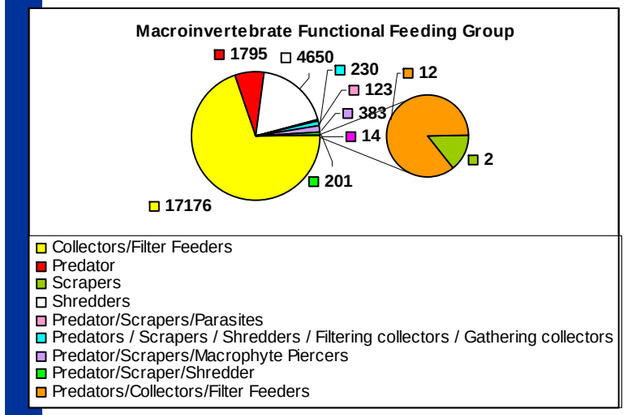
Jinjinnup Swamp

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.



Conclusion

Jinjinnup Swamp is a sub-surface and surface water fed wetland which ranges in salinity from fresh to highly saline although it is usually no higher than brackish. An artificial drain has been constructed to lower water levels in wet years to reduce flooding of farmland however this has not been required for several years. Nitrogen concentrations were consistently high and the available form was occasionally high however phosphorus concentrations were usually 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.

Low water levels in Jinjinnup Swamp in April 2008

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.

- Leonie and Anthony Thomas for their support of the project and allowing access to the lake through their property.
- Ruhi Ferdowsian (Department of Agriculture and Food, Albany) for providing knowledge of the hydrogeology associated with Jinjinnup Swamp.
- 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.

South Coast Wetland Monitoring Project June 2008

This report card summarises the Department of Water's current state of knowledge of the physical, chemical and biological characteristics of Jinjinnup 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 providing 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.

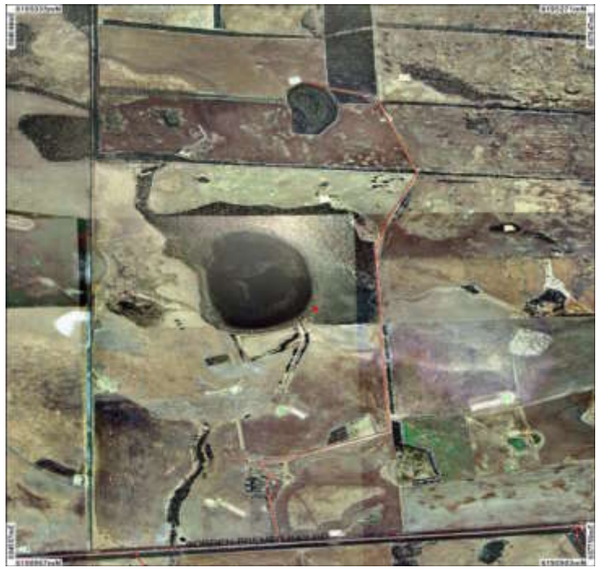
About Jinjinnup Swamp

Wetland Suite	GPS Location Coordinates		
	Easting	Northing	MGA Zone
No Suite listed	686278	6192939	50

Jinjinnup Swamp is located near the coast approximately 42km west of Bremer Bay in Western Australia within the Beaufort Inlet catchment and the sub-catchment of Pallinup River. The wetland is at approximately 75m AHD (Australian Height Datum) and the area receives an annual average rainfall of 560mm.

Jinjinnup Swamp is located on privately owned land, within a small catchment of approximately 7.8km^2. The wetland lies within a fenced vegetation buffer zone that extends approximately 35-50m from the wetland edge.

Vegetation in the upper storey consists of *Eucalyptus occidentalis* (Yate) and *Melaleuca cuticularis* (saltwater paperbark) and *Juncus pallidus* and *Baumea articulata* in the understorey. There are scorch marks on some trees from a previous fire and regenerating *Baumea articulata* in the buffer zone.



Jinjinnup Swamp

Melaleuca cuticularis and Baumea articulata

Approximately 65% of the catchment has been cleared of native vegetation for cropping and now tree plantations. In 1988 a drain was excavated into

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Jinjinnup Swamp

the swamp to drain high water levels to reduce winter flooding of nearby paddocks. Each year the swamp overflowed through the drain until 1993 and has not flowed since. Due to the need for water for drought relief small amounts of water were pumped during the 2007-08 summer for stock watering.

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

High water levels in 2005 correspond with low salinities

Wetland Classification

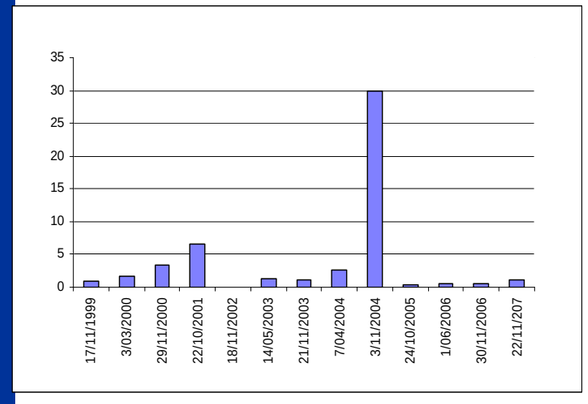
Wetland type	Water Salinity	Consistency of Salinity	Size (Metres)	Shape
Floodplain	Fresh - Subhaline - Hyposaline	Poikilohaline	Mesoscale 790 x 595	Round

Classification of Jinjinnup Swamp 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 was usually fresh to brackish (1.3 – 6.5 mS/cm) and highly saline (30mS/cm) on one occasion in November 2004. Fluctuations in salinities relate to seasonal variation in rainfall, evaporation and hence water level variations.

Jinjinnup Swamp was formed due to land subsiding and wind driven lunette (crater like) formation. The swamp receives fresh water from surface runoff and sub surface flow from the surrounding land.



Salinity (mS/cm) on all sample occasions

While the wetland-groundwater relationship requires further investigation, information previously gathered for other Bremer Bay area wetlands infers higher salinities relate to salt concentrating when the swamp dries due to evaporation and loss of water as the swamp recharges the groundwater. The high salinity in November 2004 requires further explanation.

Nutrients

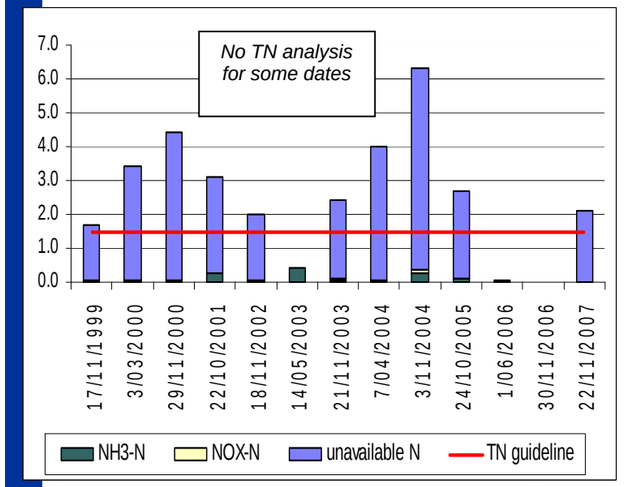
Total Nitrogen (TN) concentrations ranged between 1.7-6.3mg/L which exceeded the guidelines developed for ecosystem protection for southwest Australian wetlands for slightly disturbed systems of 1.5mg/L on all sample occasions.

Dissolved inorganic nitrogen fractions of ammonia (NH_3-N) ranged between 0.01-0.42mg/L which exceeded the recommended guideline value of 0.04mg/L on six of thirteen sample occasions. Total oxidised nitrogen (NOx-N) ranged between 0.01-0.056mg/L which did not exceed the recommended guideline value of 0.1mg/L on any sample occasions.

Total Phosphorus (TP) concentration ranged between 0.02-0.29mg/L which exceeded the water quality guidelines of 0.06mg/L on two of the thirteen sample occasions.

Jinjinnup Swamp

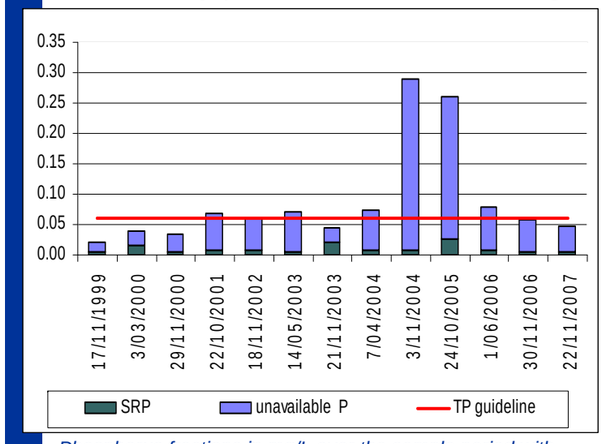
South Coast Wetland Monitoring Project June 2008



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 between 0.005-0.027mg/L which did not exceed the recommended water quality guideline value of 0.03mg/L on any sample occasion.

Nutrients are also 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.



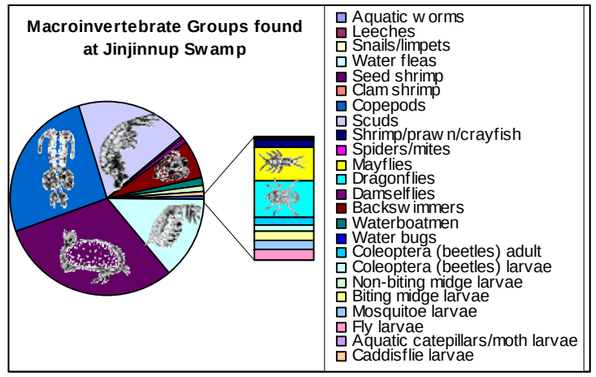
Phosphorus fractions in mg/L over the sample period with TP guideline illustrated

Nutrients may enter Jinjinnup Swamp through surface and sub surface flow from surrounding land.

Macroinvertebrates

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

Other groups of less abundance were found including; Oligochaeta (aquatic worms), Hirudinea (leeches), Gastropoda (snails/limpets), Conchostraca (clam shrimp), Decopoda (shrimp/prawn/crayfish), Ephemeroptera (mayflies), Epiproctophora



(dragonflies), Hemiptera (water bugs), Coleoptera (beetles) adult, Coleoptera (beetles) larvae, Ceratopogonidae (biting midge larvae), Culicidae (mosquitoe larvae), Other Diptera (fly larvae), and Lepidoptera (aquatic catepillars/moth larvae).

The diversity of macroinvertebrates found over the sample period ranged between nine to twenty four groups with a median of fifteen, which rates as average to high 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