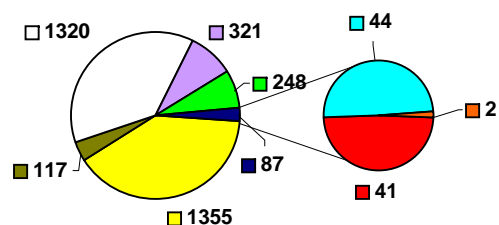


Doombup Lake

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 Doombup Lake are displayed in the below graph. There appears to be a good representation of all groups at this wetland with no real dominance.

Macroinvertebrate Functional Feeding Groups



- Collectors / Filter Feeders
- Predator
- Shredders
- Predator / Scrapers / Parasites
- Predator / Scrapers / Macrophyte Piercers
- Predator / Scrapper / Shredder
- Predators / scrapers / shredders / filtering collectors / gathering collectors
- Predators / Collectors / Filter Feeders

Conclusion

Doombup Lake lies within a pristine coastal area. It is both surface and groundwater fed from a small catchment and is moderately saline to highly saline. Nutrient levels were consistently low in the lake. The main consideration for Doombup Lake is to maintain the integrity and protection of this pristine 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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- ◆ David and Dell Johnson for their support for the project and allowing access to the lake through their property.
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- ◆ Ania Lorenz, Sherrie Randall, Kevin Hopkinson, and Albany Department of Water team who conducted the monitoring.
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- ◆ Sherrie Randall and Tracy Calvert for data analysis and report compilation.



Doombup Lake July 2006

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

Doombup Lake

This report card summarises the current state of knowledge of physical, chemical and biological characteristics of Doombup Lake 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 Doombup Lake

Doombup Lake is located on the coast approximately 12km east of Esperance, Western Australia, within the Coastal catchment and the smaller sub-catchment of Cape Le Grand National Park. The wetland is situated approximately 3km from the south coast and lies at 20m Australian Height Datum (AHD). The area receives an annual average rainfall of 630mm.



Wetland Suite	GPS Location Coordinates		
	Easting	Northing	MGA Zone
Bannitup Suite	413141	6256266	51



Doombup Lake is located on a Crown Reserve which is under the jurisdiction of the Department for Planning and Infrastructure within a catchment of approximately 595km². The Lake lies within a partially fenced wetland vegetation buffer zone that ranges between 60-2375m from the wetland edge. Vegetation predominantly consists of mature *Melaleuca cuticularis* (saltwater paperbark), *Gahnia trifida*, *Acacia sp.* and *Juncus kraussii*. A number of burnt dead trees surround the lake with some regeneration occurring.



Dense stands of sedges and rushes surrounding Doombup Lake among trees that have been scorched from a previous fire.

Approximately 90% of the northern portion of the catchment area has been cleared for farming practices. A drainage line flows from the north east into Doombup Lake.

Water quality monitoring commenced on the 12/01/2000 and included physical, chemical and biological parameters as outlined in the appendices.

Doombup Lake

Wetland Classification

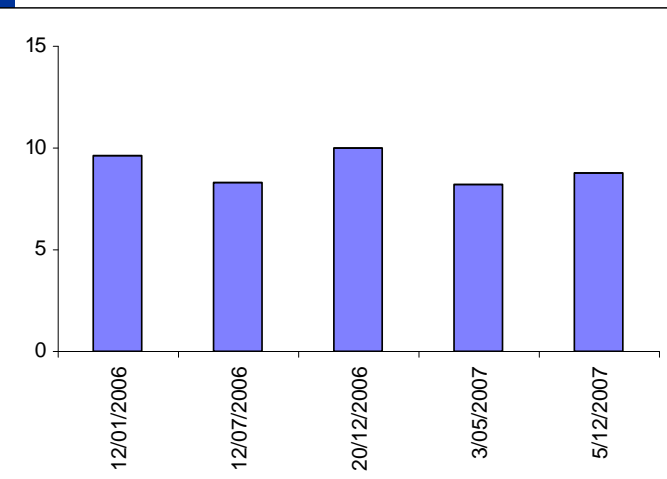
Wetland type	Water Salinity	Consistency of Salinity	Size (Metres)	Shape
Lake	Hypersaline	Stasohaline	Macroscale 2095 x 975	Irregular - Enlongate

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

Salinity

Salinity over the sample period varied slightly between moderately saline (8.2mS/cm) and saline (10.043mS/cm) which corresponds with the consistency of salinity classification based on Semeniuk 1997 as outlined in the table.

Doombup Lake is fed by both surface and groundwater. The creek entering the lake receives groundwater through hillside seeps and as a consequence flows consistently which assists to maintain the constant depth in the lake. Salinities of the creek measured on the 22/05/2008 correlated with the lake at 8.3mS/cm. Salinities in the groundwater system to the east of the creek measure 10.0mS/cm and salinities on the west side of the creek measure 4.8mS/cm which is reflected in the lake salinities.

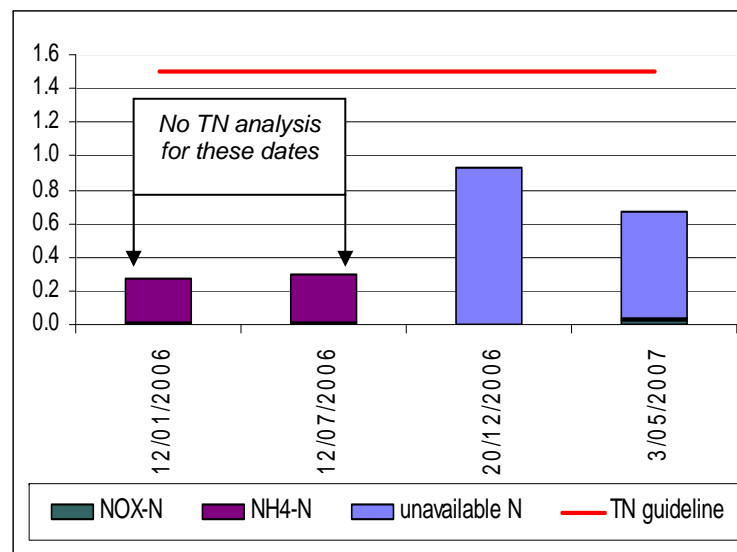


Salinity (mS/cm) over the sample period

Nutrients

Total Nitrogen (TN) concentrations were low ranging from 0.67-0.93mg/L. On all sampling occasions TN concentrations did not exceed 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 0.01-0.29mg/L and total oxidised nitrogen (NO_x-N) ranged between at 0.01-0.029mg/L. NH₃-N fractions exceeded the recommended guideline value of 0.04mg/L on two sample occasions as illustrated in the graph. In comparison, the NO_x-N fraction did not exceed the recommended value of 0.1mg/L.



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

Total Phosphorus (TP) concentrations ranged from 0.033-0.046mg/L. TP concentrations did not exceed water quality guidelines of 0.06mg/L on any sampling occasion.

Soluble Reactive Phosphorus (SRP) (form of phosphorus available for uptake by plants) ranged from 0.005-0.011mg/L. In relation to water quality guidelines SRP did not exceed the recommended value of 0.03mg/L any of the sampling occasions.

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.

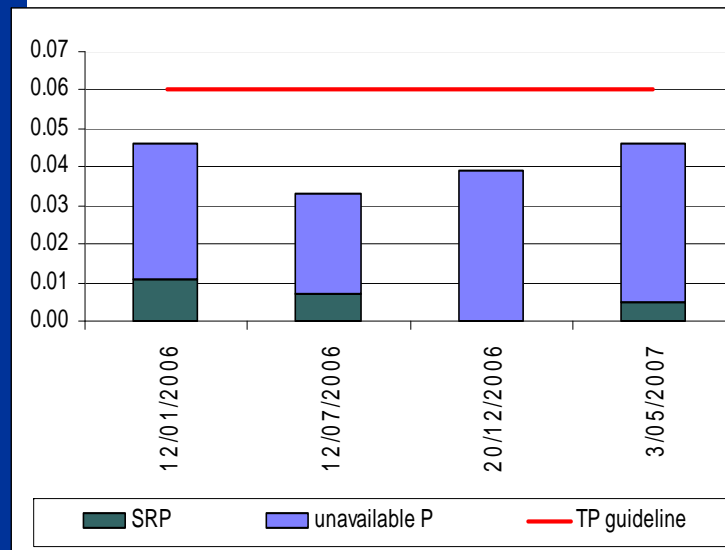
Catchment nutrients stores may enter Doombup Lake through surface and sub surface flow from the surrounding land and via the creek line. However, because the creek line is well buffered with vegetation it is likely that a large proportion of catchment nutrients are taken up before entering the wetland.

Doombup Lake

Macroinvertebrates

Twenty one groups of macroinvertebrates were found at Doombup Lake during the monitoring period of which the most abundant included Acarina (spiders/mites), Copepoda (copepods), Trichoptera (caddisfly larvae), Corixidae (waterboatmen), Amphipoda (scuds), Ostracoda (seed shrimp).

Other groups of less abundance were found and Chironomidae (non-biting midge larvae), Coleoptera (beetles) adult, Notonectidae (backswimmers), Ephemeroptera (dragonflies), Isopoda (slaters like), Decapoda (shrimp/prawn/crayfish), Cladocera (water fleas), Hirudinea (leeches), Oligochaeta (aquatic worms), Ceratopogonidae (biting midge larvae), Culicidae (mosquito larvae), Other Diptera (fly larvae), Zygoptera (damselflies), Coleoptera (beetles) larvae & Other taxa.

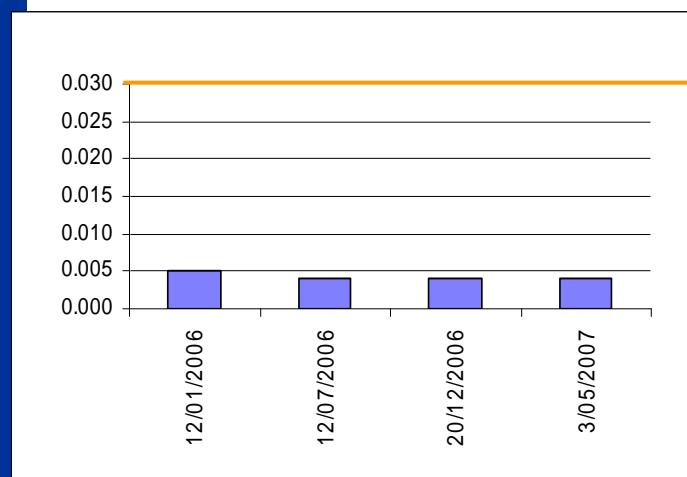


Phosphorus fractions in mg/L over the sample period with TP guideline illustrated

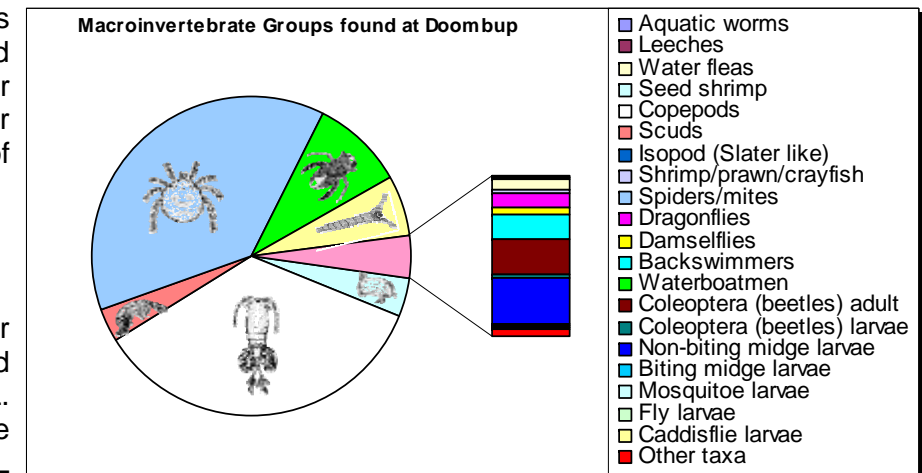
Low proportions of available nutrients can indicate the majority is being readily taken up by plants and animals while the remainder may be bound up in organic matter, or as dirt or dead cells that contain nitrogen or bound to clay soils in the case of phosphorus.

Chlorophyll a

Chlorophyll a concentrations over the sample period was low and ranged from 0.004 to 0.005 mg/L. Chlorophyll a did not exceed the water quality guideline of 0.03mg/L on any sample occasion which corresponds with the low proportions of available nutrients.



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



The diversity of macroinvertebrates found over the sample period ranged between eleven to twenty one groups with a median of fourteen groups which rates as average 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.