SEDIMENT STABILISATION IN WESTERN PORT RAMSAR AREA

Port Phillip and Westernport CATCHMENT MANAGEMENT AUTHORITY
Natural Heritage Trust

Sediment Stabilisation in Western Port Ramsar Area
Project 4.09
NHT and PP&WCMA Funded

1. Executive summary

The project aimed to contribute to reversing the trend of biodiversity loss in Western Port through marine and coastal habitat restoration, particularly focussing on seagrass and mangroves. The focus of the project was to trial different planting techniques for mangroves and seagrass along the coast in the north east corner of Western Port in Victoria. The project area consisted of extensive tidal mudflats fronting an actively eroding 2m high river sediment muddy cliff face. The project built on existing work that has been completed on seagrass replanting and coastal erosion studies in Western Port in the last few years.

A second major component of the project was to trial 'built' structures to protect the eroding mud cliffs in conjunction with mangrove and seagrass planting. However this element of the project was abandoned due to the lack of success achieved with a similar DSE project nearby at Lang Lang township and the funding diverted to additional direct mangrove planting, the element of the trial showing most promise.

At project completion approximately 4000 mangrove seedlings have been transplanted into the study area, approximately 5000 seeds direct planted and approximately 0.25ha of seagrass transplanted. Survival rates have been highly variable but generally very good for mangrove seedlings, not very good for mangrove seeds and even less so for seagrass.

2. Description of the project, results and outcomes

The different project elements are discussed in detail below including highlights, achievements and difficulties encountered.

Seagrass Planting

The project description required us to grow seagrass (Zostera spp) behind the pole barriers. The pole barrier concept was discarded due to difficulties demonstrated at a nearby DSE site at Lang Lang. Nevertheless seagrass plantings (with cores transplanted from Coronet Bay) were tried on three occasions; at the Lang Lang boat ramp, near the pier and several quadrats adjacent to the Lang Lang cliffs.

In all case the seagrass was smothered by very fine silt and died. The Lang Lang substrate was tested in containers at Coronet Bay where there was no fine silt and proved excellent for seagrass growth but not at Lang Lang. Therefore no further trials were attempted with seagrass. It is not clear whether planting behind a protective structure (eg the pole barrier originally proposed) would have increased survival rates. However as the primary cause of death was smothering rather than loss due to wave action this is considered unlikely.

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Mangroves

Mangroves are quite easy to grow in protected situations. However in the high energy environment of the Lang Lang cliffs, waves of 2m can occur. Here special techniques are required. Part of our work was devoted to trying out different staking and tying methods in different substrates.

- Unless stakes were buried deeply they washed out.
- When plants were tightly tied to the stakes they broke off.
- Loose ties allowed plants to wash out
- Unless planting was carried out in very firm mud there were losses. Even though such mud would have been ideal in calmer conditions.
- Using two stakes with ties which allowed some movement but gave support have given better results.

Planting south of the Lang Lang River was mainly carried out by volunteers. Here seedlings were planted at 1m centres in three rows 1m apart and extended for 800m south of the river. All planting north of the river was carried out by the Bass Valley Landcare bush crew which we hired plus their 4wd vehicle. Except near the river mouth only a single row was planted so as to evaluate the coast as quickly as possible. Only double staking was used here. This extended for almost 1.5km and will be added to when the 7km of coast has been explored. In the meantime the southern planting will be added to and losses replenished using volunteers.

In early planting losses were high as planting was sometimes done in inappropriate less stable mud and stakes were not deeply embedded. Since then there has been significant survival rates even with single stakes. A recent (8th July 2007) assessment was carried out south of the river. There has been almost 100% survival in one section where seedlings planted 30th May 2005 have grown to 50cm. In other sections all seedlings have been killed by cold or washed away. Of 1324 seedlings planted using one stake only 36% survived. In contrast, of 604 seedlings planted using double staking 80% survived.

North of the river over 1,000 seedlings have been planted using double staking. The earlier planting was not very successful probably because of the cold. However of recent planting nearly 50% survived. It has been resolved to only plant seedlings at the six leaf stage and arrange for the School to grow on smaller plants.

Thousands of seeds collected by volunteers from around Western Port were planted during the summer but the germination rate was disappointing. Crabs were observed eating mangrove seeds. However some seeds have germinated and if the assertion of the people planting seeds on the Shoalhaven River in NSW is to be believed they will grow much faster than transplanted seedlings.

We are now trialling a new planting and staking method with a further 260 seedlings not included in the above. Despite previous losses we have learned a great deal and are confident that about 1000 mangroves will survive south of the river and probably much more than 1000 will survive north of the river.

Erosion

Erosion of the muddy banks is being measured at twelve sites south of the Lang Lang river. The erosion has averaged 40.7cm ranging between 73cm and 20cm since 3rd June 2006 (i.e.a little over 12 months). There is great variability in erosion rate at different sites. Where a sloping beach has been formed erosion seems to have stopped.

Joint project with DSE

DSE placed five rows of poles at the Lang Lang Caravan Park at 10cm spacings about 10m apart pointing towards the south west. We planted 50 mangrove seedlings between each row and two control plantings. There was no evidence that the poles protected the seedlings especially from the south west gales. As the substrate was very variable the survival rate was really a function of the firmness of the mud.

Future Work

The results of the project have been generally very successful and encouraging in relation to mangroves. The Partnership will be looking to expand the revegetation works over the coming years as funding becomes available using a combination of volunteers and paid Landcare / GreenCorps workers as opportunities and funding arise.

The results of this project indicate that mangrove replacement is likely to be a feasible and cost effective method of habitat creation and shoreline protection, but additional monitoring over the next few years will confirm this. Whilst authorities may allow short term 'hardening' of the coast to prevent recession in some areas, this is unlikely to provide an effective or cost efficient response in the face of climate change and sea level rise.

Seagrass transplanting has been less successful and the Partnership is unlikely to expend significant effort in this area until mobile sediment loads in this part of Western Port are reduced.

3. Outputs

Outputs/Milestones Description	Unit	Anticipated	Actual	Comment *(If actual value differs from anticipated value)*
Area revegetated with mangroves and seagrass	ha	4	5	Based on a 5km length of coastline and working in a 10m strip out from muddy banks. Seagrass contributed approximately 0.25ha with the balance being mangroves. However all the seagrass died.
Number of mangrove seedlings transplanted	Plants	N/A	App. 4000	
Number of mangrove seeds transplanted	Seeds	N/A	App.5000	
Volunteers recruited to assist in transplanting work	Volunteers	20	45	20 volunteers recruited plus school groups of up to 25 students involved in different aspects of the project (eg seed collecting, planting)

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4. Reports and Documents Provided

- Report to Board February 2005
- Report to Board June 2005
- Report to Board October 2005
- Report to Board November 2005
- Report to Board February 2006
- Report to Board June 2006
- Report to Board October 2006
- Report to Board November 2006

5. Connecting your project with regional, catchment and local area planning

The project has contributed to a number of objective and targets in the Port Phillip and Western Port Regional Catchment Strategy. The key MATs are discussed below:

WT17: Reduce the proportion of coast in the region where environmental values, recreational beaches, Indigenous cultural values and public infrastructure are at high risk from accelerated coastal erosion and other degrading.

The project area is in an area of Endangered EVC (Salt tolerant and or succulent shrublands) which is being degraded by rapid coastal recession. The project has contributed to finding a long term, ecologically sound, management response to coastal stabilisation in this section of Western Port.

WT18: A net gain in the extent and quality of native coastal vegetation, as measured by habitat hectares.

The project has resulted in the direct planting of approximately 5ha of mangroves, which over time, is expected to develop into a mature mangrove community providing habitat for the range of terrestrial and marine fauna species that exist in the area. If successful in the long term the project will also result in the protection of adjacent saltmarsh communities.

6. Making use of the results and implementation with stakeholders

The project outcomes are in the process of being communicated to stakeholders in the region. The inaccessibility of the site poses some problems but delegations from a number of Government agencies have visited the site to view progress.

The project has had a major community strengthening role through the Bass Valley Primary School involvement and related local press coverage.

7. Where to from here

The indications from the project are that the basic principle, that of planting mangroves into areas where mangroves have been removed in the past to improve coastal habitat and reduce coastal recession are likely to succeed. The Partnership is exploring other opportunities to extend funding to ‘roll out’; the work on a larger scale using a combination of volunteers and paid planting teams.

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Discussion with partners in this work is at an early stage but is likely to include joint projects with the Nature Conservancy and additional work with the Port Phillip and Western Port CMA and Melbourne Water. New Haven College and other local schools will be raising mangrove seedlings.

9. Promoting work

A range of press articles and media material is attached. In addition, the project leader Dr Tim Ealey has appeared in a 10 minute segment on national television on the 7.30 Report on the ABC discussing the project and the involvement of local school children.

The funding bodies have been acknowledged on the Partnership's website via the project link.

10. Attachments

Photos taken during count on February 8th 2006 south of the Lang Lang River Mouth: