within the Shire of Cranbrook. The wetland lies within a fenced wetland vegetation buffer zone that ranges between 50-1800m from the wetland edge within a catchment of approximately 17.5km². Vegetation is predominantly mature *Melaleuca raphiophylla* (freshwater paperbark) and mix of *Eucalyptus sp.* scattered throughout the swamp with some regenerating saplings.



Mix of Eucalyptus throughout Worrongerup Swamp (note: swamp is inundated)



Worrongerup Swamp when dry

Worrongerup Swamp

South Coast Wetland Monitoring Project

June 2008

Approximately 45% of the catchment has been cleared of native vegetation for stock, cropping and now plantation forestry.

Water quality monitoring commenced in November 1999 however the lagoon was dry on most sample occasions. Monitoring included physical, chemical and biological parameters as outlined in the appendices.

Wetland Classification

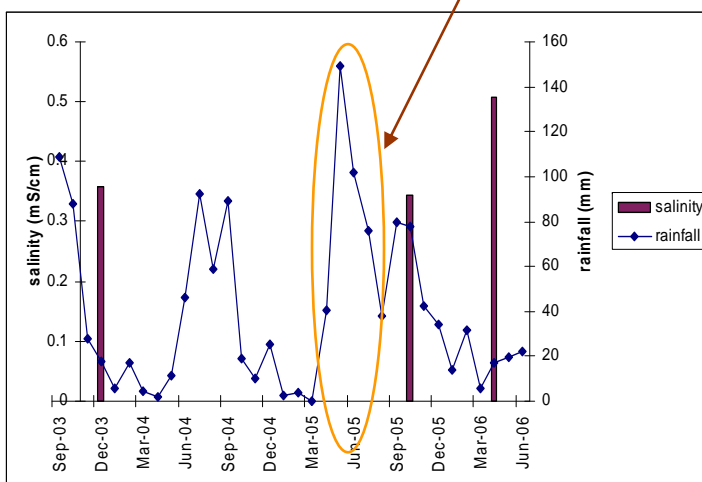
Wetland type	Water Salinity	Consistency of Salinity	Size (Metres)	Shape
Playa	Fresh	Stasohaline	Microscale 340 x 230	Irregular

Classification of Worrongerup Swamp has been evaluated on the basis of guidelines developed by V & C Semeniuk Research Group which are explained in the appendices. Extended dry periods of the wetland correspond with the hydro period classification Playa meaning intermittently flooded basin. Inundation of the swamp corresponded to periods of high rainfall, for example the wetland filled following high rainfall that occurred in winter 2005.

Salinity

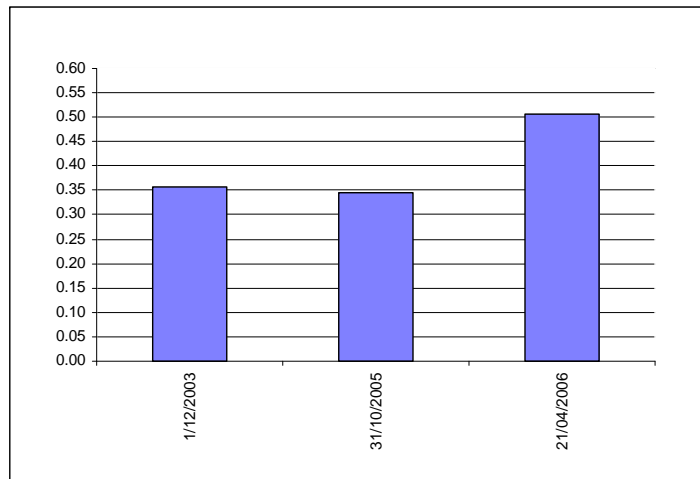
Salinity over the sample period was fresh ranging between 0.34-0.5mS/cm. Fluctuations in salinities relate to seasonal fluctuations in rainfall which in turn determines the amount of surface runoff and sub surface flow from the surrounding land into the swamp.

Inundation of swamp after high rainfall period -2005



In October 2005 wetland was inundated in response to high rainfall in June 2005

Currently there is no interaction between the swamp and groundwater as the swamp has a very shallow basin and groundwater is 2m below the lake bed. Groundwater is fed to the aquifer below the swamp from the south and north. Groundwater to the south is highly saline and close to the ground surface. Although further investigations are required, with groundwater rising in the area there could be interaction with the wetland in the near future.



Salinity (mS/cm) over sample period

Nutrients

Total Nitrogen (TN) concentrations ranged between 1.8-2.9mg/L which exceeded the guidelines developed for ecosystem protection for southwest Australian wetlands for slightly disturbed systems of 1.5mg/L on all sample occasions.

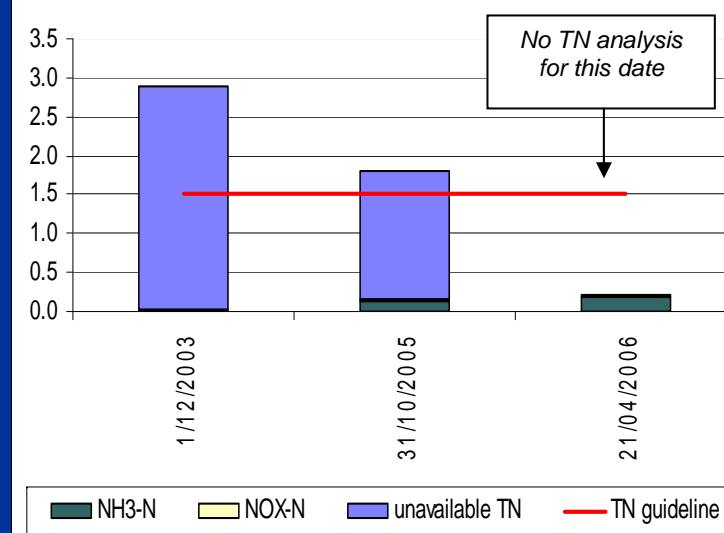
Dissolved inorganic nitrogen fractions of ammonia (NH₃-N) ranged between 0.02-0.19mg/L which exceeded the recommended guideline value of 0.04mg/L on two sample occasions. Total oxidised nitrogen (NO_x-N) was consistent at <0.01mg/L which did not exceed the recommended guideline value of 0.1mg/L.

Total Phosphorus (TP) concentration ranged between 0.057-0.1mg/L which exceeded the water quality guidelines of 0.06mg/L on two sample occasions.

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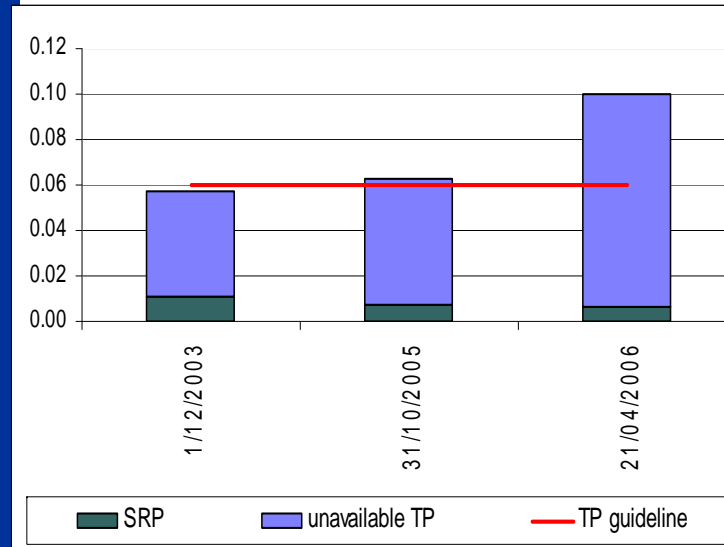
June 2008



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

Soluble Reactive Phosphorus (SRP) (form of phosphorus available for uptake by plants) ranged between 0.006-0.011mg/L which did not exceed the recommended water quality guideline value of 0.03mg/L.

When Worrongerup Swamp becomes inundated nitrogen may be present in the organic material (eg. vegetation, woody debris) in the wetland. Nutrients may be released during decomposition of this organic material especially in the form of NH₃-N. Low amounts of phosphorus and available phosphorus may indicate nutrients are readily taken up by plants or bound to sediments.



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

Macroinvertebrates

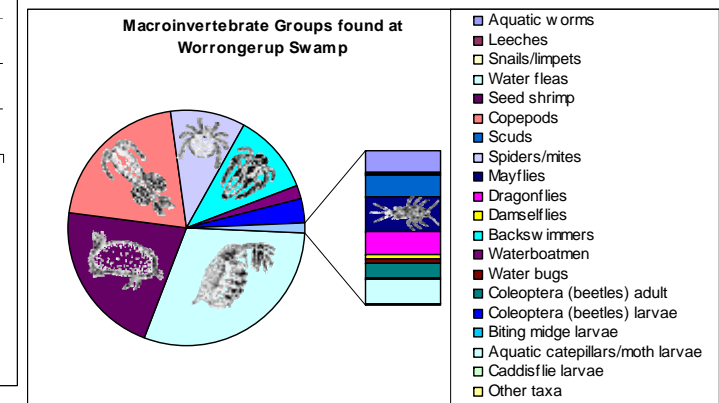
Twenty groups of macroinvertebrates were found at Worrongerup Swamp during the monitoring period of which the most abundant included; Cladocera (water fleas), Ostracoda (seed shrimp), Copepoda (copepods), Acarina (spiders/mites), Notonectidae (backswimmers), Corixidae (waterboatmen), and Coleoptera (beetles) larvae

Other groups of less abundance were found including; Oligochaeta (aquatic worms), Hirudinea (leeches), Gastropoda (snails/limpets), Amphipoda (scuds), Ephemeroptera (mayflies), Epiproctophora (dragonflies), Zygoptera (damselflies), Hemiptera (water bugs), Coleoptera (beetles) adult, Ceratopogonidae (biting midge larvae), Lepidoptera (aquatic caterpillars/moth larvae), Trichoptera (caddisfly larvae), and Other taxa.



Sieving Macroinvertebrates for identification

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



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