Both physical and human elements influence the Tweed River entrance and southern Gold Coast, the area where the Tweed River Entrance Sand Bypassing Project (TRESBP) operates.

**Physical elements**

The shape of the coastline fluctuates. Sand is constantly moving in the surf zone—eroding (washing away) and accreting (building up) with the influence of physical elements. These elements are examined below.

**Waves**

Waves shift sand. On the Gold Coast, average wave energy is high. During cyclonic periods, waves in excess of 11 metres have been recorded at the Waverider buoy off Kirra. During storms in May 2009, a 5.6-metre wave was recorded on the southern Gold Coast and waves were higher than 4 metres for four days. With very high tides at the time, waves cut even further into dunes and foreshore areas.

**Longshore drift**

Along Australia’s east coast, ocean swells from the south-east push sand (in the ocean) to the north. This is longshore drift; this drifting sand is needed to build up beaches, especially after storms. But the drift can be interrupted by natural or man-made structures.

**Tropical cyclones**

The Gold Coast averages 1.3 cyclones per year, but this is only an average. Three severe cyclones hit the Gold Coast in quick succession in 1974. In contrast, from the 1980s to the early 2000s there were few cyclones. In February 1954, a very destructive cyclone crossed the coast at Coolangatta. Beaches were scoured by waves, rain and storm surges. The Bureau of Meteorology has summarised this event, see: www.bom.gov.au/lam/climate/levelthree/c20thc/cyclone3.htm

An east coast low (ECL) is a low pressure system that intensifies rapidly, most commonly in autumn or winter. The storm-force winds can be as severe as strong cyclones. The Gold Coast and northern New South Wales suffered a series of storms from February to June 2009, mostly generated by ECLs, causing extensive coastal erosion and flooding. The intervals between storms were not long enough for natural beach recovery. See more on the impact of these 2009 storms: www.tweedsandbypass.nsw.gov.au/topics_of_interest/autumn_storms_2009 In June 1967, three ECLs brought storms that battered the Gold Coast causing the worst erosion on record. Read more through the Bureau of Meteorology at www.bom.gov.au/lam/climate/levelthree/c20thc/cyclone5.htm

**Human elements**

Coastline with sandy beaches, headlands and river access is scenic and highly valued—valued for tourism, residential, recreational and commercial purposes.

**Population growth and tourism**

Australian Bureau of Statistics (ABS) research shows the Gold Coast and Tweed Heads are growing.

**Population growth, Gold Coast City, 1987-2010**

Average weekly increase over last five years = 297 people

Note: Based on ASGC 2010 – adjustments have been made for boundary changes to Gold Coast in 2007. Source: ABS 3218.0 Regional Population Growth, Australia (various editions); unpublished data.
Beach nourishment means placing additional sand on beaches to
build them up following erosion. There were major nourishment
programs on eroded southern Gold Coast beaches from 1996
and earlier in the 1970s and 1980s. Sand for beach
nourishment usually comes from dredging.

During the 1996 to 2001 nourishment campaign, more than 3.5
ton million cubic metres of sand were dredged from the heavily silted Tweed River entrance. The sand had built up across decades;
northwards longshore drift had been blocked by the southern
training wall and accumulated at the wall and then around the
wall into the river entrance. This large volume was used to partially
restore eroded southern Gold Coast beaches. Dredging of the
Tweed River entrance still occurs periodically.

**Groynes**

Extending from the shore, groynes are structures built to interrupt
water flow and sand movement. Three groynes were built at
Kirra and North Kirra in the 1970s and 1980s to build up beaches
by trapping sand in the surf zone. Two of these have since been
modified to allow more sand to drift north.

**Revetments**

At the southern end of the Gold Coast, boulder walls were built
at Colangatta in 1968. In 1973 rock walls were built at Kirra to
prevent the highway slipping into the sea, and at Kirra Beach,
North Kirra and Bilinga over the following three years. Decades
earlier, timber walls had been constructed at the back of
Coolangatta Beach and at Kirra following a 1936 cyclone.

Since the 1970s, Gold Coast City Council has developed new
standards and sees foreshore
seawalls as one of many approaches, not a complete answer to
foreshore stability. Revetments, built to absorb wave energy and give
protection from currents and waves, often suffer significant damage.

**Tweed sand bypassing**

Tweed River Entrance Sand
Bypassing Project (TRESBP)
began in 2001. Drifting ocean
sand is drawn in at the jetty
and delivered by underground
pipe back to the ocean, north
of the river. From here, waves
and currents transport the sand,
replenishing southern Gold Coast beaches. The TRESBP jetty, on
Letitia Spit, extends seawards just beyond the river entrance
training walls. In essence, this system redirects sand preventing
it from building up around the training walls and river entrance.
Tweed River entrance is also dredged periodically, to clear sand
missed by the jetty.

Reference:


Gold Coast City Council local government area had a resident
population of 472,279 in 2006; a population of 730,000 is forecast
for 2026. Tweed Shire’s resident population was 81,386 in 2006, with
Council’s research projecting 120,000 by 2031. Tourism is a major
industry for the Gold and Tweed Coasts. Gold Coast beaches are
known worldwide; visits to the foreshore have been calculated at 40
million per year by residents and 7 million per year by tourists (Lewis
et al. 2010).

**River entrance training works**

The Tweed River entrance training walls were extended by 380
metres in the 1960s to improve navigation safety. Training walls
stabilise a river entrance and establish a channel. But improvements
after the extensions were only temporary as sand again accumulated
in the channel and around the south wall. Shorter training walls had
been built in the 1890s to assist navigation.

**Coastal protection and management measures**

From the 1960s to the 1990s a series of measures was undertaken
to address erosion at the southern Gold Coast and the heavily
silted Tweed River entrance.

**Beach nourishment and dredging**

Beach nourishment means placing additional sand on beaches to
build them up following erosion. There were major nourishment
programs on eroded southern Gold Coast beaches from 1996
and earlier in the 1970s and 1980s. Sand for beach
nourishment usually comes from dredging.

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