

Common misconceptions about beaches

Introduction

Interactive behaviour between the sea and the beaches is a complex process which is often poorly understood. One of the Beach Protection Authority's main functions is to provide expert advice to local government and the general public on the management of coastal areas. However, people have many misconceptions about beach behaviour and coastal processes, and sometimes impede implementation of the Beach Protection Authority's advice, advancing concepts which are not soundly based. The purpose of this article is to refute some of the common misconceptions.

Misconception

Beach erosion is a problem and must be prevented.

Facts

Erosion is an integral part of natural coastal processes which have formed beaches and which maintain them in a condition we can all enjoy.

Beaches are composed of individual grains of sand which move easily with the forces of the waves, currents and the wind. These forces are constantly changing. Nature has established a balance in which beaches preserve themselves but are never static. The effects of erosion during storms are balanced by subsequent accretion and dune building in calmer conditions.

Beaches are most effectively protected if we accept the natural processes of erosion and accretion and do not disrupt the balance in our use of the coastal zone.



This photograph taken on North Stradbroke Island shows the damage to sand dunes caused when vegetation is destroyed, in this case by indiscriminate use of vehicles.

Misconception

Sea walls built along the foreshore prevent beach erosion.

Facts

A natural beach may move landward or seaward under the influence of wave action and ocean currents.

This movement is the result of sand being moved from the beach to offshore areas during periods of heavy wave action and subsequently being returned in calm periods.

A sea wall built along a beach isolates the sand behind the wall from the active beach system. This sand is excluded from the normal onshore and offshore movement characteristic of natural beach behaviour. As a result, the beach seaward of the wall can become unusable for substantial periods after heavy wave action.

Sea walls really act only to protect landward property. They offer no protection to beaches against erosion.

The further seaward a wall is constructed, the greater the quantity of sand isolated, and the less likely it is that a usable beach will be maintained in front.

On persistently eroding beaches, the receding beachline will place a sea wall progressively further seaward on the beach profile over time, until no beach exists in front of the wall. Clearly, the establishment of fixed sea wall alignments on persistently eroding sections of beach will eventually lead to the loss of the beach as a useful recreational amenity.

Conversely, if a beach is allowed to erode naturally, unimpeded by the presence of a sea wall, a usable beach will always be available.

Misconception

Recreational use and development of the sand dunes pose no threat to the beach.

Facts

The frontal dunes and the upper part of the beach represent a vital reserve of sand. They provide a ready sand supply to the beach during erosion phases when sand is being moved off the beach by wave action.

The community often places great value and importance on facilities and structures located on or close to the beach. We even regard parklands developed over dune areas adjoining the beach as in expendable. Any threat of erosion to such facilities or lands usually leads to community pressures for the construction of a protective barrier such as a sea wall. This can then lead to the loss or severe depletion of the adjacent beach through isolation of the dune sand from the active beach system, as discussed earlier.

Consequently, any structures or recreational areas likely to require protection from erosion should be kept as far landward as possible.



A seawall was constructed at Machans Beach in Mulgrave Shire to halt a persistent erosion trend which threatened the adjacent development. The wall has led to the degradation of the beach to the extent that virtually no usable beach remains.



At Burleigh Heads on the Gold Coast, car parking and other public facilities have been located on the frontal dunes. Even minor erosion will constitute a direct threat to these public assets and will involve remedial action at considerable expense and possibly with adverse consequences for the beach itself.

Misconception

A good cover of trees and grasses on the dunes will effectively prevent beach erosion.

Facts

A good cover of vegetation on the frontal dunes landward of a sandy beach traps the sand blown from the beach by the wind and causes the dune to grow and advance towards the sea. This process, when accompanied by progressive growth of dune vegetation, can result in large volumes of sand being stored in the frontal dunes.

During periods of heavy wave action, when sand is moved from the beach to offshore areas, the beach moves progressively landward. Eventually, this landward movement of the beach reaches the frontal dune.

Sand is then supplied to the beach by progressive slumping of the frontal dunes, slowing down the rate at which the beach moves landward. The larger the frontal dune, the greater its ability to continue to supply replacement sand to the beach during periods of heavy wave attack. Destroying the vegetation in sand dunes allows the wind to blow the dunes away, thus increasing the vulnerability of the coast to erosion.

While a good vegetation cover helps increase the volume of sand in the frontal dune and prevents wind erosion, the presence of the vegetation itself provides little resistance to wave erosion. The roots of plants and trees have virtually no capacity to reduce the loss of sand from the beach caused by wave attack. The role of dune vegetation is restricted to building the frontal dunes and preventing sand loss from the beach system by wind erosion.

Therefore, while a good cover of vegetation on the dunes is an important aspect of the coastal environment, we must recognise the limitations of vegetation by itself as a means of erosion prevention.

Misconception

Adding sand to beaches (sand nourishment) only provides temporary protection until a storm occurs, when most of the sand will be lost.

Facts

The replenishment of beaches by sand nourishment is one of the best available means of restoring beaches where erosion has become a problem. Sand nourishment effectively reclaims land from the sea: it thus increases the width of land available to accommodate erosion, while at the same time allowing the beach to continue to behave naturally.

An essential aspect of proper beach nourishment is that any sand added to the beach comes from a source outside the zone where significant beach profile changes are occurring. The sand introduced thereby represents a gain in the quantity of sand contained within the beach system rather than just a transfer from one part of the system to another.

It is also important that the grain size of nourishment sand be similar to that of the existing sand. This ensures that the slope of the beach profile remains compatible with the pre-nourishment profile, and that sand movements as a result of natural profile adjustments are minimised.

Sand placed in only a few selected areas of a generally eroding coastline or placed to form only the upper (visible) part of the beach will usually be dispersed quickly through the beach system. The sand is not 'lost' but remains in the active beach and nearshore zone, resulting in some gain overall but a less-than-desired gain



Development has been set well back from the beach at Bokarina on the Sunshine Coast to ensure that the amenity of the beach is always maintained, and so that the development is not threatened by future shoreline movements.



Surfers Paradise beach was nourished with about 1.4 million cubic metres of sand in 1974, and new dunes were formed and vegetated. These dunes have accommodated erosion which occurred during a storm in 1983. The photograph taken soon after the storm shows the beach still in good condition.

for individual beaches. To achieve complete beach restoration, a sufficient quantity of sand, consistent with the magnitude of the erosion problem, must be placed during nourishment.

Many people mistakenly perceive the redistribution of sand from the visible part of a beach to nearshore areas during heavy wave attack as a permanent loss of sand from the beach. However, this sand will always be retained within the active beach and nearshore zones, readily available to contribute to replenishment of the eroded beach, which will occur naturally during the ensuing calm periods.

Misconception

Taking sand from the mouths of rivers and estuaries and placing this sand on nearby eroding beaches is an effective means of overcoming erosion problems on these beaches.

Facts

Large sand masses found at the mouths of creeks and rivers are often perceived as ideal sources of sand for beach nourishment. In most cases, however, the sand is beach sand, moved into and out of the estuaries by natural processes which are linked to the behaviour of the adjacent beaches. Moving this sand onto the beaches will only result in a short-term gain, as it will be replaced eventually in the estuary by sand which moves in from beaches near the creek mouth.

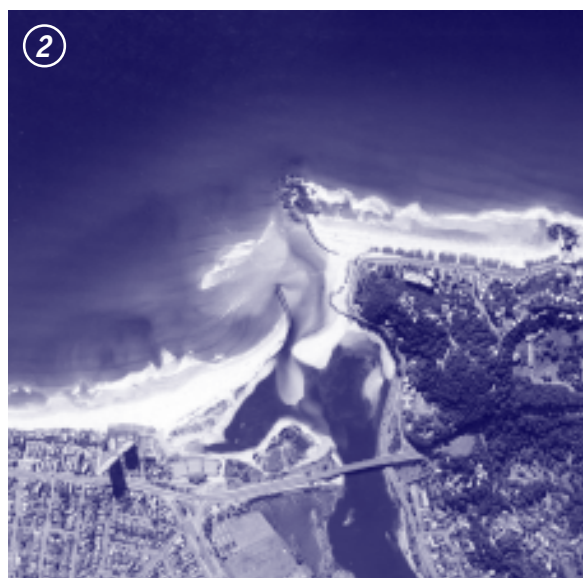
An equilibrium exists in estuaries: beach sand enters and accumulates in the estuary under normal conditions and is flushed out in times of flood. If sand is removed from the estuary and placed on the beaches, the equilibrium is disturbed. Sand, equivalent in volume to the sand removed, tends to flow back to the estuary from the nearby beaches to restore the equilibrium. Thus, the quantity of sand added to the nourished beaches will correspondingly be lost from the beaches near the estuary, resulting in no overall net gain to the beaches.

Conclusion

One of the Beach Protection Authority's prime functions is to provide advice to the authorities responsible for the management and maintenance of this State's beaches.

Misconceptions relating to beach processes must be eliminated from coastal engineering practice and coastal management if this State's beaches are to be properly protected. All persons involved in coastal management must recognise the need for sound technical advice as the basis for successful coastal management.

The Beach Protection Authority's coastal engineers and scientists are trained to high standards. They ensure that all investigations of beaches carried out by the Authority are both well planned and based on reliable data. They are also equipped to educate people in wise use of coastal resources.



Using sand obtained from estuaries for nourishment of beaches provides only short term gain to beaches. In most cases, sand will tend to return to the estuary to replace the quantity removed. Extensive dredging of the Currumbin Creek estuary on the Gold Coast was carried out in 1981. Photograph 1 shows the estuary soon after dredging. Photograph 2 taken in 1984 shows that much of the sand removed by the dredging has removed.