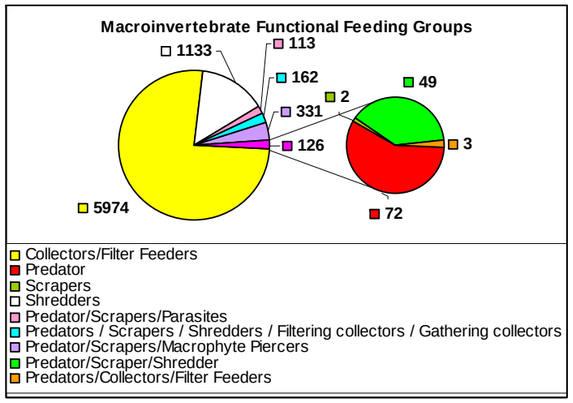
Pyle Swamp

South Coast Wetland Monitoring Project **June 2008**

The composition of these groups at Pyle 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

Pyle Swamp ranged between fresh and brackish with freshwater inputs from surface runoff and sub surface flow from the surrounding catchment. There is no connection between the wetland and groundwater. The depth to groundwater and slow rate of rise indicates no immediate threat of increasing salinity in the wetland. Total nitrogen concentrations were high including available form on occasions however phosphorus levels were usually low. The main consideration for Pyle Swamp is to protect the vegetation and maintain integrity of the swamp.

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.

- Jeff and Sue Pyle 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 Pyle 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.

Ania Lorenz and Louise Everett identifying Macroinvertebrates at Pyle Swamp 31st October 2007

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Albany (08) 9842 5760.

Pyle Swamp

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

About Pyle Swamp

Pyle Swamp is located near the coast approximately 40km east of Albany in Western Australia within the Wongerup Creek sub catchment. The wetland is at approximately 120m AHD (Australian Height Datum) and the area receives an annual average rainfall of 640mm.

	GPS Location Coordinates		
Wetland Suite	**Easting**	**Northing**	**MGA Zone**
Manypeaks Suite	610805	6155601	50

Pyle Swamp is located on privately owned land, within a catchment of approximately 30 km^2. The wetland lies within a fenced vegetation buffer zone extending approximately 0-355m from the wetland centre.

Vegetation in the upper storey consists of *Melaleuca cuticularis* (saltwater paperbark) in the upper storey and regenerating *Melaleuca cuticularis* and *Baumea articulata* in the understorey which grows throughout most of the wetland.

Melaleuca cuticularis and Baumea articulata in Pyle Swamp (the swamp overflows to the surrounding land when it fills)

Approximately 65% of the catchment has been cleared of native vegetation for cropping and now timber plantation.

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

Pyle Swamp

Pyle Swamp often dries over summer months

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Pyle Swamp

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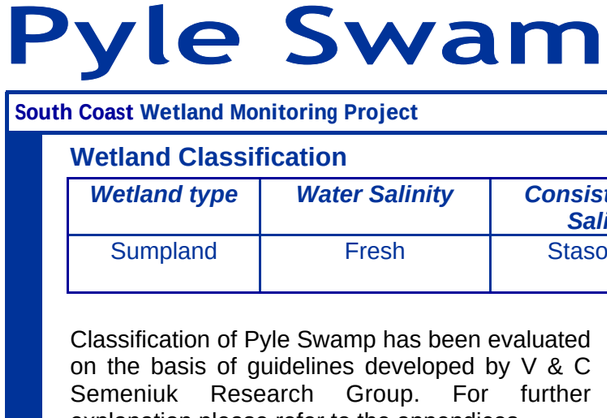
Wetland Classification

Wetland type	*Water Salinity*	*Consistency of Salinity*	*Size (Metres)*	*Shape*
Sumpland	Fresh	Stasohaline	Microscale 440 x 492	Round

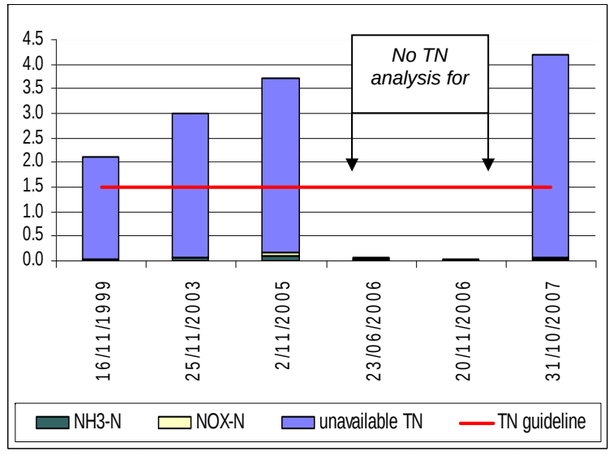
Classification of Pyle Swamp has been evaluated on the basis of guidelines developed by V & C Semeniuk Research Group. For further explanation please refer to the appendices.

Salinity

Salinity over the sample period ranged between fresh (0.22mS/cm) and brackish (1.5mS/cm). Fluctuations in salinities relate to seasonal variation in rainfall, evaporation and water levels. Pyle Swamp receives fresh water from surface and sub surface runoff from the relatively flat surrounding land. When the swamp fills during high rainfall it overflows onto the surrounding marshy land and often dries over dry summer months. There is no connection between the wetland and the groundwater table.



Salinity (mS/cm) over sample period



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

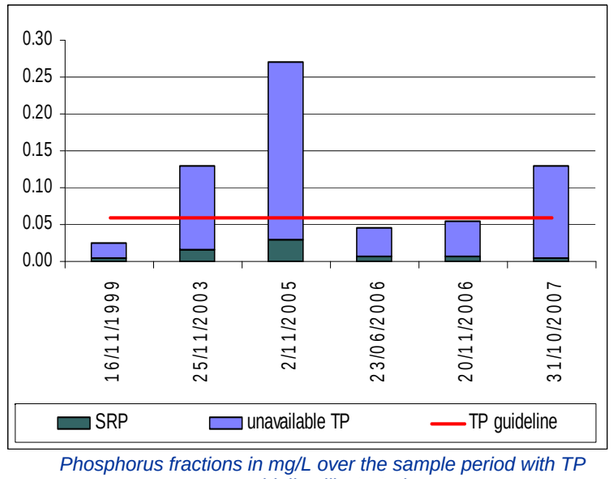
Nutrients

Total Nitrogen (TN) concentrations ranged between 2.1-4.2mg/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 0.026-0.094mg/L which exceeded the recommended guideline value of 0.04mg/L on four of six sample occasions. Total oxidised nitrogen (NOx-N) ranged between 0.01-0.025mg/L which did not exceed the recommended guideline value of 0.1mg/L on any sample occasions.

Total Phosphorus (TP) concentration ranged between 0.025-0.27mg/L which exceeded the water quality guidelines of 0.06mg/L on three of the six sample occasions.

Soluble Reactive Phosphorus (SRP) (form of phosphorus available for uptake by plants) ranged between 0.005-0.027mg/L which did not exceed the recommended water quality guideline value of 0.03mg/L on any sample occasion.



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

Pyle Swamp

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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.

Nutrients may also enter Pyle Swamp through surface and sub surface flow from surrounding land.

Low proportions of available nutrients can indicate the majority is being readily taken up by plants and animals while the remainder may be bound up in organic matter, as dirt or dead cells or bound to clay soils in the case of phosphorus.

Pyle Swamp substrate 31st of October 2007

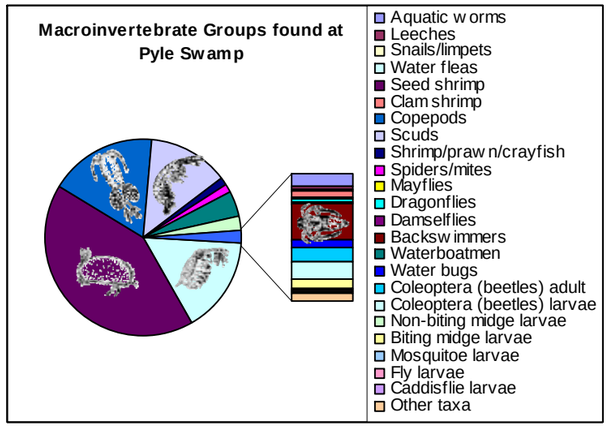
Macroinvertebrates

Twenty four groups of macroinvertebrates were found at Pyle Swamp during the monitoring period of which the most abundant included; Cladocera (water fleas), Ostracoda (seed shrimp), Copepoda (copepods), Amphipoda (scuds), Decopoda (shrimp/prawn/crayfish), Acarina (spiders/mites), Corixidae (waterboatmen), and Chironomidae (non-biting midge larvae).

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

Sieving Macroinvertebrates into trays for identifcation

The diversity of macroinvertebrates found over the sample period ranged between eleven to twenty six 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.

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.