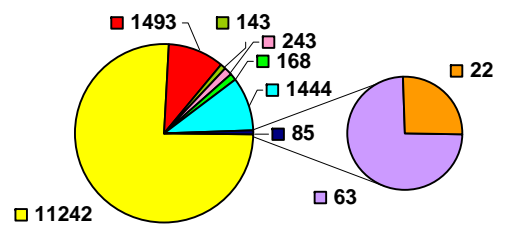


# Shapland Swamp

Macroinvertebrate Functional Feeding Groups



- Collectors/Filter Feeders
- Predator
- Scrapers
- Predator/Scrapers/Parasites
- Predator/Scrapers/Macrophyte Piercers
- Predator/Scraper/Shredder
- Predators / Scrapers / Shredders / Filtering collectors / Gathering collectors
- Predators/Collectors/Filter Feeders

## Conclusion

Shapland Swamp is fresh to marginal and is fed by surface runoff and sub surface flow from surrounding land. The wetland is perched on clays just above the groundwater which is close to the surface. Nutrient concentrations were consistently high however the available forms of nitrogen and phosphorus were usually low. The main consideration for Shapland Swamp is to support and monitor the success of rehabilitation management initiatives and confirm the wetland-groundwater relationship.

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.



Melaleuca cuticularis establishing at Shapland Swamp.

## 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.

- ◆ John and Kathryn Shapland 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 Shapland 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.



Damselflies on rushes

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

# Shapland Swamp

This report card summarises the Department of Water's current state of knowledge of the physical, chemical and biological characteristics of Shapland 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 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 South Coast Natural Resource Management Inc. - supported by the Australian Government and the Government of Western Australia.

## About Shapland Swamp



Shapland Swamp is located near the coast approximately 13km east of Denmark in Western Australia within the Wilson Inlet catchment and the sub catchment of the Sleeman River. The wetland is at approximately 5m AHD (Australian Height Datum) and the area receives an annual average rainfall of 932mm.

Wetland Suite	GPS Location Coordinates		
	Easting	Northing	MGA Zone
No Suite listed	534621	6131510	50

Shapland Swamp is located on privately owned land within a catchment of approximately 3km<sup>2</sup>. The wetland is a recovery demonstration site established by Green Skills Inc. which has been fenced and revegetated.



Vegetation at Shapland Swamp.

While the upper storey is still establishing, *Kunzea ericifolia*, *Melaleuca cuticularis* (Saltwater paperbark) are situated in the mid storey with *Juncas pallidus*, *Evandra aristata*, native rushes and grasses in the understorey. Aquatic plants including *Azolla sp.* and *Lemna spp* (duckweed) regularly cover the swamp.

Approximately 60% of the catchment has been cleared of native vegetation for agriculture.

# Shapland Swamp

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

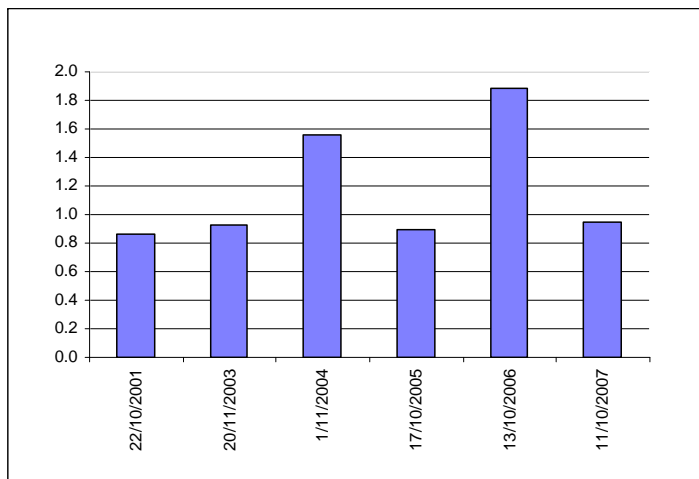
## Wetland Classification

Wetland type	Water Salinity	Consistency of Salinity	Size (Metres)	Shape
Floodplain	Fresh	Stasohaline	Microscale 260 x 70	Elongate

Classification of Shapland 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 ranged between fresh (0.86mS/cm) and marginal (1.88mS/cm). Fluctuations in salinities relate to seasonal fluctuations in rainfall, evaporation and water levels.



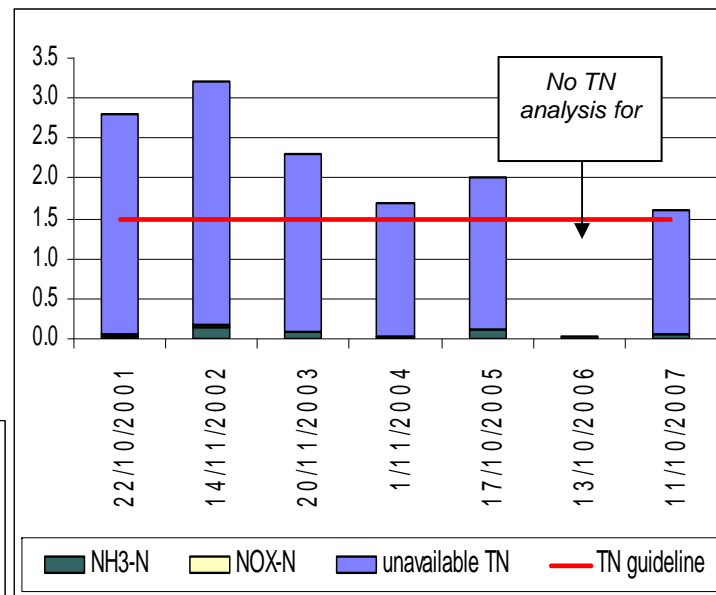
Salinity (mS/cm) over the sample period

Shapland Swamp is a low lying boggy area that is a part of the Sleeman River flood plain. The swamp fills following the onset of winter rains and dries during summer. The wetland is perched on clays above the more saline groundwater and receives fresh surface runoff and sub surface flow from surrounding land. Depth to groundwater in two nearby bores in 1997 was 1.5m and 2.2m which, with capillary rise, could potentially interact with the wetland.

## Nutrients

Total Nitrogen (TN) concentrations ranged between 1.6-3.2mg/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.



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

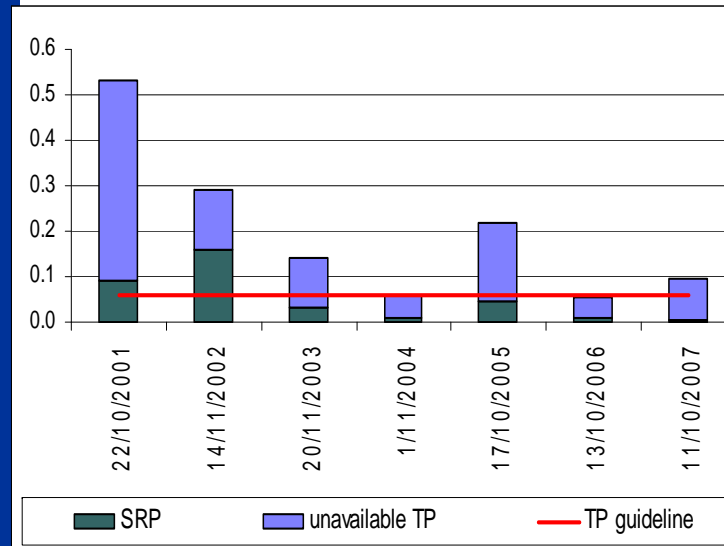
Dissolved inorganic nitrogen fractions of ammonia (NH<sub>3</sub>-N) ranged between 0.01-0.16mg/L which exceeded the recommended guideline value of 0.04mg/L on three of the seven sample occasions. Total oxidised nitrogen (NO<sub>x</sub>-N) remained consistent at <0.01mg/L which did not exceed the recommended guideline value of 0.1mg/L on any sample occasion.

Total Phosphorus (TP) concentration ranged between 0.05-0.53mg/L which exceeded the water quality guidelines of 0.06mg/L on five of the seven sample occasions.

Soluble Reactive Phosphorus (SRP) (form of phosphorus available for uptake by plants) ranged between 0.005-0.16mg/L which exceeded the recommended water quality guideline value of 0.03mg/L on three of the seven sample occasions.

Nutrients are recycled naturally through the swamp

# Shapland Swamp



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

due to uptake and assimilation of nutrients by plants and animals and through release of nutrients for example through microbial breakdown of organic material.

Nutrients stores in the catchment may also enter Shapland Swamp through surface runoff and sub surface flow from the surrounding land.

## Macroinvertebrates

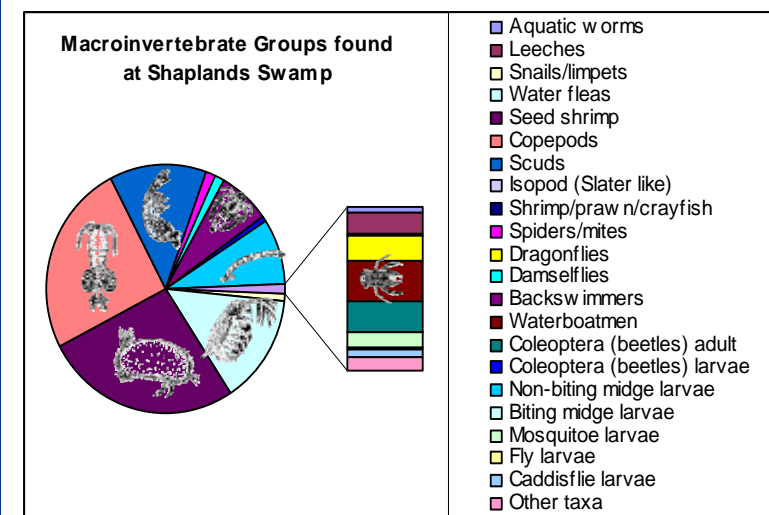
Twenty two groups of macroinvertebrates were found at Shaplands Swamp during the monitoring period of which the most abundant included; Cladocera (water fleas), Ostracoda (seed shrimp), Copepoda (copepods), Amphipoda (scuds), Gastropoda (snails/limpets), Acarina (spiders/mites), Zygoptera (damselflies), Notonectidae (backswimmers), Coleoptera (beetles) larvae, and Chironomidae (non-biting midge larvae).

Other groups of less abundance were found including; Oligochaeta (aquatic worms), Hirudinea (leeches), Isopoda (slater like), Decopoda (shrimp/prawn/crayfish), Eiproctophora (dragonflies), Corixidae (waterboatmen), Coleoptera (beetles) adult, Ceratopogonidae (biting midge larvae), Culicidae (mosquitoe larvae), Other Diptera (fly larvae), Trichoptera (caddisflie larvae) and Other taxa.

The diversity of macroinvertebrates found over the sample period ranged between thirteen to twenty two groups with a median of twenty 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 Shapland Swamp 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.



Looking over the Shapland swamp