



3. South Point to Bongaree Jetty

3.1 Site description

The South Point to Bongaree Jetty study area (refer to [Figure 19](#)) is at the south-western tip of Bribie Island (South Point) and consists of the beach adjacent to the Buckley's Hole Conservation Park as well as approximately one kilometre of shoreline between Buckley's Hole lagoon and the Bongaree Jetty. The extent of Buckley's Hole Conservation Park is of National Park tenure, with the remaining foreshore in this study area consisting of esplanade and road reserve. There is a small area of leasehold land at the commercial area adjacent Bongaree Jetty.

The southern extent of this study area (at Buckley's Hole) consists of vegetated estuarine wetland areas of mangroves and foreshore communities. Along the upper beach zone is *Callitris columnellaris* (coastal cypress), *Banksia integrifolia* (coast banksia) and *Eucalyptus tessellaris* (carbeen) trees. The weed mother-of-millions, which is a declared class 2 pest, is located along the foreshore. A number of mangrove seedlings have established within the tidal pools between the outer spit and the foreshore. The shoreline here is habitat to crustaceans and molluscs, with small fish and other marine animals able to move through the channel at the higher part of the tide.

The waterhole that makes up Buckley's Hole is regarded as an important shorebird and migratory bird habitat and nesting site (refer to [Photo Plate 3-2](#)). The freshwater lagoon of Buckley's Hole is known to be intermittently used by migratory shorebirds. Access is limited by vegetation around the lagoon and therefore disturbance is negligible (Milton *et al*, 2009).

The sandspit adjacent to Buckley's Hole lagoon is a critical shorebird roost available on all tides. This site is signed as a shorebird roost however is heavily disturbed by beach visitors and fishers (Milton *et al*, 2009).

The foreshore between Buckley's Hole and Bongaree Jetty (approximately 700 m) is reinforced by a sea wall, which is presently mostly covered by sand and foredune vegetation. The sea wall ends at Buckley's Hole where an old timber groyne is located at the mouth of a small channel between the high-water mark and the northern end of a long sand spit that forms a tidal estuary adjacent to the Conservation Park (refer to [Photo Plate 3-1](#) and [Photo Plate 3-4](#)). On the southern side of this groyne is an area of scattered pier or bridge timber logs that were reportedly placed by a former land owner many years ago as erosion protection works. A number of large sand bags have also been placed on the southern side of the timber groyne at some stage in the past presumably to stabilise the groyne when it was threatened by erosion. Several trees have recently been destabilised in the upper beach zone (refer to [Photo Plate 3-3](#)).

The South Esplanade runs adjacent the seawall, with car parking in the south and park areas and shops near Bongaree Jetty. The seawall changes at the jetty from a sloped rock and grouted concrete wall (south – refer to [Photo Plate 3-5](#)) to a stepped concrete wall (north – refer to [Photo Plate 3-6](#)). Historical photographs of these areas have been provided in Photo Plates 3-7 and 3-8. There is a 750 mm diameter stormwater pipe south of the jetty with an outlet at the



top of the beach forming a channel through the sand (refer to [Photo Plate 3-9](#)). The sand build-up south of Bongaree Jetty is shown in Photo Plate 3-10..

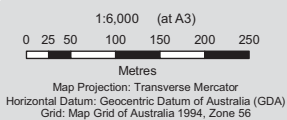
The results of a desktop review indicate that the following are a consideration at this site:

- ▶ The tidal zone adjacent Buckley's Hole Conservation Park is mapped as a declared fish habitat area subject to management level B (refer to declared fish habitat area map in [Appendix B](#)). This indicates that this area is to be managed under a flexible management approach, with a number of works or activities possible for authorisation, including beach replenishment. The fish habitat area is important as a spawning area for whiting and for the long-term protection of mud crabs. No declared fish habitat is mapped within the SEMP study area north of Buckley's Hole.
- ▶ Remnant vegetation is mapped surrounding Buckley's Hole, described by the Regional Ecosystem Description Database as least concern RE 12.2.14 (foredune complex) and least concern RE 12.1.3 (mangrove shrubland to low closed forest on marine clay plains and estuaries). Under the *Vegetation Management Act 1999*, any clearing of remnant vegetation requires a development approval unless the clearing is for an exempt activity.
- ▶ This site is mapped as essential habitat for three species of protected acid frogs; *Litoria olongburensis*, *Crinia tinnula* and *Litoria freycineti*.
- ▶ Buckley's Hole Conservation Park is an area of National Park that supports a high diversity of bird species, including a number of migratory birds or other species of conservation significance.
- ▶ A Coastal Management District over land is mapped along the shoreline in this section and over most of Buckley's Hole Conservation Park (refer to [Appendix B](#)). The Erosion Prone Area is shown on the map in [Appendix B](#), and can be described as covering area 40m landward of the plan position of MHWS or the area seaward of the line of HAT whichever provides the greater erosion prone area width. Where there is an approved revetment wall, the erosion prone area is 10m landward of the upper seaward edge of approved revetment structure. South Point, which forms the southern boundary of the study area is also the western boundary of the 400m wide erosion prone area that extends around the southern end of Bribie Island. In this area the erosion prone area boundary is measured from the seaward toe of the frontal dune. It is understood that at the time this report was being written DERM was in the process of mapping the erosion prone areas along the coast of Queensland and hence should be contacted for more definitive information regarding the location on the ground of the erosion prone area landward boundary.



LEGEND

- | | | | | |
|-----------------|--------------------|------------------------|---------------------------------|-------------------|
| Stormwater Pipe | Cadastral Boundary | Section 86 Permits | Culvert/Bridge/Weir/Groyne/Wall | Dredging Area |
| Footpath | Community Facility | Jetty/Pier/Pontoon | Marina/Building | Beach Nourishment |
| Main Road | Foreshore Reserve | Boat Ramp/Works/Access | Channel/Canal | Seawall |



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Moreton Bay Regional Council
Shoreline Erosion Management Plan

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**South Point to Bongaree Jetty -
Locality Plan**

Figure 19

Photo Plate 3-1 Tidal channel seaward of Buckley's Hole



Source: GHD 21/12/2009 8:31

Photo Plate 3-2 Buckley's Hole shorebird habitat



Source: GHD 21/12/2009 8:25

Photo Plate 3-3 Foreshore south of timber groyne with vegetation damage



Source: GHD 21/12/2009 17:13

Photo Plate 3-4 Timber groyne and other structures at mouth of channel



Source: GHD 21/12/2009 17:13

Photo Plate 3-5 Sea wall north from timber groyne



Source: GHD 21/12/2009 8:34

Photo Plate 3-6 Seawall and foredune south of Bongaree Jetty



Source: GHD 21/12/2009 10:00

Photo Plate 3-7 Seawall south of Bongaree Jetty 1990s



Source: Morris Lewin 1990

Photo Plate 3-8 Seawall north from timber groyne 1990s



Source: Morris Lewin 1990

Photo Plate 3-9 Stormwater outlet south of Bongaree Jetty



Source: GHD 21/12/2009 15:30

Photo Plate 3-10 Sand build-up south of Bongaree Jetty



Source: GHD 21/12/2009 8:41

Photo Plate 3-11 Bongaree Jetty 1990s



Source: Morris Lewin 1990

3.2 Historical shoreline changes

Analysis of historical aerial photography shows that significant accretion has been occurring in the vicinity of Buckley's Hole since the first photographs taken in 1942. The southernmost line of dwellings facing the south-west were constructed close to and along the general alignment of the shoreline in the 1950s. GIS imagery of the photographic analysis has been shown in [Figure 20](#) and [Figure 21](#).

The photographs show the pronounced formation of spits at varying locations and of differing sizes throughout the area. Spit growth is consistently towards the north. This indicates that sand is being transported via longshore transport along the southern coastline of Bribie Island from the east towards the west. When the sand reaches Pumicestone Passage, the wave and tidal conditions change significantly, and the sand falls out of suspension, resulting in a submerged spit. As this spit grows, it then starts to influence nearshore waves and currents, which gradually cause the spit to reorient to become shore parallel whilst migrating landwards. Eventually, the spit becomes exposed during the tidal cycle, when aeolian (wind) transport can occur. Gradually, the sand moves further up the beach and eventually becomes a new dune ridge.

The photography indicates that spit growth and attachment occurs predominantly towards the southern tip of Bribie Island, although at any one time multiple spit formations of varying sizes are evident. Due to this spit attachment process, it is difficult to estimate whether the rate of accretion has been consistent over the past 60 years.

The waterhole that gives the area its name is a remnant of this shoreline evolution process. The photography shows that Buckley's Hole was part of the intertidal flat in 1958. A small watercourse from the south western part of the island drained into the ocean at this point. The



onshore spit migration resulted in the separation of part of the intertidal flat, which became an estuary. Eventually sufficient infill isolated the area from tidal influence and the area became a waterhole. Examination of recent aerial photography shows that this same process is currently repeating immediately to the west of Buckley's Hole with the formation of a small tidal estuary.

The shoreline change in the area surrounding Buckley's Hole ranges from just a few metres at the northern end of the beach (southernmost end of South Esplanade) and the southern shoreline of Bribie Island, up to an accretion of approximately 275m in the centre of this coastal unit.

On the western-facing shoreline at the southern end of South Esplanade, immediately north of Buckley's Hole, the shoreline appears to have fluctuated in the order of approximately 30m. Since 1942, the shoreline has accreted and receded several times. This fluctuation is likely to be the result of "slugs" of sediment being transported northwards along the coastline. Recession at the site coincides with a significant period of sand accumulation at Buckley's Hole. It is therefore likely that Buckley's Hole was acting as a temporary sediment sink, and sediment bypassing of this area only resumed once the Buckley's Hole estuary had been closed. The shoreline is currently experiencing recession again, however the northward growth of the spit forming the western side of the new lagoon is now providing some protection from wave action to the shoreline at the southern end of South Esplanade.

The aerial photography shows comparatively little change in the shoreline north of the southern end of South Esplanade to Bongaree Jetty. From 1942 to 1990, the shoreline appears to have been relatively stable, although it was located very close to South Esplanade in places, most notably in the vicinity of Shirley Creek near the northern end of South Esplanade. This creek has a very small catchment and appears to behave as a perched lagoon which only flows into Pumicestone Passage after periods of heavy rainfall. The direction of the outflow is strongly influenced by the local wind, wave and tide conditions. Evidence from the aerial photography shows that the outflow channel has historically meandered over 200m northwards before entering Pumicestone Passage. At the point where the creek outflow channel meets the Passage, the disruption of the beach profile can result in localised beach lowering as sediments are redistributed around the channel. In an area such as this where the sediment supply to the beach is intermittent and small in quantity, it may take some time for the beach to recover, particularly if storm erosion occurs concurrently.

The 1942 photography of this area shows a jetty located on the site and there is evidence at this time of shoreline progradation in the vicinity of the jetty, although it is unclear whether this was a result of interruption to longshore transport by the jetty or if it was a natural feature that resulted in this location being specifically chosen as the jetty site. Nevertheless, since that time there is evidence of further accretion on both sides of the jetty, indicating that the jetty has had some influence on the coastal processes at this site. With sediment transport occurring in both directions but in a net northerly direction the jetty appears to be causing a local buildup of sand that can be likened to the beginnings of a tombolo like feature even though there is no island offshore for it to connect to. The definition of a tombolo is a sandbar that connects an island to the mainland or to another island and is usually formed by the interaction of waves refracting from opposite directions.

A stone pitched low rock wall has been constructed from the southern end of South Esplanade northwards to Bongaree Jetty. Northwards of the jetty the wall is a stepped vertical concrete



structure. The wall appears to have been located on the erosion scarp at the time of construction, hence it has a meandering alignment. In places, the wall is located over 30m seaward of South Esplanade. This lack of a consistent or natural alignment has resulted in pockets of erosion and accretion as the shoreline tries to realign itself. In locations where the wall is furthest seaward, no recreational beach is available at high tide.

A small structure (possibly a groyne or stormwater pipe) is visible in the 1958 imagery approximately 180m south of the small creek. Even though subsequent photography does not show the existence of this structure, the impacts on the shoreline have been noticeable. A significant amount of accretion occurred around the structure between 1958 and 1975, creating a “bulge” in the shoreline. This widened dune area was then protected from erosion by the construction of the rock wall.



LEGEND

	Shorelines		1975		1999		2009
			1942		1982		2003
			1958		1990		2007

1:6,000 (at A3)
 0 25 50 100 150 200 250
 Metres

Map Projection: Transverse Mercator
 Horizontal Datum: Geocentric Datum of Australia (GDA)
 Grid: Map Grid of Australia 1994, Zone 56



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**South Point to Bongaree Jetty -
 Shorelines**

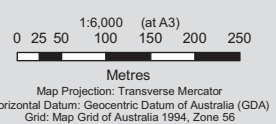
Figure 20

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 Data source: MBRC Quickbird Image 2009 and Council Infrastructure, 2009. Created by: S Potts



LEGEND

	Vegetation Lines		1975		1999		2009
			1982		2003		
			1990		2007		
			1942				
			1958				



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**South Point to Bongaree Jetty -
Vegetation Lines**

Figure 21



3.3 Longshore transport

This section presents details of the potential longshore transport for this particular section of the coastline with both the annual southerly, northerly, and net transport movements shown as well as the seasonal variations. Just as the annual calculations are based on the average wind climate over the period of record for the full 12 months, the seasonal calculations are based on the average wind climate over the period of record for that particular season.

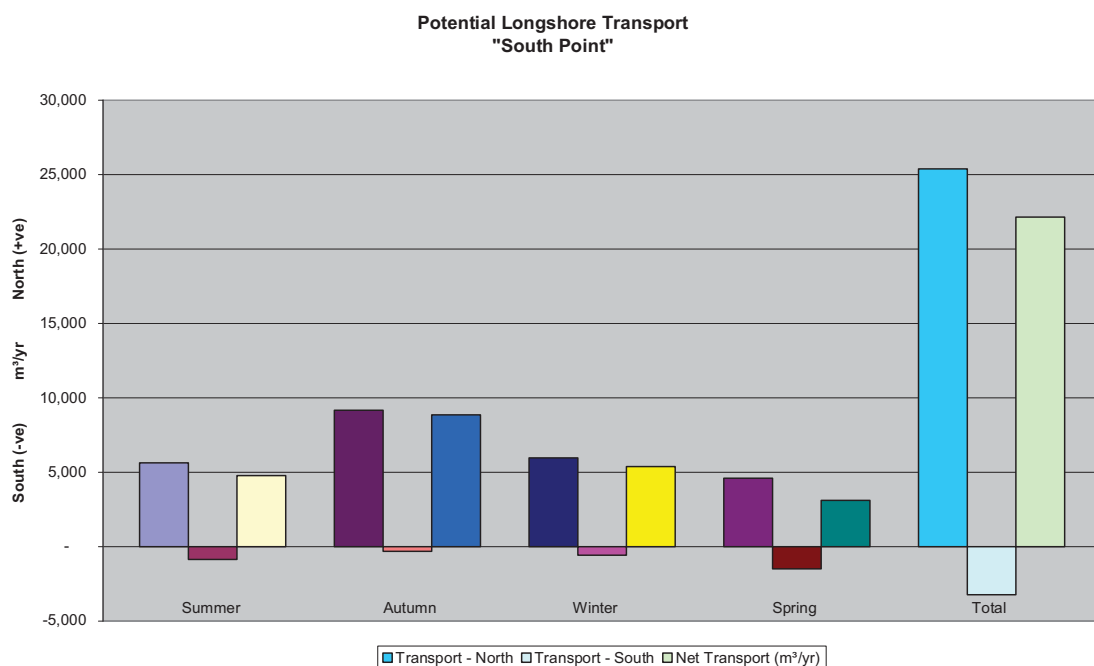
The seasons are defined as follows:

- ▶ Summer – December, January, February;
- ▶ Autumn – March, April, May;
- ▶ Winter – June, July, August; and
- ▶ Spring – September, October, November.

For this section of the coast the following observations can be made (refer [Figure 22](#)):

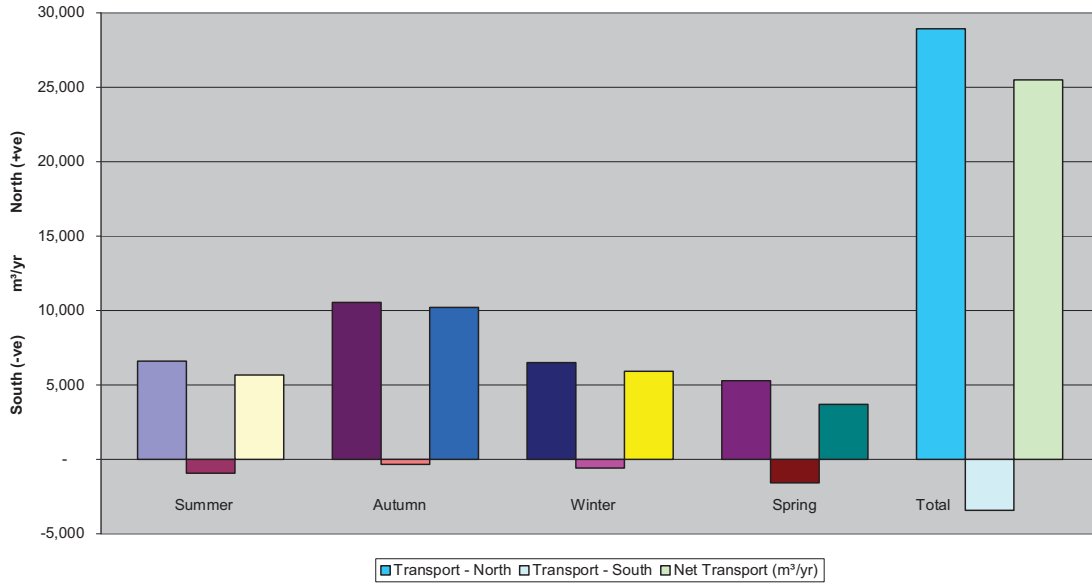
- ▶ The predominant transport direction is strongly to the north;
- ▶ The potential longshore transport at South Point and Buckley's Hole is higher than any other section of the SEMP area of interest, as it is the most exposed to the prevailing south-easterly winds;
- ▶ The Buckley's Hole transport is slightly larger than that for South Point because of the larger angle of the coastline to the waves; and
- ▶ The seasonal variation is similar to the annual results with higher potential transport rates occurring during Autumn.

Figure 22 South Point to Bongaree Jetty – Longshore Transport

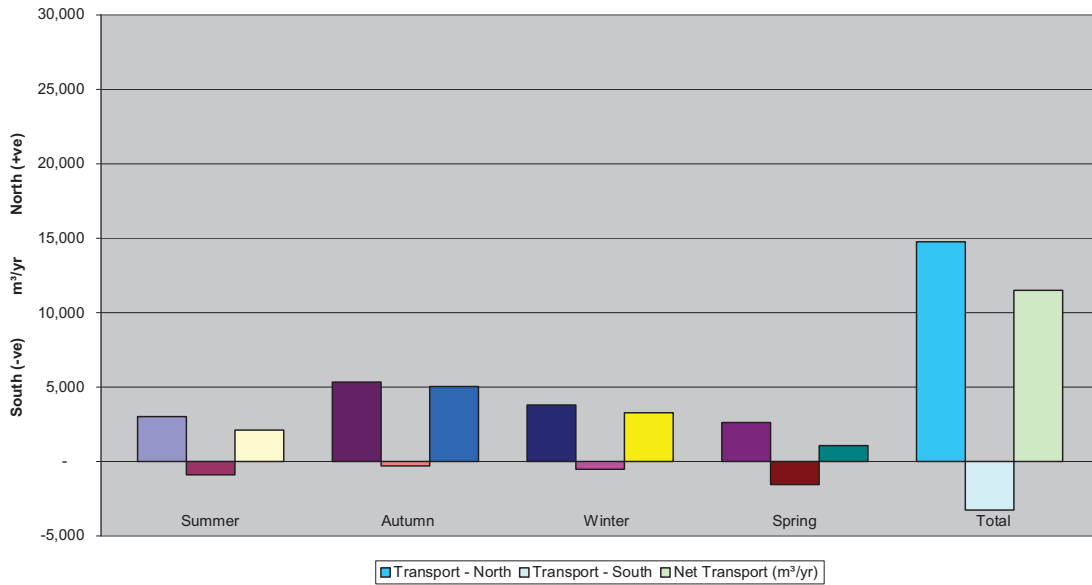




Potential Longshore Transport
"Buckleys Hole"

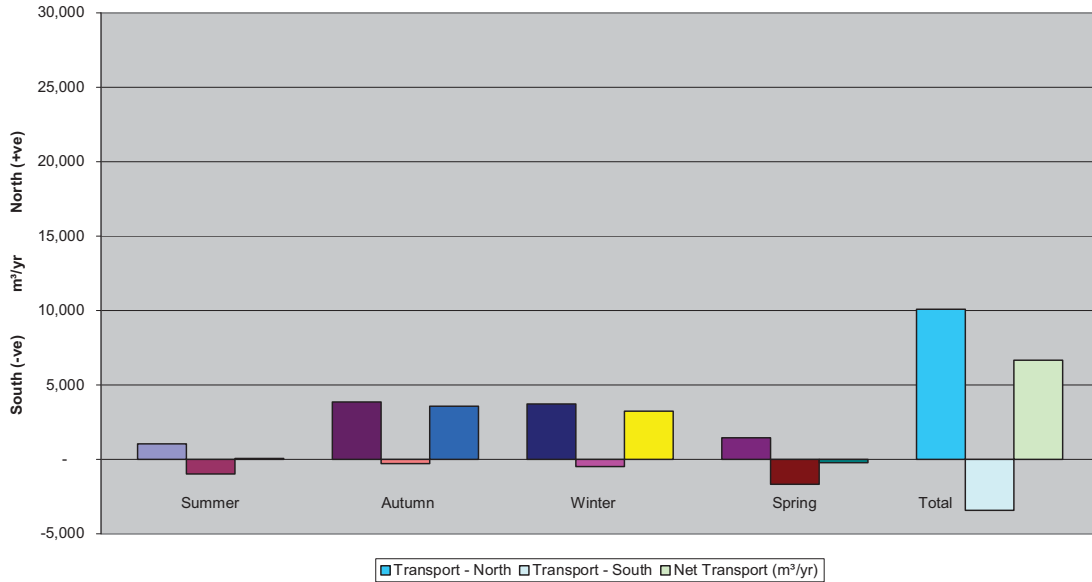


Potential Longshore Transport
"Bongaree South"





Potential Longshore Transport
"Jetty"



3.4 Expected shoreline trends

The lagoon immediately west of Buckley's Hole is close to being permanently closed off and once this occurs natural sediment bypassing of the new lagoon should resume.

If accretion at the jetty is allowed to continue unchecked, eventually the tombolo will behave like a groyne and interrupt sediment supply further north. This will gradually cause the beach compartment to fill with sand and a wider beach will be created. However, this will be at the expense of the beach to the north of the Jetty, which will be exposed to further erosion. Sediment supply to the beach north of Bongaree Jetty will only resume once the southern beach compartment is full. In addition, sand accumulated in the tombolo may adversely impact on the functionality of the jetty for recreational use. Dredging to maintain navigational depths may be required to allow all tide access. Any sediment removed from the tombolo should be placed on the foreshore north of the jetty.