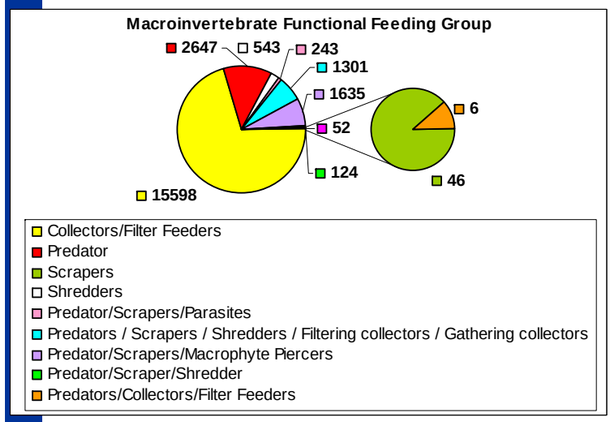
Karri Lake

South Coast Wetland Monitoring Project **June 2008**



There appears to be a high number of collectors / filter feeders which could relate to high amount of decomposing suspended fine particulate organic matter in the wetland.

Conclusion

Karri Lake ranged between fresh and marginal and receives fresh water inputs through surface runoff, sub surface flow and via the small wetland to the north when it overflows. Then wetland is a recharge lake and perched above the groundwater. While rates of groundwater rise and salinities in the area need to be established there are no signs of secondary salinity in the catchment. Total and available forms of nutrients were high on most sample occasions. Karri Lake is situated within remnant stands of Karri trees which are unique to the area. A corridor of native vegetation has been established to create linkage between the lake and remnant bushland to the south therefore enhancing the integrity 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

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.

- Doug and Eva Russell for their support of the project and allowing access to the lake on their property.
- Ruhi Ferdowsian (Department of Agriculture and Food, Albany) for providing knowledge of the hydrogeology associated with Karri Lake.
- 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.

Landowners Doug and Eva Russell have given the land covered in Karri Trees next to Lake to the National Heritage Trust which is protected by a covenant

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 Karri 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 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 Karri Lake

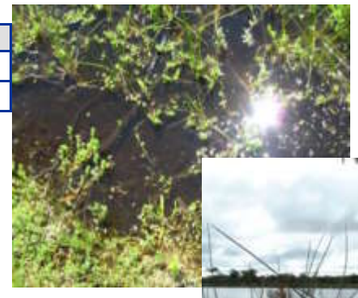
Karri Lake is located on the coast approximately 37km east of Albany in Western Australia within the Waychinicup River catchment. The wetland is at approximately 80m AHD (Australian Height Datum) and the area receives an annual average rainfall of 725mm.

Karri Lake is located on privately owned land within a catchment of approximately 33.5km^2. The swamp lies within a fenced wetland vegetation buffer zone extending approximately 10-100m from the wetland edge.

Vegetation consists predominantly of *Eucalyptus diversicolor* (Karri) in the upper storey with *Melaleuca rhaphiophylla* (freshwater paperbark) in the mid storey and rushes in the understorey. There a number of aquatic or submerged plants in the lake. A corridor of native vegetation has been established to create linkage between the vegetation around the lake with the remnant bush to the south.

	GPS Location Coordinates		
Wetland Suite	**Easting**	**Northing**	**MGA Zone**
No Suite listed	610787	6142068	50

Karri Lake



Left: Aquatic or submerged vegetation in Karri Lake

Right: Riparian vegetation surrounding Karri Lake

Approximately 65% of the catchment has been cleared of native vegetation for cropping, livestock and now Blue Gum plantations.

Water quality monitoring commenced in November 1999 which included physical, chemical and biological parameters as outlined in the appendices.

Department of Water
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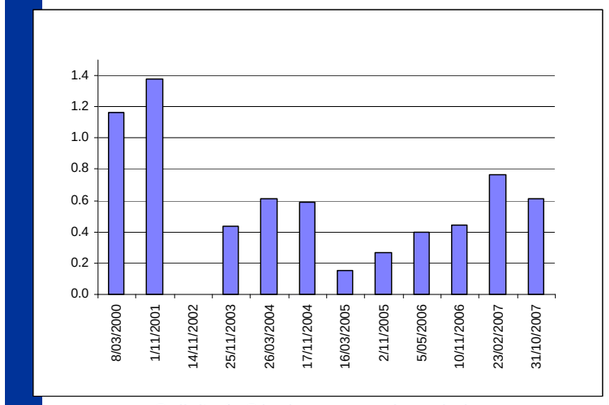
Wetland Classification

Wetland type	*Water Salinity*	*Consistency of Salinity*	*Size (Metres)*	*Shape*
Lake	Fresh	Stasohaline	Microscale 530 x 200	Irregular

Classification of Karri Lake 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 ranged between fresh (0.15mS/cm) and marginal (1.3mS/cm). Fluctuations in salinities relate to seasonal fluctuations in rainfall, evaporation and water levels.



Salinity (mS/cm) over sample period

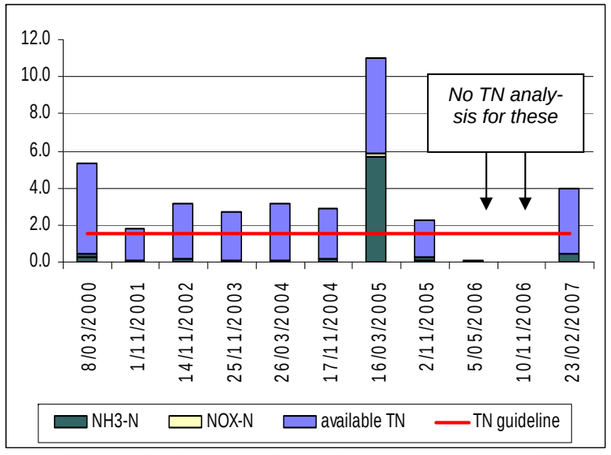
Karri Lake receives fresh surface and sub surface flow from surrounding lands including from the small wetland to the north east when it overflows. When Karri Lake fills (at approximately 82-85m AHD) overflow is likely toward the west and south through the swampy area and water course and then to the Waychinicup River.

Karri Lake is situated in the Tertiary sediments that include Pallinup sands (siltstone and clays) which overlays granitic material at depth (indicated by the presence of Karri trees which are commonly associated with granite). The wetland is perched above the regional watertable and recharges the groundwater. Although depth to groundwater needs to be established, there are no secondary salinised land issues in this area.

Nutrients

Total Nitrogen (TN) concentrations ranged between 1.8-11.0mg/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 0.02-5.7mg/L which exceeded the recommended guideline value of 0.04mg/L on nine of the eleven sample occasions. Total oxidised nitrogen (NOx-N) ranged between 0.01-0.19mg/L which exceeded the recommended guideline value of 0.1mg/L on three of the eleven sample occasions.



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

Total Phosphorus (TP) concentration ranged between 0.11-1.3mg/L which exceeded the water quality guidelines of 0.06mg/L on all sample occasions.

Soluble Reactive Phosphorus (SRP) (form of phosphorus available for uptake by plants) ranged between 0.032-0.6mg/L which exceeded the recommended water quality guideline value of 0.03mg/L on all sample occasions.

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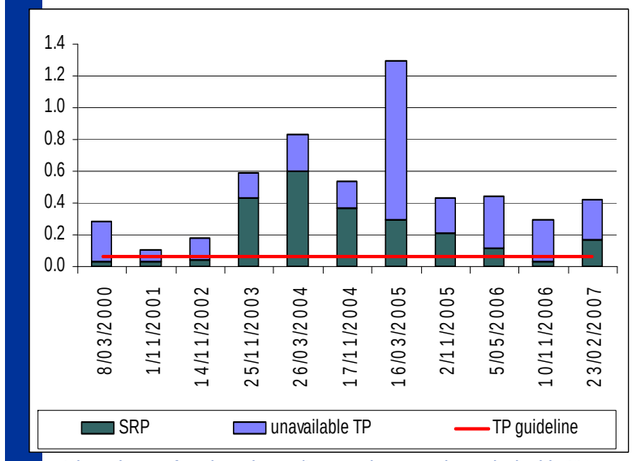


Phosphorus fractions in mg/L over the sample period with TP guideline illustrated

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.

Catchment nutrients stores may also enter Karri Lake through surface and sub surface flow from the surrounding land.

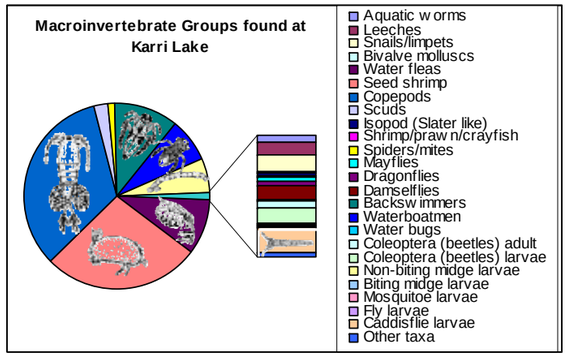
Macroinvertebrates

Twenty five groups of macroinvertebrates were found at Karri Lake during the monitoring period of which the most abundant included; Copepoda (copepods), Ostracoda (seed shrimp), Cladocera (water fleas), Notonectidae (backswimmers), Corixidae (waterboatmen), Chironomidae (non-biting midge larvae), Amphipoda (scuds), and Acarina (spiders/mites).

Other groups of less abundance were found including; Oligochaeta (aquatic worms), Hirudinea (leeches), Gastropoda (snails/ limpets), Bivalvia (bivalve molluscs), Isopoda (slater like), Decopoda (shrimp/prawn/ crayfish), Ephemeroptera (mayflies), Epiproctophora (dragonflies), Zygoptera (damselflies), Hemiptera (water bugs), Coleoptera (beetles) adult, Coleoptera (beetles) larvae, Ceratopogonidae (biting midge larvae), Culicidae (mosquitoe larvae), Other Diptera (fly larvae), Trichoptera (caddisflie larvae) and Other taxa.

Louise Everett sampling for Macroinvertebrates at Karri Lake 31st October 2007

The diversity of macroinvertebrates found over the sample period ranged between eleven to twenty two groups with a median of fourteen 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 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 Karri Lake are displayed in the below graph.