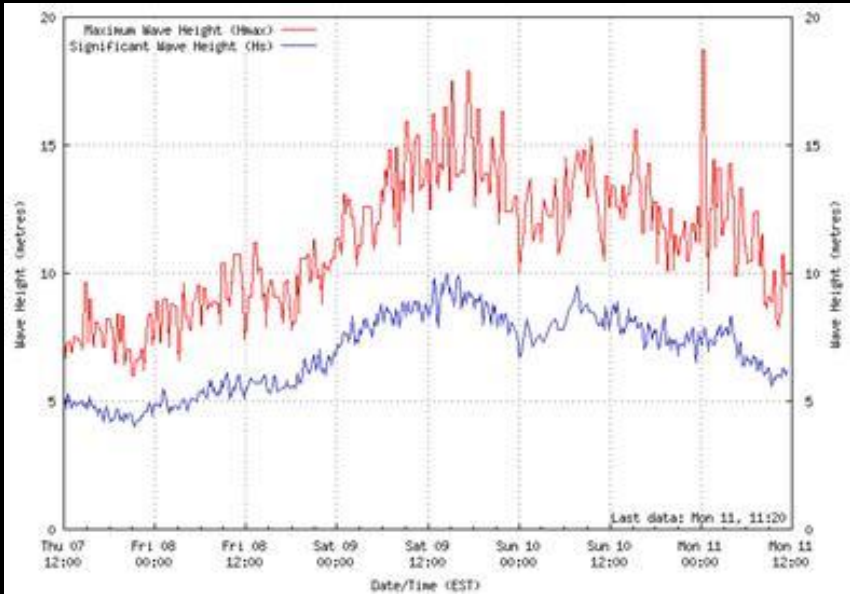
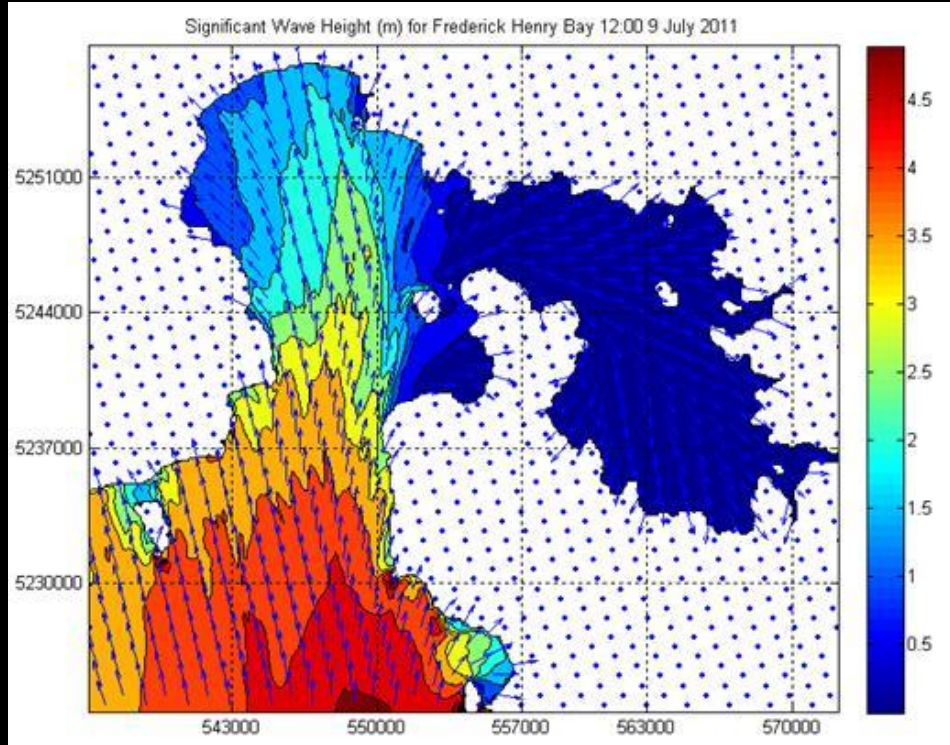
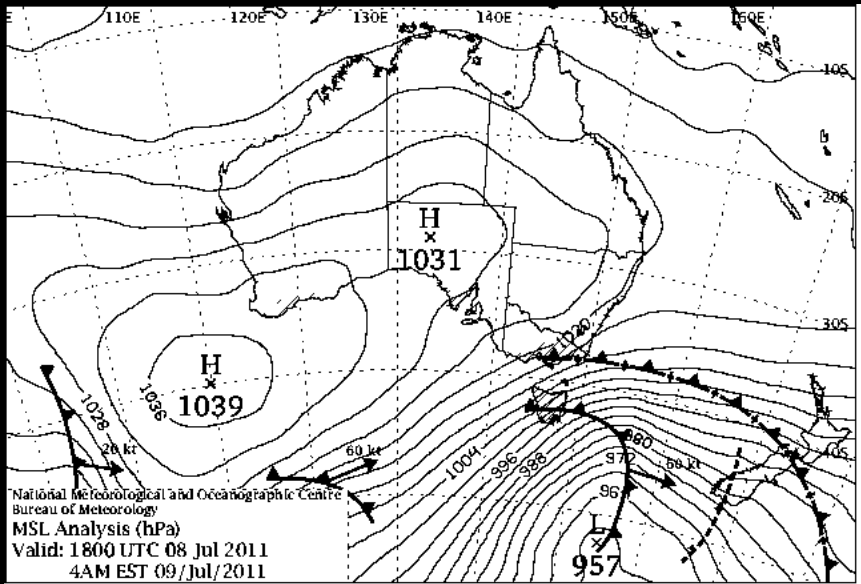


Clarence City Council Shoreline Monitoring Program 2011-2020



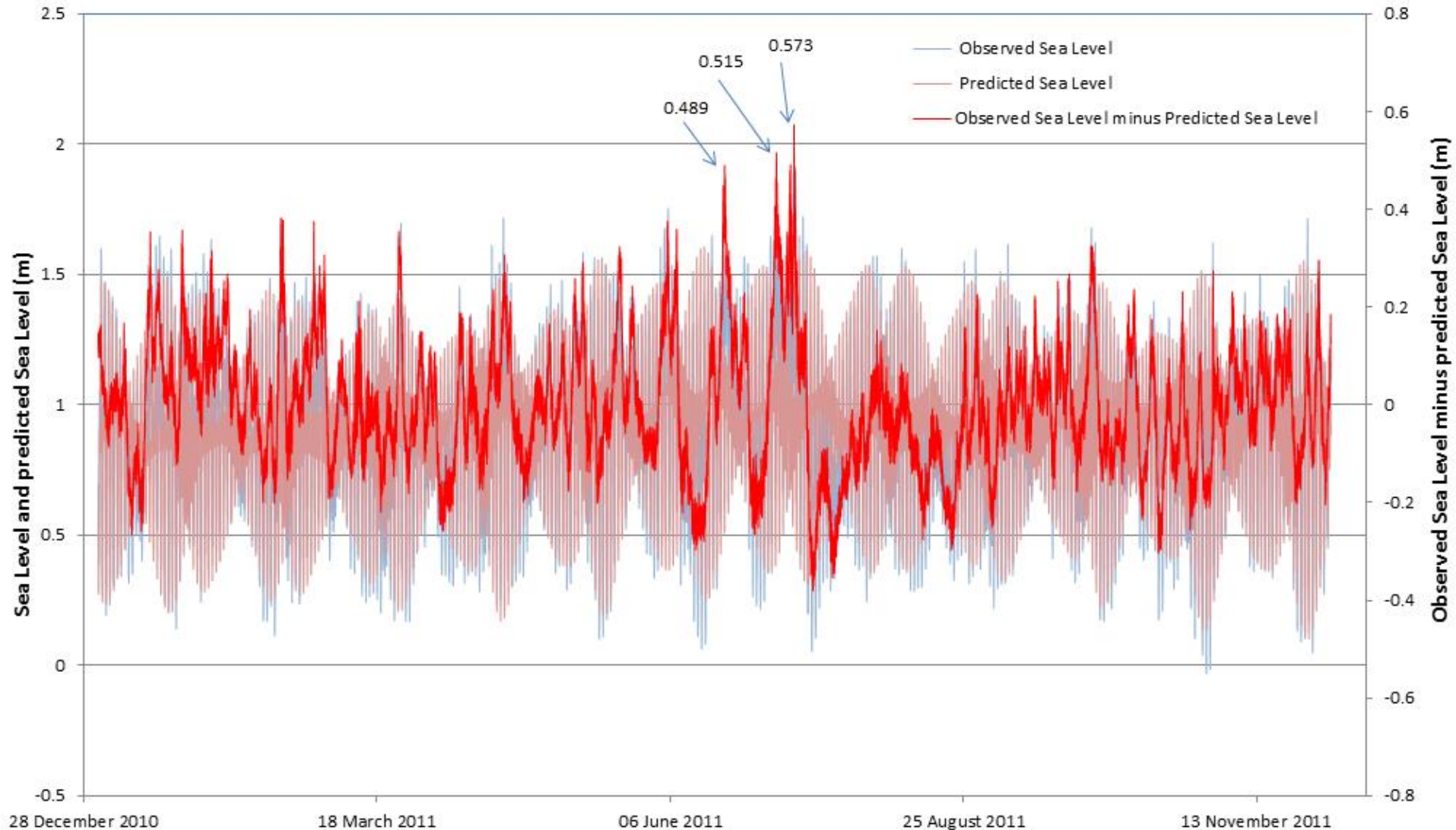
Flightlines 2011-2020



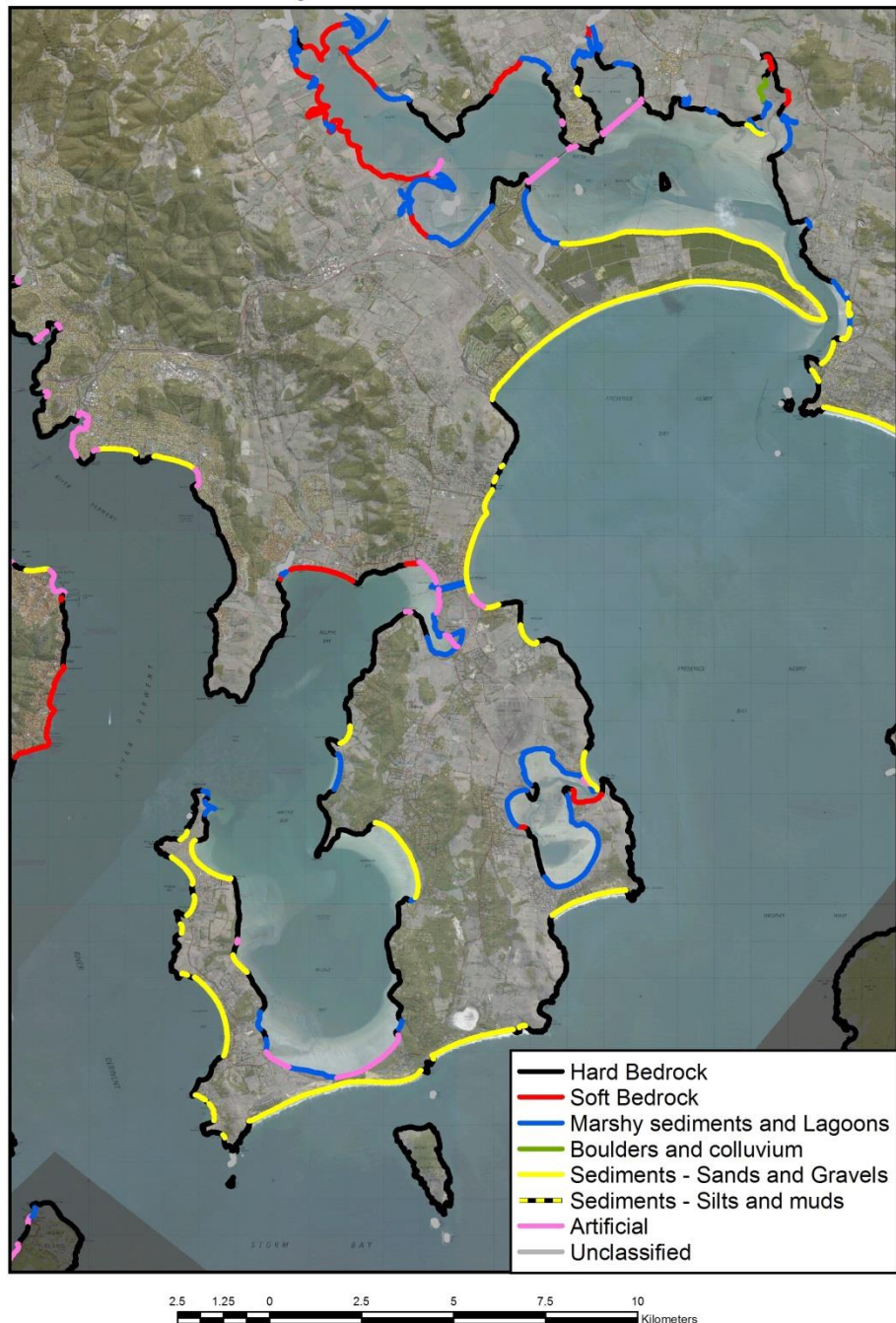


Storm Tides – 2011 event

Measured Storm Tides July 2011
Height (m) above predicted sea level



Clarence City Council Smartline Classification



Smartline Summary

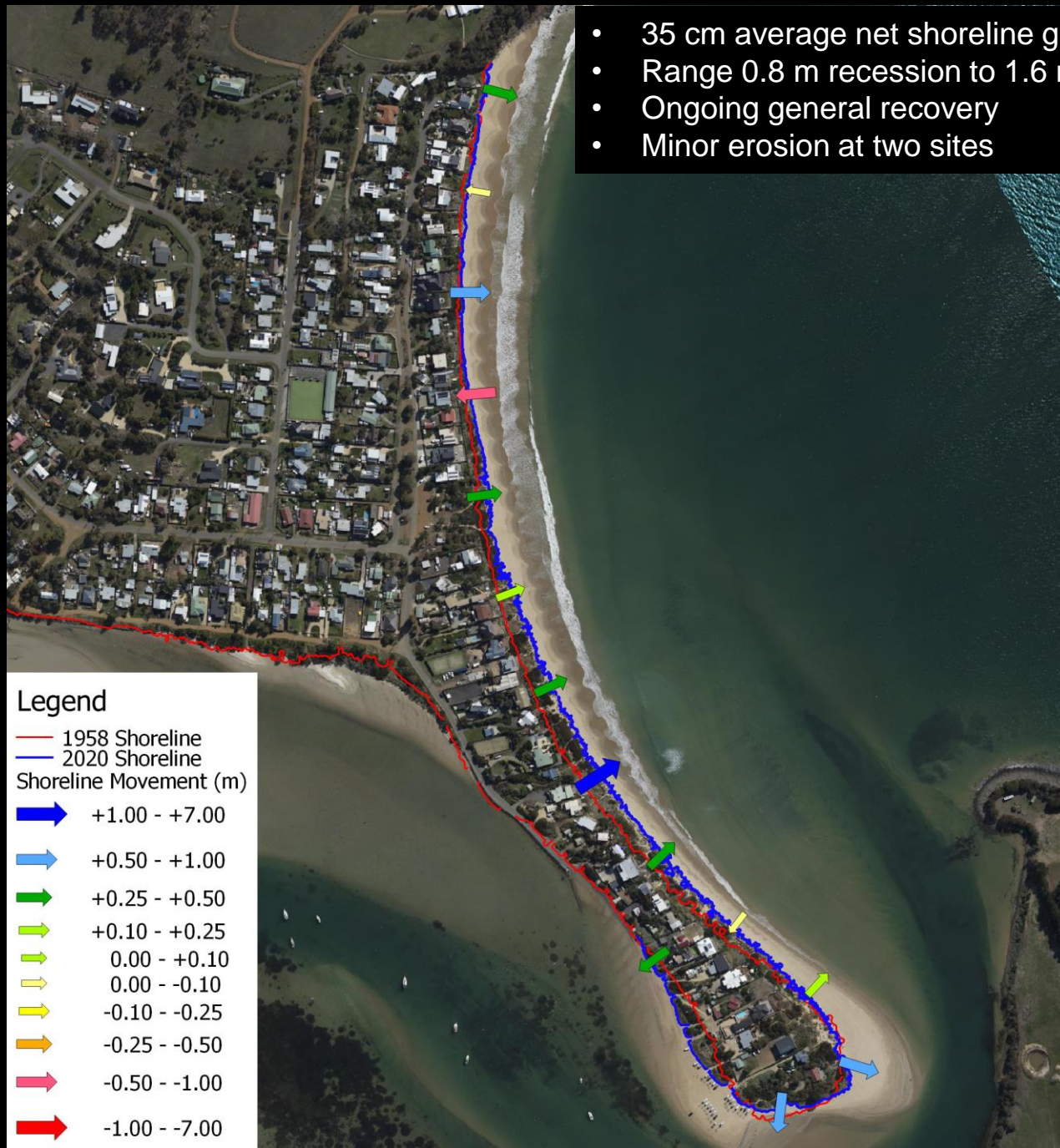
Smartline - Classification	Length
Hard Bedrock	109.4 km
Soft Bedrock	17.3 km
Marshy/Lagoon Sediments	39.4 km
Sediments sands, gravels & Muds	47.0 km
Artificial Structures	9.3 km
Unclassified	36.0 km
TOTAL	258.4 km

- Black is “safe”
- Yellow is vulnerable
- Red is vulnerable
- Blue is vulnerable
- Pink is stabilised
- Grey unclassified

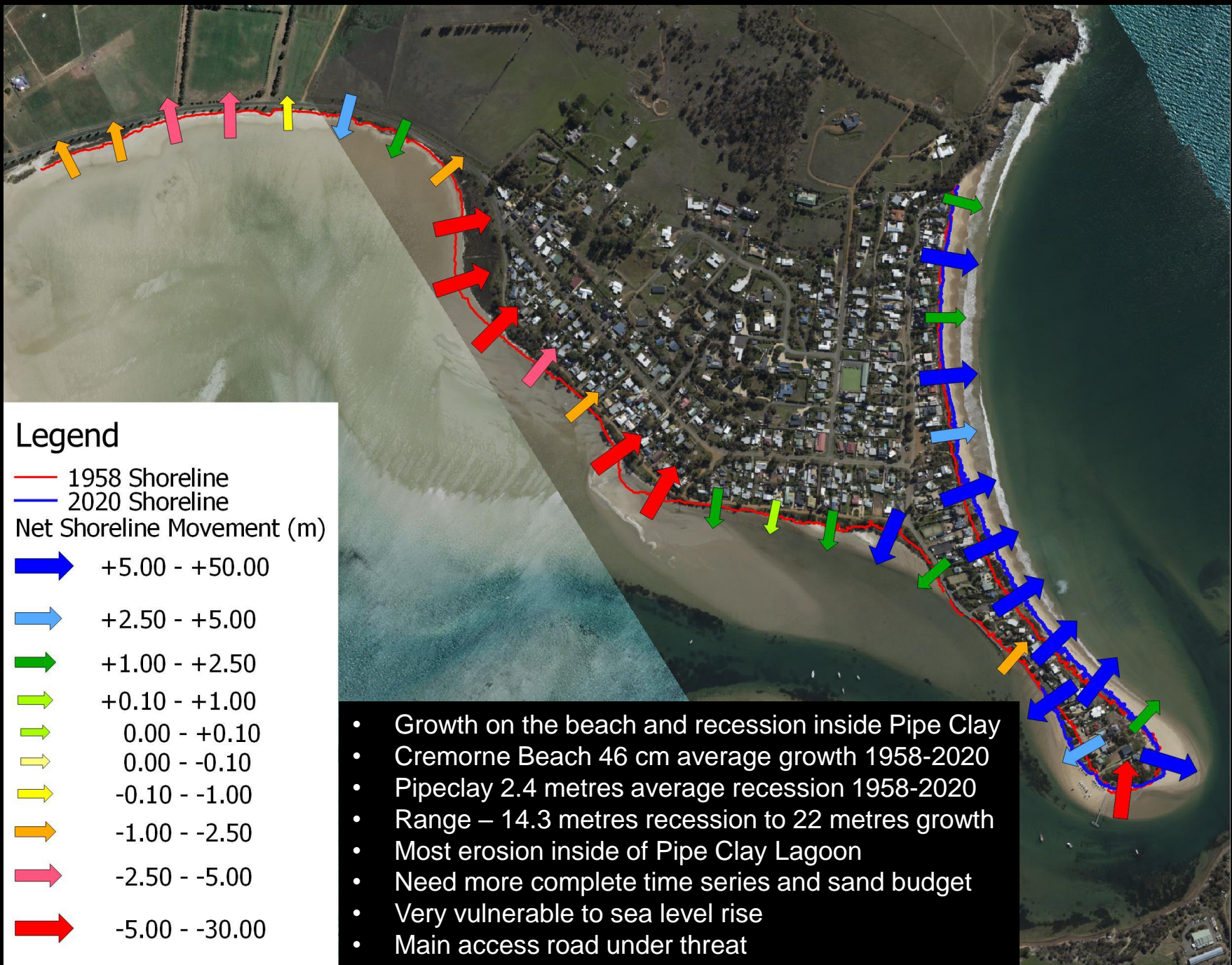
Source: Sharples et al. (2012 in prep)

Cremorne 2019-2020 – Moderate shoreline growth

- 35 cm average net shoreline growth
- Range 0.8 m recession to 1.6 m growth
- Ongoing general recovery
- Minor erosion at two sites

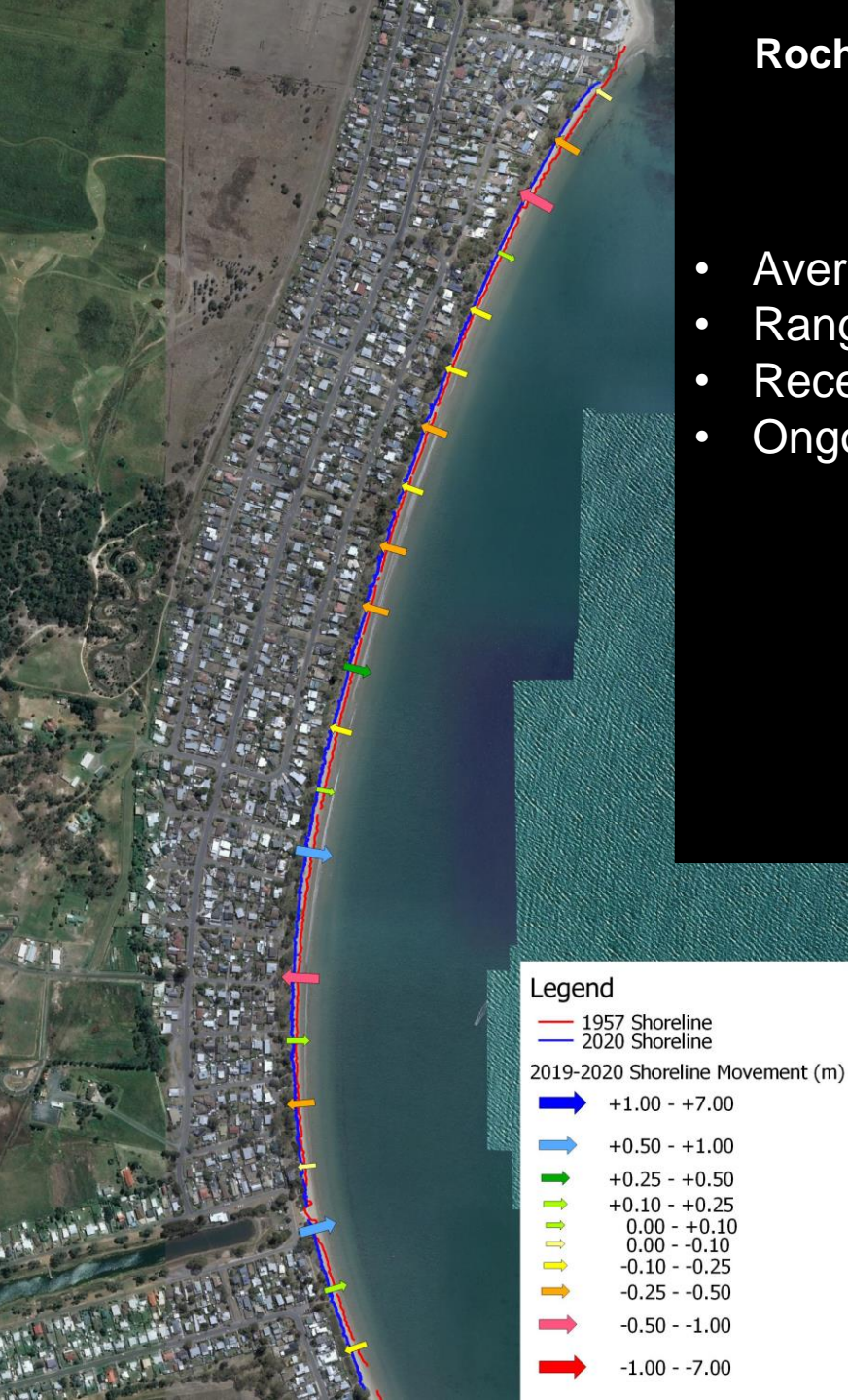


Cremorne – Pipe Clay Lagoon 1958-2020 – Mixed recession signal



Roches Beach 2019-2020 – Recession Trend

- Average net shoreline retreat of 10 centimetres
- Range – 0.94 cm retreat to 0.75 cm shoreline growth
- Recession at 13 of 20 surveyed sites
- Ongoing recession at northern end of the beach



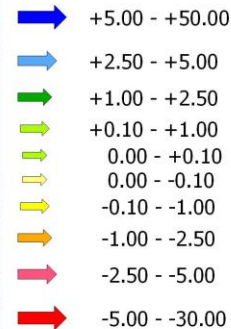
Roches Beach 1957-2020 – Strong recession trend

- 6.9 metres average net recession 1957-2020
- Range – 2 metres shoreline growth to 13.5 metres recession
- Single Shoreline growth due to fencing impacting results
- 2011-2020 20 cm net shoreline recovery aided by active sand replenishment
- Long Term recession signal
- Very vulnerable to sea level rise

Legend

— 1957 Shoreline
— 2020 Shoreline

Net Shoreline Movement (m)



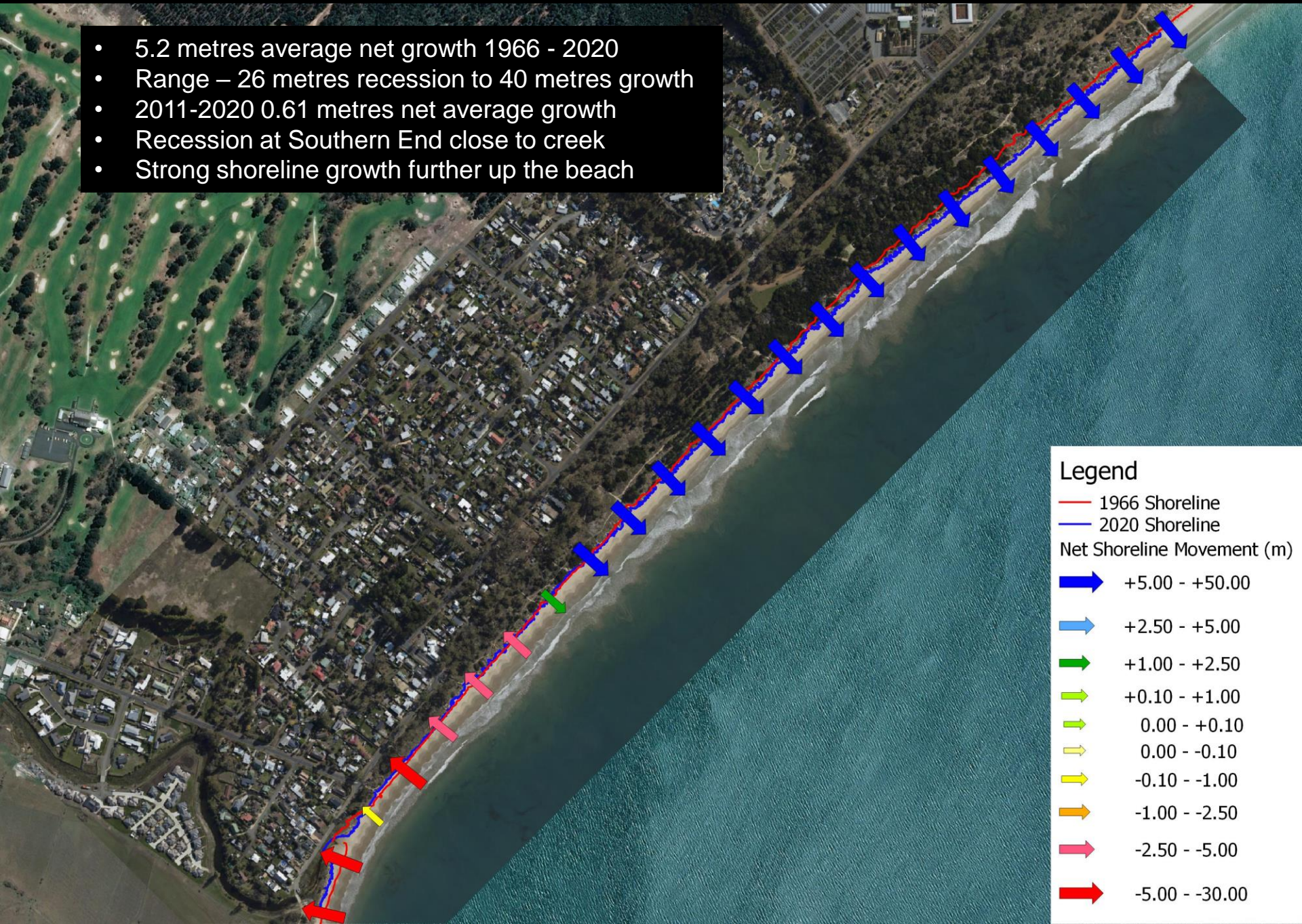
Seven Mile Beach 2019-2020 – Recovery Trend

- 1.28 metres average net growth 2019 - 2020
- Range – 2.1 metres recession to 3.14 metres growth
- Recession observed at 9 of 22 survey sites
- Recession at southern end of beach close to creek
- Ongoing Marram Grass expansion

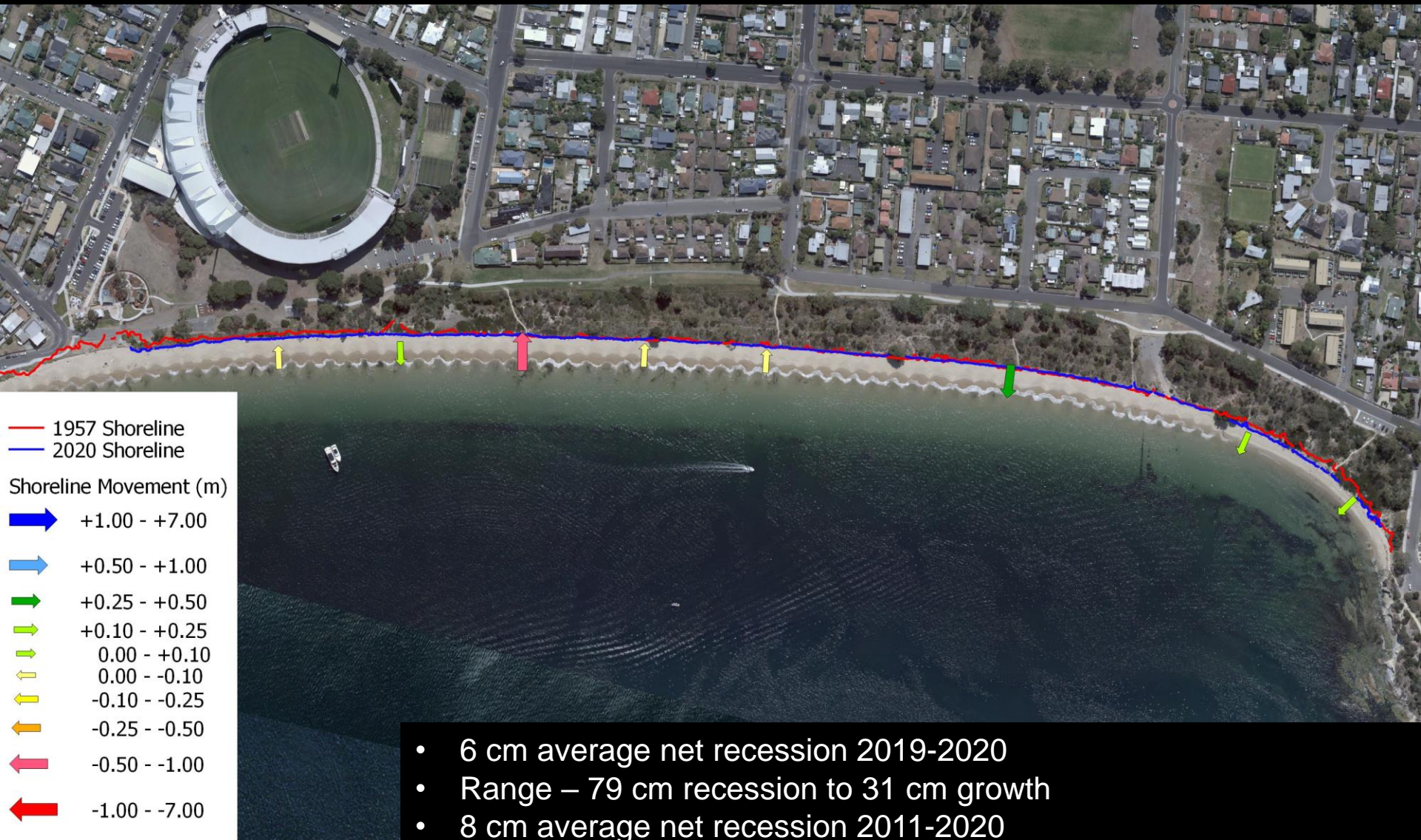


Seven Mile Beach 1966-2020 – Mixed recovery trend

- 5.2 metres average net growth 1966 - 2020
- Range – 26 metres recession to 40 metres growth
- 2011-2020 0.61 metres net average growth
- Recession at Southern End close to creek
- Strong shoreline growth further up the beach



Bellerive 2019-2020 – Slight recession signal



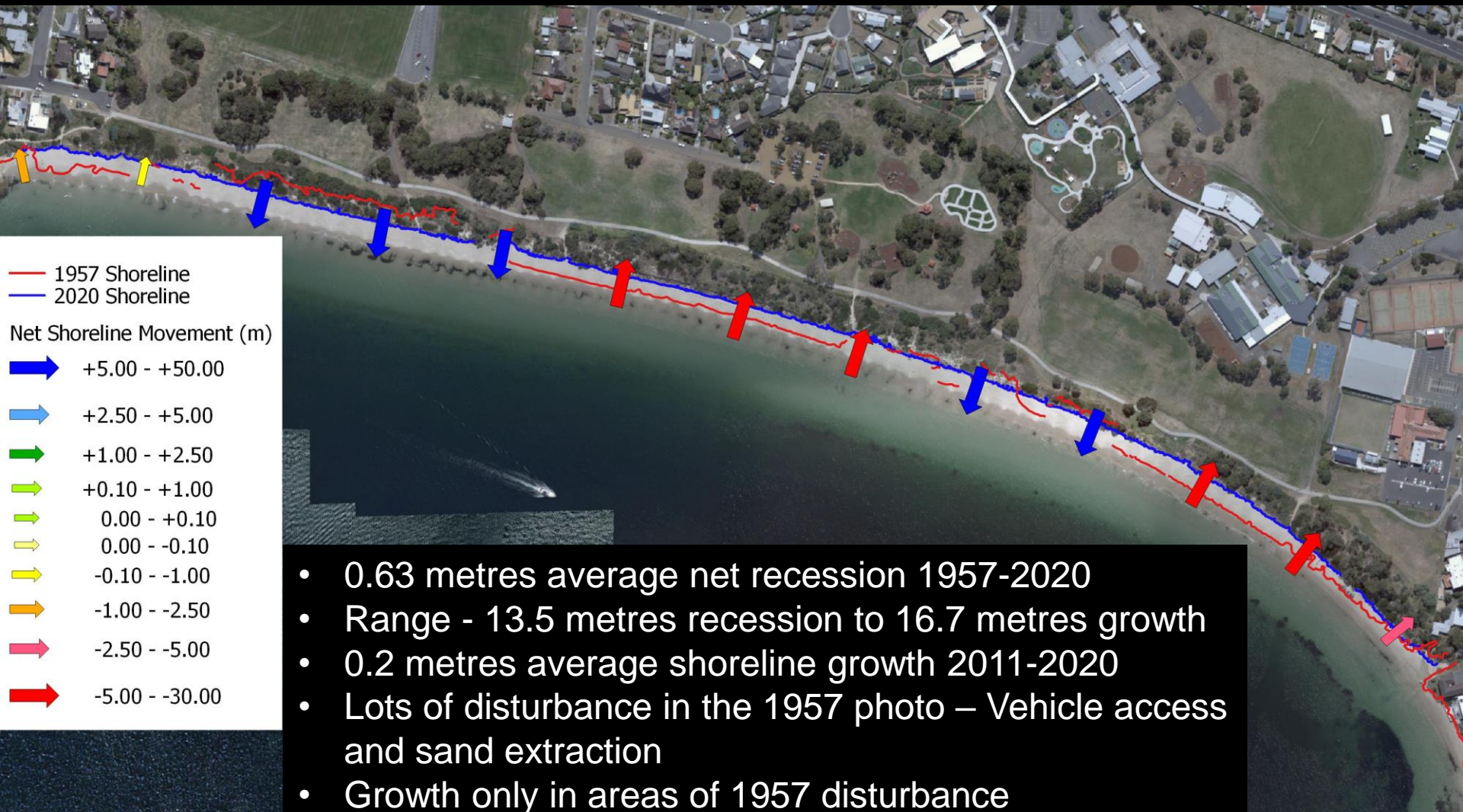
Bellerive 1957-2020 – Mixed recession signal



Howrah 2019-2020 – Mild shoreline recovery



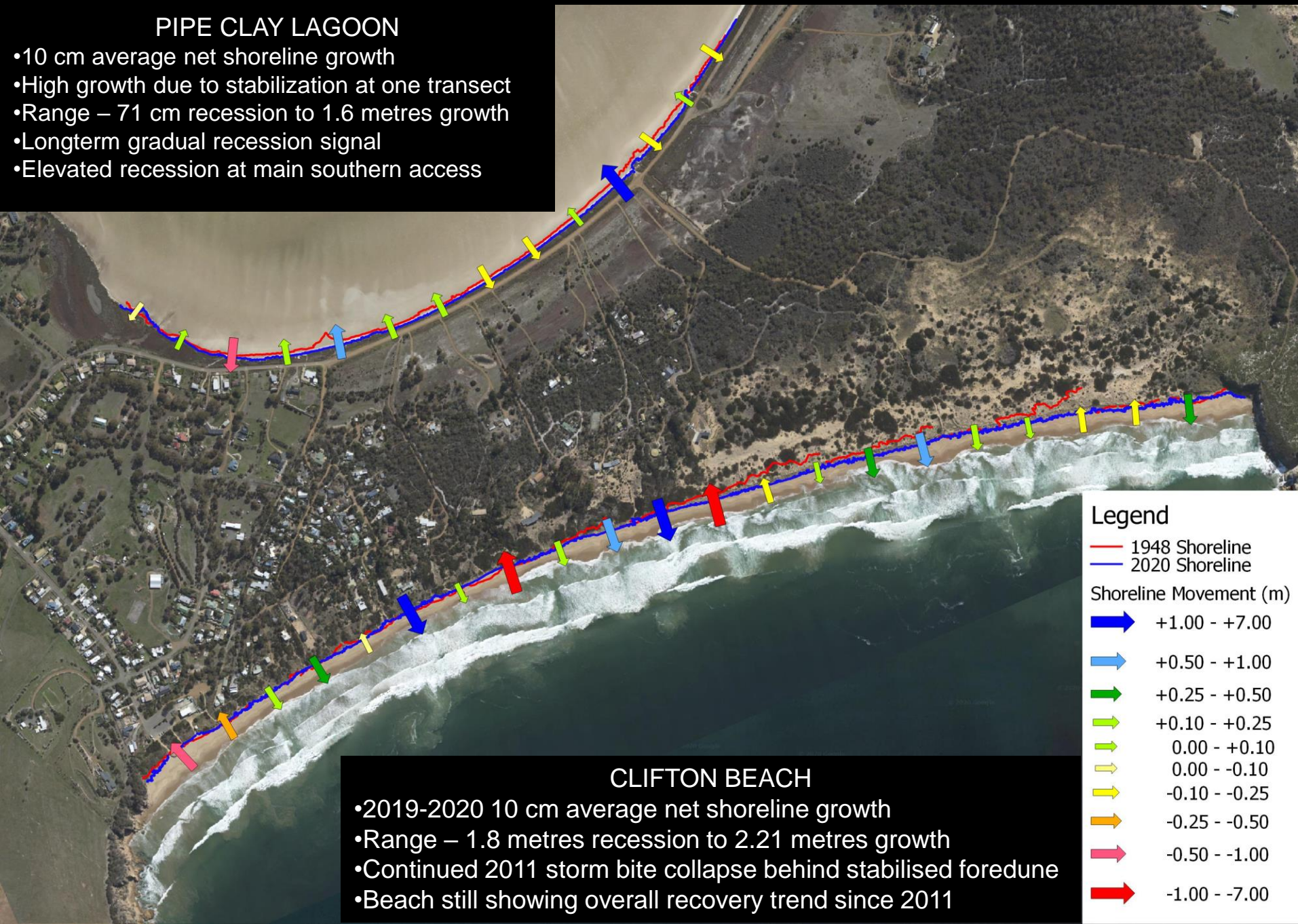
Howrah 1957-2020 – Mixed recession signal



Clifton-Pipeclay 2019-2020 – Mixed recession signal

PIPE CLAY LAGOON

- 10 cm average net shoreline growth
- High growth due to stabilization at one transect
- Range – 71 cm recession to 1.6 metres growth
- Longterm gradual recession signal
- Elevated recession at main southern access



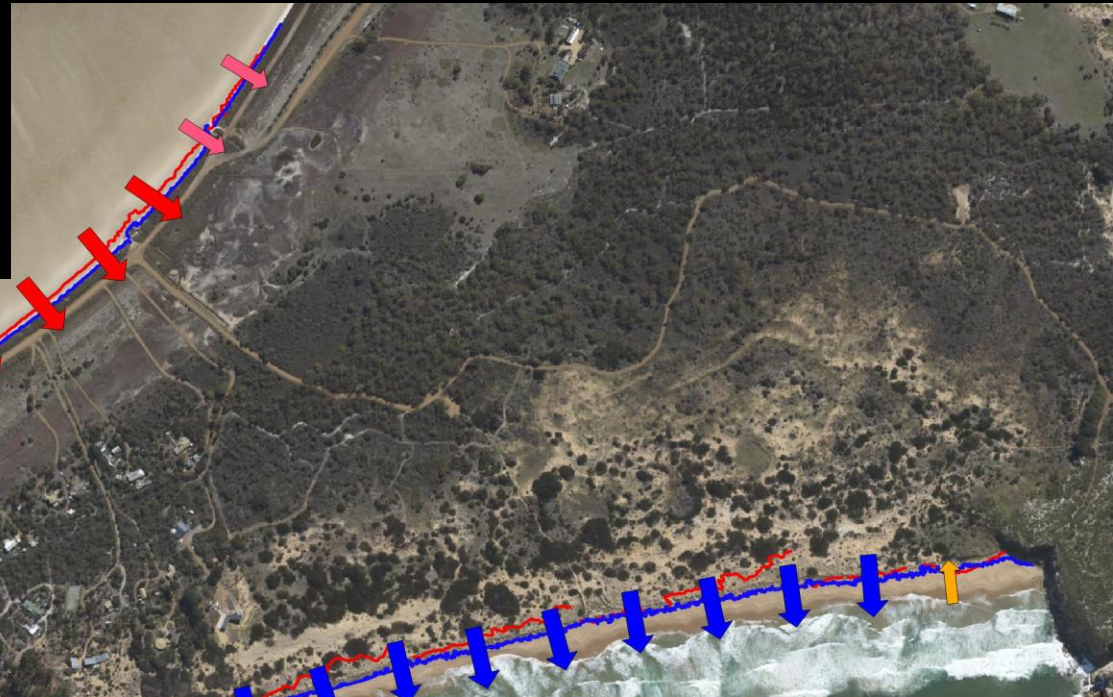
CLIFTON BEACH

- 2019-2020 10 cm average net shoreline growth
- Range – 1.8 metres recession to 2.21 metres growth
- Continued 2011 storm bite collapse behind stabilised foredune
- Beach still showing overall recovery trend since 2011

Clifton-Pipeclay 1948-2020 – Mixed recession signal

PIPE CLAY LAGOON

- 1948-2020 6.09 metres average recession
- Range – 34 cm to 10.5 metres recession
- Longterm gradual recession signal
- 2011-2020 Average net recession 10 cm



CLIFTON BEACH

- 1948-2020 10.15 metres average net growth
- Range – 6.9 metres recession to 45 metres growth
- 2011-2020 50 cm average net growth
- Sand dunes in eastern half stabilised by marram grass and emergent bushes and trees
- Potential erosion hazard at site 1/3 away along beach

Legend

- 1948 Shoreline
- 2020 Shoreline

Net Shoreline Movement (m)

- ➡ +5.00 - +50.00
- ➡ +2.50 - +5.00
- ➡ +1.00 - +2.50
- ➡ +0.10 - +1.00
- ➡ 0.00 - +0.10
- ➡ 0.00 - -0.10
- ➡ -0.10 - -1.00
- ➡ -1.00 - -2.50
- ➡ -2.50 - -5.00
- ➡ -5.00 - -30.00

Clifton Beach – 2016-2020

2016

2020



- Transition from steep to low profile
- Growth of back dune vegetation
- Beach has remained relatively shallow for a few years