

HIGGENS REEF (UNION REEFS)

9°47'49.88"N, 114°24'12.23"E

Geographic area

Higgins Reef is a shallow coral reef atoll with a trapezoid shape, located in the southwest of Union Reefs between Jones Reef (around 3.5NM northeast and of similar size and geomorphology) and Lansdowne Reef (around 1.7NM southwest). Two deeper coral platforms are also visible between Jones Reef and Higgins Reef, the biggest of which is around 800m by 600m. Another deep coral platform is visible between Higgins Reef and Lansdowne Reef that is around 1km by 600m. Overall, Higgins Reef extends 1.9km along its west-east axis and reaches close to 1.8km along its north-south axis.

Land area above water

There are no visible above-water land areas on this reef as at 23 October 2014.

Human infrastructure

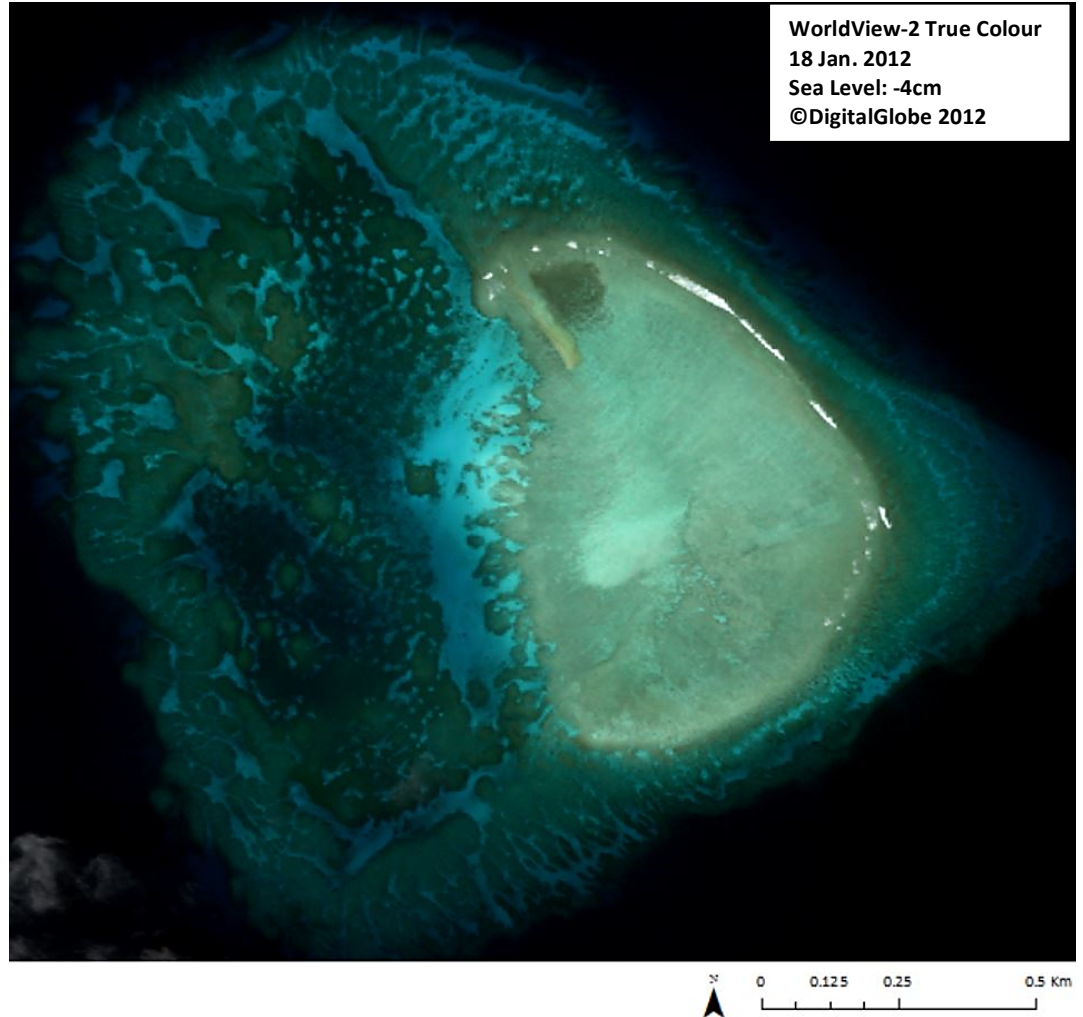
There are no visible man-made structures on this reef as at 23 October 2014.

Intertidal and submerged area

The overall aerial coverage of Higgins Reef is 2.28km² comprising a reef flat of 0.55km², a reef slope of 1.24km² and a lagoon of 0.48km². The reef flat is located in the eastern side of this small atoll. The shallowest sand bank

visible in the 2012 satellite image is 0.66-1m deep. On the basis that the satellite data was captured when the sea level was 4cm below Mean Sea Level, the sea level is expected to be higher by over 80cm at Mean High Water Spring and lower by 1.10m at Lowest Astronomical Tide. This sand bank should therefore uncover at Lowest Astronomical Tide but remain submerged at high tide. Most of the reef flat is sand dominated (0.22km²). However, a small section is coral/seagrass/algae dominated (11,000m²). Most of the reef flat is below 1.6m deep but not less than 1m deep (except around the shallowest sand bank). Based on the bathymetry data calculated on the basis of the 18 January 2012 satellite data, most of the reef flat remains submerged at low tide and only very small and isolated coral heads might uncover at Lowest Astronomical Tide, as well as one sand bank. The lagoon is located west of the reef flat and enclosed within coral ridges from the reef slope on its north, western and southern sides. It is 3-6m deep. Pronounced spurs and grooves are visible on the reef slope at a depth of 4-8m.

Dredging marks are visible on the central part of the reef flat (29,000m²) on 18 January 2012. Water ripples in the satellite image from 26 February 2014 image viewable on Google Earth prevent from seeing whether there is evidence of more dredging activity as at this date.

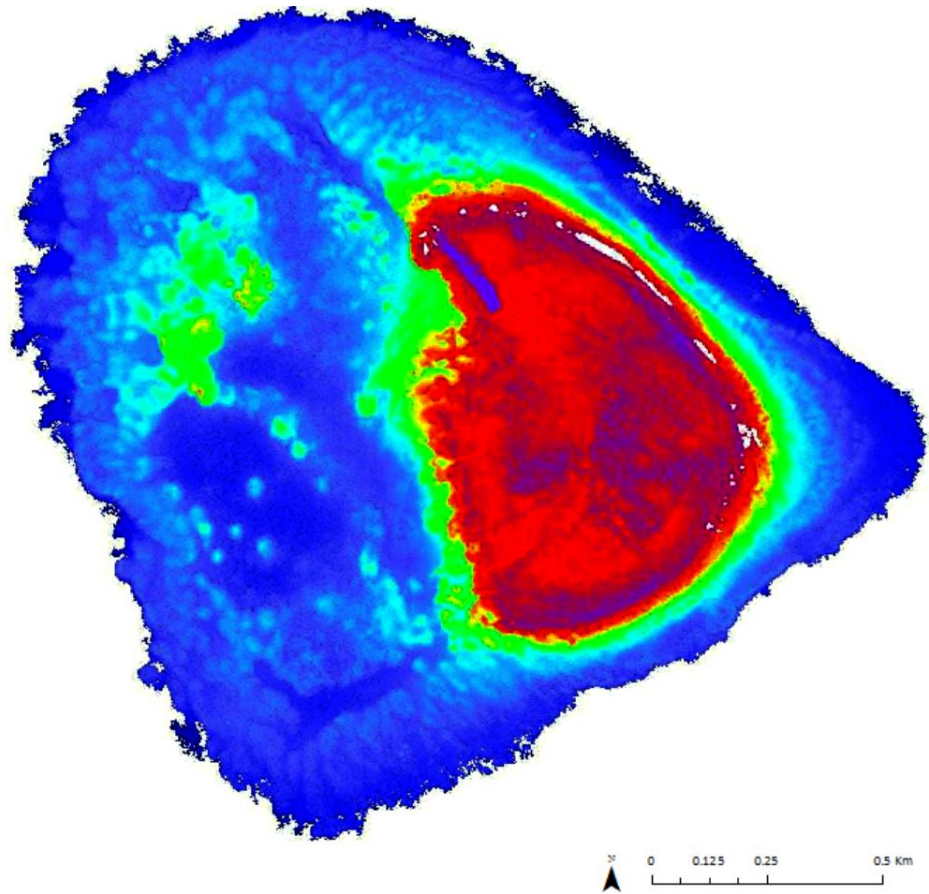


HIGGENS REEF (UNION REEFS)

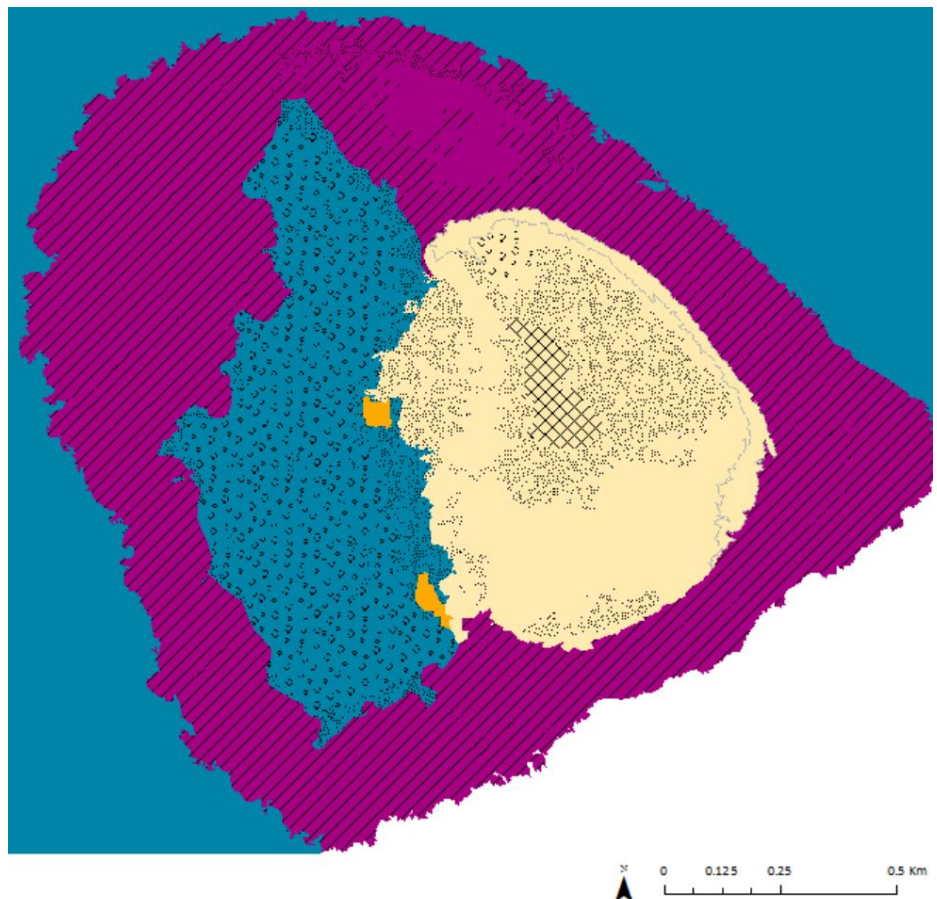
9°47'49.88"N, 114°24'12.23"E

Derived from WorldView-2 satellite data captured on 18 January 2012 [Sea Level: -4cm]

Bathymetry Map

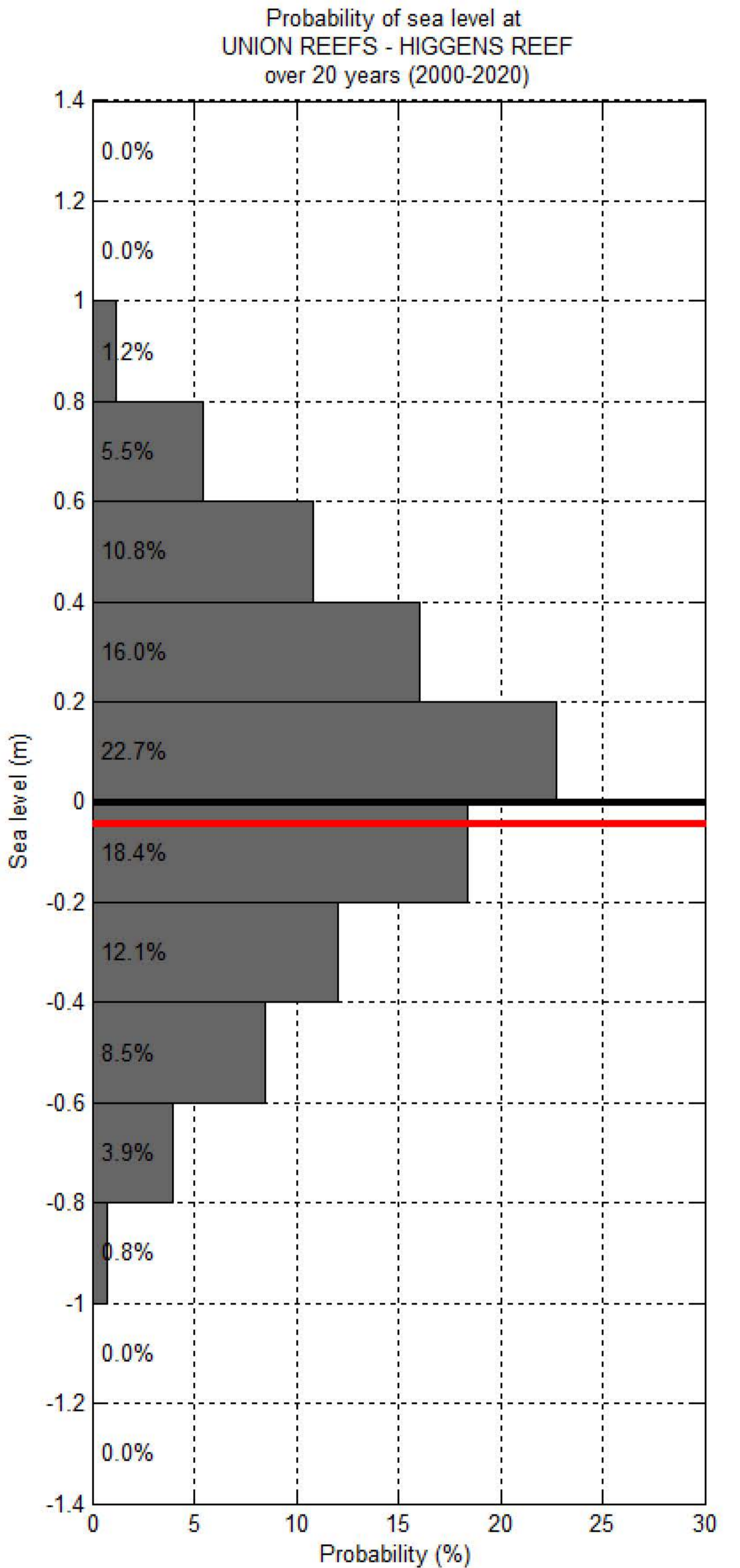
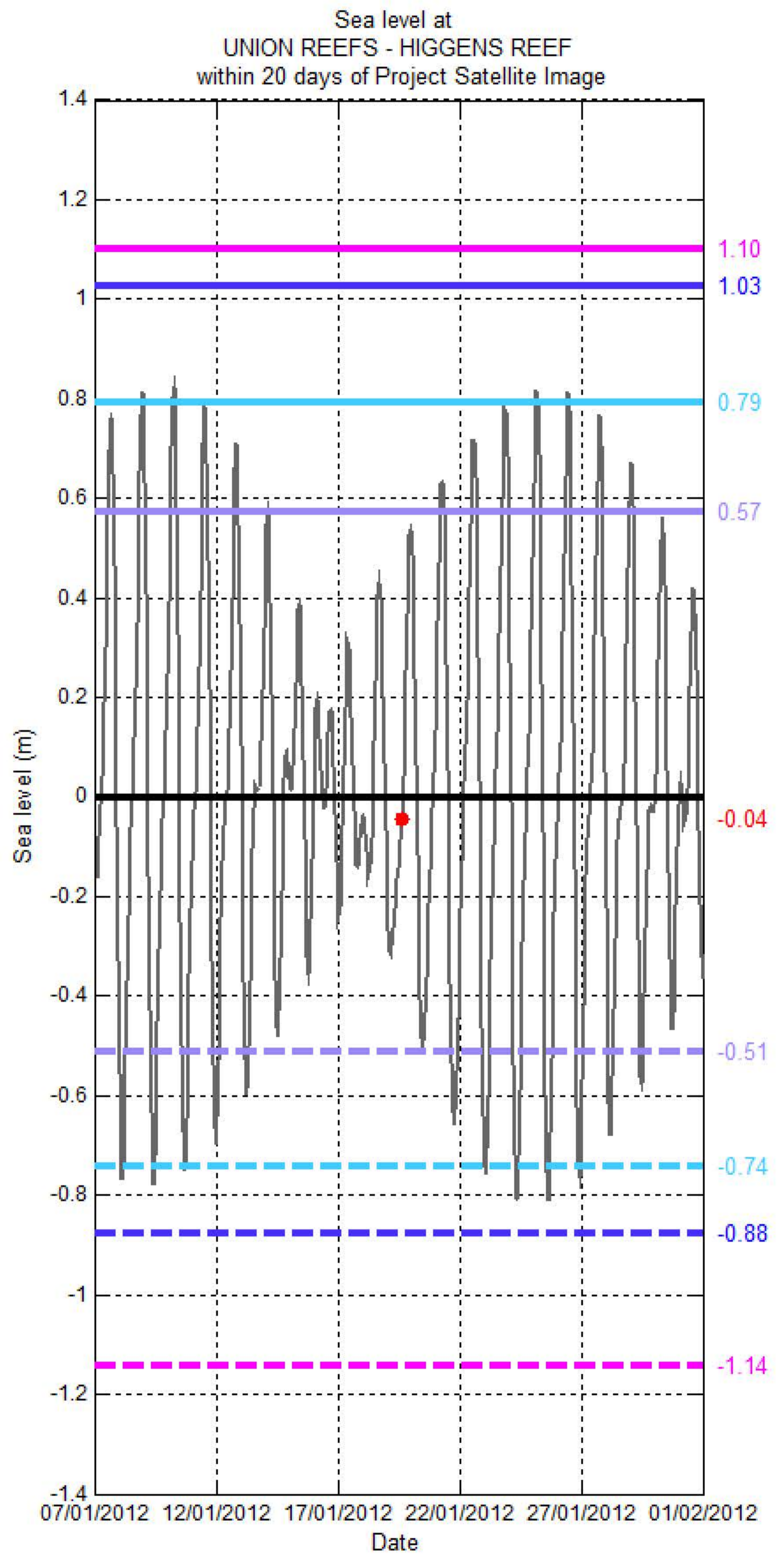
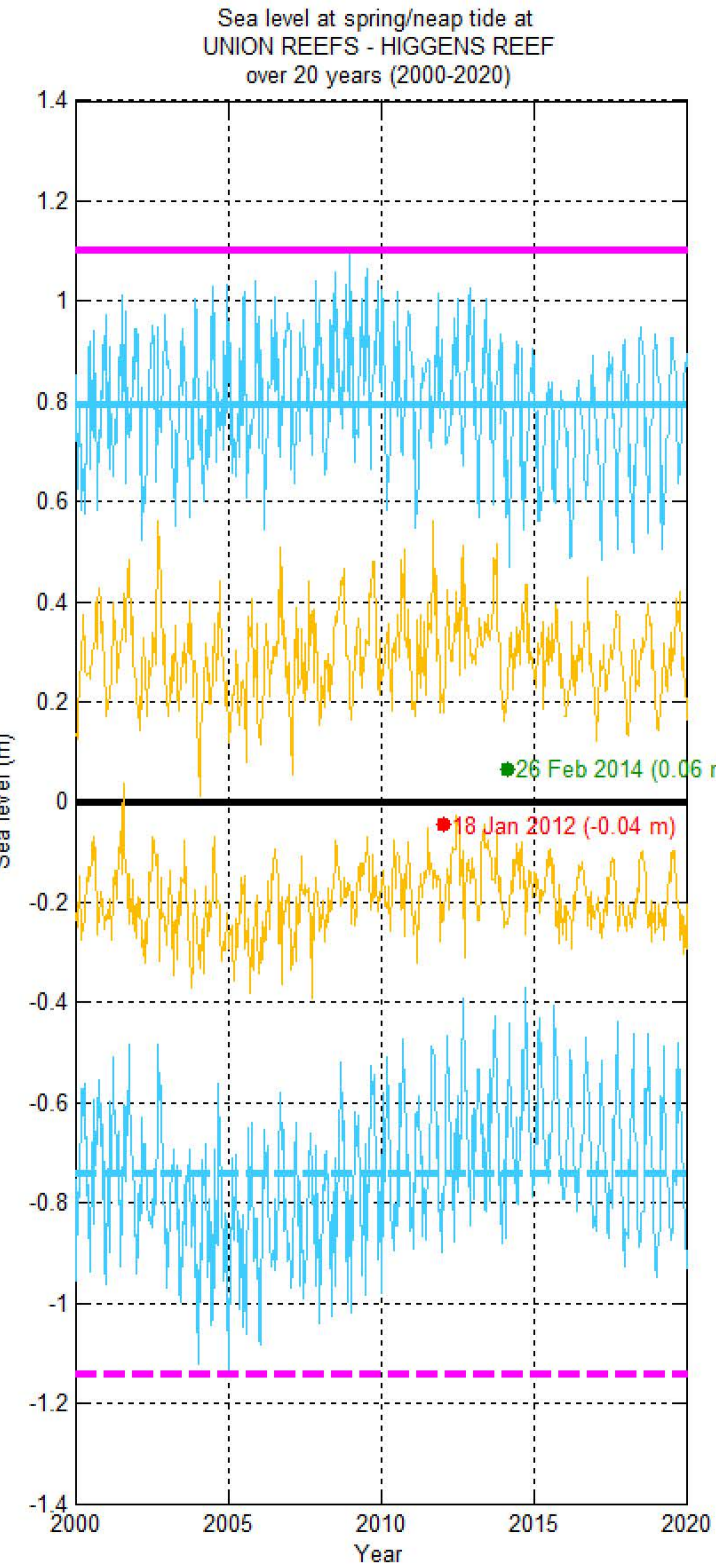


Habitat Classification and Land Cover Map



Sea level (SL) at HIGGENS REEF (UNION REEFS)

[9°47'49.88"N, 114°24'12.23"E]



— Hourly sea level
 — SL at spring tide
 — SL at Mean High Water Spring
 — SL at highest tide of the year
 — SL at Mean Higher High Water
 — SL at Highest Astronomical Tide
 ● Project Satellite Image
— Mean Sea Level
 — SL at neap tide
 — SL at Mean Low Water Spring
 — SL at lowest tide of the year
 — SL at Mean Lower Low Water
 — SL at Lowest Astronomical Tide
 ● Google Earth and Landsat satellite images