Zone 4: Under-pruning of mature trees and removal of tall shrubs

Existing vegetation

Before foliage cover: 85%

After foliage cover: 67%

No target is set for this zone. The image is simply shown to understand the different foliage cover results.

Zone 5: Up to 50% foliage cover in the 1.5m - 2.5m view window (not including trees to be retained)

Existing vegetation

Before foliage cover percentage: 70%

After foliage cover percentage: 50%

APPENDIX C OPTIONS PROPOSED DURING CONSULTATION AND SUPPORTING FACT SHEETS

Option 1

Banksias maintained at different densities in different areas:

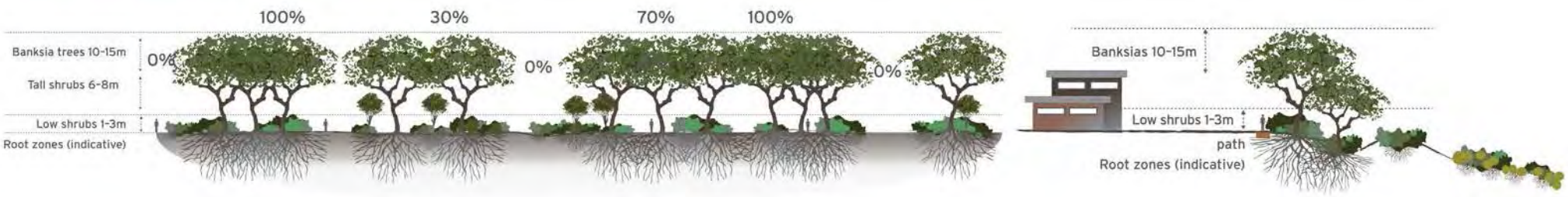
- 0%, 30% 70% and 100% density banksias
- Low, medium and tall shrubs in between

1

Searching for a compromise at
Collingwood Beach

This provides views in certain areas as well as areas with greater plant root protection where this is needed more.

Year 20 Elevation

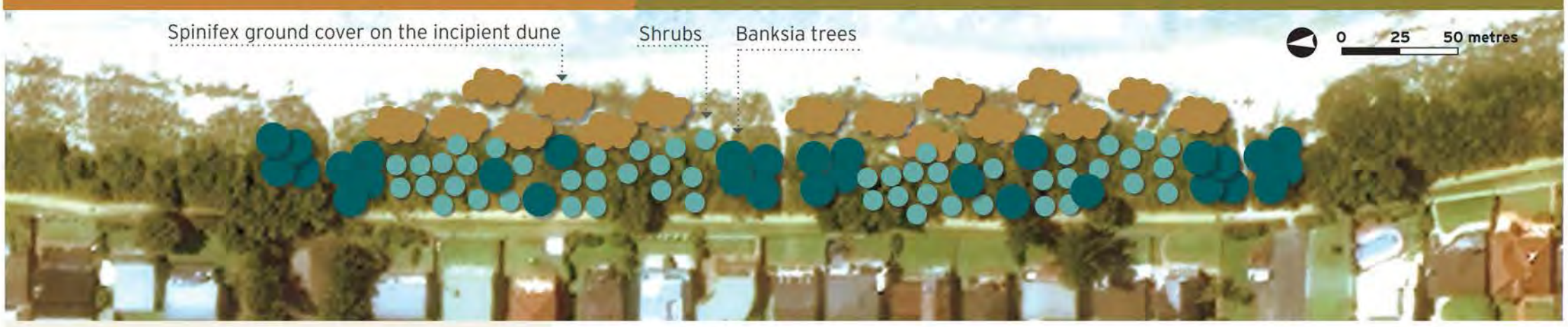


Advantages of Option 1

- Very good dune protection for areas with 70-100% Banksia tree density.
- Views maximised in some areas.
- Good fauna habitat values are retained in many areas (30-100% Banksia tree density).

Disadvantages of Option 1

- Higher likelihood of erosion and damage from storm surge in areas with 0% trees.
- Higher likelihood of degradation to residences and infrastructure from higher salt load, erosion or sand ingress in areas with 0% trees.
- Labour intensive to maintain areas within specific density parameters.
- Potential impacts to vegetation from disturbance as a result of ongoing seedling removal.



Costs & Management

- Moderate cost.
- Management centres on removing seedlings to maintain set densities.

Caveat - This scenario is an approximation of what could be achieved with specific management actions. Advice is based on general ecological and geomorphological literature and not trials at the Collingwood Beach site. Graphics are indicative.

Your feedback is important. Which option provides the best result?

OPTION 1, 2 or 3? Please fill out a feedback form and tell us. The results of your feedback will be used to develop a detailed Dune Vegetation Management Plan that may combine or adapt the options to achieve a plan that can be supported by the broader community, while also meeting social, environmental and legal requirements for the area.

Please send your feedback to:
Shoalhaven City Council
Attention Karen Rourke
Council@shoalhaven.nsw.gov.au
Or PO Box 42 Nowra, NSW 2541

ngh environmental

Shoalhaven City Council

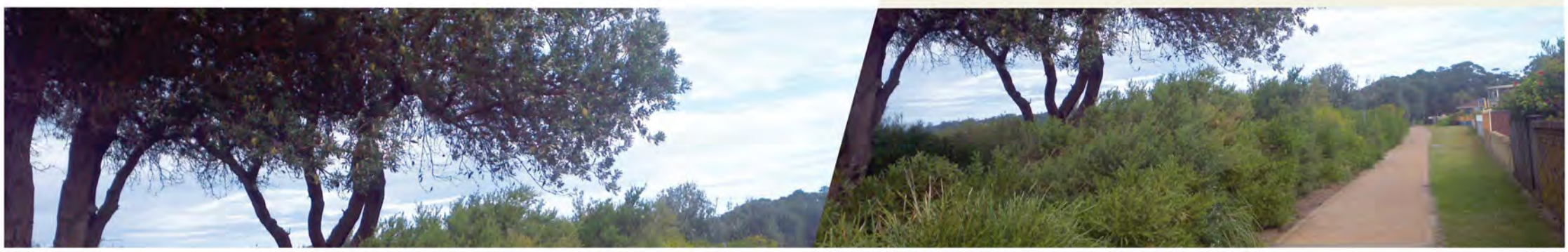
Option 2

Lift the canopy of existing and naturally regenerating Banksias. Remove tall shrubs.

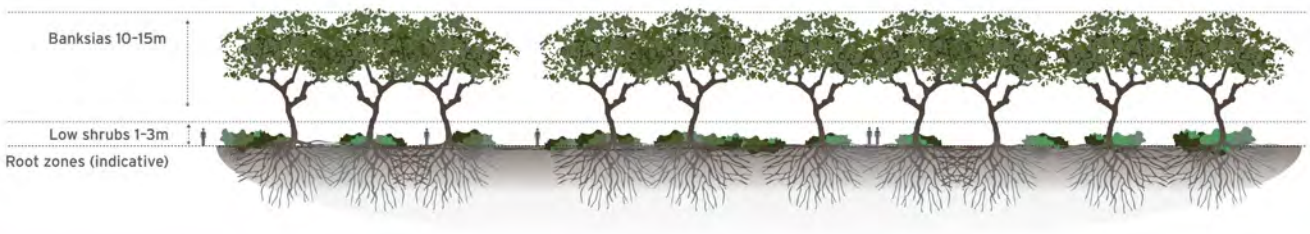
Provides good dune stability across a broad area while providing filtered lower level views. (*Note: image portrays less tree density than desirable or than will regenerate naturally*)

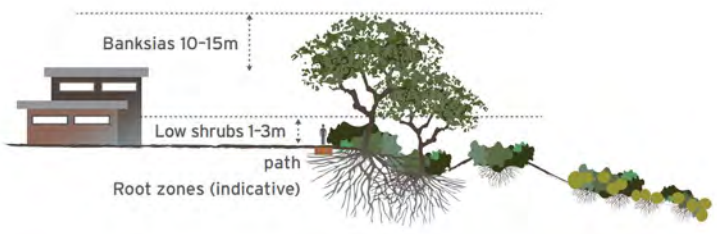
2

Searching for a compromise at
Collingwood Beach



Year 20 Elevation





Advantages of Option 2

- Very good dune protection at moderate to high Banksia tree density.
- Low level views maximised in most areas.
- Good fauna habitat values where canopy connectivity is retained.

Disadvantages of Option 2

- Time: the Banksias need to obtain a certain height before pruning can commence. Views may be obstructed during this time.
- Labour intensive management, requires ongoing pruning and removal of tall shrubs.
- Risks to long term survival of the Banksias (e.g. risk of disease from pruning, instability due to modified, top heavy tree structure).
- Potential increased risk to public safety from trees/branches falling in high wind events.
- Loss of high level views.

Costs & Management

- Moderate to high cost.
- Management centres on pruning trees and removing seedlings.

Caveat - This scenario is an approximation of what could be achieved with specific management actions. Advice is based on general ecological and geomorphological literature and not trials at the Collingwood Beach site. Graphics are indicative.

Your feedback is important. Which option provides the best result?

OPTION 1, 2 or 3? Please fill out a feedback form and tell us. The results of your feedback will be used to develop a detailed Dune Vegetation Management Plan that may combine or adapt the options to achieve a plan that can be supported by the broader community, while also meeting social, environmental and legal requirements for the area.

Please send your feedback to:
Shoalhaven City Council
Attention Karen Rourke
Council@shoalhaven.nsw.gov.au
Or PO Box 42 Nowra, NSW 2541

ngh environmental

Shoalhaven City Council

Option 3

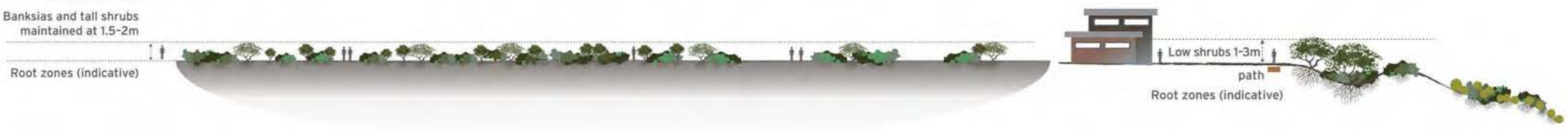
Restrict the height of naturally occurring Banksia trees and tall shrubs (shrubs up to 3 m).

Provides reasonably good dune stability across a broad area while providing for higher level views.

3

Searching for a compromise at
Collingwood Beach

Year 20 Elevation



Advantages of Option 3

- Reasonable dune stability although roots would not be as deep as for higher growing trees.
- Provides high level views .
- Provides dense connecting habitat for small birds.

Disadvantages of Option 3

- Labour intensive management, requires ongoing pruning of dense thickets.
- Risks to long term survival of the Banksias (e.g. risk of disease from pruning).
- Potential increased risk to public safety from sharp branches .
- Possibility of degradation to residences and infrastructure from higher salt load.
- Loss of amenity: 'unnatural' appearance of vegetation.
- Low vegetation less able to keep sand volumes seaward.

Costs & Management

- High cost.
- Management centres on pruning trees.

Caveat - This scenario is an approximation of what could be achieved with specific management actions. Advice is based on general ecological and geomorphological literature and not trials at the Collingwood Beach site. Graphics are indicative.

Your feedback is important. Which option provides the best result?

OPTION 1, 2 or 3? Please fill out a feedback form and tell us. The results of your feedback will be used to develop a detailed Dune Vegetation Management Plan that may combine or adapt the options to achieve a plan that can be supported by the broader community, while also meeting social, environmental and legal requirements for the area.

Please send your feedback to:
Shoalhaven City Council
Attention Karen Rourke
Council@shoalhaven.nsw.gov.au
Or PO Box 42 Nowra, NSW 2541

ngh environmental

Shoalhaven City Council

Collingwood Beach
FACT SHEET 1

1

Your 'stake' in the decision

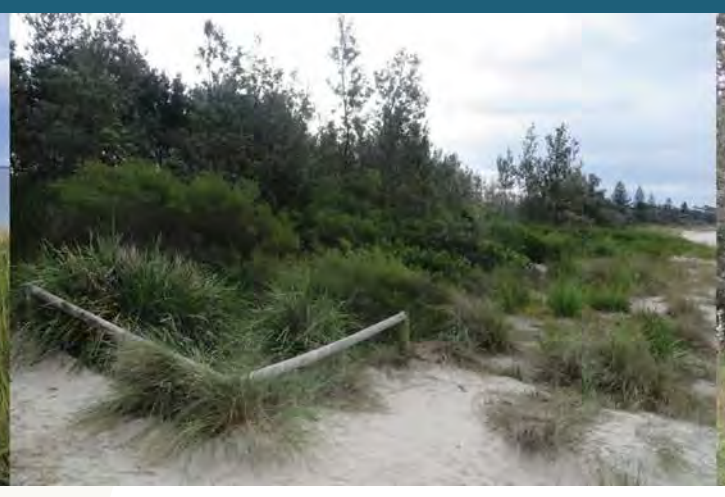
Collingwood Beach – the story so far

In the 1960's, dune vegetation was cleared along Collingwood Beach to make way for residential development. Storms in the early 1970's showed that the loss of a vegetated dune system has left the area vulnerable to storms and erosion. The impact of coastal erosion1 on public and private assets (these include the pathway, roads, water and sewer lines and private houses) has been identified as a high risk; about 100 private properties in this area could be affected[1]. The value of public assets at risk is approximately $2.2 million[2].

The need to compromise

The Council reserve foreshore provides many 'services' to the community. These include:

- Providing views of the bay.
- Providing natural areas.
- Protecting assets against sand ingress, erosion and salt spray during storm events.


The Collingwood Beach Dune Vegetation Management Project aims to manage the beach foreshore vegetation to address competing interests in a sustainable manner from the Northern end of Illfracombe Avenue to Susan Street.

While some dune management options sound appealing and address some of the issues, they do not address others. This is the 'compromise' problem.

Vegetation management must taking into account all issues and must be supported by the community to be effective[3]. The Shoalhaven City Council is seeking community input into the Vegetation Management Plan so that it can be supported by the broader community, while also meeting social, environmental and legal requirements for the area.

Who are the Stakeholders?

Many people will be affected if the dune fails and erosion takes away the foreshore. It is important to understand the views of everyone who will be affected. Who are the key stakeholders?

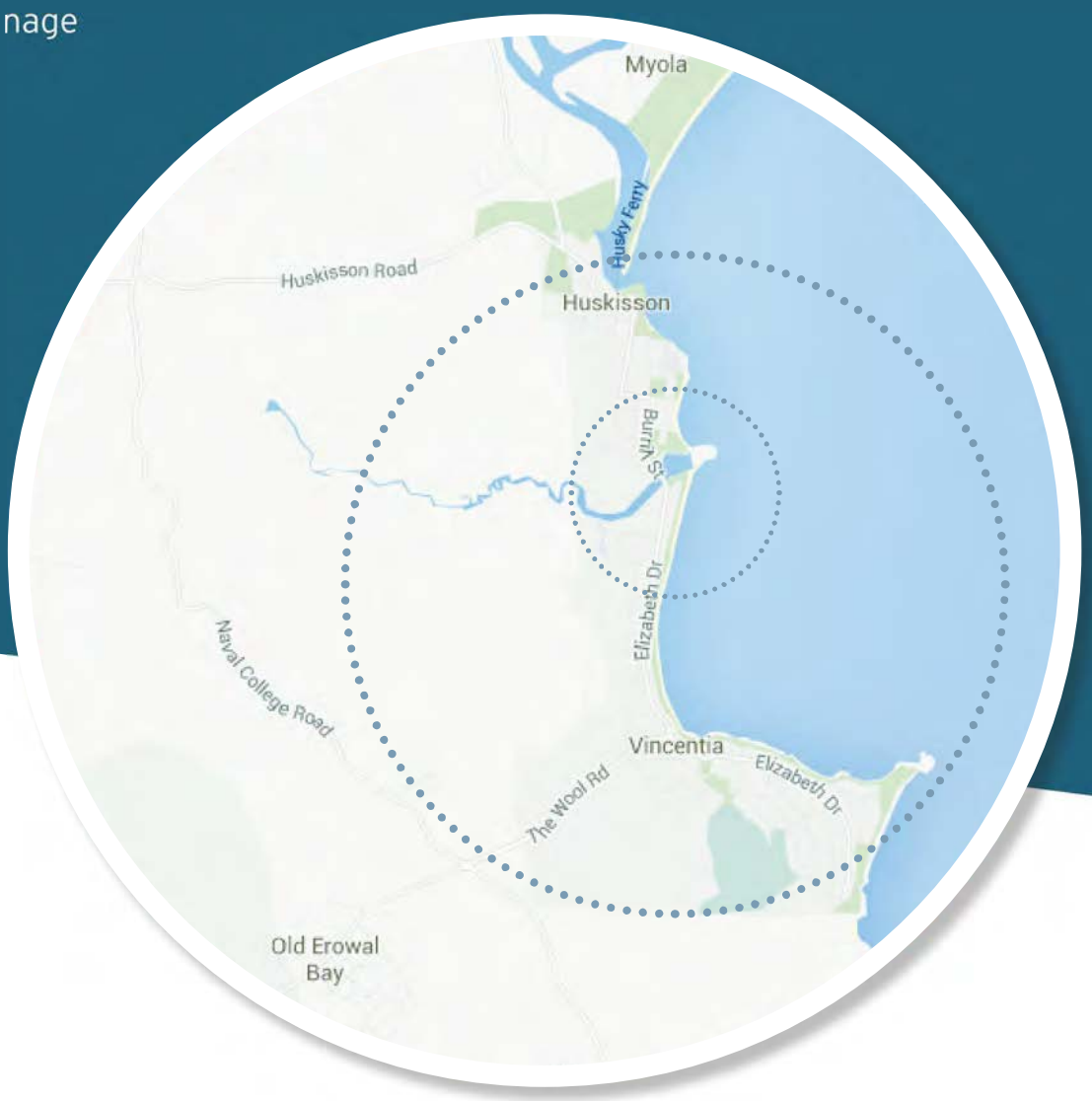
- Near residents – properties most at risk and most impacted by changes to vegetation management of the reserve.
- The local community - approximately 3000 residents in Vincentia, many of whom may also be highly impacted. From Susan Street to the northern end of Illfracombe Avenue represents about 40% of the Collingwood Beach foreshore.
- Local special purpose and special interest groups. These groups may be formed around a single issue or set of issues, important to them. For example; bird watching or paddle board clubs, residents groups.
- The broader community - including tourists and other visitors.
- The Council and other government agencies, who have responsibilities under environmental legislation to protect and appropriately manage the reserve.

In developing a plan that recognises the views of all stakeholders, we need to hear from you. What is your main interest? What do you value most about the area? What would you like to see happen?

Where to now?

Three options have been developed that aim to balance the competing issues in an acceptable way (see the separate 3 POSTER SET). Which option provides the best result in your opinion: Option 1, 2 or 3?

The results of your feedback will be used to develop a detailed Dune Vegetation Management Plan that may combine or adapt the options to achieve a plan that can be supported by the broader community, while also meeting social, environmental and legal requirements for the area.



References

1. Coastal Hazards Studies and Plans , SMEC 2009
2. Shoalhaven Public Asset Coastal Risk Management Review (BMT WBM) 2012
3. Beardsmore, A., Gangaiya, P. and Misckiewicz, T. (no date). 'Winding Back the Clock in Dune Management at Wollongong'.

ngh environmental

Shoalhaven City Council

Collingwood Beach
FACT SHEET 2

2

The role of vegetation in protecting the foreshore

Dune under threat

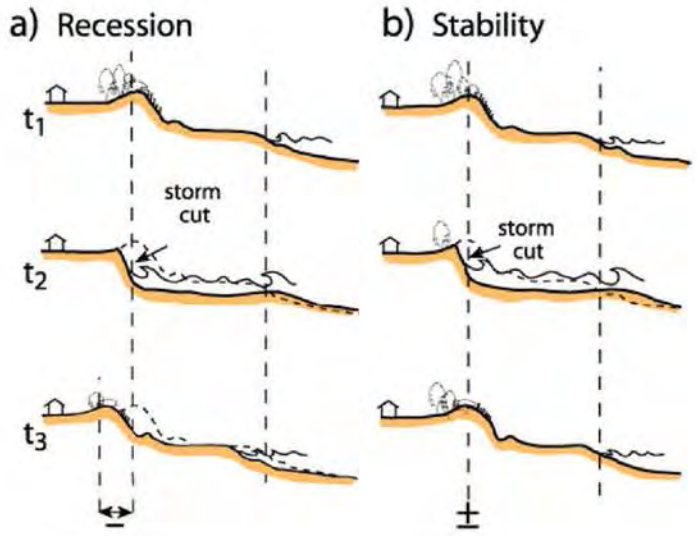
Collingwood Beach is one of the most vulnerable beaches in the Shoalhaven Local Government Area from coastal processes[1]. Specific risks include coastal erosion, coastal inundation and entrance instability at Moona Moona Creek. The erosion could affect the entire length of the beach whilst wave inundation could occur in areas where the dune is lower (between Berry and Albion Park).

The severe storms of 1974 demonstrated how erosion can threaten assets. By 1978, the effects of erosion and associated lack of vegetation on the dune included: wind-blown sand covering roads, lawns and gardens, blocking stormwater drains and causing 'sand blast' damage to houses and vehicles as well as causing ceiling collapse . These impacts are known to have affected real estate values and the wellbeing of many local residents[2]. As these type of events can be decades apart, it can be easy to forget the lessons learned and repeat historical mistakes.

The lessons

A three year vegetation rehabilitation effort commenced in 1978, shaping the dune and planting grasses and trees. Monitoring demonstrated that the results of this work could create a dune more resilient to storms[3]. It was also noted as being aesthetically and ecologically harmonious. Importantly it also fostered a 'dune care' ethic important to maintaining the support of the local community in protecting the dune.

Unstable sand is the enemy. Vegetation creates a net above and below the ground to slow its movement.



Receding beach profile compared to stable beach profile. The dotted line can be thought of as the 'risk line', moving closer to houses and other assets in picture a), above[4].

The role of vegetation

Using vegetation to manage erosion is called a 'soft' technique. It is much less expensive than 'hard' engineering solutions, such as groynes or rock walls, and does not have the negative consequences of 'hard' structures such as loss of beach, amenity and environmental impacts. As set out above, there is good evidence that 'soft' technique can work at Collingwood Beach and that it can provide additional aesthetic and ecological benefits.

Important functions that vegetation can provide include:

- Trapping airborne sand and salt – vegetation height and density is important to achieve this. The higher and denser the vegetation, the more sand and salt will be kept seaward, away from houses and public assets.
- Trapping sand at the ground surface – vegetation structure is important to achieve this. Grasses that cover the ground surface and act as a net, hold sand in place and increase stability.
- Trapping sand beneath the ground surface – root structure is important for this. The deeper the roots penetrate and denser they are, the more stable the overall land form will be.

Additionally, the shape of the dune is important. A dune that has a wedge shape (low near the water, higher near the residences) will provide better wind and salt spray protection.

Our impact on vegetation

Management activities can also have a large impact on how well the vegetation performs these functions. In developing a stable and resilient dune system, it is important to know that:

- Weeding or pruning activities that require people to walk over the vegetation, will impact the health of smaller plants, like grasses and seedlings.
- Pruning plants will increase susceptibility to disease and restricting the height of plants will affect the depth of the root ball. Both of these actions may impact on the long term stability of the dune.
- Removing plants or otherwise disturbing the soil can increase erosion and weeds.
- Taller more robust species will provide greater long term protection, although they will block out some views from the path and residences.

Where to now?

Three options have been developed that aim to balance the competing issues in an acceptable way (see the separate 3 POSTER SET). Which option provides the best result in your opinion: Option 1, 2 or 3?

The results of your feedback will be used to develop a detailed Dune Vegetation Management Plan that may combine or adapt the options to achieve a plan that can be supported by the broader community, while also meeting social, environmental and legal requirements for the area.

Comparative root systems and above ground height of trees, shrubs and ground covers at Collingwood Beach.

References

1. Haskoning Australia Maritime & Waterways (2014). Shoalhaven Coastal Erosion Remediation Adaptive Works Strategy for Transitioning from "Make- Safe/Make-Good" to "End-State" Protection. Report prepared for Shoalhaven City Council, July 2014.
2. SMEC (2011). Site Specific Emergency Action Plans for Shoalhaven City Council. Report prepared for Shoalhaven City Council, May 2011.
3. Davies P.T. & Kesby N.A. (no date). Coastal Protection Hard or Soft.
4. Woodroffe C.D. 2014. Collingwood Beach Jervis Bay, Geomorphological background. Presented at Collingwood Beach public forum.

ngh environmental

Shoalhaven City Council

Collingwood Beach
FACT SHEET 3

3

Management of dynamic natural systems

Collingwood Beach – a highly modified landscape

In the 1960's, dune vegetation was cleared along Collingwood Beach to make way for residential development. The vegetation types and structure that occur in the Council reserve today are a result of:

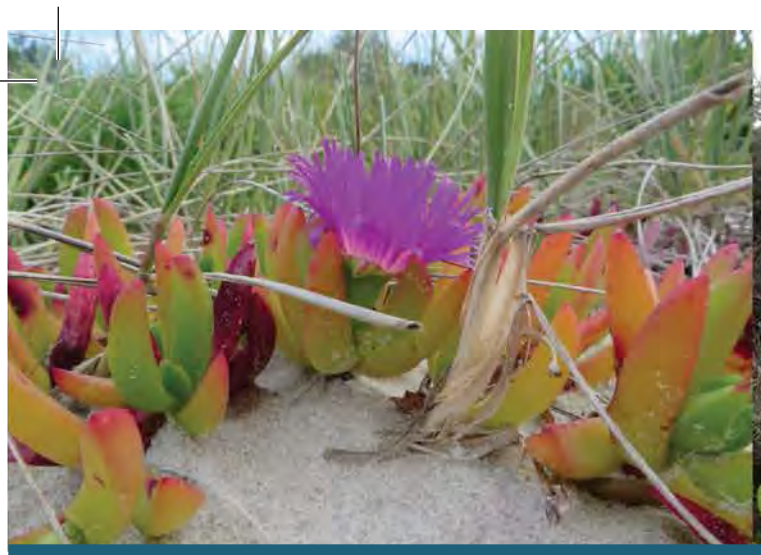
- An extensive vegetation rehabilitation effort that commenced in 1978
- Natural colonisation from surrounding vegetation remnants
- Management actions (legitimate as well as illegal) including weeding, pruning and poisoning of dune vegetation

Over time, the vegetation can be expected to continue to change. This occurs as a natural process called 'succession' as some plants grow to outcompete or replace others. As they grow plants may create more sheltered conditions for other species to survive. A natural vegetation system that changes over time in response to natural conditions generally becomes more resilient. We can influence the vegetation types and vegetation structure but we need to work with these natural processes for it to be both resilient and cost effective.

Banksias: friend or foe?

The local coastal vegetation is derived from the 'Coastal Foredune Scrub' vegetation community. Coast Banksia (Banksia integrifolia) is the most common tree in this vegetation type. It commonly occurs in dune vegetation. It is likely to have naturally occurred prior to initial clearing for housing in the 1960s (it can be found on Myola spit which had little human interference).

At Collingwood Beach, Coast Banskia is a very successful competitor. It produces many



seedlings. Its deep and dense root system helps dune stability and it creates habitat for smaller species less able to tolerate the harsh conditions. Its height blocks airborne sand and salt, keeping it seaward. Whilst Banksias contribute to a resilient dune system, their increasing prevalence causes concern for some members of the community. In several locations, dense Banskia thickets block out views of the bay and reduce the scenic vistas that were present when the dune had less vegetation following subdivision and major erosion event of the 1970s.

Management options for the reserve

A management plan is being developed for the Council reserve, to take into account the many 'services' to the community that the vegetation provides; natural areas and wildlife habitat, protection for assets against sand ingress, erosion and salt spray during storm events whilst acknowledging community requests for more views of the bay.

Management options are influenced by the resources available. While 'soft' vegetation management is considered to have many advantages over 'hard' engineering solutions, the costs are still substantial. The vegetation that exists at Collingwood Beach today has cost the community time as well as money, as many community members have contributed to planting efforts:

- In 1978 over 2500 trees were planted, dunes were reformed, access tracks stabilised, grasses planted1
- Around $44,000 was spent between 1978 - 1981 under the direction of the Soil Conservation Service[2]
- A cost for actively managing a 2km section of dune at Woonona beach has been estimated to cost $150,000[3]
- A 'hard' engineering solution to the Collingwood Beach risks has been estimated at approximately $ 18 million and was therefore deemed to be unaffordable[4]

Where to now?

Three options have been developed that aim to balance the competing issues in an acceptable way (see the separate 3 POSTER SET). Which option provides the best result in your opinion: Option 1, 2 or 3?

The results of your feedback will be used to develop a detailed Dune Vegetation Management Plan that may combine or adapt the options to achieve a plan that can be supported by the broader community, while also meeting social, environmental and legal requirements for the area.

References

1. Collingwood Beach Dunecare Group, Vincentia Ratepayers and Residents Association and Department of Conservation and Land Management Nowra (1993). 'Are you aware of importance of the dunes?' Flyer.
2. Davies P.T. & Kesby (1989). 'Collingwood Beach - Ten Years On'. Australian Journal of Soil and Water Conservation Vol. 2 November 1989.
3. Beardsmore, A., Gangaiya, P. and Misckiewicz, T. (no date). 'Winding Back the Clock in Dune Management at Woolongong'.
4. Haskoning Australia Maritime & Waterways (2014). 'Shoalhaven Coastal Erosion Remediation Adaptive Works Strategy for Transitioning from Make- Safe/Make-Good to End-State Protection'. Report prepared for Shoalhaven City Council, July 2014.

ngh environmental

Shoalhaven City Council

Figure 10—Secondary planting of tree species (Coast Wattle) on an area stabilized by marram grass.

DISCUSSION

The basic question arising from such a project is . . . will the beach now fulfil its natural function as a protective barrier against heavy seas? This question cannot be answered in the short term but, significantly, sand is now being accumulated and maintained within the system where it can add to the bulk of the protective dune barrier (figures 6, 8 and 9), and is not being permanently lost from the system as was previously the case.

Because of the proximity of development to the sea, and previous loss of substantial quantities of sand, it may yet prove too late to permanently restore the beach by the natural methods described. The use of engineered structures such as sea walls to protect landward development, and groynes to encourage sand accretion, may be necessary in the long term.

Nevertheless, it is now generally held by professional authorities that, when possible, non-structural measures should be employed to restore eroded beaches. "Various coastal protection measures ... such as groynes, dredging, offshore structures, and seawall construction have been used with variable success from an overall view, though they have often caused erosion on beach realignment in adjoining areas" (Anon. 1977).

CONCLUSION

The co-operative effort between an active local interest group, local government and professional government services led to efficient implementation of the project and its on-going maintenance.

The Collingwood Beach Project has so far achieved a favourable result with the limited amount of sand available, at a reasonable cost and within a relatively short time.

References

Anon. (1977) — Environmental control criteria for coastal beaches. *Environmental Guide ECB-1. State Pollution Control Commission: Sydney.*

Fleck, B.C. (1975) — Dune erosion, sand drift control and community effort — Callala Beach. *J. Soil Cons. N.S.W.* **31:** 19-24.

Posford, Pavry, Sinclair and Knight; Consulting Engineers. (1975) — Coastal zone management study, Culburra, Callala and Collingwood beaches. A study undertaken for Shoalhaven Shire Council.

Extract from the Journal of the Soil Conservation Service of N.S.W. Vol. 38, No. 1, January, 1982

THE COLLINGWOOD BEACH STORY – A CO-OPERATIVE EFFORT

BY

P. T. DAVIES

D. WEST, GOVERNMENT PRINTER, NEW SOUTH WALES—1983

The Collingwood Beach Story — A Co-operative Effort

P. T. Davies.

Sand drift from coastal beaches occurs when the dunal vegetation is damaged or destroyed. Loss of sand in this way reduces the capacity of the beach to withstand the onslaught of storms while the moving sand damages landward developments. Restoration measures centre on a revegetation programme and control of access to the beach.

This article describes a restoration programme carried out under difficult conditions: difficult, because the dunes had been largely destroyed by a series of severe storms leaving the beach in an unstable condition. As a result of this, sand drift inland from the beach became active. Thus the restoration programme had to be implemented on a greatly reduced dunal system (figure 1).

Figure 1—Storm damage at southern end of Collingwood Beach, 1977.

P. T. Davies is District Soil Conservationist at Nowra.

THE BEACH

Collingwood Beach is situated about 30 kilometres south of Nowra within Jervis Bay. It stretches north from Vincentia to Moona Moona Creek (figure 2).

The section of the beach which was severely eroded by the storms of May and June, 1974, is approximately 1.5 km long immediately south of Moona Moona Creek.

Before the storms, a public reserve 30 metres wide separated the seaward limit of development from mean high water mark. Following the severe storms of 1974 and a storm of lower intensity in July, 1975, Posford *et al* (1975) reported that the general width of the reserve had been reduced to about 17 metres and to as narrow as 7 metres near Berry Street (figure 3).

Maintenance works have included a further application of fertilizer (18:18:0 at 250 kg/ha) twelve months after the initial sowing, together with re-sowing of spinifex and spot plantings of marram grass. At this time, 1 500 tree seedlings, made available from the Soil Conservation Service nursery at Windang, were also planted. Species used were:

Coast Wattle	—	*Acacia sophorae*
Coast Teatree	—	*Leptosperum laevigatum*
White Honeysuckle	—	*Banksia integrifolia*

The fertilizer application was repeated twelve months later and an additional 1 000 tree seedlings, of the same species, were planted.

Local community interest and involvement in this project has been outstanding.

RESULTS OF TREATMENT

A few weeks after work commenced, a storm of moderate intensity developed in June, 1978. At that time, approximately 300 metres of the beach had been shaped to form a small dune with a 1:7 to 1:8 seaward batter and grasses had been planted on this section. The rest of the beach was still in its eroded, scarped shape resulting from the previous storms.

Following this storm, debris left by wave action indicated that the waves had penetrated about ten metres into the shaped and planted area. Damage to this area was negligible; however, the untreated section of beach suffered further erosion to a significant extent.

These results indicate that the formed batter slope was sufficiently low so that no significant energy reflection occurred and the waves were able to gradually dissipate their energy as they ran up the shaped batter without causing erosion.

The natural dune reformed rapidly within the planted area. In less than a year after completion of the works, sand accumulation from drift sand along the beach had covered much of the front dunal fence and, even at that early stage, the beach was in a much more favourable condition to withstand erosive storms. Since then, it has been necessary to increase the fence height as the dune built up (figures 6 and 8).

BENEFITS

The immediate benefits are obvious. There is now no need to remove drift sand from private homes and public roads, as sand drift inland from the beach is no longer a problem (figure 9). This represents a considerable saving in labour and expense, both public and private, as well as an improvement in living conditions for householders.

Another important, though intangible, benefit is that a desirable beach area has been restored to a condition where it can withstand public usage without deterioration.

Figure 9—Vigorous vegetation effectively trapping wind borne sand, and promoting dune formation.

Figure 7—Southern end of restoration works, six months after implementation of the scheme.

Figure 8—Same area as in Figure 7, fourteen months later. The buried fence posts indicate the considerable sand accretion.

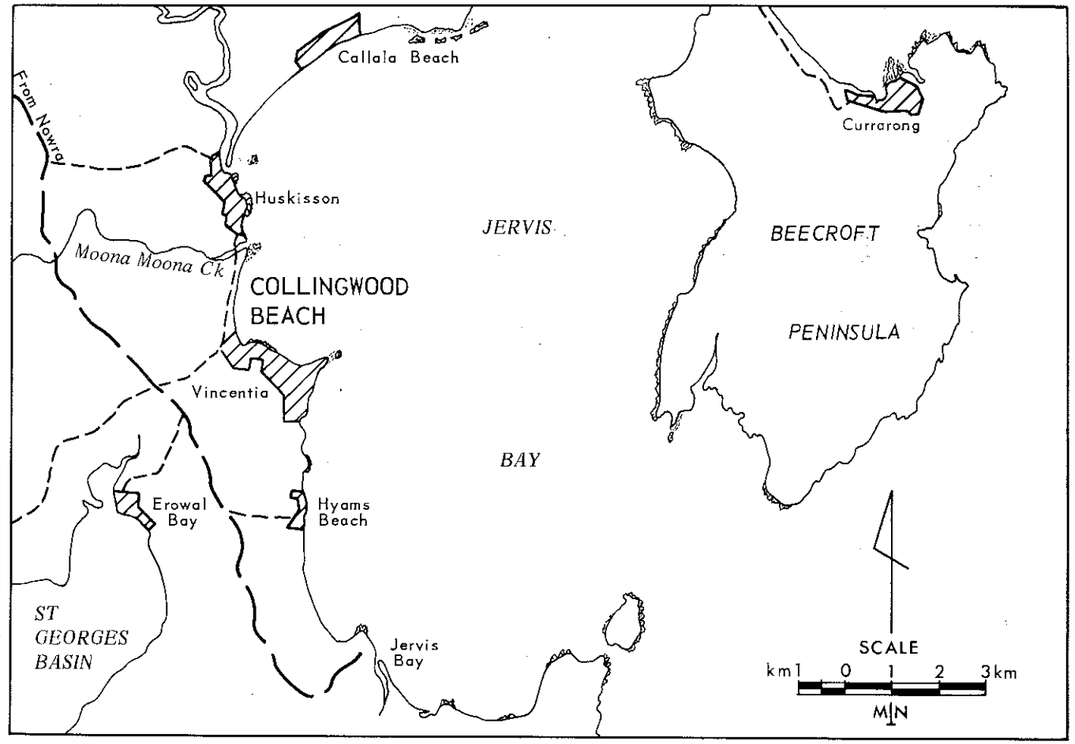


Figure 2—Collingwood Beach is situated within Jervis Bay on the New South Wales South Coast.

THE STORMS

Fleck (1975) described the combination of climatic factors which resulted in the storms of May and June, 1974, causing severe erosion at Callala Beach. As Callala Beach is only four kilometres north of Collingwood Beach, both being within Jervis Bay and of a similar aspect, it can be assumed that similar conditions prevailed at Collingwood Beach at that time (figure 2).

Results of the storm were more dramatic at Callala however, as housing development had taken place closer to the existing frontal dune system.

SAND DRIFT

Following the 1974-75 storms, sand began to accumulate on Collingwood Beach. Tide and swell action gradually returned sand to the beach which had been previously eroded by wave action into an off-shore sand bar.

By the latter part of 1977 this sand commenced to drift inland and became a continual problem for beachfront residents. Most of the dune vegetation had been destroyed by the storms and the pressure of human traffic moving onto the beach. Consequently, there was little vegetation left to arrest the landward drift of wind borne sand (figure 4).

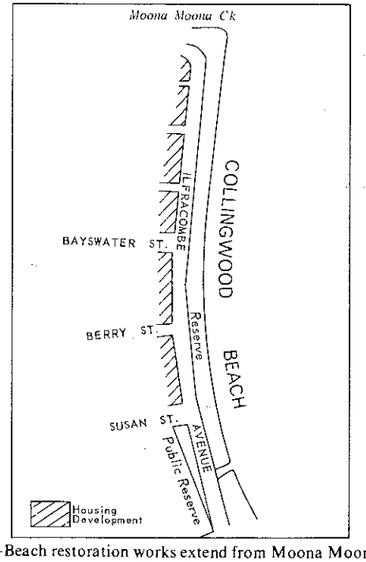


Figure 3—Beach restoration works extend from Moona Moona Creek to Susan Street.

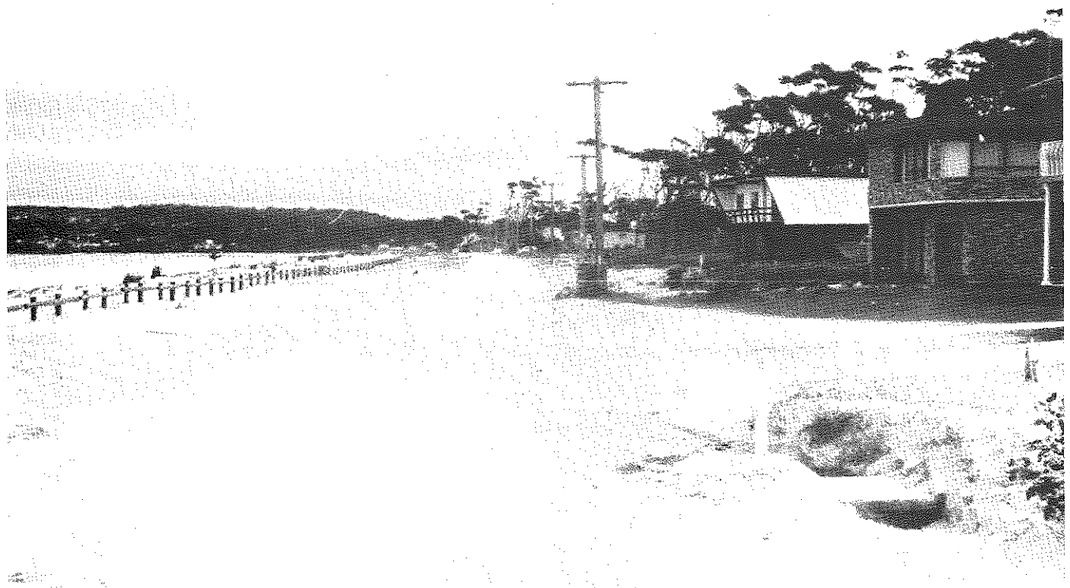


Figure 4—Active sand drift in March, 1978, along Ilfracombe Avenue.

Apart from the nuisance of sand drifting into private homes and yards and on to roads and into road drainage systems, the most serious result of the drift was that a protective dunal barrier was not reforming on the beach. It was evident that when further erosive storms eventuated both private and public property would be in serious danger of destruction.

CO-OPERATIVE EFFORT

At the instigation of the Collingwood Beach Progress Association, an on-site meeting was arranged in January, 1978, involving the Association, Shoalhaven Shire Council, and the Soil Conservation Service.

Following the meeting, a beach management plan was prepared by the Service and submitted to Council.

Following adoption of the plan by Council, restoration works were commenced by Shire staff in May, 1978, and completed in September of that year.

The eroded scarp of the frontal dune was reshaped, using a bulldozer, to form an approximate seaward slope of 1 : 7 (vertical to horizontal). The area, of average width 30 metres and length 1 500 metres, was planted to marram grass (*Ammophila arenaria*) and sand spinifex (*Spinifex hirsutus*). Fertilizer (18:18:0 at 250 kg/ha) was applied to the planted area which was protected from use by the public with fencing (figures 5 and 7). Public access to the beach was provided at regular intervals by fenced lanes and board-and-chain walkways down the frontal slope of the reformed dune. Road drainage onto the beach was also improved by provision of concrete pipes, through the reformed dunes, discharging onto rock mattresses.

On-site advice and initial and follow-up supervision were provided by the Soil Conservation Service, which also supplied spinifex seed heads. Marram grass (culms) were provided by the Commonwealth Department of the Capital Territory from their sand drift control project area at Bherreherre Beach. Members of the Collingwood Beach Progress Association assisted council staff with the restoration work.

Adequate rain fell after the initial planting, and marram grass established and developed well. Performance of the initial planting of spinifex was disappointing, apparently due to poor seed. However a replanting twelve months later gave satisfactory results.

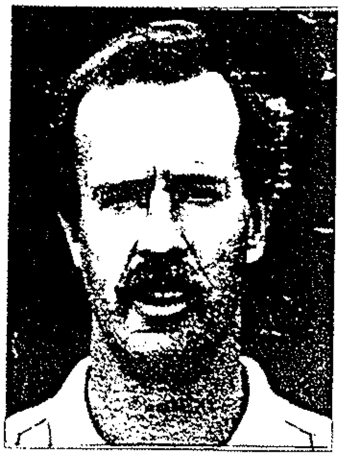
Following completion of the works in September, 1978, the Progress Association assumed responsibiliy for maintenance of the project. A subcommittee of beach-front residents from within the Association was formed for this purpose.

Figure 5—Northern section of Collingwood Beach, six months after restoration works had been carried out.

Figure 6—Same area as in Figure 5, fourteen months later, showing return of natural dune formation.

COASTAL PROTECTION — COLLINGWOOD BEACH TEN YEARS ON

PETER DAVIES — Director, Environment and Research, Soil Conservation Service of NSW, Kempsey.



NOEL KESBY — District Soil Conservationist, Soil Conservation Service of NSW, Nowra.

Summary: *This paper aims to highlight the economy and effectiveness of non-structural measures of coastal dune management as means of coastal protection, using the example of Collingwood Beach.*
The article describes a restoration program carried out under difficult conditions: difficult because the dunes had been largely destroyed by a series of severe storms leaving the beach in an unstable condition. As a result of this, sand drift inland from the beach became active. Thus the challenge was to undertake a rehabilitation program on a greatly reduced dunal system.

Introduction

Collingwood Beach is located within Jervis Bay on the south coast of New South Wales. It runs north from Vincentia to Moona Moona Creek. The section of beach, which was severely eroded by the 1974 storms and was subsequently rehabilitated, is approximately 1.5km long immediately south of Moona Moona Creek (Fig. 1).

Fleck (1975) described the combination of climatic factors which resulted in the storms of May and June, 1974, causing severe erosion of Callala Beach. As Callala Beach is only four kilometres north of Collingwood Beach, both being within Jervis Bay and of a similar aspect, it has been assumed that similar conditions prevailed at Collingwood Beach at that time (Fig. 2).

A report by consulting engineers (Posford *et al.* 1975) to Shoalhaven City Council recommended the implementation of a coastal protection program incorporating both "hard" (structural) and "soft" (vegetative) techniques.

As the recommendations were not immediately implemented the degraded dune vegetation was inadequate to trap sand returning to the beach, and by 1977 wind erosion was resulting in loss of sand from the dune by landward drift. At the instigation of the local community, a dune management plan was prepared by the Soil Conservation Service in 1978 and implemented by Council. The plan used only "soft" protection measures.

Davies (1982) described the development, installation and initial performance of the Collingwood Beach coastal dune management program from January 1978 to August 1979.

This paper continues to describe the performance of these "soft" measures since implementation. Factors considered include: subsequent climatic conditions; development of dune vegetation; dune profile changes; costs; benefits and problems associated with both program establishment and

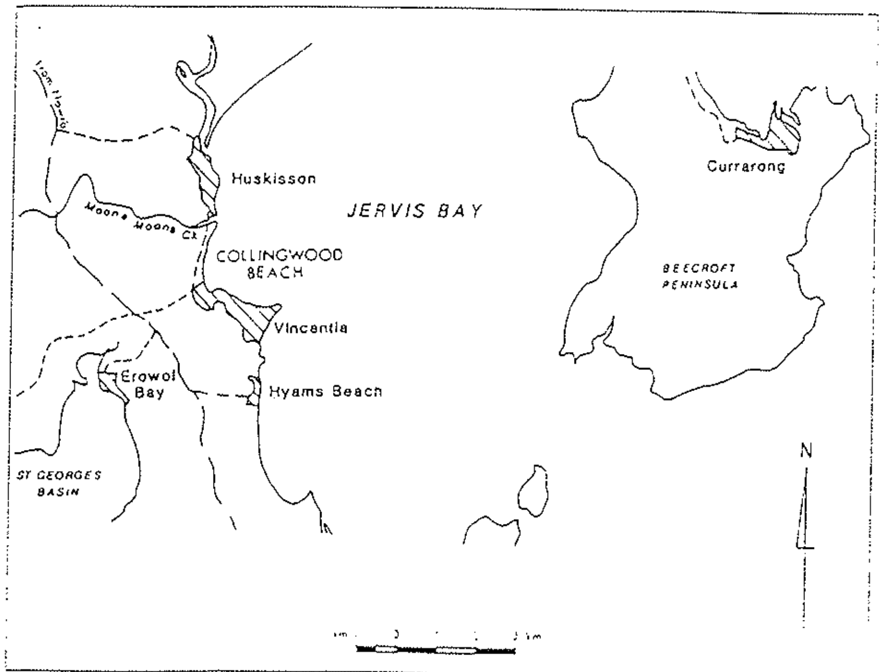


Figure 1. Collingwood Beach — location.

dune accretion, Council decided to implement Option 2.

On-site advice and initial follow-up supervision were provided by the Soil Conservation Service, which also provided spinifex seed heads and tree seedlings. Marram grass culms were provided by the Commonwealth Department of Capital Territory from their sand drift control project area at Bherreherre Beach. Members of the Collingwood Beach Progress Association assisted council staff with the restoration and follow up maintenance work (Figs. 4 and 5).

The three year rehabilitation program cost $32 000 and a further $4000 has since been expended on maintenance. The community input is difficult to cost because records were not kept, however they planted 2500 trees, carried out some spot plantings of spinifex seed and provided spray irrigation of some sections of the initial plantings. Therefore a value of $5000 on their input would seem reasonable. Total Cost $41000 to date.

Figure 4. Northern section of Collingwood Beach six months after restoration work (December 1978).

Storm Events Since Rehabilitation

1978 A few weeks after work commenced a storm of moderate intensity developed in June 1978. At that time approximately 300 metres of the beach had been shaped to form a small dune with 1:7 to 1:8 seaward batters. Following this storm, debris left by wave action indicated that the waves had penetrated ten metres into the shaped and planted area. Damage to this area was negligible; however, the untreated section of beach suffered further erosion.

1979 — 1985 There have been numerous smaller storms during this period, however, they have had little impact on the beach. Any sand that had been removed by wave action had quickly returned to the beach.

1986 In August 1986 the beach experienced further storm action. Wind gusts up to 63 knots were recorded and a constant wind of 40 knots prevailed over a three day period. These winds produced considerable sand drift from the beach berm prior to any wave erosion. By 1986 the vegetation along the dune crest was well established and this resulted in a lowering of the wind velocity and most of the drift sand was dropped in front of the dune paddocks. During the latter period of the storm, the seas, whipped up by the strong winds, began to attack the beach. Because of the massive build up of sand along the beach since 1978, only a part of the incipient dune was affected by the wave action.

Community Awareness and Attitudes

The Service considers that the success of a beach management plan is critically dependent on the positive awareness and attitude of the community at large, and particularly that of the local community.

As indicated, community support and awareness of the program was very high. The nuisance of sand drift and threat of wave erosion was stimulus enough for this. Their initial involvement in the program also fostered a strong feeling of stewardship towards the dune environment.

However, as human nature dictates, time quickly blurred the images of a degraded dune system, its loss of amenity and the threat of destructive storms. The fencing is now seen by some as an impediment to the beach's usage, and the developing dune and tree cover is seen as spoiling the view of the "tranquil" waters of Jervis Bay. To compound the problem, a number of recent residents have moved in. They have only a hearsay comprehension

Figure 5. Northern section, nine years later, showing reformed dune. Note telegraph pole as reference point.

in beach restoration works and appreciation of their worth in recent years because of mild ocean conditions and the recent influx of many new residents to the area. The Service is now carrying out needed dune maintenance works. However, we consider the most effective and permanent solution as being the involvement of the residents in caring for their own dunal environment. To this end a "Collingwood Beach Dunecare Group" has been formed.

Acknowledgement
The ready assistance of Mr. R.J. Stanley, Investigations Officer, Soil Conservation Service in providing editing and technical advice, is gratefully acknowledged.

References

Davies, P.T. (1982). The Collingwood Beach story — a co-operative effort. *J Soil Cons NSW.* 38:132-138.

Fleck, B.C. (1975). Dune erosion, sand drift control and community effort. *J Soil Cons NSW.* 31:19-24.

Posford, Parvey, Sinclair and Knight (1975). *Coastal zone management study, Culburra, Callala and Collingwood beaches.* A study undertaken for Shoalhaven Shire Council.

Smith, E. (President Collingwood Beach Progress Association) — pers comm.

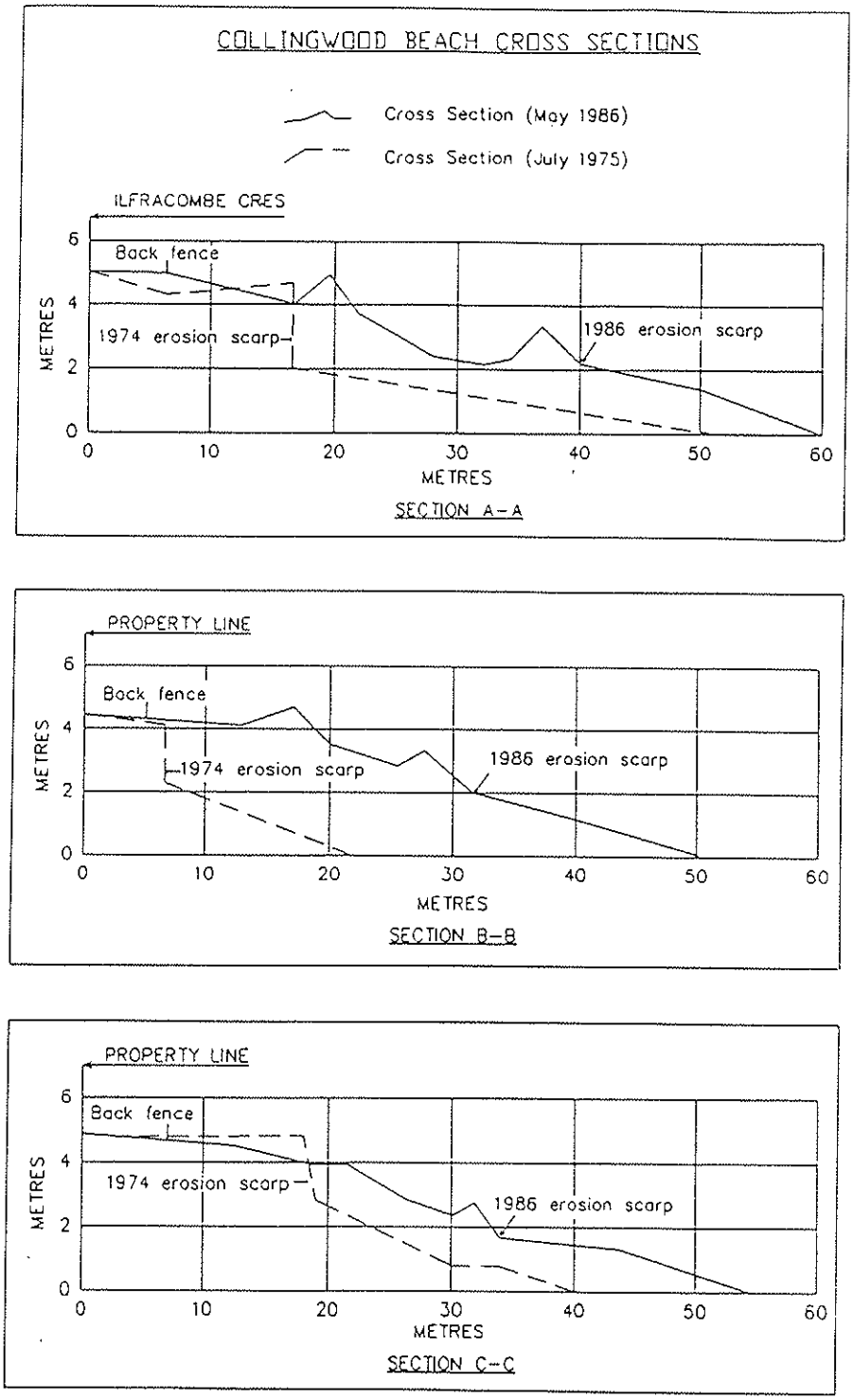


Figure 8. Collingwood Beach cross-sections

Revegetation of Collingwood Beach Sand Dunes, Vincentia

Come along and join in with neighbours in the stabilisation of Collingwood Beach sand dunes. Make it a community effort. Share a morning tea break mid morning when the bonding begins to tell.

MEET: At the public reserve beside Moona Moona Creek off Illracombe Avenue.

TIME: 9.00 a.m. on Saturday, 8th September, 1990.

BRING: ... plenty of enthusiasm
... your own garden spade if you have one
... a plastic bucket for watering the shrubs you plant
... an identifiable cup to be used for morning tea

The Soil Conservation Service will provide -

... advice on planting the shrubs
... shrubs to be planted
... fertilizer pellets
... garden spades and plastic buckets where necessary

The shrubs to be planted are coastal wattle and coastal rosemary which have a growth height of less than two meters. Trees may be planted later in carefully selected positions.

If you would like to donate a cake for morning tea, please contact Joan Adams on 416930 or Pat Cooper on 416299. We hope to have the billy boiling by 10.30 a.m.

DUNE CARE

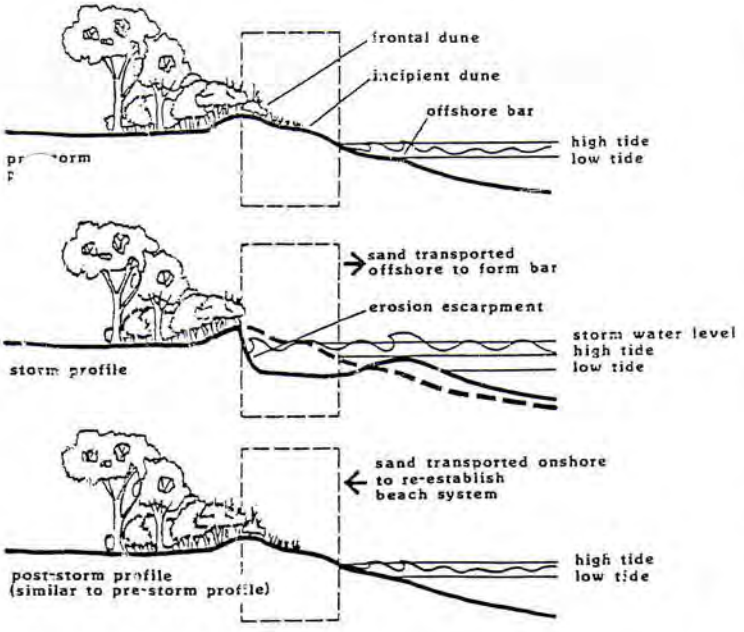
This programme is being carried out by the Collingwood Beach Dune Care Group. This group of local residents is under the direction of the Vincentia Ratepayers & Residents Association Inc.

ARE YOU AWARE OF THE IMPORTANCE OF SAND DUNES?

The sand dunes of Collingwood, Orion and Nelson Beaches are fragile environments that are constantly under stress from human interference and natural forces.

The dunes and their vegetation are very precious. They restrict wave and wind erosion, sea intrusion, salt spray and sand drift into areas behind beaches including homes and roads; they supply sand to the beaches; act as a buffer to wave attack; and they provide a transition from marine to terrestrial environments.

The dunes and their vegetation are a vital part of beaches. Vegetation deflects wind, traps sand and holds it in place. This then promotes dune growth and dune reformation following storms (Figure 1A). Vegetated dunes are vital to reduce wind erosion. Without them your beach and property are in danger from sand-drift and storm damage (Figure 1B). The dunes are a part of the natural beauty of Jervis Bay and they desperately need to be protected from human interference.



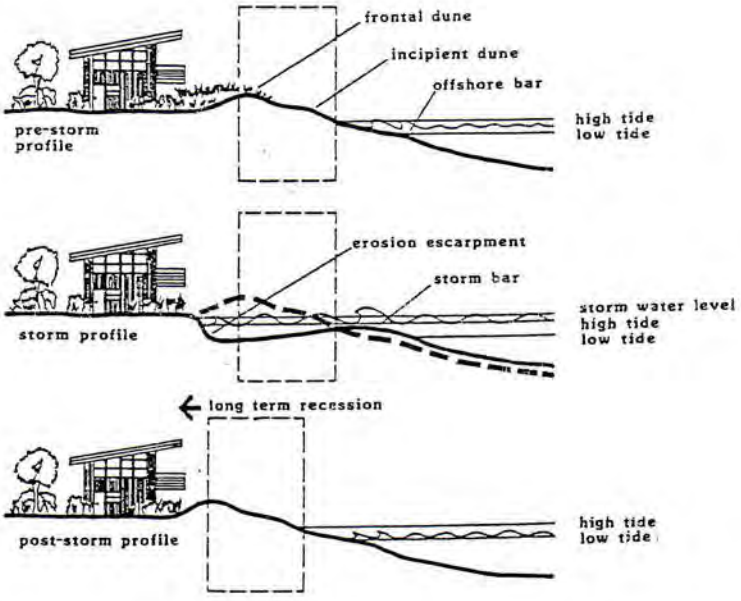


Figure 1A (left): Stable vegetated dune. Figure 1B (right): Unstable dune without vegetation

Damage to Sand Dunes and Their Vegetation

A number of actions can damage our sand dunes. Some of these are natural; others are caused by people. The dunes of Collingwood, Orion and Nelson Beaches are being damaged by the following human activities which are placing these beaches under high erosion threat.

* Destruction and removal of trees including cutting branches and poisoning, to obtain a better view or gain easy access to the beach (Figure 2).

* Walking through fenced areas rather than using designated access tracks.

* Destruction of vegetation by fire and the collecting of firewood.

* Dumping of rubbish, including garden waste such as grass clippings and prunings on the dunes and surrounding land.

* Destruction of signs.

These activities are contrary to the community's use of the beach. They also violate Council and State Government legislation aimed at protecting dunes and their vegetation. It is an offence under the Crown Lands Act, 1989 to interfere with dunes and their vegetation. Residents are urged to report any damage to the Council Ranger on 293111 BH or 213100 AH.

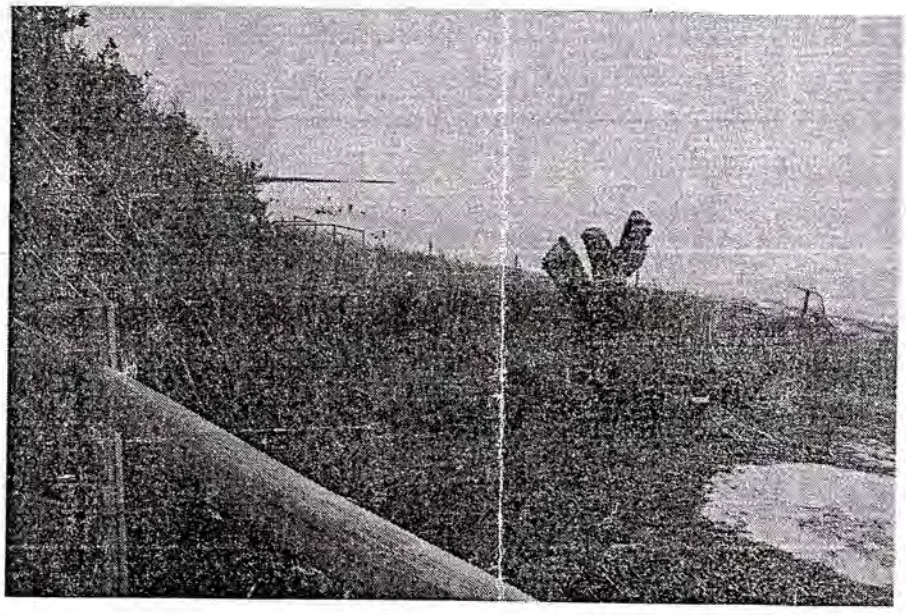


Figure 2: The destruction of trees on the dunes of Nelson Beach, 1993.