

Beaumont Nature Reserve

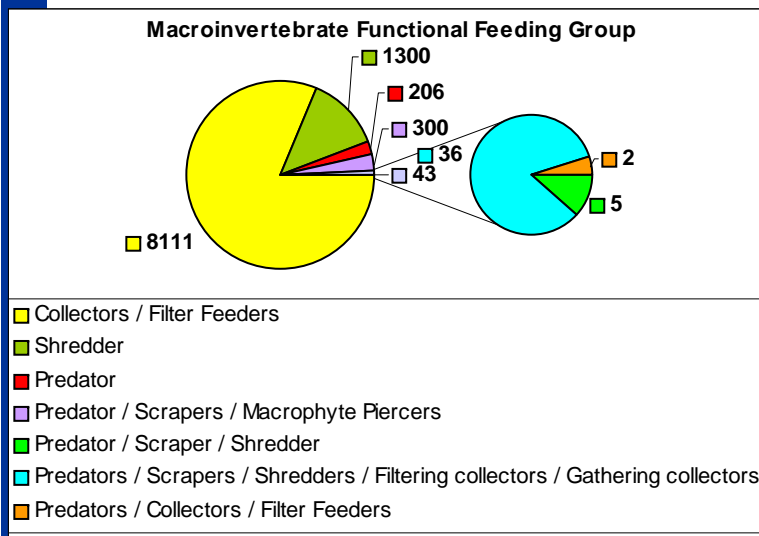
South Coast Wetland Monitoring Project

June 2008

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 Beaumont Nature Reserve are displayed in the below graph.



Conclusion

Beaumont Reserve wetland ranged between moderately saline to brine and is influenced by both groundwater and surface water from the catchment including the northern creek line which is affected by secondary salinisation. Groundwater connectivity is likely with levels within 0.75m of the wetland floor. Nutrient levels are high although the available forms of nitrogen and phosphorus are generally low.

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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- John Simons (Department of Agriculture and Food, Esperance) for providing knowledge of the hydrogeology associated with Beaumont Reserve wetland and editing assistance.
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- Sherrie Randall and Tracy Calvert for data analysis and report compilation.



Sherrie Randall Wetland Sampling at Beaumont Reserve 2006

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

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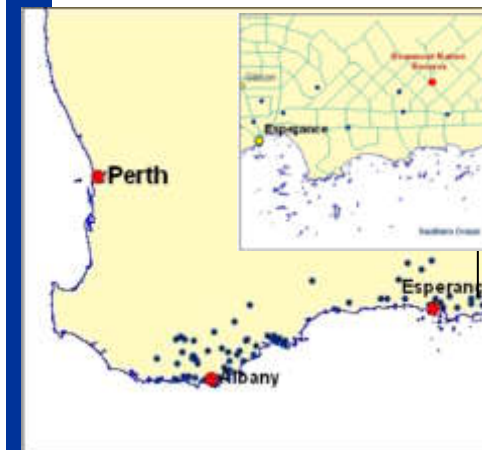
This report card summarises the current state of knowledge of physical, chemical and biological characteristics of a wetland in the Beaumont Nature Reserve based on the knowledge gained from investigation and monitoring conducted by the Department of Water through the South Coast Wetland Monitoring Program.

Accompanying this document are appendices that 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 Beaumont Nature Reserve

Beaumont Nature Reserve is located approximately 85km west of Esperance, Western Australia, within the Esperance Coast catchment and the smaller sub-catchment of the Munglignup River.



The wetland lies at approximately 116 m AHD (Australian Height Datum). The area receives an annual average rainfall of 510mm.

Wetland Suite	GPS Location Coordinates		
	Easting	Northing	MGA Zone
Condingup	471309	6277845	51



Beaumont Nature Reserve



Beaumont Nature Reserve is located on Crown Reserve within a small catchment of approximately 233.9km². The Lake lies within an unfenced wetland vegetation buffer zone that ranges between approximately 410-1000m from the wetland edge.

Vegetation predominantly consists of *Eucalyptus occidentalis* (Yate) and *Melaleuca cuticularis* (Saltwater paperbark) through the wetland and its perimeters with the understorey consisting of *Acacia Cyclops* and regenerating *Melaleuca cuticularis*. There are a number of dead *Melaleuca cuticularis* on the fringes of the lake. Accumulations of *Ruppia megacarpa* (seagrass) debris has also been observed around the wetland fringes.



Melaleuca cuticularis on the shores of Beaumont Nature

Approximately 95% of the catchment area has been cleared for farming practices including cropping.

Water quality monitoring commenced on the 09/02/2006 and included physical, chemical and biological parameters as outlined in the appendices.



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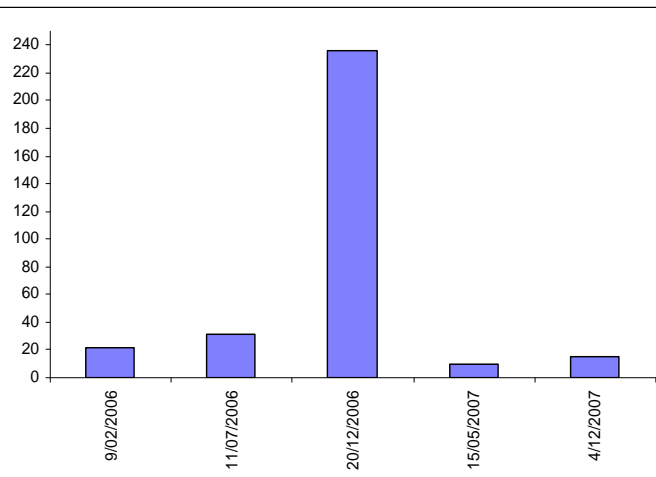
Wetland Classification

Wetland type	Water Salinity	Consistency of Salinity	Size (Metres)	Shape
Lake	Hypersaline - Brine	Poikilohaline	Mesoscale 625 x 530	Round

Classification of Beaumont Nature Reserve has been evaluated on the basis of guidelines developed by V & C Semeniuk Research Group (1997). For further explanation please refer to the appendices.

Salinity

Salinity over the sample period was moderately saline (9.45mS/cm) to brine (82mS/cm). Fluctuations in salinities relate to rainfall and evaporation and hence water level variations. Very high salinities measured on the 20/12/2006 relate to concentration of salts during extreme low water levels. Salinities also alter in response to surface flow through the drainage line entering the wetland which drains agricultural land to the northwest, some of which is affected from secondary salinisation land.



Salinities (mS/cm) over the sample period

Knowledge of hydrogeology of the area suggests that the wetland is connected to a local groundwater system which is sitting on top of a bedrock high. Salinity measured in August 2001 at the Department of Agriculture and Food bore MB32 was within the wetland salinity range at 40.9mS/cm.



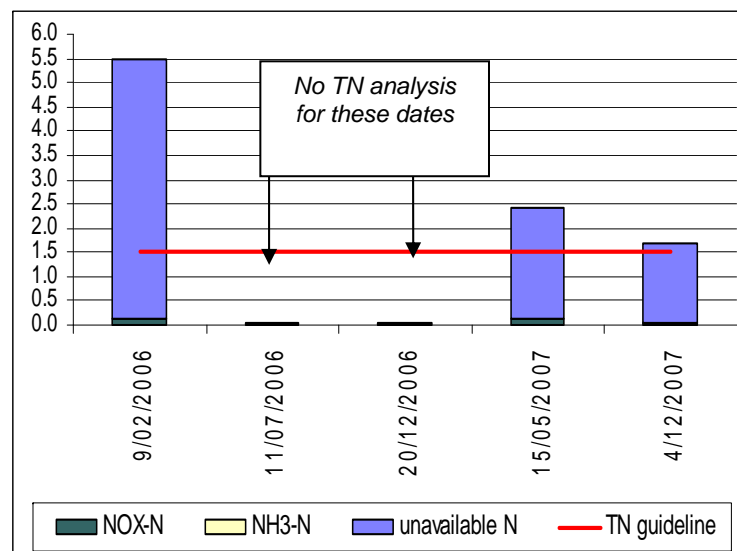
Low water levels on the 20/12/2006 correspond with high salinities

At the time of sampling the groundwater was 0.75m below ground surface which indicated there is groundwater connectivity with the wetland. Higher salinities relate to evaporation and concentration of salts at low water levels.

Nutrients

Total Nitrogen (TN) concentrations were high ranging from 0.025-5.5mg/L. TN concentrations on two of the four 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 (NH₃-N) ranged from 0.01-0.12mg/L and total oxidised nitrogen (NO_x-N) ranged between 0.01-0.12mg/L. NH₃-N fractions exceeded the recommended guideline value of 0.04mg/L on one of the four sample occasions (9/02/2006). The NO_x-N fraction also exceeded the recommended value of 0.1mg/L on one sample occasion (15/05/2007).



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

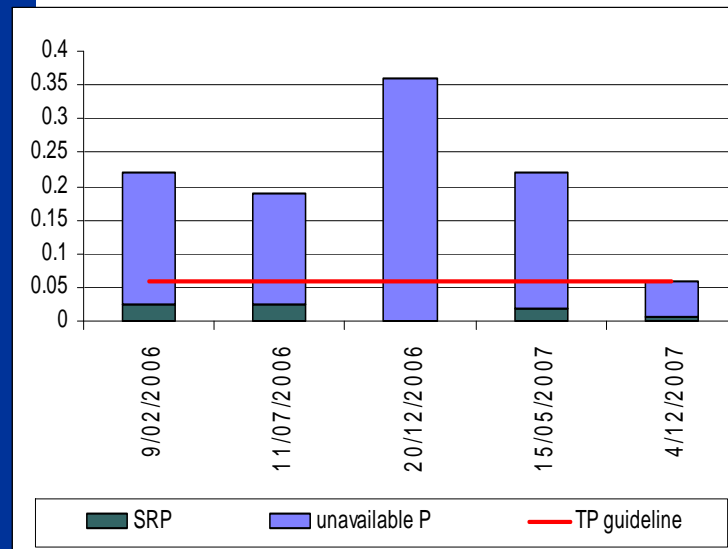
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Total Phosphorus (TP) concentrations ranged from 0.028-0.45mg/L. TP concentrations exceeded water quality guidelines of 0.06mg/L on two of the four sample occasions.

Soluble Reactive Phosphorus (SRP) (form of phosphorus available for uptake by plants) ranged from 0.005-0.018mg/L. In relation to water quality guidelines SRP did not exceed the recommended value of 0.03mg/L on any sample occasion.



Algae found at Beaumont Reserve May 2007



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 for example through microbial breakdown of organic material. Various birds including wading birds that frequent the lake can also contribute nutrients into the lake.

Nutrients stores in the catchment may also enter the lake through surface and sub surface flow from the surrounding land and via the creek line.

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 as dirt or dead cells that contain nitrogen or bound to clay soils in the case of phosphorus.

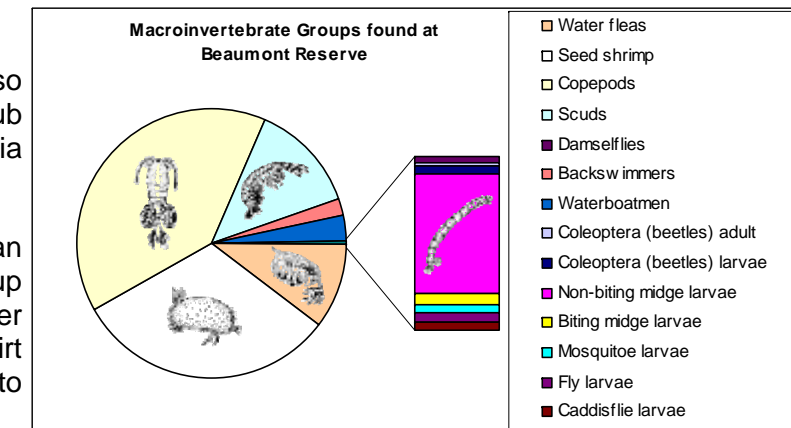
During algae bloom events total nitrogen (TN) can also be high as it is bound in phytoplankton.

Macroinvertebrates

Fourteen groups of macroinvertebrates were found at Beaumont Nature Reserve during the monitoring period of which the most abundant included. Copepoda (copepods), Ostracoda (seed shrimp), Amphipoda (scuds), Cladocera (water fleas), Corixidae (waterboatmen), and Notonectidae (backswimmers).

Other groups of less abundance were found including; Chironomidae (non-biting midge larvae), Zygoptera (damselflies), Coleoptera (beetles) larvae, Coleoptera (beetles) adult, Ceratopogonidae (biting midge larvae), Culicidae (mosquito larvae), Other Diptera (fly larvae), and Trichoptera (caddisfly larvae).

The diversity of macroinvertebrates found over the sample period ranged between one to eighteen groups with a median of eight, 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