

## How was it done?

### 1. Site and species selection

The site of Neil's wetland is situated within the Bassendean dune system on poorly drained sandplain and would have hosted a wetland environment prior to agricultural use. The size of the wetland was determined by the area that Neil was prepared to remove from agricultural production. A species list was created according to what exists naturally in the wetlands of the southern Bassendean dunes. Species were selected from all the wetland zones bar sub-emergent species which are generally not commercially available. Commercial availability therefore was a major determining factor in producing the species list (see attached list). Plants were ordered in December 2005 to be planted in August 2006. Early ordering is necessary to ensure that nurseries can propagate and grow what you ask for.

### 2. Acid Sulfate Soil Test

Acid sulfates are naturally occurring soils that commonly occur in wetlands. If left undisturbed they remain non-acidic and harmless. However, when they come in contact with oxygen (e.g. excavation), they react to form sulphuric acid.



A test hole was dug with a backhoe, to around 1m deep. Two soil samples were taken from identical positions in the soil profile, the first made into a paste with deionised water and the second using hydrogen peroxide (30% concentration). The pH of the different samples was then compared using a soil pH test kit, available from nurseries and hardware stores. As a rule, if the pH of the sample mixed with peroxide is much lower than the pH of the sample mixed with deionised water then you have good grounds to suspect the presence of acid sulfate soils and excavation should not proceed.

### 3. Surveying

The site was surveyed using a dumpy level to ensure that the wetland would be located at the lowest point in the paddock and to determine the shape of the wetland to ensure the flow of water from the surrounding areas. Fencing occurred soon after surveying to prevent cattle from trampling the area after earthworks had taken place.

### 4. Earthworks

Earthworks took place in late summer prior to the opening rains. The sides of the wetland were constructed according to the initial survey and to be no more than a 1:3 slope to ensure a gradual transition between wetland zones.



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### 5. Weed control

Effective and ongoing weed control is the most important activity in any revegetation program. During this project, weeds were sprayed as they emerged after the earthworks were carried out and moisture levels increased. Biactive glyphosate was used during late morning on fine days away from the open water to minimise impact on frogs making use of the increasing water levels. Neil's aim was to have minimal weeds competing with the seedlings by the time they were planted, and thereafter until the plants were well established. This meant that continual monitoring of the weeds was necessary so that spot spraying could occur around seedlings at opportune times.

### 6. Planting

The seedlings were planted according to the wetland zone that they belonged to (see attached list). Guards were placed around the tree and shrub species to protect them from rabbits. Although at most sites guards are very effective in protecting seedlings from grazing animals and human activity, in hindsight it would have been better not to use the guards at this particular site due to some of them blowing sideways in the soft soil and blocking the plants from rain. There was also an issue with ducks pulling seedlings out of the ground! All revegetation projects require a number of years of in-fill planting to fill the gaps left by seedlings that don't make it for one reason or another.



### REFERENCES AND ACKNOWLEDGEMENTS

This pamphlet was put together by Johanne Garvey from West Coast TAFE on behalf of the SJ Landcare Centre.

Boland, M., *Soils of the Swan Coastal Plain* (1998) Department of Agriculture and Food (Printed under Agriculture Western Australia)

Department of Water (2001), *River Restoration Manual - Report*

No.RR8 (Printed under Water & Rivers Commission)

GeoCatch (2006) *Converting Dams to Living Wetlands* (Pamphlet)

### MORE INFORMATION

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# Wetlands Creation



*In the Southern Bassendean sands  
of the Swan Coastal Plain*

*-A Landowner's Experience-*



## Wetlands of Bassendean sands

### What are Wetlands?

Wetlands are areas that are inundated with water for a significant length of time, long enough for plants and animals living in and around the area to adapt, becoming somewhat dependent on the conditions for their existence.

### Where do wetlands occur?

The Swan Coastal Plain is the relatively low-lying strip of land in South West WA that runs between the Darling Scarp and the coast, from Jurien in the north to Cape Naturaliste in the south. On a broad scale it contains two types of soil, the three dune systems running roughly adjacent to each other north-south along the coast, and the Pinjarra plain alluvial soils which are situated between the dunes and the scarp. The Bassendean dunes are the furthest from the coast and the oldest and most nutrient-poor of the three dune systems. The Bassendean dunes consist of low-lying hills with poorly drained swales between the hills where swamps and wetlands occur naturally. This is caused by the water table being relatively shallow. Much of the area has been cleared of native vegetation and drained to make way for urban development and agricultural land use.

### What lives in a wetland environment?

Wetlands provide habitat for a diverse range of animals such as birds, frogs, fish and mammals that use the area for nesting, feeding and migration. Wetland environments contain many unique species of plants adapted to the conditions, for example sedges.

### Why conserve wetlands?

In an area that supported many wetlands prior to large scale clearing and drainage, there is great opportunity for landholders on the Swan Coastal Plain to conserve and enhance remaining wetlands or create wetlands where they previously existed. The advantages of this are that wetlands:

- ♦ Reduce erosion and manage water movement by capturing it safely from surrounding land;
- ♦ Improve water quality through nutrient stripping and shading;
- ♦ Can provide controlled stock watering points;
- ♦ Help control micro-climate of a property by creating natural windbreaks and pockets of cooler air in summer, and shelter for stock in winter;
- ♦ Provide pest control through hosting of pest predators; and
- ♦ Add value to a property, both visually and ecologically.

## Wetland zones

Wetlands are complex and play host to a wide range of plant and animal species. The varying conditions within a wetland environment influence the type of species that will occupy a particular area. Wetlands can be wet all year in parts, but can also dry up in the summer months, therefore different species will occur in different parts or 'zones' of wetlands according to their ability to withstand varying degrees of inundation or dryness. It is worth keeping in mind that wetland zones may alter somewhat if rainfall continues to decrease.

### Submergent zone

The submergent zone contains surface water for much of the year. Plants in the submergent zone grow below water levels with their leaves floating on the surface. Many submergent species can survive adequately as the water levels drop, becoming dormant or living as terrestrial plants until water levels rise again. Submergent plants provide aquatic habitats for many plants and animals.

### Emergent zone

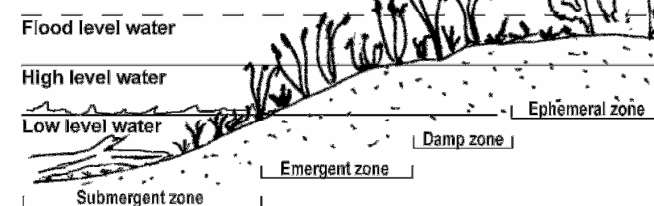
The emergent zone ranges from damp in the driest part of summer to depths of up to 1 metre in winter. This zone supports plants that require their roots to be wet for at least part of the year, their stems and leaves extending above the water surface. Aquatic and amphibious fauna rely greatly on this zone, both for protection and food found in the shallows and along the edges of the waterline.

### Damp zone

The damp zone is permanently damp, at least near the surface for most of the year. Except for flood events it does not come in contact with the standing water. This zone extends far out into the floodplains and acts as a filter for debris and sediment, allowing only the water to pass through. Dense plant life grows here, such as sedges and rushes, creating a good composition to prevent erosion. It also provides good habitat for fauna, especially birdlife.

### Ephemeral zone

The ephemeral zone remains quite dry for most of the year, only becoming wet in times of flood. This zone links the wetlands and the bushland. A few hardier species of sedges and rushes grow in this zone.



## Wetland creation



### A Farmer's Vision

"The decision to put some agricultural land back to swamp was not a difficult one for me. I am aware of the type of vegetation that was growing in that area when we bought the property in 1966 and I wanted to revert some land back to a swamp.

I remember seeing long necked tortoises in the waterways and was hoping to one day see that again.

I would like to eventually have the (wetland) area made 4-5 times bigger than it currently is.

I am aware that I have been involved in clearing land for growing food for people, but we overdid it, and my father before me also made that statement to me 30 years ago. We were encouraged by the government of the day.... and now we can see a better option, although it will not be growing food."

Neil Kentish, Serpentine Farmer.

### Funding

SJ Landcare Centre staff assisted with accessing funding to achieve the vision of Neil Kentish.

An application to the Australian Government Envirofund was developed, outlining Neil's project plan. That is, part of his land be returned to a wetland, as it had once been.

The Envirofund application process involved outlining details of site location, current condition and proposed activities. Indigenous consultation was sought as well as environmental and heritage considerations taken into account. A work plan and budget was put together comprising of all activities and costs. A proposed species list was created, and quotes were obtained from contractors, both for materials and labour. Volunteer labour was taken into consideration, such as time needed for planting.

There are many ways to obtain funding for projects like this. Contact the SJ Landcare Centre for more information. (see back)

