



Appendix II

Preliminary mangrove dieback in Queensland Gulf Plains and Cape York Peninsula

Queensland Herbarium, June 2019



Appendix II. Preliminary mangrove dieback in Queensland Gulf Plains and Cape York Peninsula (Zone 54)

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The Queensland Herbarium has developed a process to assess the extent of the recent 2016 mangrove dieback extent (see below). This process uses the SLATS Landsat imagery and derived NDVI indices for 2014 and 2016. These indices were masked to include only areas that contain mangroves using the regional ecosystem mapping of Queensland.

In the regional ecosystem mapping the associated communities such as supratidal flats maybe present as a mosaic within the mangrove area. Subtracting the 2014 NDVI from the 2016 NDVI indices provides first assessment of increase or decrease in greenness during the 2014–16 period. Assessing these indices in areas where high resolution imagery is available before and after the dieback event, for example the area around Karumba, provided the necessary thresholds to quantify a) that the 2014 is a mangrove stand and not another associated community such as a salt marsh; and b) determine using the NDVI (2014–16) subtraction product the extent of the affected area. The areas which are greater than 0.5 m were visually assessed using the Landsat imagery and areas which did not reflect mangrove dieback where removed. The areas that were removed mainly occurred within or adjacent to rivers, and therefore provided higher NDVI signature during the wetter period of 2014 to the drier period of 2016.

Areas with less than 0.5 ha require higher resolution imagery for more accurate analysis. The patches greater than 0.5 ha amount to a potential dieback of about 900 ha in the Queensland Gulf Plains bioregion and a further 500 ha in the west coast of the Cape York Peninsula bioregion (Figure 1). There are only three patches that are greater than 50 ha. All these occur in the Gulf Plains bioregion with the patch north of Karumba (171 ha) being the largest in the west coast of Queensland. Overall 18 patches are above 10 ha, 11 in Queensland Gulf Plains and seven (7) in Cape York Peninsula bioregion.

When better imagery or ground validation data becomes available, these preliminary potential dieback areas and calculations can be further assessed and refined. Future analysis of Lidar and high resolution imagery will be able to determine the trajectory (recovery or further degradation) of the affected areas and other areas. This process applied in Queensland can be applied elsewhere in Australia and in other parts of the world.

Accompanying this report is a digital KML file which can be viewed on Google Earth or other applications.

Method:

The **normalised difference vegetation index (NDVI)** is an index that quantifies whether there is a live green vegetation in the target being observed and the level of greenness.

The NDVI is calculated as:

$$\text{NDVI} = (\text{NIR} - \text{VIS}) / (\text{NIR} + \text{VIS})$$

Where: **VIS** stands for the spectral reflectance measurements in the visible red band; and **NIR** stands for the spectral reflectance measurements in the near-infrared band.

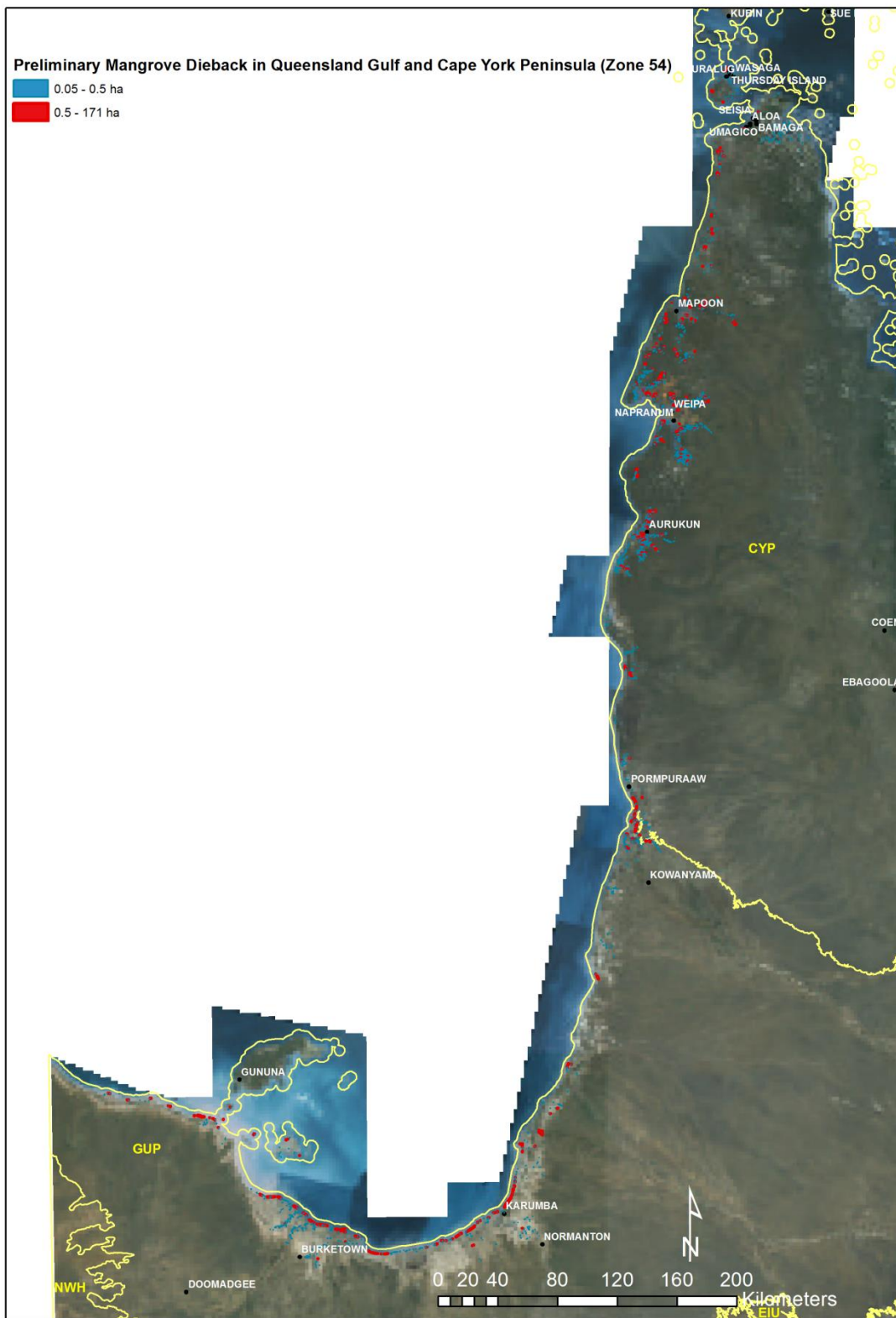


Figure 1. This is a preliminary map showing the potential mangrove dieback in the Gulf Plains and the Cape York Peninsula bioregions (zone 54) between 2014 and 2016