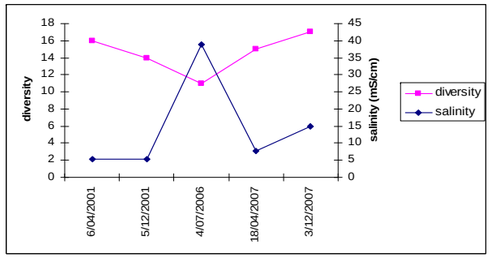
Coomalbidgup Swamp

South Coast Wetland Monitoring Project **June 2008**

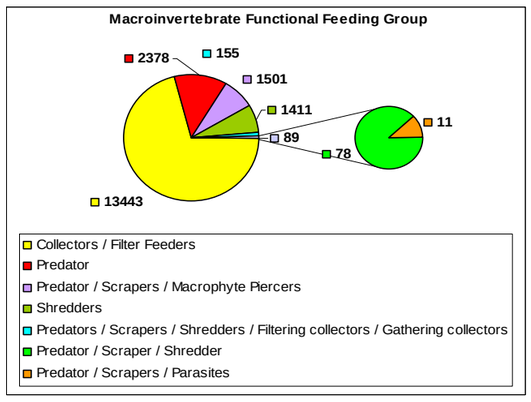
The diversity of macroinvertebrates found over the sample period ranged between eleven to twenty groups, with a median of fourteen groups which rates from average to high based on the Ribbons of Blue Wetland Habitat Score.

Lowest diversity was observed when salinity was high on the 4/07/2006 as shown in the graph below. This relationship is consistent with other wetlands where high salinities impact on macroinvertebrate diversity.



Lowest Diversity occurred with high salinities on the 4/07/2006

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 ofeach 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 Coomalbidgup Swamp is displayed in the graph below. 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

Condingup Swamp receives water through surface runoff, sub surface flow and via the northern creek line from the upper catchment which is affected by secondary salinisation. Salinity within the wetland fluctuated between moderately saline to highly saline. The wetland is connected to the groundwater table. Nutrient levels in the wetland were consistently high however this did not usually result in high chlorophyll *a* concentrations, probably, due to the highly coloured wetland water which reduces light penetration. The main issues to consider are the trends of increasing salinities and inundation which is potentially causing the demise of riparian vegetation.

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.

- John Simons (Department of Agriculture and Food, Esperance) for providing knowledge of the hydrogeology associated with Comalbidgup Swamp and editing assistance.
- 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.

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

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This report card summarises the current state of knowledge of physical, chemical and biological characteristics of Coomalbidgup 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 Coomalbidgup Swamp

Wetland Suite	GPS Location Coordinates		
	Easting	Northing	MGA Zone
Coomalbidgup Suite	349135	6268049	51

Coomalbidgup Swamp is located approximately 51km west of Esperance Western Australia within Barker Inlet Catchment and the smaller sub-catchment of Coomalbidgup Creek. The wetland lies at approximately 59.7m AHD (Australian Height Datum) and receives an annual average rainfall of 530mm.

Coomalbidgup Swamp

Coomalbidgup Swamp is located on a Crown Reserve within a small catchment of approximately 99km^2 in the Esperance shire. The wetland lies within a fenced wetland vegetation buffer zone that ranges between 45-635 m from the wetland edge.

Dead Swamp Yate trees due to extended inundation and increased salinities

Vegetation predominantly consists of mature *Melaleuca sp., Eucalyptus occidentalis* (Swamp Yate), *Acacia cyclops Juncus pallidus* and Samphires. Numerous dead Swamp Yate trees are scattered throughout the wetland as a result of altered hydrology which was evident after high rainfall events which occurred in the 1980's when the wetland became flooded. In recent years regenerating Yate trees have been observed within the shore buffer zones.

Approximately 95% of the catchment has been cleared of native vegetation for livestock, cropping and now tree farming.

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Coomalbidgup Swamp

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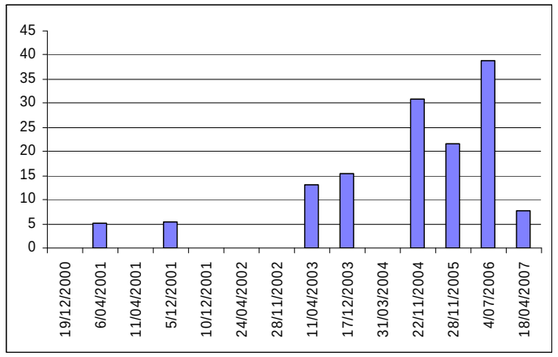
Wetland Classification

Wetland type	*Water Salinity*	*Consistency of Salinity*	*Size (Metres)*	*Shape*
Lake	Subhaline - Hyposaline - Mesosaline	Poikilohaline	Macroscale 1378 x 1235	Round

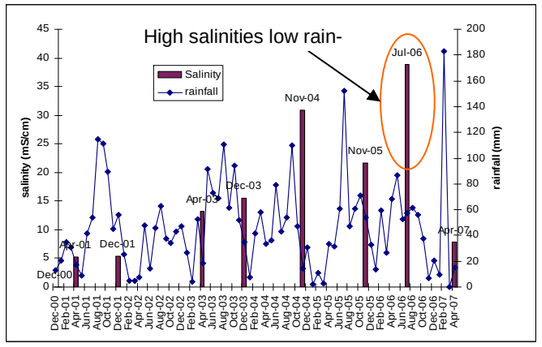
Water quality monitoring commenced on the 19/12/2000 which included physical, chemical and biological parameters as outlined in the appendices.

Classification of Coomalbidgup Swamp has been evaluated on the basis of guidelines developed by V & C Semeniuk Research Group. The wetland was previously a sumpland which would have dried out over summer months and filled during winter rains, however since catchment clearing and increased runoff Coomalbidgup Swamp is now permanently flooded and classified as a lake. For further explanation please refer to the attached appendices.



Salinity (mS/cm) over sample period

Regenerating Swamp Yate trees around the swamp



High salinities in July 2006 relate to low rainfall during preceding months

Salinity

Salinity over the sample period fluctuated between moderately saline (5.36mS/cm) and highly saline (38.8mS/cm). Fluctuations in salinities relate to variations in rainfall which determines the amount of surface runoff from surrounding land and through drains which transport surface salts from secondary salinised land in the north. Higher salinities experienced on the 4/07/2006 correspond with the low rainfall during preceding months. The storm event in February 2007 that brought approximately 180mm of rainfall may have influenced the reduction of salinity recorded on the 18/04/2007.

Currently there is no evidence that the wetland is connected with groundwater. Groundwater levels in April 2008 in nearby monitoring bores (AG24 and COO10B) were 51 m AHD (Agbores database) which is approximately eight metres below the bed of the swamp which is at 59.7m AHD. Higher salinities in the wetland relate to evaporation and concentration of salts.

Nutrients

Total Nitrogen (TN) concentrations were high ranging from 1.7-6.0mg/L. TN concentrations on all sampling occasions exceeded the guidelines developed for ecosystem protection for southwest Australian wetlands for slightly disturbed systems of 1.5mg/L.

Dissolved inorganic nitrogen fractions of ammonia (NH_3-N) ranged from 0.015-0.37mg/L and total oxidised nitrogen (NOx-N) remained consistent at 0.010mg/L. NH_3-N fractions exceeded the recommended guideline value of 0.04mg/L on four of the twelve sample occasions. In comparison, the NO_X-N fraction did not exceed the recommended value of 0.1mg/L. Overall, there was a low percentage (0.5-9.3%) of available nitrogen (NH_4-N and NO_x-N) making up the total nitrogen (TN) on all sampling occasions.

Total Phosphorus (TP) concentrations ranged from 0.093-0.57mg/L which exceeded water quality guidelines of 0.06mg/L on all sampling occasions.

Coomalbidgup Swamp

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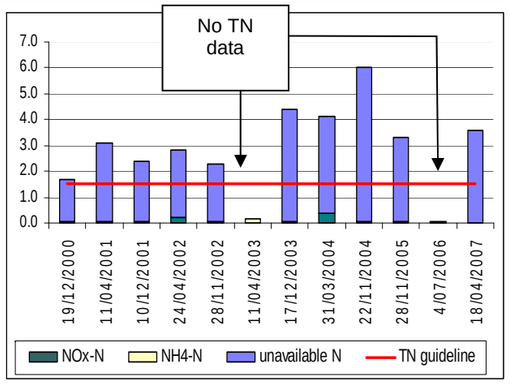
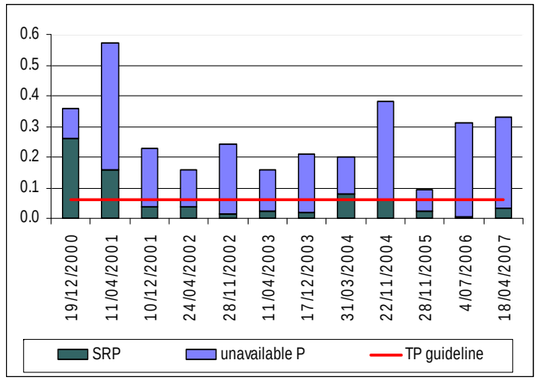


Nitrogen fractions in mg/L over the sample period with TN guideline illustrated

Soluble Reactive Phosphorus (SRP) (form of phosphorus available for uptake by plants) ranged from 0.005-0.260mg/L. In relation to water quality guidelines SRP exceeded the recommended value of 0.03mg/L on half of the sampling occasions.



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

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

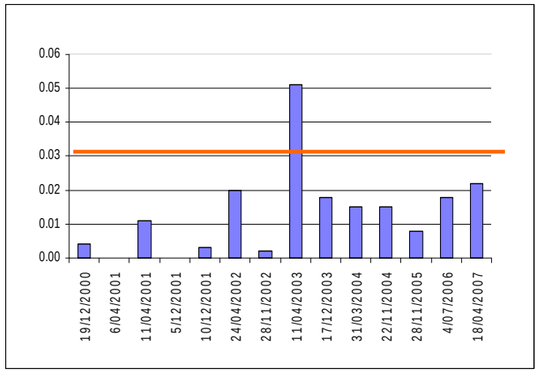
Catchment nutrients stores may also enter Coomalbidgup Swamp through surface runoff, sub surface flow from the surrounding land and via Coomalbidgup Creek.

Low percentages 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, or undissolved as dirt or dead cells

that contain nitrogen or bound to clay soils in the case of phosphorus.

Chlorophyll *a*

Chlorophyll *a* concentrations over the sample period were low and ranged from 0.004 to 0.051 mg/L. Chlorophyll *a* only exceeded the water quality guideline of 0.03mg/L once over the twelve sample occasions. Low occurrence of algae blooms may relate to the stained to highly coloured nature of the waters within the swamp which limit light penetration.



Chlorophyll a (mg/L) over sample period in comparison to recommended guideline value of 0.03mg/L.

Coloured waters at Coomalbidgup Swamp

Macroinvertebrates

Nineteen groups of macroinvertebrates were found at Coomalbidgup Swamp during the monitoring period of which the most abundant included Ostracoda (seed shrimp), Copepoda (copepods), Notonectidae (backswimmers), Corixidae (waterboatmen), Amphipoda (scuds), Oligochaeta (aquatic worms), Cladocera (water fleas), Culicidae (mosquitoe larvae). Groups of less abundance found Chironomidae (non-biting midge larvae), Trichoptera (caddisflie larvae), Coleoptera (beetles) adults, Coleoptera (beetles) larvae, Zygoptera (damselflies), Epiproctophora (dragonflies), Acarina (spiders/mites), Ceratopogonidae (biting midge larvae), Other Diptera (fly larvae), Conchostraca (clam shrimp), Other taxa.