Coastal monitoring: Shoreline position

Why monitor the coastline? Monitoring the coastline allows us to identify long-term trends and highlight any vulnerable areas on Gold Coast beaches.

Coastal Monitoring

Beaches are naturally dynamic. Small changes, associated with wave-induced sand movement, can be observed on a daily basis while large changes are observed during major storm events (see Beach erosion: Coastal processes on the Gold Coast information sheet). Understanding how the shoreline position changes, both during erosion and accretion (or deposition), leads to better management through prioritising coastal works.

Current monitoring technologies and techniques used on the Gold Coast include hydrographic surveys that extend from the dunes into the wave breaking zone, detailing the beach profile (see Coastal monitoring on the Gold Coast information sheet), as well as remote cameras which are used for shoreline position and beach width monitoring.

Improved technology and remote techniques have led to innovative methods of monitoring shoreline changes. Data collected can also be used to develop predictive models to understand what changes may occur during extreme storm events.

Shoreline position monitoring

Shoreline position monitoring is undertaken using a series of sophisticated cameras that allow continuous monitoring of a number of beaches along the Gold Coast. These systems collect real-time images of the coastline and indicate beach width and shoreline position to assist in monitoring the effectiveness of management strategies and post-storm recovery of beaches.

Over the monitoring period, results show the overall trend in shoreline position (defined by the height of the water at mid-tide or mean sea level). The shoreline position can vary as a result of periods of accretion, where beaches became wider due to the deposition of sand, and periods of beach erosion after storm events. Monitoring also highlights the recovery period after erosion events which assists in understanding the natural coastal processes at play. The formation of sand bars and the presence of rip currents can also be detected from the images collected.

CoastalCOMS camera
(Source: CoastalCOMS)
Coastal Imaging System

The Argus coastal imaging system was implemented in 1999 and is managed by the Water Research Laboratory, within the University of New South Wales. The system has been in place at the following locations:

- Narrowneck Beach from 1999 to 2008
- Palm Beach from 2004 to 2008
- Southern Gold Coast beaches (Kirra, Coolangatta/ Greenmount and Rainbow Bay/Snapper) since 2002 as part of the Tweed River Entrance Sand Bypassing Project.

The Argus system is a static, multi-camera system spanning a 180 degree view of the coastline. The system is mounted on a local high-rise, up to 100m above sea level. Digital images are collected every daylight hour, with a snapshot image and a series of several hundred images taken within a 10 minute period to create a timex image of the shoreline.

CoastalCOMS

CoastalCOMS currently provide shoreline position data for Palm Beach and the northern Gold Coast beaches (Surfers Paradise and Narrowneck). A rotating, robotic camera is installed at each site on a nearby high-rise building that views the beach vertically. During the mid tide each day a snapshot image and video feed is collected and from this a time exposure image, or timex image is created. The timex image smooths out the waves and shows the shoreline position.

The CoastalCOM cameras have been in place since October 2008 and six-monthly reports are provided to Gold Coast City Council to assist with the management of these beaches.