Lake Vancouver

South Coast Wetland Monitoring Project **June 2008**

maintain the integrity and protection of this relatively pristine coastal 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.

Sampler Dave Bloomfield at Lake Vancouver

Rushes surrounding Lake Vancouver

Low water levels in March 2007

Higher water levels after winter 2007

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.

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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.

Sherrie Randall enjoys the surroundings At Lake Vancouver

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 Department of Water's current state of knowledge of the physical, chemical and biological characteristics of Lake Vancouver 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 Lake Vancouver

Lake Vancouver is located on the coast approximately 20km south of Albany, in Western Australia within an ill-defined coastal catchment. The wetland is at approximately 5m AHD (Australian Height Datum) and the area receives an annual average rainfall of 950mm.

	GPS Location Coordinates		
Wetland Suite	*Easting*	*Northing*	*MGA Zone*
Goode Beach Suite	585137	6117227	50

Lake Vancouver is located on Crown Reserve vested under the Department of Planning and Infrastructure within a small catchment of approximately 0.5km^2. The lake lies within a wetland vegetation buffer zone extending approximately 10-40m from the wetland edge.

Lake Vancouver

Vegetation around Lake Vancouver

Vegetation predominantly consists of a *Bansia littoralis* (Swamp Banksia), *Melaleuca cuticularis* (saltwater paperbark), *Calystachys lanceolata* in the upper storey with *Agonis flexuosa* (peppermint tree), *Adenanthos sericeous* in the mid storey and *Lepidosperma gladiatum* (Coastal sword sedge) and *Baumea juncea* in the understorey.

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Lake Vancouver is situated within a largely uncleared coastal area which has been reserved for recreational purposes. Approximately 30% of the catchment has been cleared of native vegetation for housing.

Water quality monitoring commenced in November 2005 which included physical, chemical and biological parameters as outlined in the appendices.

Wetland Classification

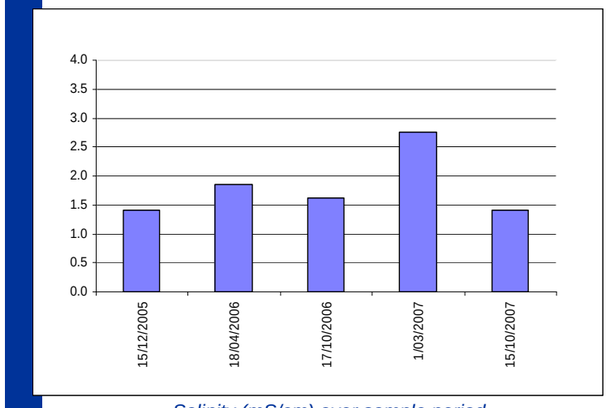
Classification of Lake Vancouver has been evaluated on the basis of guidelines developed by V & C Semeniuk Research Group. For further explanation please refer to the appendices.

Wetland type	*Water Salinity*	*Consistency of Salinity*	*Size (Metres)*	*Shape*
Lake	Hypersaline - Brine	Poikilohaline	Macroscale 1540 x 1255	Irregular - Round

Salinity

Salinity over the sample period ranged between marginal (1.4mS/cm) and brackish (2.7mS/cm). Fluctuations in salinities relate to seasonal fluctuations in rainfall, evaporation and hence water level variation.

Lake Vancouver is situated on the edge of granitic material within tertiary sediments and formed due to land subsidence and migration of clay and sands. The wetland receives fresh surface flow from surrounding lands and groundwater through sub surface flows. The wetland also contributes to recharge of the groundwater. Groundwater salinities increase with depth and superficial groundwater salinities range between 1-2 ms/cm which is reflected in the marginal to brackish wetland salinities.

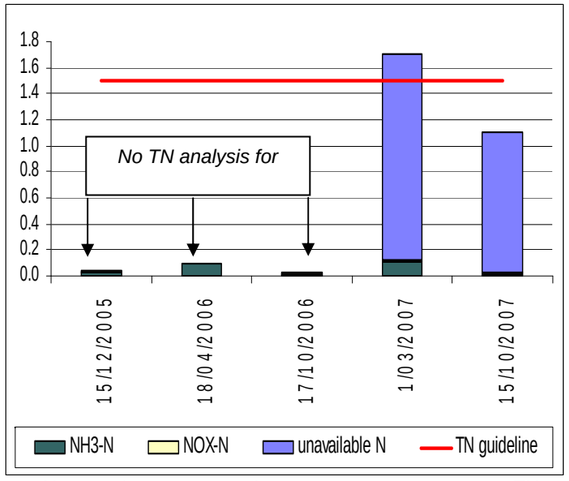


Salinity (mS/cm) over sample period

Nutrients

Total Nitrogen (TN) concentrations ranged between 1.1-1.7mg/L which exceeded the guidelines developed for ecosystem protection for southwest Australian wetlands for slightly disturbed systems of 1.5mg/L on the two sample occasions.

Dissolved inorganic nitrogen fractions of ammonia (NH_3-N) ranged between 0.01-0.11mg/L which exceeded the recommended guideline value of 0.04mg/L on two of the five sample occasions. Total oxidised nitrogen (NOx-N) was consistent at 0.01mg/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 0.006-0.02mg/L which did not exceed the water quality guidelines of 0.06mg/L on any sample occasions.

Soluble Reactive Phosphorus (SRP) (available form of phosphorus for uptake by plants) ranged between 0.0075-0.008mg/L which did not exceed the recommended water quality guideline value of 0.03mg/L on any sample occasion.

Nutrients are recycled naturally through the swamp due to uptake and assimilation of nutrients by plants and animals and through

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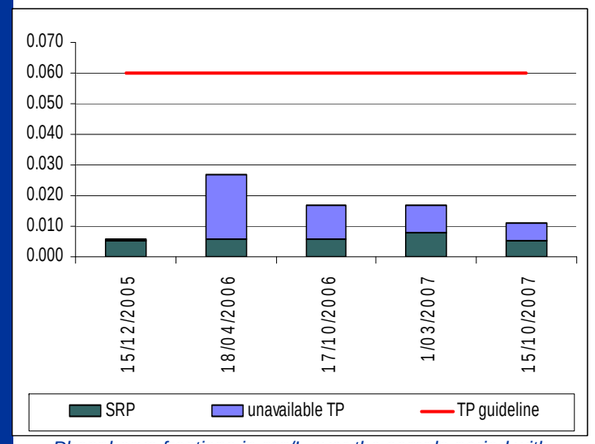
release of nutrients for example through microbial breakdown of organic material. Low amounts of nutrients are indicative of a largely uncleared catchment where there are low nutrient stores or sources.



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

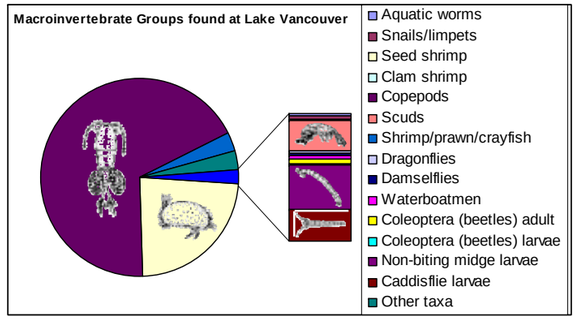
Macroinvertebrates

Fifteen groups of macroinvertebrates were found at Lake Vancouver during the monitoring period of which the most abundant included; Copepoda (copepods), Ostracoda (seed shrimp), Decopoda (shrimp/prawn/ crayfish) and Other taxa.

Other groups of less abundance were found including; Oligochaeta (aquatic worms), Gastropoda (snails/limpets), Conchostraca (clam shrimp), Amphipoda (scuds), Epiproctophora (dragonflies), Zygoptera (damselflies), Corixidae (waterboatmen), Coleoptera (beetles) adult, Coleoptera (beetles) larvae, Chironomidae (non-biting midge larvae), and Trichoptera (caddisflie larvae).

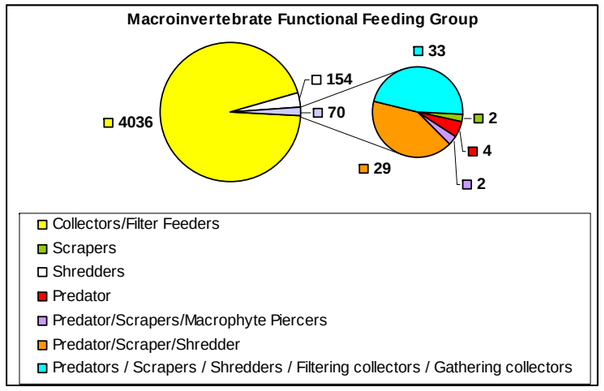
The diversity of macroinvertebrates found over the sample period ranged between seven to fourteen groups which rates average based on the Ribbons of Blue Wetland Habitat Score.

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. The composition of these groups at Lake Vancouver 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

Lake Vancouver is fed by surface runoff, sub surface flow and groundwater. Water quality is good with salinity ranging between marginal and brackish and the nutrient concentrations being relatively low. On some occasions nitrogen concentrations exceeded guideline values. The main consideration for Lake Vancouver is to