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

Woods Lake receives fresh water inputs from surface and sub-surface runoff and saline sub surface flow from the steep hills to the north and south which results in salinities ranging from fresh to moderately saline. Total nitrogen and phosphorus levels were high on all occasions and the forms of these nutrients available for plant growth were occasionally high. The main consideration for Woods Lake is to maintain the integrity and protection of this system and to support and monitor the success of revegetation work.

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.

Temporary Marker Location at Woods Lake

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.

- Steve and Mandy Woods for their support of the project and allowing access to the lake on their property.
- Ruhi Ferdowsian (Department of Agriculture and Food, Albany) for providing knowledge of the hydrogeology associated with Wood's Lake.
- 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.

Robert Woods and their dog Chewy at Woods Lake 12th October 2007

For further information please contact
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Albany (08) 9842 5760.

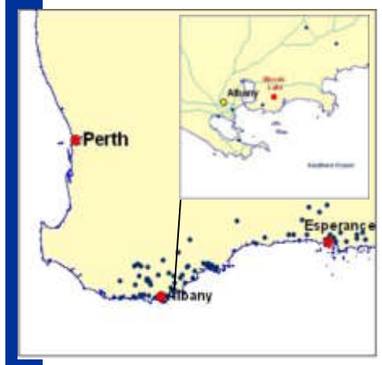
South Coast Wetland Monitoring Project June 2008

This report card summarises the Department of Water's current state of knowledge of the physical, chemical and biological characteristics of Woods Lake 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 Woods Lake



Woods Lake is located near the coast approximately 16km east of Albany in Western Australia within the Taylor Inlet catchment. The wetland is at approximately 20m AHD (Australian Height Datum) and the area receives an annual average rainfall of 840mm.

Woods Lake is located on privately owned land within a catchment of approximately 12km^2. The wetland lies within a fenced wetland vegetation buffer zone extending approximately 2-60m from the wetland edge.

The buffer zone has been enhanced through revegetation of various native species. Vegetation predominantly consists of a number of Eucalyptus species *including Agonis Flexuosa* (Peppermint) and *Melaleuca rhaphiophylla* (freshwater paperbark) in the upper storey with various shrub species in the mid storey rushes and grasses in the understorey.

	GPS Location Coordinates		
Wetland Suite	**Easting**	**Northing**	**MGA Zone**
No Suite listed	594290	6128560	50

Woods Lake

Woods Lake Vegetation

Approximately 65% of the catchment has been cleared of native vegetation for livestock and now tree plantations.

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

Department of Water
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Woods Lake

South Coast Wetland Monitoring Project — **June 2008**

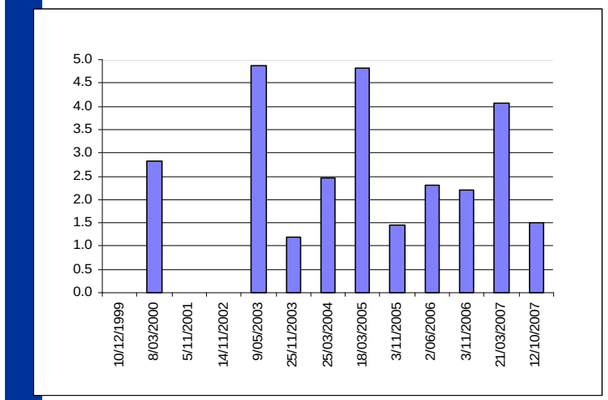
Wetland Classification

Wetland type	*Water Salinity*	*Consistency of Salinity*	*Size (Metres)*	*Shape*
Lake	Fresh - Subhaline	Poikilohaline	Microscale 485 x 95	Elongate

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

Salinity

Salinity over the sample period ranged between marginal (1.1mS/cm) and moderately saline (4.8mS/cm). Fluctuations in salinities relate to seasonal fluctuations in rainfall, evaporation and water levels.



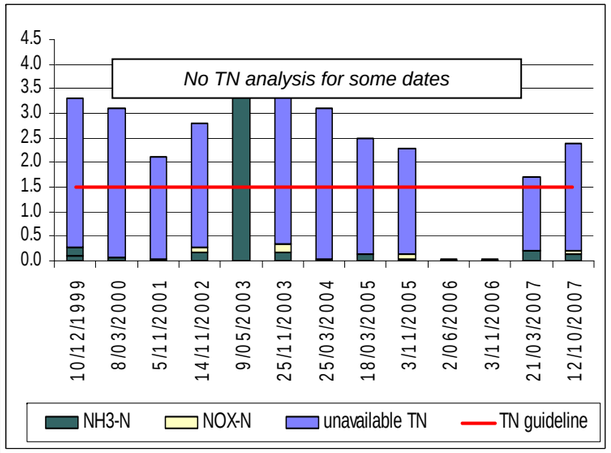
Salinity (mS/cm) over sample period

Woods Lake receives surface flow from surrounding lands particularly from the steeper slopes to the north. The wetland is an elongated basin that lies between two granite hills to the north and south that discharge higher salinity groundwater into the wetland through sub surface flow. When the lake is full it over flows into the water course that drains into Taylor Inlet and the ocean. Higher salinities correspond with high evaporation rates, low water levels and salt concentration towards the end of each summer.

Nutrients

Total Nitrogen (TN) concentrations ranged between 1.7-3.5mg/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 (NH_3-N) ranged between 0.01-3.9mg/L which exceeded the recommended guideline value of 0.04mg/L on eight of the thirteen sample occasions. Total oxidised nitrogen (NOx-N) ranged between 0.01-0.16mg/L which exceeded the recommended guideline value of 0.1mg/L on one of the thirteen sample occasions.



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

Total Phosphorus (TP) concentration ranged between 0.074-0.4mg/L which exceeded the water quality guidelines of 0.06mg/L on all sample occasions.

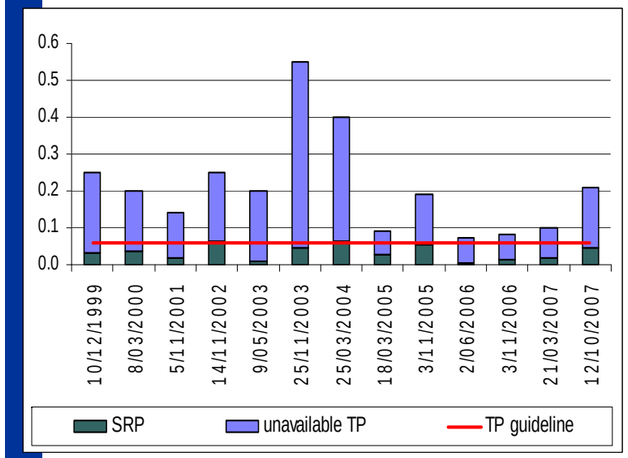
Soluble Reactive Phosphorus (SRP) (form of phosphorus available for uptake by plants) ranged between 0.007-0.064mg/L which exceeded the recommended water quality guideline value of 0.03mg/L on four of the thirteen sample occasions.

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 enter Woods Lake through surface and sub-surface flow from the surrounding land and through groundwater discharge.

Woods Lake

South Coast Wetland Monitoring Project — June 2008



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

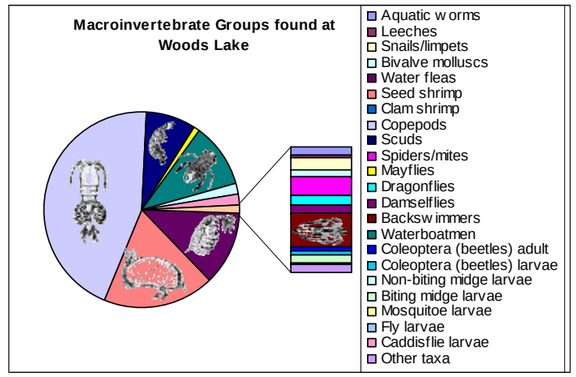
Woods Lake Substrate photo taken when raining 18th April 2008

Macroinvertebrates

Twenty groups of macroinvertebrates were found at Woods Lake during the monitoring period of which the most abundant included; Ostracoda (seed shrimp), Cladocera (water fleas), Copepoda (copepods), Amphipoda (scuds), Ephemeroptera (mayflies), Corixidae (waterboatmen), Chironomidae (non-biting midge larvae), and Trichoptera (caddisflie larvae).

Other groups of less abundance were found including; Oligochaeta (aquatic worms), Hirudinea (leeches), Gastropoda (snails/ limpets), Bivalvia (bivalve molluscs), Conchostraca (clam shrimp), Acarina (spiders/ mites), Epiproctophora (dragonflies), Zygoptera (damselflies), Notonectidae (backswimmers), Coleoptera (beetles) adult, Coleoptera (beetles) larvae, Ceratopogonidae (biting midge larvae), Culicidae (mosquitoe larvae), Other Diptera (fly larvae), Trichoptera (caddisflie larvae), and Other taxa.

The diversity of macroinvertebrates found over the sample period ranged between six to twenty two groups with a median of twelve 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.

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 Woods Lake are displayed in the below graph.