

EMPIRE REEF AND HOLIDAY REEF (UNION REEFS)

9°58'01.28"N, 114°34'15.14"E

Geographic area

Holiday Reef and Empire Reef are two shallow coral reef platforms located southwest of Whitsun Reef in the northeast of Union Reefs. They are less than 1NM away from each other. The next shallow reef platform on the northern side of Union Reefs is Hallet Reef, just under 2NM southwest.



Land area above water

Four above-water sand banks are visible in the 12 November 2011 satellite image captured when the sea level was expected to be 10cm below Mean Sea Level, two on each reef flat. On Holiday Reef, the two sand banks are located on the western and eastern side. The western sand bank is the largest, with a length of close to 300m and a width of 10-50m. The eastern sand bank has two very small above-water sand banks at this stage of the tidal cycle (15-20m by 40-50m) that are less than 50m from one another and most likely merge as one low tide sand bank of a larger size at lower tide. On Empire Reef, the two sand banks are nearly symmetrical and located on the edge of the deepest part of the reef flat (1.4-2m deep). They are around 120m long by 40m wide. However, just as with Whitsun Reef, these small, barren and dynamic (unstable) sand banks are unlikely to remain permanently above water. For example, they are expected to be submerged when the sea level increases by 90cm as is expected at Mean High Water Spring. This is supported by satellite images viewable on Google Earth from 15 January 2012, 26 February 2014 and 4 October 2014, which show some sand banks in the same area but in different locations (distance of 10-100m compared to the 12 November 2011 satellite image), with different shapes and of different sizes. Sometimes they even seem to disappear altogether under the combined effect of astronomic tides, storm surges and wind-waves.

Human infrastructure

There are no man-made structures on these reef platforms as at 4 October 2014.

Intertidal and submerged area

The aerial coverage of the coral reef area is 3.46km² on Holiday Reef and 1.76km² on Empire Reef. These two reefs are shaped differently but have a similar reef flat and depth profile although the reef flat of Holiday Reef (18% of 2.84km²) has a larger sand-dominated area than that of Empire Reef (4% of 0.93km²). The reef flats are 0.5-2m deep at Mean Sea Level, meaning that at low tide, parts uncover. Spurs and grooves are particularly pronounced on the reef slope of Empire Reef (in the north) as well as on the deeper reef platform connected to the reef slope. They cover 68% of the reef slope.

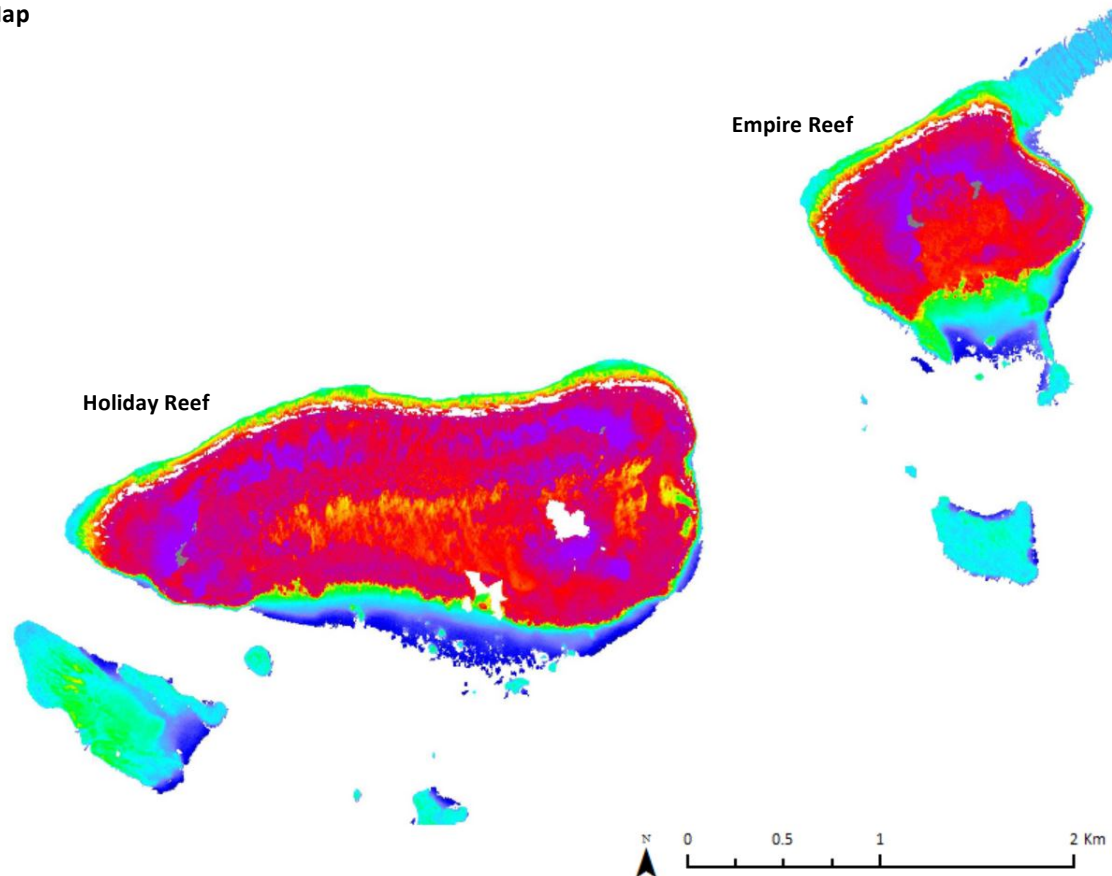
In 2011, although these two reefs show no sign of construction activity, there are severe dredging marks on most of the central part of both reef flats (0.67km² total). More recent satellite images viewable on Google Earth show that there has been further dredging activities since 12 November 2011. Deep circular dredging marks are visible on all sand-dominated areas, especially where they border coral/seagrass/algae-dominated areas of reef flats. Dredging marks are particularly extensive on Holiday Reef where dredgers in action are visible in the satellite image captured on 26 February 2014.

EMPIRE REEF AND HOLIDAY REEF (UNION REEFS)

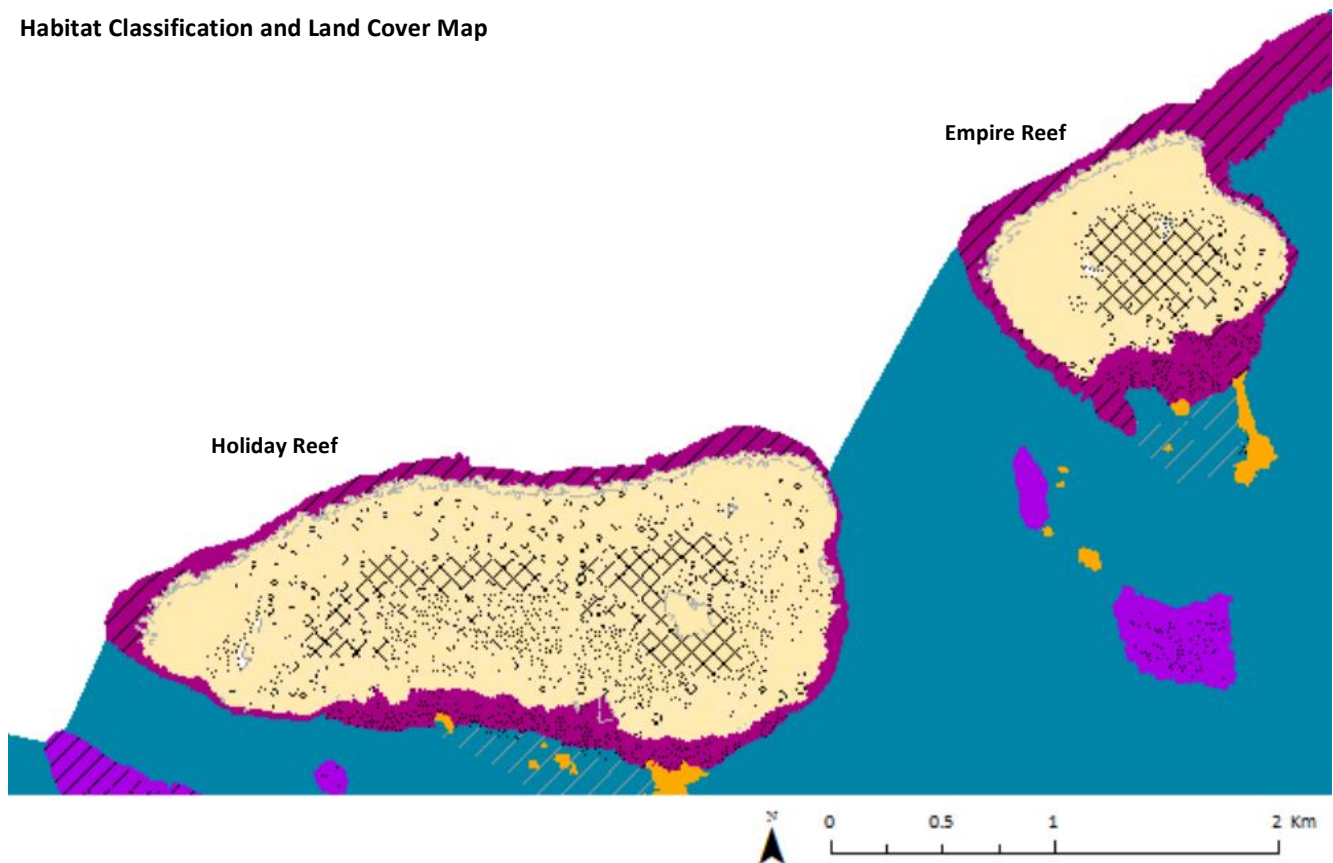
9°58'01.28"N, 114°34'15.14"E

Derived from GeoEye-1 satellite data captured on 12 November 2011 [Sea Level: -10cm]

Bathymetry Map

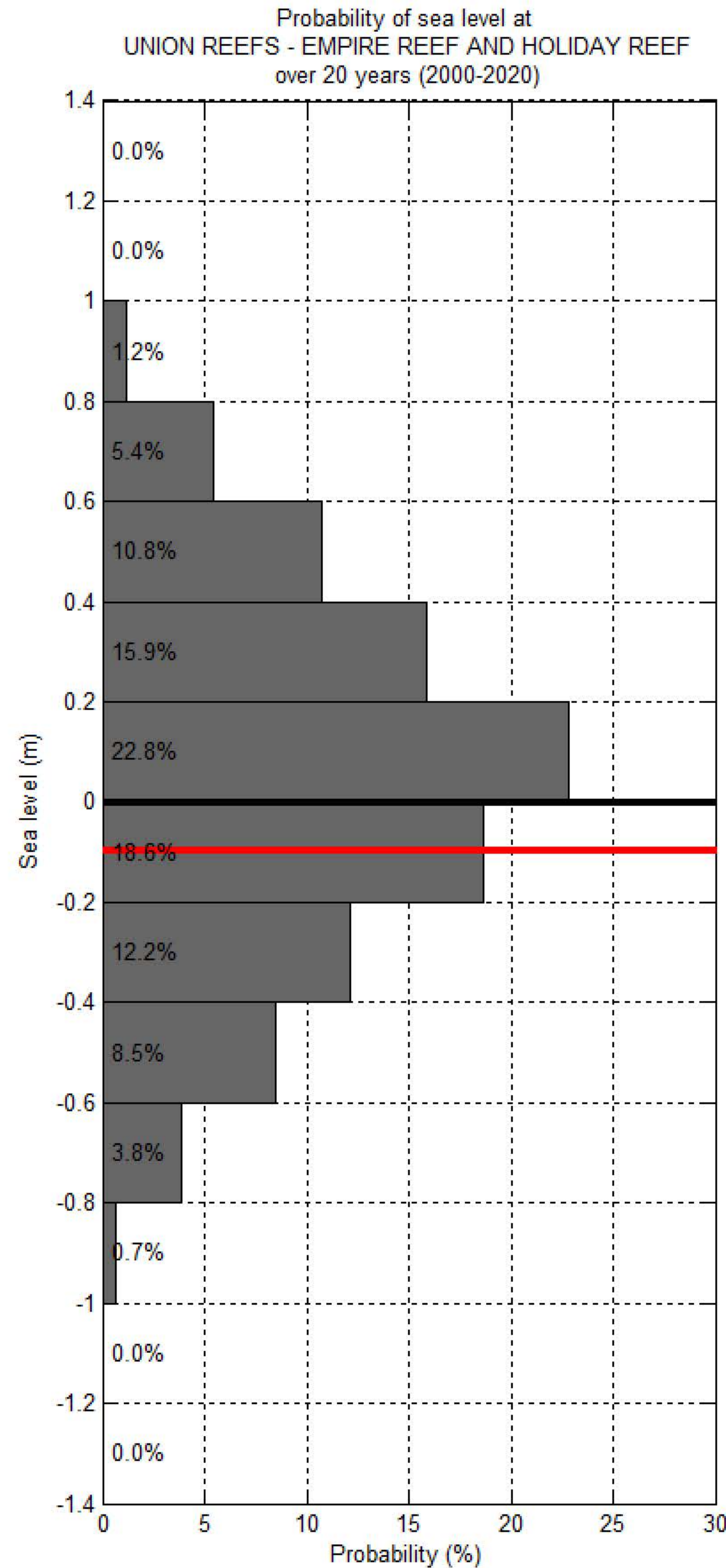
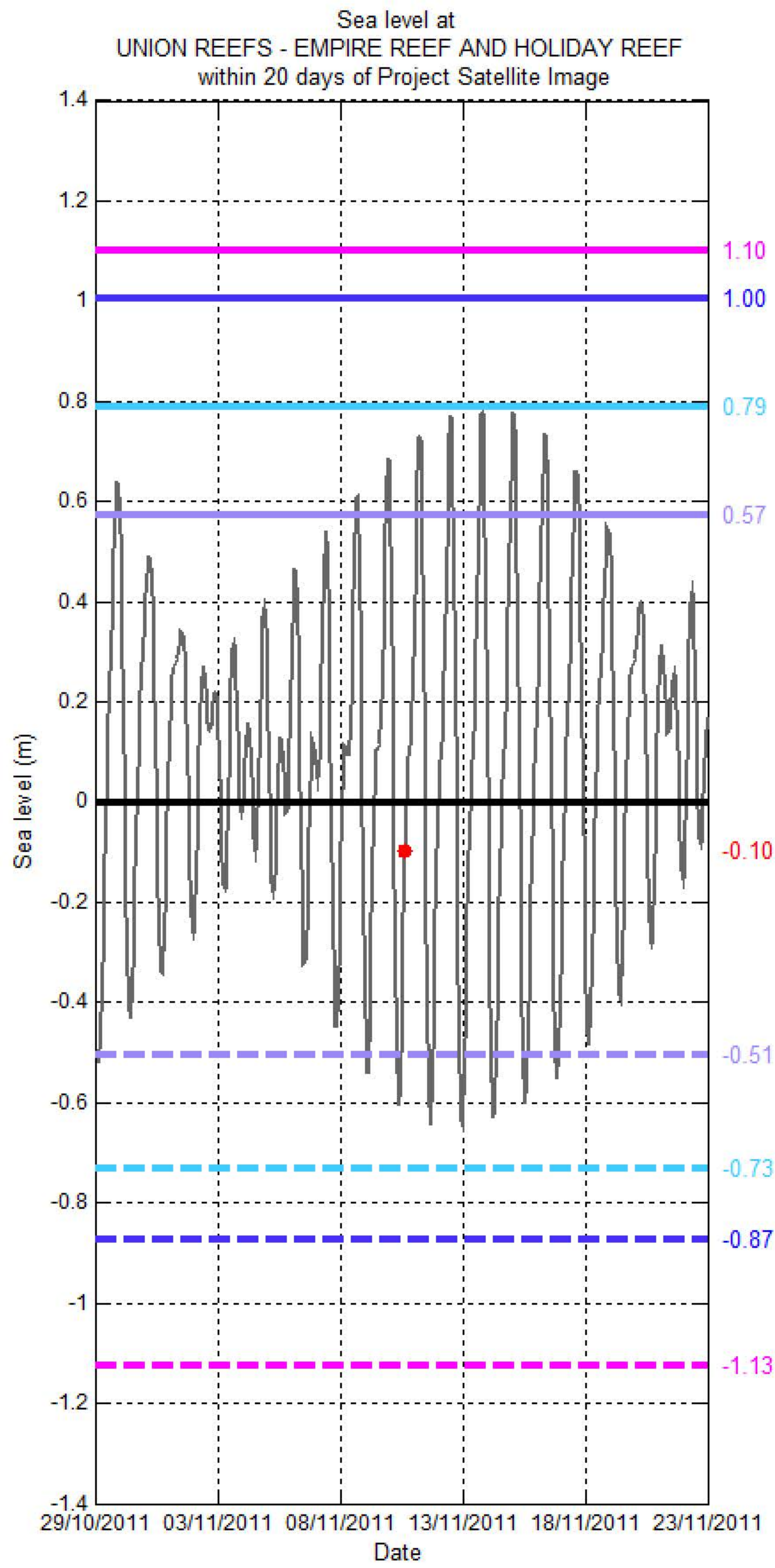
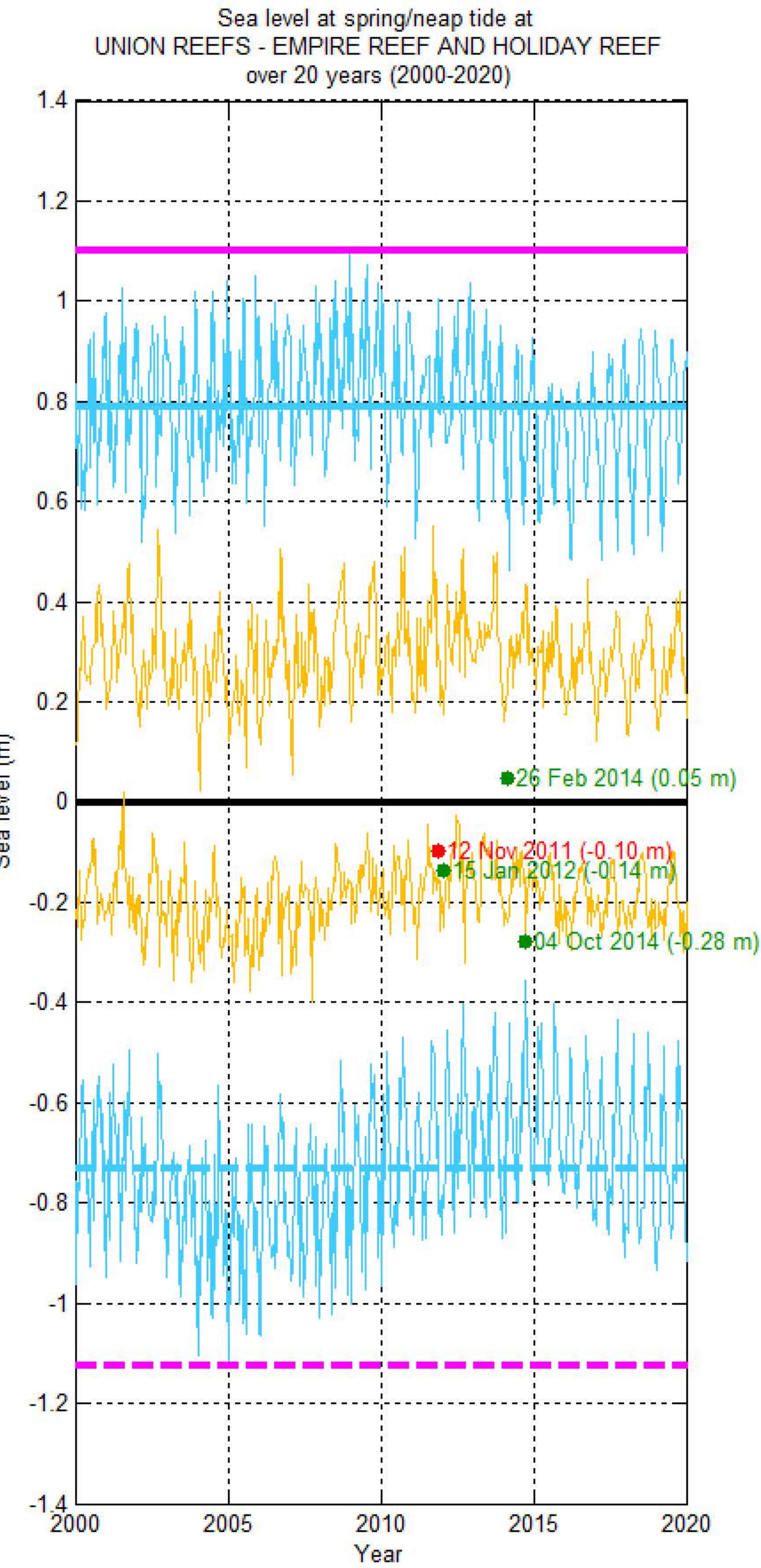


Habitat Classification and Land Cover Map



Sea level (SL) at EMPIRE REEF AND HOLIDAY REEF (UNION REEFS)

[9°58'01.28"N, 114°34'15.14"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