

## Restoration planting organised by Naturally Native for the Tauranga District Council, especially the Matua Saltmarsh stormwater ponds

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### ABSTRACT

Naturally Native New Zealand Plants has been involved in the restoration of natural environments and wetlands in a number of areas including Tauranga City, where the development of the Matua saltmarsh stormwater retention ponds have proved successful. Planting of wetland species has produced better than expected results within one year. The lessons that have been learned from this and other projects are examined. The concept of planting for natural regeneration is discussed, including those species that achieve the initial results and then provide the environment that facilitates the natural regeneration of a wide range of other naturally occurring species. Problems that were encountered are outlined and some possible solutions for similar situations are suggested.

### INTRODUCTION

Naturally Native New Zealand Plants is a nursery company established in 1980. The nursery's focus has changed over the years from mainly a garden centre supply company to the present, where nearly 80% of the nursery lines produced are used for environmental restoration work.

In October 2001, the Tauranga District Council approached Naturally Native to organise the supply of plants and project management of a planting programme for the development of the Matua stormwater retention ponds. The Tauranga office of the Isthmus Group prepared the initial concept. The planting plan was developed by Naturally Native with input from local residents and the Tauranga branch of Forest and Bird (Fig. 1). The plan involved wetland planting and general revegetation, including some larger tree species. CGC Landscapes were contracted to undertake the actual planting work.

### THE MATUA SALTMARSH SITE

The Matua saltmarsh site (Fig. 2) is approximately 2 ha in area, and before restoration planting the site was largely covered in rank grass and blackberry, with a wet central drain. The concept was to build two stormwater buffer ponds, between the street run-offs and the Matua saltmarsh. The upper pond would be fresh water and the lower pond would be tidal. The two ponds

were separated by a rock weir which included a fish ladder. Between the ponds and the saltmarsh a walkway has been developed which links the Matua residential area with the local secondary and intermediate schools. As a result the area is one of high use by pedestrian traffic.

### CONSTRUCTION AND PLANTING

The earthworks contractors started work late in December 2001. They were plagued by wet weather throughout January (Fig. 3) and February 2002 — the summer season was one of the wettest the Bay of Plenty had experienced for many years. Not only did this result in the completion of the earthworks being delayed, but there were also problems with planting. Wet soils made access difficult and the planting contractors were not able to get onto the site until late in April, when the ground had dried out sufficiently to enable mulch to be spread. Because of the wet, boggy site, it was decided to spread mulch first and then to plant through it. A combination of recycled wood chip (which proved to be very effective; Fig. 4A) and post peelings (Fig. 4B) were used as mulch.

Planting began in May 2002 with the laying out of large specimen trees. Initially, plantings were to include a number of PB95 specimen trees, but these were reduced to PB8 grade as we

felt that there would be a much better chance of survival in the exposed conditions the site offered. This considerably lowered the cost of planting and resulted in more natural growth of the total landscape.

The CGC Landscapes team undertook placement and planting of the plants, both on the drier sites (Fig. 5) and in the wetland (Fig. 6). In the centre of the upper pond an island had been created as a bird refuge with an open sandy bird roost at one end. The sand and mulch were moved onto the island and spread before the pond was flooded. However, at the time of planting the pond was already filling, so the plants had to be ferried across by boat (Fig. 7).

### COMMUNITY INVOLVEMENT

Community involvement in revegetation projects in public areas is essential. We involved Otumoetai College students with this planting as this school is adjacent to the area (Fig. 8). Public plantings gives an ownership to the local community — involving schools and their students is also effective because children return home to educate their parents.

The community involvement concept needs to be extended to develop reserve care groups, modelled after the coast care group system. There is considerable potential to develop reserve care groups to involve the public in the upkeep of reserve areas.

Unfortunately, despite involving the school children, some plants were still vandalised (Fig. 9). The day that the vandalism was noticed, I collared a few kids who were walking past and said, 'Hey, give us a hand to replant these', and an hour later the job was done. I had a digital camera in my pocket, and soon after I emailed the images and the children's names to the principals of the three local schools with a request, 'Please praise these pupils'. This was done at assembly the next day, the kids got recognition and significantly, the vandalism stopped almost immediately.

### DEVELOPMENT OF PLANTINGS

Some six months after planting there were obvious signs of growth (Fig. 10). The grass

species were establishing, and oioi (*Apodasmia similis*) was just coming through.

A year after planting the results speak for themselves (Fig. 11). The planting has been a considerable success with well-established reed species around the pond edges, and waterfowl frequenting the ponds. However, the general revegetation species in this area will need some attention in the coming year. This includes application of fertiliser, as the plants here have not grown as quickly as expected, possibly due to the poor soil conditions on the extensively disturbed site.

### SUCCESSFUL SPECIES

Some of the species that have been successful include *Baumea articulata* (Fig. 12), the naturalised *Juncus effusus* that has established on its own (Fig. 13) and *Juncus pallidus* that was planted on the water margins (Fig. 14). *Cortaderia toetoe* has successfully established (Fig. 15), and *Machaerina sinclairii* is growing on some of the damp banks (Fig. 16).

Raupō (*Typha orientalis*) was not planted but has established spontaneously (Fig. 17). Unfortunately, this may prove to be a problem for the future managers of these stormwater ponds. As the ponds are not very deep, raupō may eventually infest the whole area if left. We would recommend its removal from this site, as the ponds are not of sufficient depth to limit its growth. This species should not be planted in water less than 2 m deep.

*Baumea teretifolia* has already become well established on the pond margins (Fig. 18), and the *Cyperus ustulatus* has been very successful as a planting (Fig. 19). Oioi (*Apodasmia similis*) is starting to grow, although rather slowly, in the saline pond (Fig. 20). *Bolboschoenus* failed to establish at all, even though it was widely planted along the upper pond edges.

### SPECIES SELECTION

Although there is an element of trial and error, and some species may not succeed, it is of critical importance to carefully select the correct species to encourage natural regeneration. Recently, I encountered a revegetation plan that

even stipulated that supplejack (*Ripogonum scandens*) be planted. This species is a climber of the deep forest and will not grow in an open situation. We need to encourage people to plant the species that will work, and to educate them to follow the natural succession in the ecological process over time.

For example, *Juncus kraussii* was not included in the planting plan for the Matua site. As this species naturally occurs adjacent to the ponds and plantings, just across the walkway (Fig. 21), we felt that there was no need to plant it in the lower saline tidal pond area because it is going to quickly establish itself there anyway.

Fig. 22 illustrates some of the plants that occur at the site in an adjacent area; saltmarsh ribbonwood (*Plagianthus divaricatus*), oioi (*Apodasmia similis*), and flax (*Phormium* spp.). Admittedly the flax has been planted here, but these species are going to disperse and some have already. *Cotula coronopifolia* had established itself in the lower tidal pond (Fig. 23). Opposite the ponds, in the saltmarsh there are large patches of oioi amongst the *Juncus* (Fig. 24). These patches will establish in the revegetation area over time, by themselves — no effort is necessary to recreate it, just a little patience.

### EVALUATION OF RESULTS

In summary, revegetation work has to be carefully planned, managed and evaluated. Plantings should encourage true regeneration, rather than attempting to mimic or recreate a landscape. Some species may not succeed in the planting programme, but these failures do not matter as they could be considered part of the natural ecological process. It is not necessary to have every species succeed, so long as there are enough to achieve the desired results of establishing an environment that will be self-sustaining and will encourage the start of a natural process of restoration.

Bird problems can be expected. Pūkekos love pulling out newly planted plants, and are very persistent. We have experienced considerable damage from Pūkekos who we believe deliberately pull out newly planted plants. This is not just on this site but is a common problem on

most wetland sites. These birds are particularly fond of flax plants (*Phormium* spp.). Vandalism by humans is also a problem that needs to be closely monitored in areas open to the public. On this site, Tauranga District Council provided a security guard for the first seven days, before and after school hours to prevent vandalism.

One of the major lessons learned from this project was that most of the wetland plants, given the right conditions, are easy to establish. However, we need to adopt new methods to overcome some of the problems that are encountered. One new approach we are trialing is the use of a product imported from Australia called 'wetland strips' (Fig. 25). With this system, a number of plants are grown along a trough until they are ready to be planted out. As the trough does not offer very much space, the plant roots become matted together. Initially the idea was developed as an edging concept for garden centres, but the system was found to be ideal for wetland plants as a whole strip of five plants cannot be pulled out by the birds.

Weed control is very important, and revegetation projects must include a planned programme of weed control. Weeds are one of the biggest problems in revegetation programmes. Instituting a weed control programme would dramatically increase the quality of the results achieved in many restoration programmes.

### FURTHER DEVELOPMENT OF STORMWATER PONDS

Naturally Native are involved in other revegetation projects of stormwater ponds. We recently completed another similar project this year for Tauranga District Council and there are more planned in the future.

Revegetation is not a one-off concept. Ongoing development of any revegetation planting is essential to achieve a complete restoration, and that means a planned planting programme, including maintenance and in-fill planting especially over the first few years. In later years, the planting may also require the in-fill planting of successional species to assist the natural regeneration process.





**Fig. 1** Planting plan for the Matua stormwater retention ponds.



**Fig. 2** The 2-ha Matua saltmarsh site before restoration planting.



**Fig. 3** Earthworks on the Matua saltmarsh site in January 2002.





**Fig. 4** Detail of mulch used for Matua restoration plantings. **A**, recycled wood chip; **B**, post peelings.



**Fig. 5** CGC Landscapes planting revegetation and tree species on a drier site during May 2002.



**Fig. 6** CGC Landscapes planting wetland species.



**Fig. 7** Plants ferried to island by boat for restoration planting.



**Fig. 8** Community involvement in restoration planting — Otumoetai College students planting at the Matua saltmarsh site.



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**Fig. 9** Vandalism of newly planted material.



**Fig. 10** Lower pond margin (at high tide) six months after planting. Photo taken December 2003.



**Fig. 11** One year after planting. Photo taken July 2003.



**Fig. 12** *Baumea articulata*.



**Fig. 13** *Juncus effusus*.



**Fig. 14** *Juncus pallidus*.



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Fig. 15 *Cortaderia toetoe*.



Fig. 16 *Machaerina sinclairii*.



Fig. 17 Raupō (*Typha orientalis*).



Fig. 18 *Baumea teretifolia*.



Fig. 19 *Cyperus ustulatus*.



Fig. 20 Oioi (*Apodasmia similis*).





**Fig. 21** *Juncus kraussii* growing naturally adjacent to the ponds and plantings. This species is expected to establish by itself into the Matua restoration area.



**Fig. 22** Saltmarsh ribbonwood (*Plagianthus divaricatus*), oioi (*Apodasmia similis*), and flax (*Phormium* spp.) growing in an area adjacent to the Matua restoration plantings.



**Fig. 23** *Cotula coronopifolia* that has established itself in the lower tidal pond.



**Fig. 24** Large patches of oioi (*Apodasmia similis*) growing naturally adjacent to the ponds and plantings.



**Fig. 25** Plants growing along a trough in 'wetland strips'.