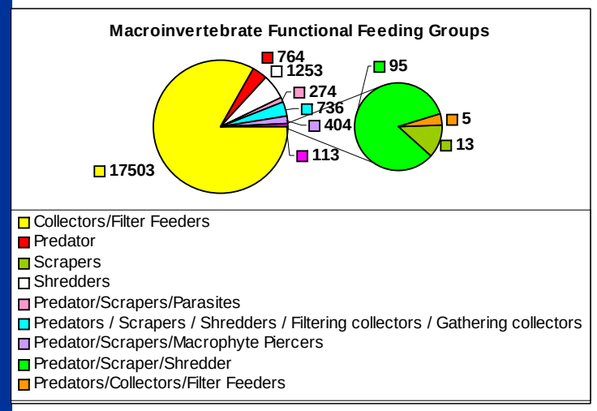
Lock Swamp

South Coast Wetland Monitoring Project **June 2008**

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 Lock 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

Lock Swamp receives fresh water inputs from surface runoff and sub surface flow and is generally fresh. There appears to be no connection between the wetland and the groundwater table and there is unlikely to be any future connection as the regional watertable is declining due to tree plantation establishment. Total nutrient concentrations were generally high and while the the available form of nitrogen was often high, the available form of phosphorus was usually low.

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.

- Mr Alan Lock for his support of the project and allowing access to the lake on his property.
- Ruhi Ferdowsian (Department of Agriculture and Food, Albany) for providing knowledge of the hydrogeology associated with Lock Swamp.
- 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.

Lock Swamp 2005

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

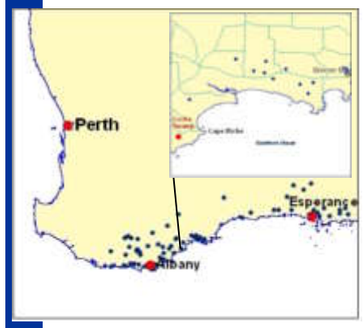
South Coast Wetland Monitoring Project **June 2008**

This report card summarises the Department of Water's current state of knowledge of the physical, chemical and biological characteristics of Lock 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 providing 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 the South Coast Natural Resource Management Inc. - supported by the Australian Government and the Government of Western Australia.

About Lock Swamp



Lock Swamp is located approximately 73km west of Bremer Bay in Western Australia within the sub-catchment of Willyun Creek. The wetland is at approximately 82m AHD (Australian Height Datum) and the area receives an annual average rainfall of 615mm.

Lock Swamp is located on privately owned land within a catchment of approximately 8.9km^2. The wetland lies within a within a fenced wetland vegetation buffer zone that extends approximately 30-300m from the wetland edge.

Vegetation growing throughout Lock Swamp

	GPS Location Coordinates		
Wetland Suite	**Easting**	**Northing**	**MGA Zone**
Cheyne Suite	652405	6166927	50

Lock Swamp

Vegetation is growing throughout the swamp with *Eucalyptus occidentalis* (Yate in the upper storey), *Melaleuca cuticularis* (saltwater paperbark) in the mid storey and sparse *Juncas pallidus* in the understorey. There are a few collapsed trees in the swamp and some Yates and Acacia sp. regenerating.

Approximately 50% of the catchment has been cleared of native vegetation for livestock and now tree plantations.

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Lock Swamp

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Wetland Classification

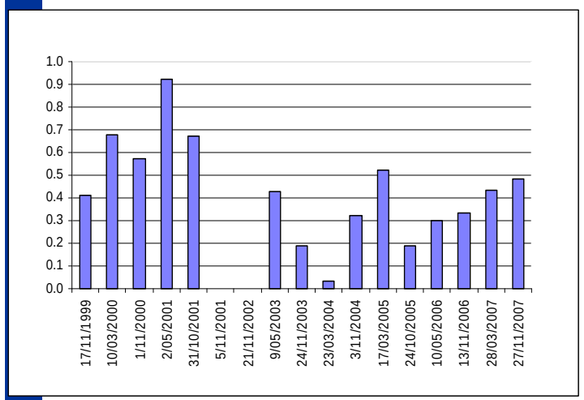
Wetland type	*Water Salinity*	*Consistency of Salinity*	*Size (Metres)*	*Shape*
Sumpland	Fresh	Stasohaline	Mesoscale 1100 x 450	Irregular

Water quality monitoring commenced in November 1999 which included physical, chemical and biological parameters as outlined in the appendices.

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

Salinity

Lock swamp is fresh with salinity ranging between 0.034 and 0.92 mS/cm. Fluctuations in salinities relate to seasonal fluctuations in rainfall, evaporation and hence water level variation.



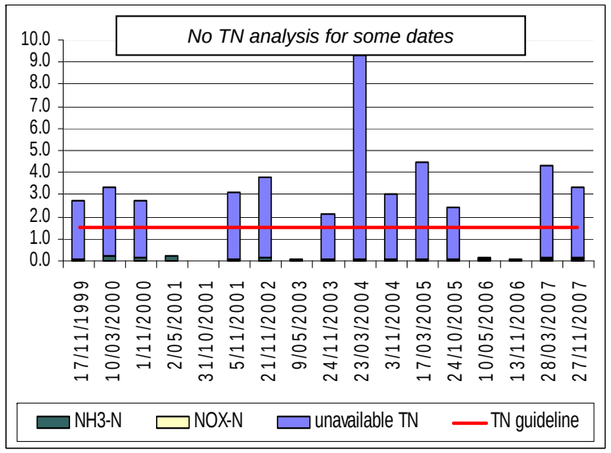
Salinity (mS/cm) over sample period

Lock Swamp is perched above the groundwater table and receives fresh water from surface runoff and sub surface flow from surrounding land.

Investigation of a Department of Agriculture and Food bore drilled in 1999 (WE3D99) confirmed there was no connection with groundwater as the watertable was 13m below ground surface with moderately saline water at 7.27mS/cm. Groundwater in this area is also declining back towards pre clearing levels due to the presence of tree plantations in the Area.

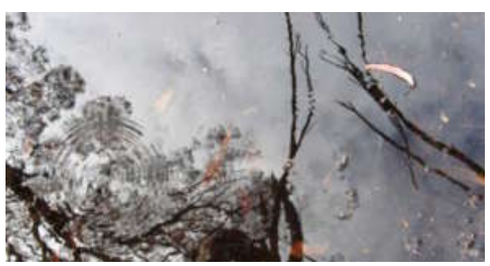
Nutrients

Total Nitrogen (TN) concentrations ranged between 2.7-9.3mg/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.



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

Dissolved inorganic nitrogen fractions of ammonia (NH_3-N) ranged between 0.037-0.2mg/L which exceeded the recommended guideline value of 0.04mg/L on fifteen of the sixteen sample occasions. Total oxidised nitrogen (NOx-N) ranged between 0.01-0.045mg/L which did not exceed the recommended guideline value of 0.1mg/L on any sample occasion.

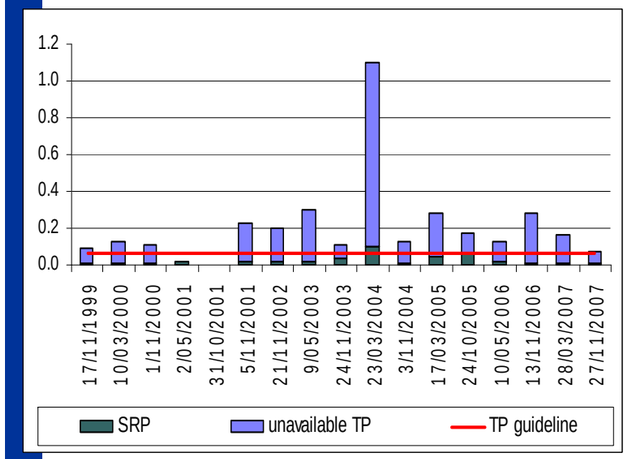


Lock Swamp substrate taken 27th November 2007

Lock Swamp

South Coast Wetland Monitoring Project June 2008

Total Phosphorus (TP) concentration ranged between 0.069-0.5mg/L which exceeded the water quality guidelines of 0.06mg/L on all sample occasions.



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

Soluble Reactive Phosphorus (SRP) (form of phosphorus available for uptake by plants) ranged between 0.005-0.1mg/L which exceeded the recommended water quality guideline value of 0.03mg/L on four of the sixteen sample occasions.

Nutrients are recycled naturally through the swamp due to uptake and assimilation of nutrients by plants and animals and through release of nutrients for example through microbial breakdown of organic material.

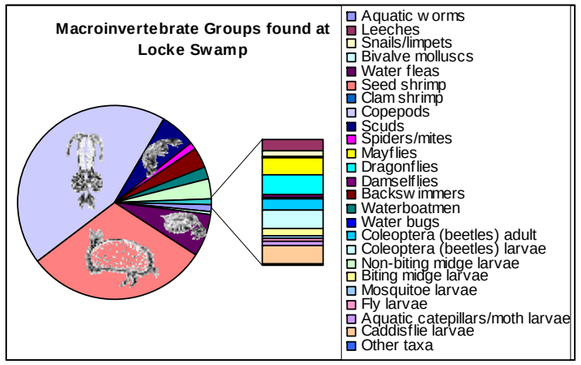
Catchment nutrients stores may also enter Lock Swamp through surface and sub surface drainage flow from the surrounding land.

Macroinvertebrates

Twenty five groups of macroinvertebrates were found at Lock Swamp during the monitoring period of which the most abundant included; Ostracoda (seed shrimp), Copepoda (copepods), Amphipoda (scuds), Cladocera (water fleas), Oligochaeta (aquatic worms), Bivalvia (bivalve molluscs), Acarina (spiders/mites), Notonectidae (backswimmers), Corixidae (waterboatmen), and Chironomidae (non-biting midge larvae)

Other groups of less abundance were found including; Hirudinea (leeches), Gastropoda (snails/limpets), Conchostraca (clam shrimp), Ephemeroptera (mayflies), Epiproctophora (dragonflies), Zygoptera (damselflies), Hemiptera (water bugs), Coleoptera (beetles) adult, Coleoptera (beetles) larvae, Ceratopogonidae (biting midge larvae), Culicidae (mosquitoe larvae), Other Diptera (fly larvae), Lepidoptera (aquatic catepillars/moth larvae), Trichoptera (caddisflie larvae) and Other taxa.

The diversity of macroinvertebrates found over the sample period ranged between seven to twenty two 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 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.

Letisha Newman identifying Macroinvertebrates at Lock Swamp 11th April 2008