

Smiths Swamp

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.

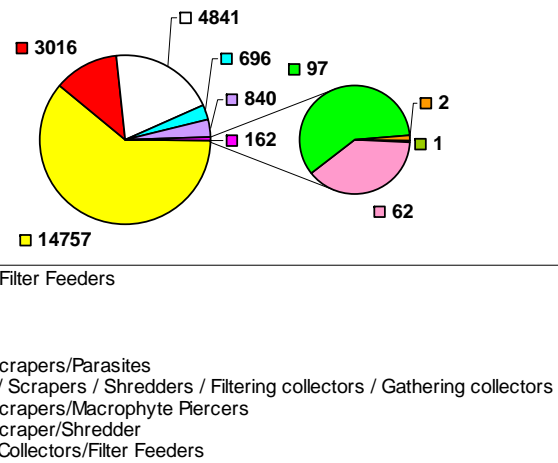
interaction between groundwater and surface water. A future monitoring program should be developed to address these issues.

Acknowledgements

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- Ruhi Ferdowsian (Department of Agriculture and Food, Albany) for providing knowledge of the hydrogeology associated with Smith's swamp.
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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.

Macroinvertebrate Functional Feeding Groups



Conclusion

Smith's Swamp receives water from surface runoff, sub surface flow and possibly groundwater. The salinity ranges from marginal to highly saline. Nutrient levels, including the available forms of nitrogen and phosphorus are often slightly above the guideline levels. The main consideration for Smith's Swamp is to confirm the wetland-groundwater relationship and monitor the ecological impacts of water quality changes.

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



Luke and Peter from Great Southern Tafe sampling at Smiths Swamp 2007

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

Smiths Swamp

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

Smith Swamp is located approximately 70km east of Albany in Western Australia within the catchment of Cordinup Creek. The wetland is at approximately 155m AHD (Australian Height Datum) and the area receives an annual average rainfall of 610mm.



Smith Swamp is located on privately owned land within a catchment of approximately 50km². The wetland lies within a partially fenced wetland vegetation buffer zone that extends approximately 10-130m from the wetland centre.



Eucalyptus occidentalis (Yates) in the background with bluegums in the flooded margin of the swamp

Wetland Suite	GPS Location Coordinates		
	Easting	Northing	MGA Zone
Manypeaks Suite	623965	6166060	50



Smith Swamp

Vegetation is predominantly *Corymbia calophylla* and *Eucalyptus occidentalis* (Yates) in the upper storey with some Blue gums on the edge of wetland which were harvested in 2007. *Melaleuca cuticularis* (saltwater paperbark) are situated in the mid storey and sparse *Juncus pallidus* in the understorey. There are a number of dead trees in the centre of the lake.



Bluegums were harvested in 2007

Smiths Swamp

Approximately 70% of the catchment has been cleared of native vegetation for cropping, livestock and now plantation timber.

Water quality monitoring commenced in November 2005 which included physical, chemical and biological parameters as outlined in the appendices.

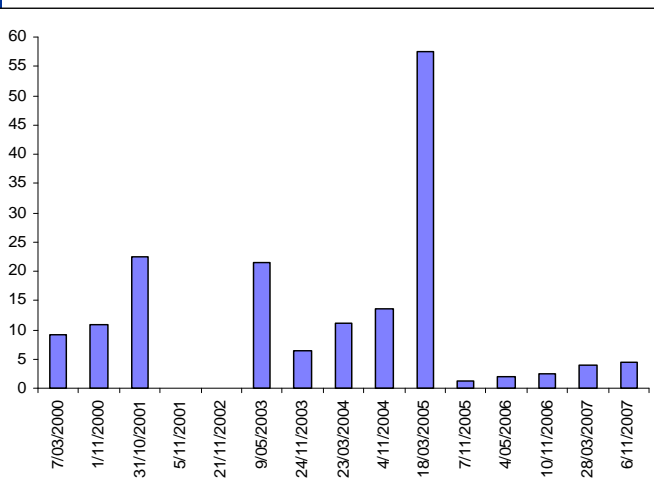
Wetland Classification

Wetland type	Water Salinity	Consistency of Salinity	Size (Metres)	Shape
Lake	Fresh - Subhaline - Hyposaline - Mesosaline	Poikilohaline	Mesoscale 950 x 675	Ovoid

Classification of Smith 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

Salinity over the sample period ranged between marginal (1.2mS/cm) and highly saline (57.5mS/cm). Fluctuations in salinities relate to seasonal fluctuations in rainfall, evaporation and water levels.



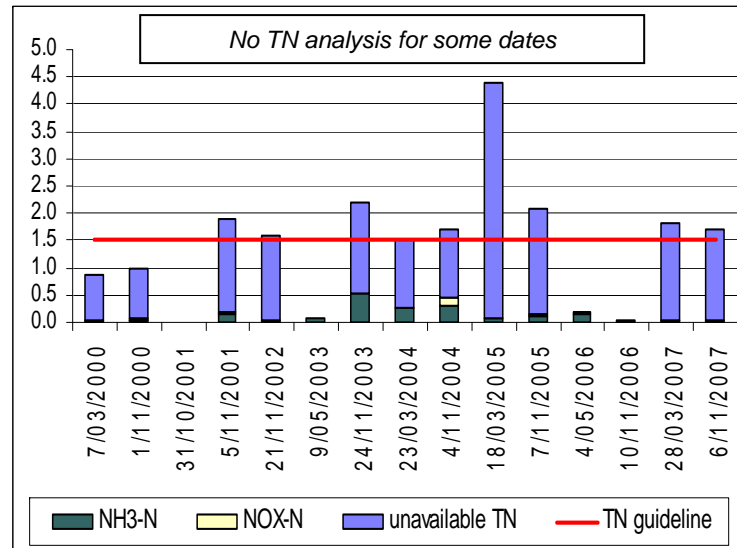
Salinity (mS/cm) over sample period

Smith's swamp receives fresh surface and sub surface flow from surrounding lands. Measurements in a Department of Agriculture and Food bore (MTC14D97) indicate the groundwater table is only 2m below the wetland base. Groundwater salinity, at 2.34mS/cm, is within the salinity range of the wetland which indicates groundwater may interact with the wetland, possibly through capillary rise. Higher salinities in the wetland relate to evaporation and concentration of salts.

Nutrients

Total Nitrogen (TN) concentrations ranged between 0.89-4.4mg/L which exceeded the guidelines developed for ecosystem protection for southwest Australian wetlands for slightly disturbed systems of 1.5mg/L on eight of the eleven sample occasions.

Dissolved inorganic nitrogen fractions of ammonia (NH₃-N) ranged between 0.01-0.52mg/L which exceeded the recommended guideline value of 0.04mg/L on nine of the fourteen sample occasions. Total oxidised nitrogen (NO_x-N) ranged between 0.01-0.13mg/L which did not exceed the recommended guideline value of 0.1mg/L on any sample occasion.

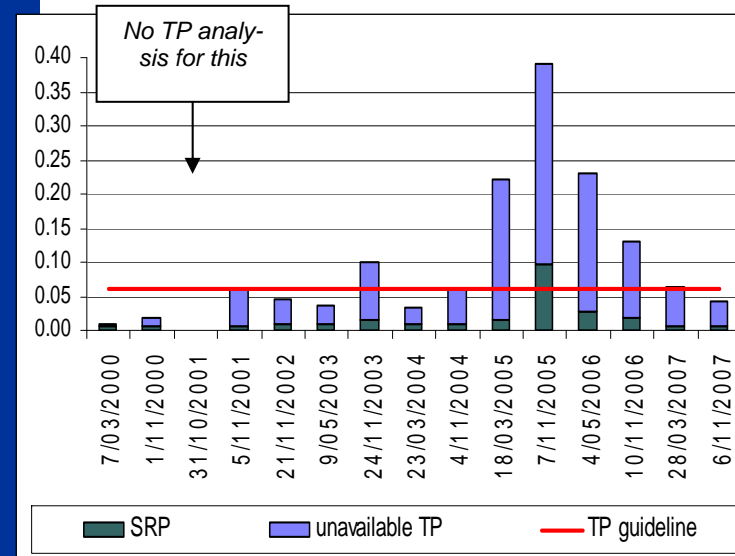


Nitrogen fractions in mg/L over the sample period with TN guideline illustrated

Total Phosphorus (TP) concentration ranged between 0.01-0.39mg/L which exceeded the water quality guidelines of 0.06mg/L on eight of the eleven sample occasions.

Soluble Reactive Phosphorus (SRP) (form of phosphorus available for uptake by plants) ranged between 0.005-0.097mg/L which exceeded the recommended water quality guideline value of 0.03mg/L on one of the fourteen sample occasions.

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

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 in may enter Smith Swamp through surface and sub surface drainage flow from the surrounding land and through groundwater discharge.

Low proportions of available phosphorus can indicate the majority is being readily taken up by plants and animals while the remainder may be bound to clay soils.



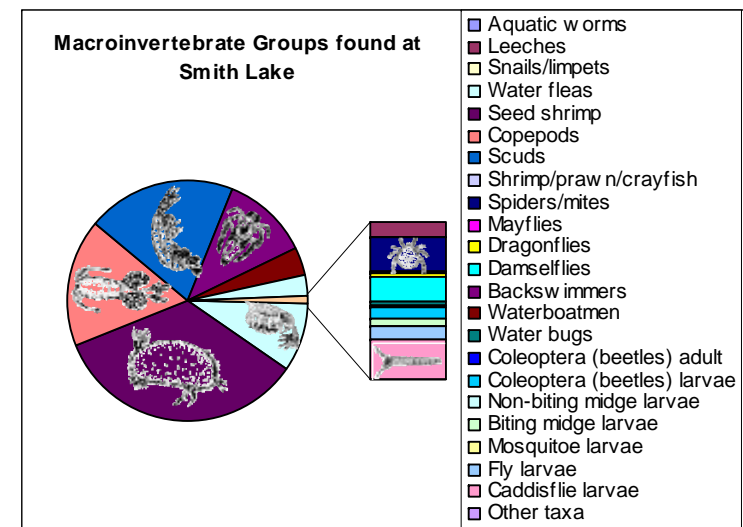
Smiths Swamp Substrate photo taken 6th November 2007

Macroinvertebrates

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

Other groups of less abundance were found including; Oligochaeta (aquatic worms), Hirudinea (leeches), Gastropoda (snails/limpets), Decapoda (shrimp/prawn/crayfish), Acarina (spiders/mites), 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), Trichoptera (caddisfly larvae), and Other taxa

The diversity of macroinvertebrates found over the sample period ranged between one to twenty groups with a median of fourteen 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).