

GEOGRAPHY

Coastal Dunes at Warilla Beach

Nature and Location

Warilla beach is located 100km south of Sydney, 35°S, 151°E. Due to the rapid 1.7%p.a population growth in Shellharbour and a large tourist influx in summer, the coastal dune ecosystem suffered from increased stress through human impacts. Relevant examples of the stress this ecosystem was under includes; damage of dunes and vegetation, as well as changes to runoff patterns and more. Several management practices have been introduced to reduce the impact of humans on the coastal dune ecosystem; some examples of these include the Rip Rap Wall at South Warilla Beach, dune restoration at Pur Pur Point and the Recreation Park. These management practices all work differently and have several advantages and disadvantages.

Biophysical Processors

The biophysical processors of the ecosystem at Warilla beach are very important as they enable the beach to function correctly, however, with increasing detrimental human impacts these processors are being interfered with, resulting in the damage of the dune ecosystem. Sand dunes are a very important ecosystem as they act as a buffer which protects the land from the sea and absorbs wave energy, therefore these dunes need to be protected and managed appropriately. The erosion accretion cycle, longshore drift, vegetation and the dynamic equilibrium are all examples biophysical processors which enable the coastal dune ecosystem to function properly. However, as well as human impacts, natural processors are also affecting the dune ecosystem; these include storms, floods, washouts, blowouts and fires. In order for the biophysical processors to continue to function and manage this dune ecosystem, human impacts need to be managed appropriately and effectively.

Management Practices

Traditional

Aboriginals had many management practices which helped to sustain the environment at Warilla beach including its coastal dune ecosystem. Some practices included the middens to reduce pollution, fires to damage vegetation, exposing sand and creating migrating dunes, the rule of only taking what you need and leaving species especially females to reproduce. These practices along with cultural values such as the role of totem, and the in depth understanding of the land and the interrelationships within the ecosystem all helped sustain the environment of Warilla beach and its' surrounding areas enabling the biophysical processors to continue functioning.

Contemporary

South Warilla Beach-Rip Rap Wall

One contemporary management practice which was introduced at South Warilla beach was the Rip Rap Wall to protect the surrounding streets and houses. In the 1950s residential development occurred on the secondary dune which destroyed the natural vegetation and interfered with the dune cycle therefore reducing the buffer. In the 1970s a large storm removed large quantities of beach and several houses were in danger of being washed away into the sea.

Although this rock wall protected the houses and slightly dispersed wave energy there are several disadvantages of this wall. These include its promotion of turbidity which means sand is removed by a longshore drift and transported to the north resulting in the beach not accumulating implicating a reduction of the beach width and poor amenity. Along with these negative issues the wall was very

expensive to build and maintain. The wall also restricted access to the beach therefore lifesavers could not get boats and other equipment to the beach as well as being dangerous for children.

In order to fix the issue of poor access for the lifeguards, the surf lifesaving club was relocated further north to the middle of Warilla beach.

From these negative impacts of the rip rap wall there have been several strategies put in place to try and minimise the walls impacts. An example of this is beach nourishment from Lake Illawarra entrance to widen beach and improve amenities, however, this was expensive at about \$2 million to dredge and transport sand, as well as maintaining because LSD resulted in the narrowing of the beach again. Other management practices included the buyback of houses at risk to convert the space into a recreation area. Although these strategies to minimise the effects of the Rip Rap Wall were effective to an extent they were very expensive and other practices such as the Groyne and honeycomb wall were more effective.

Pur Pur Point-Dune restoration

Another major management strategy put in place was the processes of dune restoration at Pur Pur Point which was more successful than the Rip Rap wall as it enhanced the natural and biophysical processes. In the 1960s large amounts of sand was extracted and sold to Hawaii disturbing the dune process, as well as this, the Lake Illawarra entry caused a wash over and uncontrolled human access to each area.

In order to open the LIE and prevent sand entering it, a Groyne was created to trap the sand moving north via the LSD and form a Tombolo which accumulated sand at Pur Pur Point. This strategy was successful as it resulted in the opening of the LIE and supported the sand accretion at Pur Pur Point. With this accumulation of sand at Pur Pur Point dunes were built and shaped by bulldozers and an aero dynamic shape with 2 dunes and a swale was formed. Board and chain walkways every 60m and signage was then introduced to minimise human impacts such as trampling and disturbance of vegetation. Fencing and netting also helped to keep humans off the dunes; fences were in the form of treated pine poles so they can be lifted as sand grows and a shade cloth to trap the sand. Vegetation was introduced to further allow for the important, natural vegetation succession. Primary species such as Marram grass, Spinifex, pennywort, rocket etc were planted as well as secondary including coastal tea-tree, wattle, pigface etc and tertiary such as coastal Banksia, Bitou bush and swamp oak etc.

This strategy of dune restoration was successful in opening the LIE and allowing for biophysical processes to continue. It's replication of natural processes and dune cycle of trapping sand as it returns via accretion makes it a more effective and sustainable management practice in comparison to the RRW at south Warilla beach as it looks natural and requires little maintenance. This strategy also protects the park and facilities behind the dune, however, similarly to all human made ecosystems, it lacks biodiversity.

Recreation Park

The recreation park is another management strategy put in place to minimise human activity on the dunes. Rubbish bins and tables are examples of keeping human impacts to a minimum by controlling pollution and access to the dunes.

Overall, the management strategies put in place at Warilla beach in order to protect the coastal dune ecosystem had many advantages and disadvantages. The RRW at south Warilla protected the surrounding streets and houses; however, it resulted in poor amenity, due to the ugly wall and the narrowing of the beach. It also disturbed the natural processes such as the erosion accretion cycle and was expensive to create and maintain. The dune restoration strategy was far more effective and resulted in a natural, sustainable and efficient dune cycle which looks much better and requires little maintenance, however, lacks biodiversity.