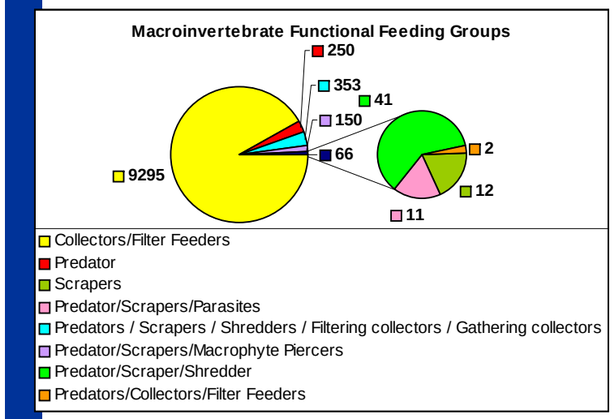
Qualinup Swamp

South Coast Wetland Monitoring Project **June 2008**

Qualinup Swamp 28th April 2008



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

Qualinup Swamp is a fresh wetland which is fed by surface runoff and sub surface flow from surrounding land and discharges to the underlying aquifer. Total nitrogen and phosphorus levels were always high although the available forms were usually low. The main consideration for Qualinup Swamp is to maintain the integrity and protection of this system.

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

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- Geoffrey and Francis McGrath for their support of the project and allowing access to the lake on their property.
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- 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.

Temporary Marker Location at Qualinup Swamp

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

Qualinup Swamp

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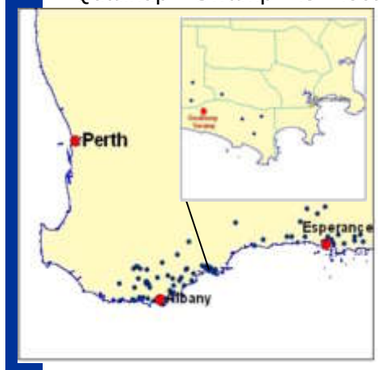
This report card summarises the Department of Water's current state of knowledge of the physical, chemical and biological characteristics of Qualinup Swamp based on the knowledge gained from investigation and monitoring conducted by the Department of Water through the South Coast Wetland Monitoring Program.

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 Qualinup Swamp



Qualinup Swamp is located near the coast approximately 20km west of Bremer Bay in Western Australia within the sub-catchment of Bitter Water Creek. The wetland is at approximately 65m AHD (Australian Height Datum) and the area receives an annual average rainfall of 595mm.

Qualinup Swamp is located on privately owned land, within a catchment of approximately 65.4km^2. The wetland lies within a within a fenced wetland vegetation buffer zone that extends approximately 70-960m from the wetland edge.

Vegetation in Qualinup Swamp

	GPS Location Coordinates		
Wetland Suite	***Easting***	***Northing***	***MGA Zone***
Qualinup Suite	689590	6190495	50

Vegetation in the upper storey consists of *Eucalyptus occidentalis* (Yates) along with *Melaleuca preissiana* (Modong). There are a number of dead trees scattered in the wetland and regeneration of *Melaleuca preissiana.* Grass is growing where water levels have subsided and macroalgae was observed in the shallow margins.

Qualinup Swamp

Macroalgae observed in the shallow margins of the swamp Qualinup Swamp

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Approximately 85% of the catchment has been cleared of native vegetation for livestock, horticulture and now tree plantations.

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	Stasohaline	Mesoscale 550 x 900	Irregular

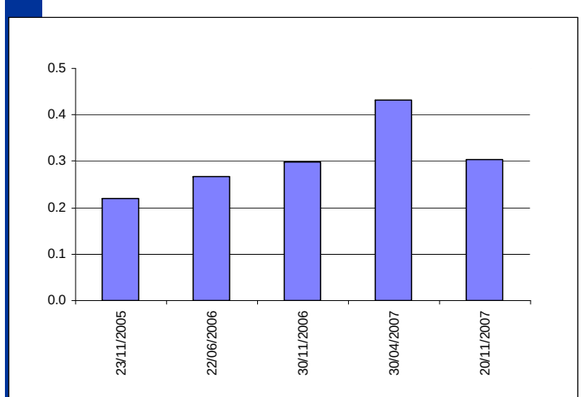
Classification of Qualinup Swamp has been evaluated on the basis of guidelines developed by V & C Semeniuk Research Group. For further explanation please refer to the appendices.

Salinity

Salinity over the sample period was fresh ranging between 0.2-0.43mS/cm. Fluctuations in salinities relate to seasonal fluctuations in rainfall, evaporation and water level variation.

The wetland is situated on the inland margin of the coastal dune system. Fresh surface runoff and sub surface flow enters the swamp from the surrounding land.

The wetland recharges the underlying fresh to brackish groundwater aquifer which then discharges to the ocean. With the reasonably steep gradient of the Werillup Formation aquifer at the coast it is not expected that groundwater will rise and wetland connectivity will occur in this area.

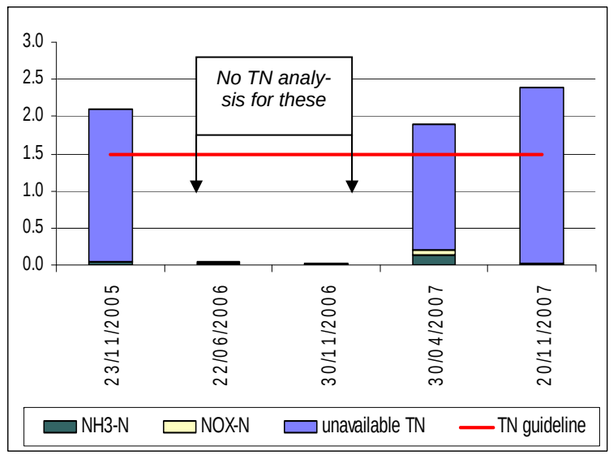


Salinity (mS/cm) over sample period

Nutrients

Total Nitrogen (TN) concentrations ranged between 1.9-2.4mg/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 0.01-0.14mg/L which exceeded the recommended guideline value of 0.04mg/L on one sample occasion. Total oxidised nitrogen (NOx-N) ranged between 0.010-055mg/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 0.1-0.45mg/L which exceeded the water quality guidelines of 0.06mg/L on all of the sample occasions.

Soluble Reactive Phosphorus (SRP) (form of phosphorus available for uptake by plants) ranged between 0.005-0.22mg/L which exceeded the recommended water quality guideline value of 0.03mg/L on two of the five sample occasions.

Qualinup Swamp

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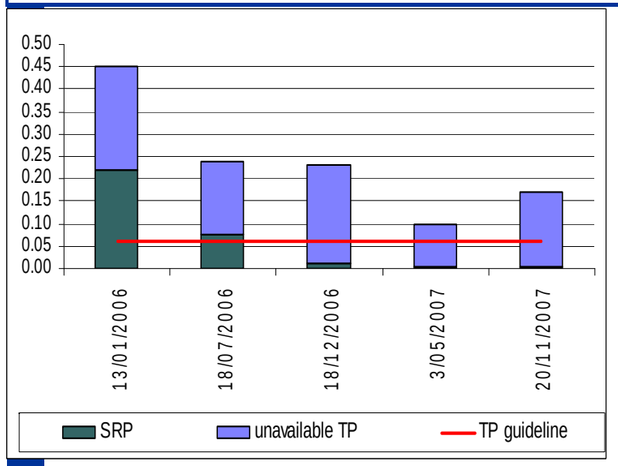


Phosphorus fractions in mg/L over the sample period with TP guideline illustrated

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.

Nutrients stores in the catchment may enter Qualinup Swamp through sub surface and 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.

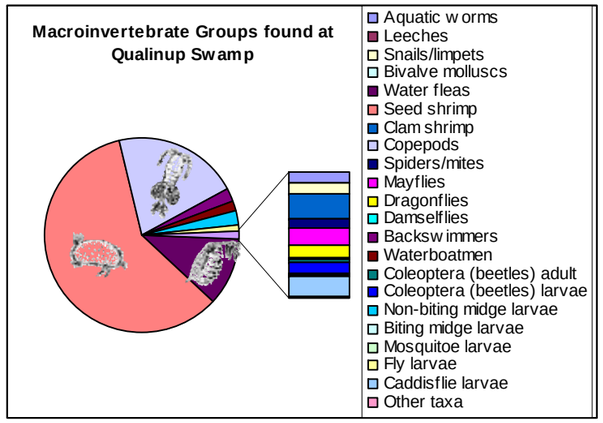
Macroinvertebrates

Twenty two groups of macroinvertebrates were found at Qualinup Swamp during the monitoring period of which the most abundant included; Cladocera (water fleas), Ostracoda (seed shrimp), Copepoda (copepods), Notonectidae (backswimmers), Corixidae (waterboatmen), Chironomidae (non-biting midge larvae), and Other Diptera (fly 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), Ephemeroptera (mayflies), Epiproctophora (dragonflies), Zygoptera (damselflies), Coleoptera (beetles) adult, Coleoptera (beetles) larvae, Ceratopogonidae (biting midge larvae), Culicidae (mosquitoe larvae), Trichoptera (caddisflie larvae) and Other taxa.

Sieving Macroinvertebrates for identification

The diversity of macroinvertebrates found over the sample period ranged between ten to twenty two groups with a median of sixteen which rates high 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 Qualinup Swamp are displayed in the below graph.