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.

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THE COLLINGWOOD BEACH STORY – A CO-OPERATIVE EFFORT

BY

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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.

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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.

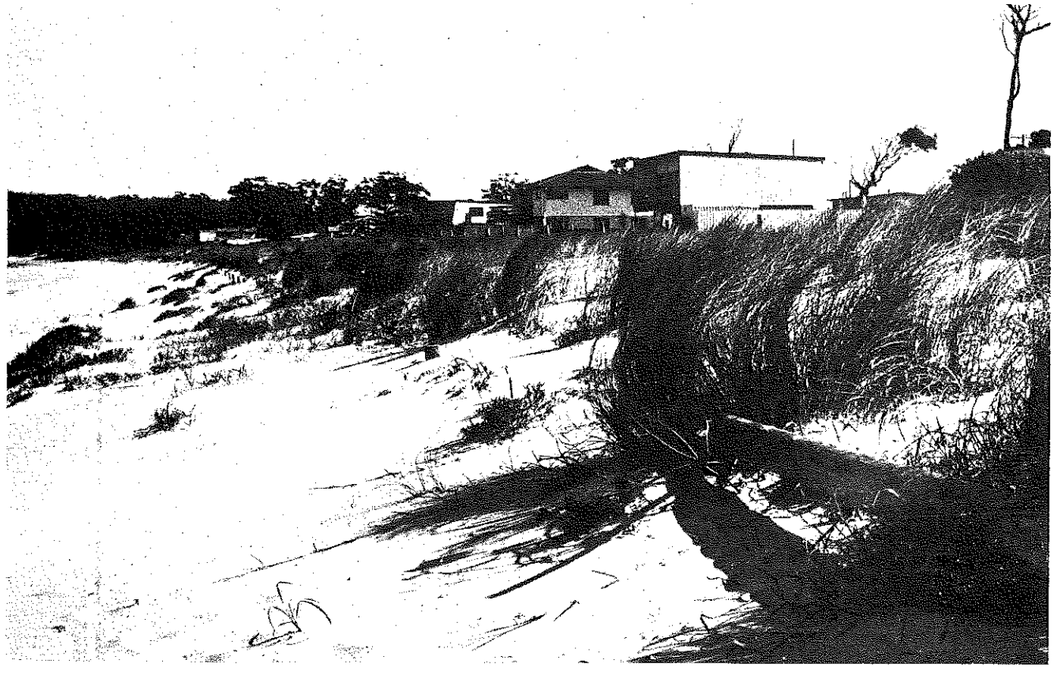

Figure 8—Same area as in Figure 7, fourteen months later. The buried fence posts indicate the considerable sand accretion.

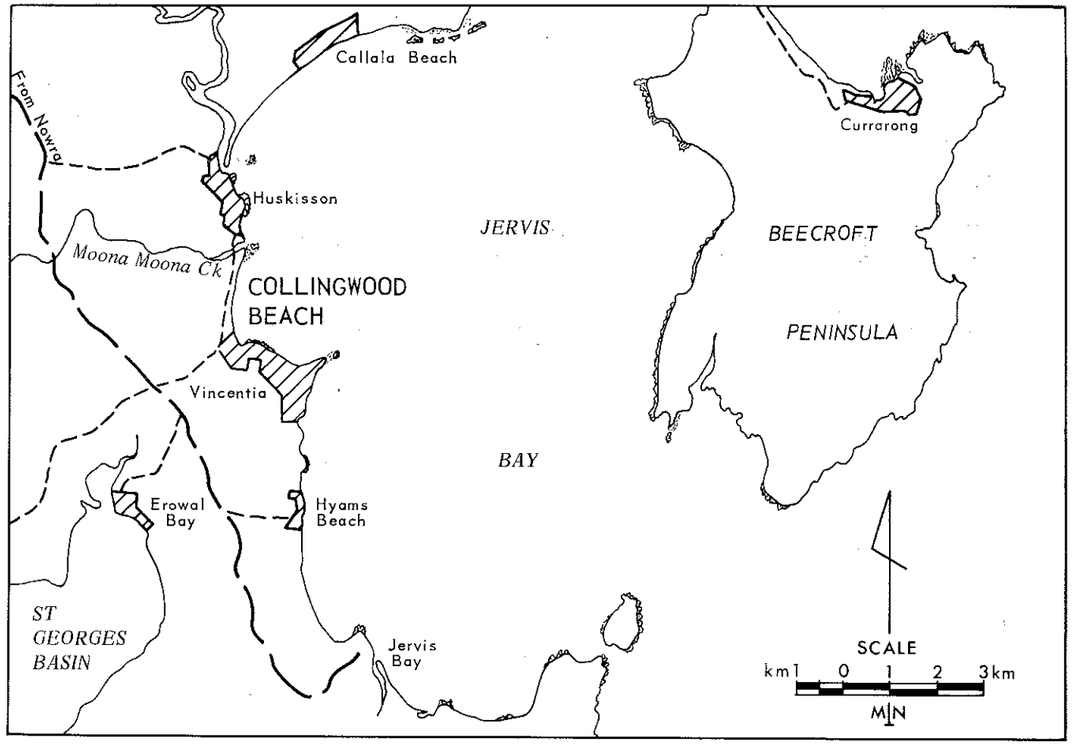

Figure 2—Collingwood Beach is situated within Jervis Bay on the New South Wales South Coast.

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).

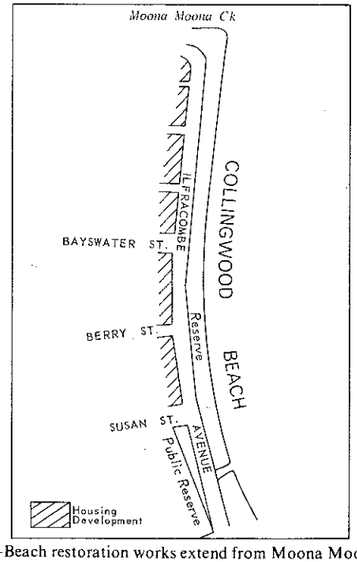

Figure 3—Beach restoration works extend from Moona Moona Creek to Susan Street.

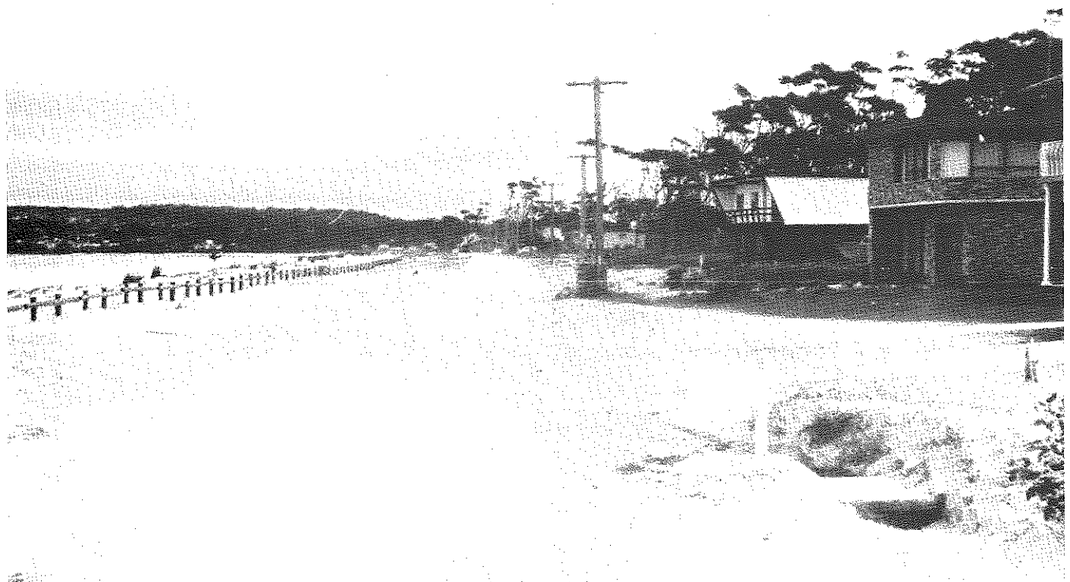

Figure 4—Active sand drift in March, 1978, along Ilfracombe Avenue.

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.