

# Kiribati: A Nation on the Brink

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### Kiribati's Main Island: Tarawa

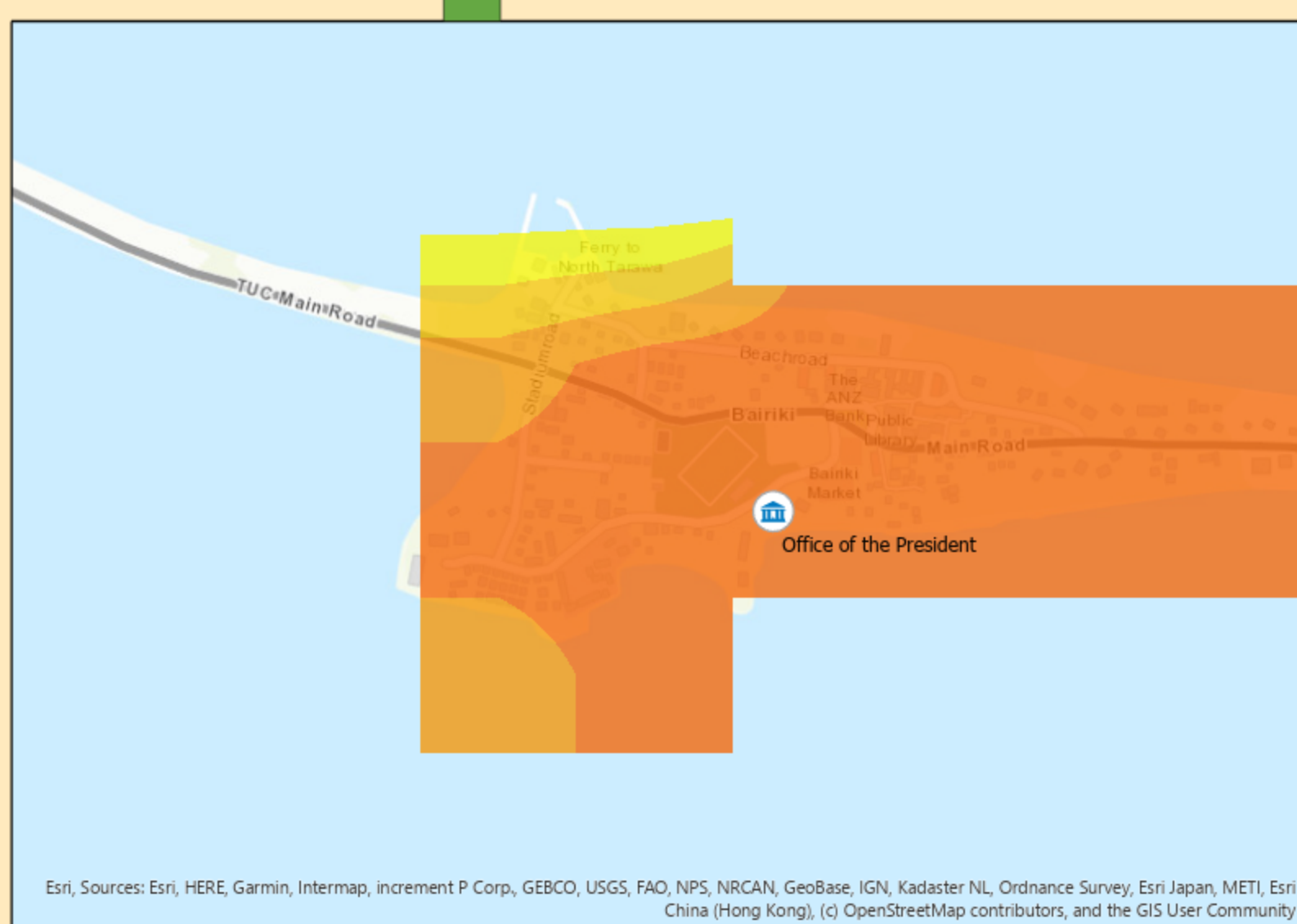
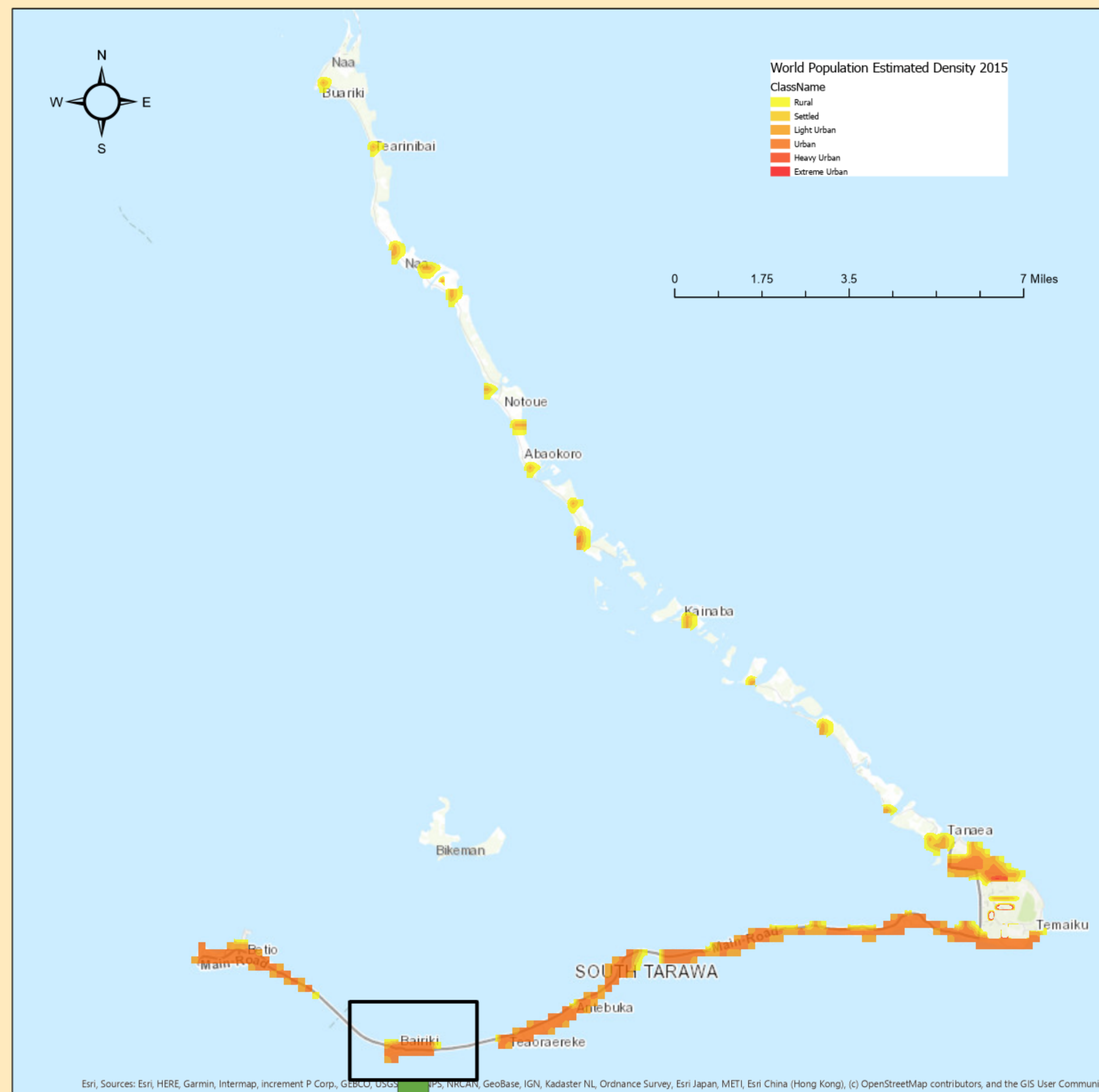


Figure 2b: Bairiki, Kiribati's administrative center, has a similar population density to Miami, USA (3).

### Introduction, Data and Sources

Kiribati is an island nation located in the South Pacific Ocean (Figure 1) (1). Comprised of 32 atolls and 1 coral raised island, Kiribati has a mean elevation of 3m above sea level (2). This presents an issue with regard to the projected sea level rise within the region (Figure 2) (2). The IPCC projected sea level rise for Kiribati are modeled in Figure 2 based on the 90% intervals of RCP 2.6,4.5, 6.0 and 8.5 (3). The anticipated mean sea level rise by the end of the century is nearly 1m. In December 2019, the high tide was recorded at 2.7m (4). The maps displayed in the green shaded area demonstrate mean tide levels a 0m, .625m and 2.5m above the current mean sea level.

The data collected for this project comes from Open Source Topography, World Banks Population Data and the Kiribati Government. Additionally, Kiribati land cover and boundary were acquired from ArcGIS online database.

### Method and Workflow

1. Gather data and import into ArcGIS Pro. Align data with WGS 1984 Web Mercator
2. Remove any data from all datasets a 0m Sea Level
3. Create a map for both population density for Tarawa atoll and the administrative center, Bairiki
4. Create a map for Tarawa with regards to topography data and future mean sea levels
5. Evaluate the projected sea level rise maps with regards to current 2019 high tide data
6. Adjust symbology, map layouts, legends, labels, charts, etc. to reflect sources or maps

### Results

While analyzing the sample data it has become clear that Tarawa and the administrative capital of Kiribati, Bairiki are vulnerable to sea water intrusion at high tide and at the projected mean sea level for the region. In December 2019, the highest tide point recorded in Tarawa was measure at 2.7m (4). By using current models we can project that the effects of sea level rise modeled in Figure 4 will become increasingly frequent.

Additionally, this report does not dispute the findings of Webb and Kench from 2010 that indicated that Tarawa's land mass is expanding (5). However, these land mass expansions are anthropogenic and place additional infrastructure within the projected flood areas (2,5).



Tarawa Atoll, looking west from Bonriki International Airport (4)

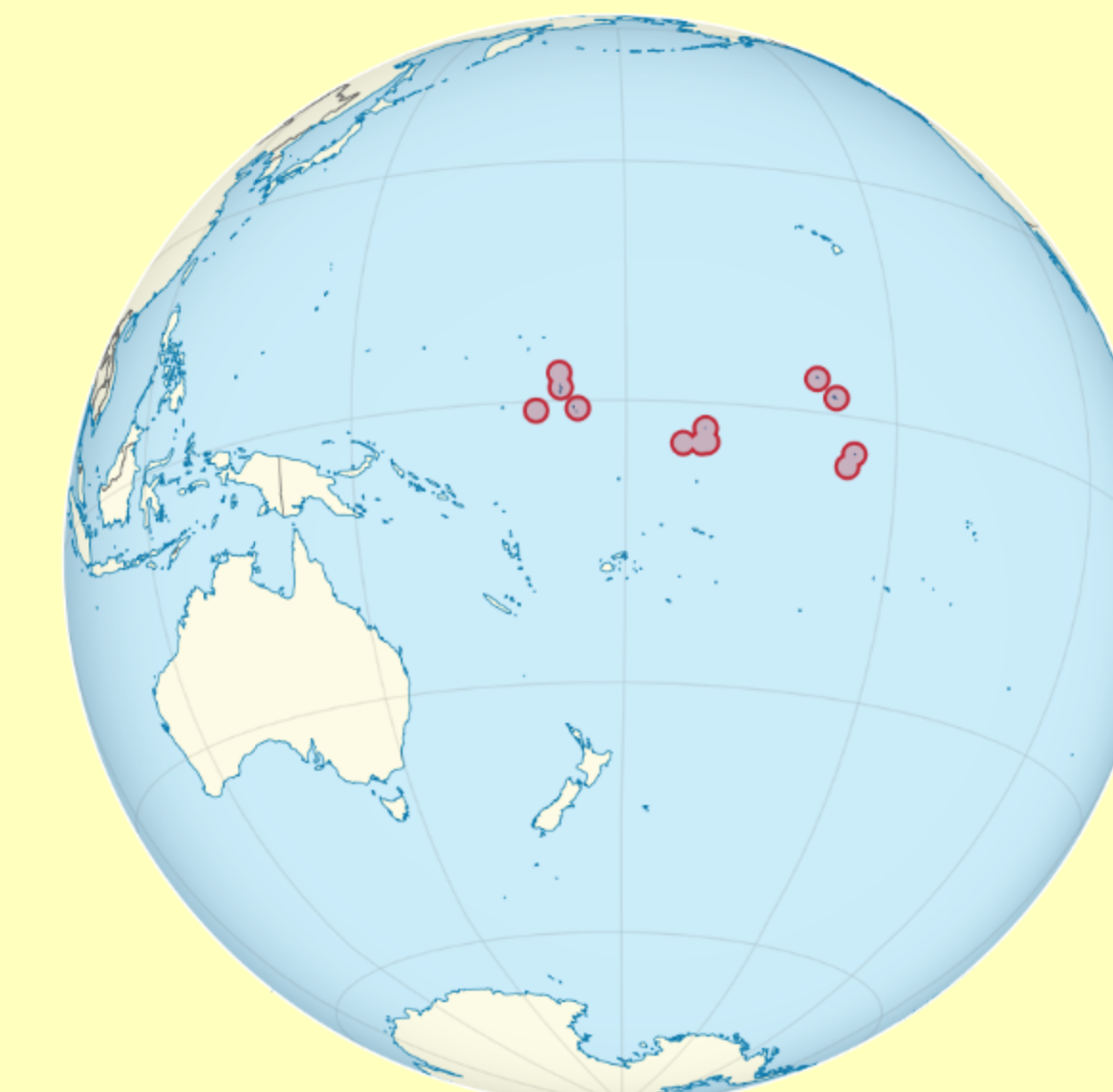


Figure 1: Location of the three primary Kiribati island Clusters (1)

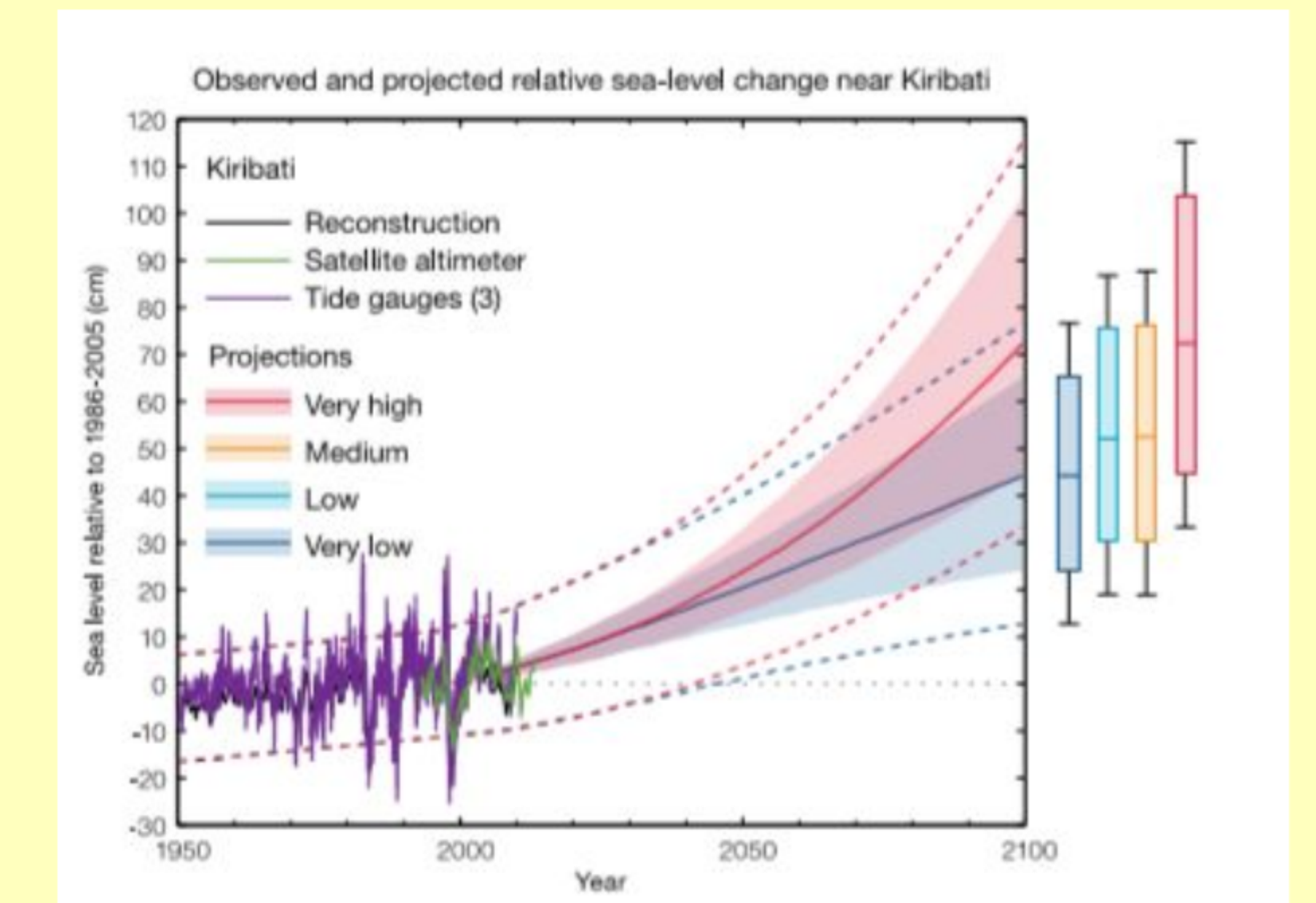
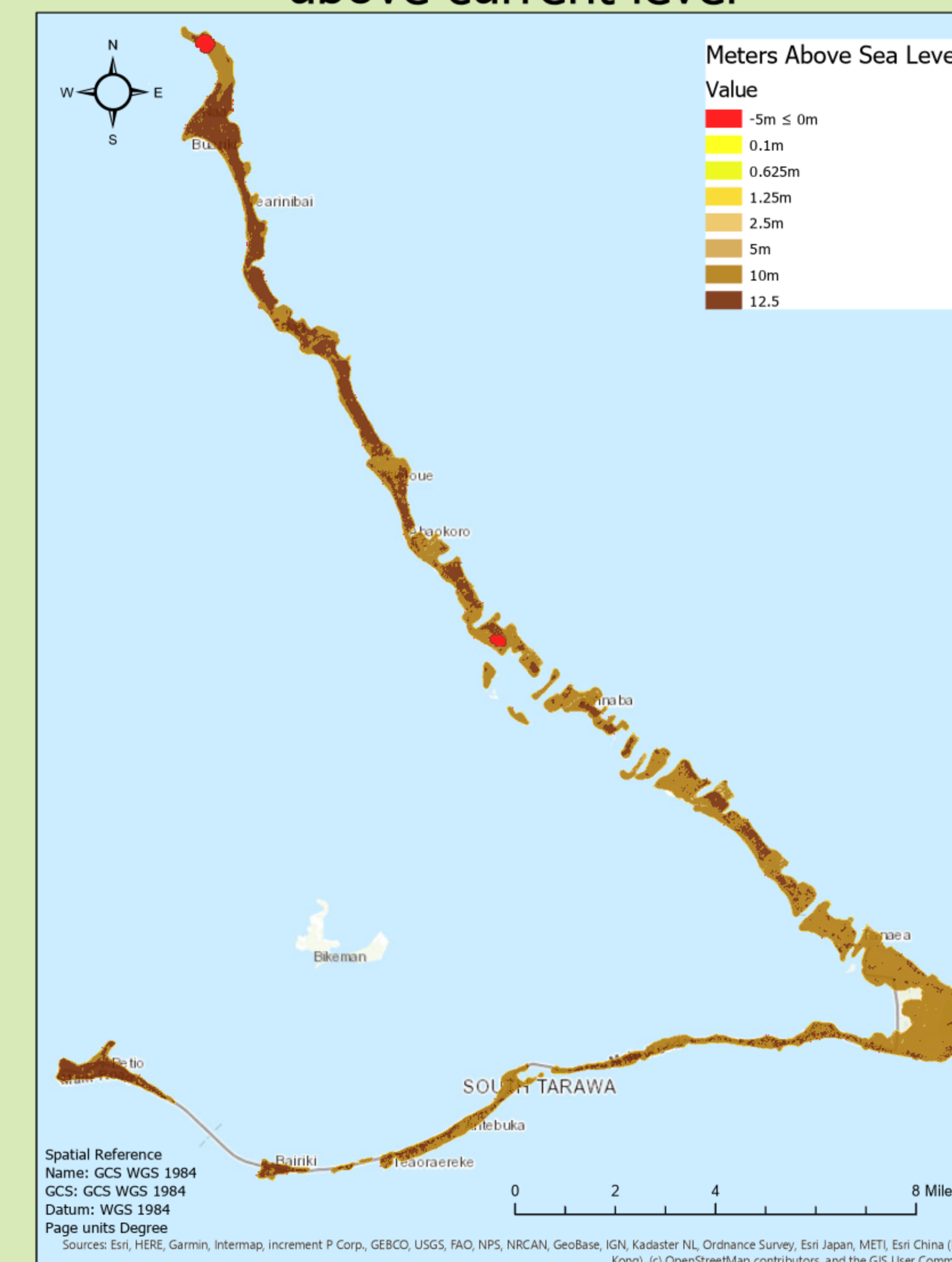
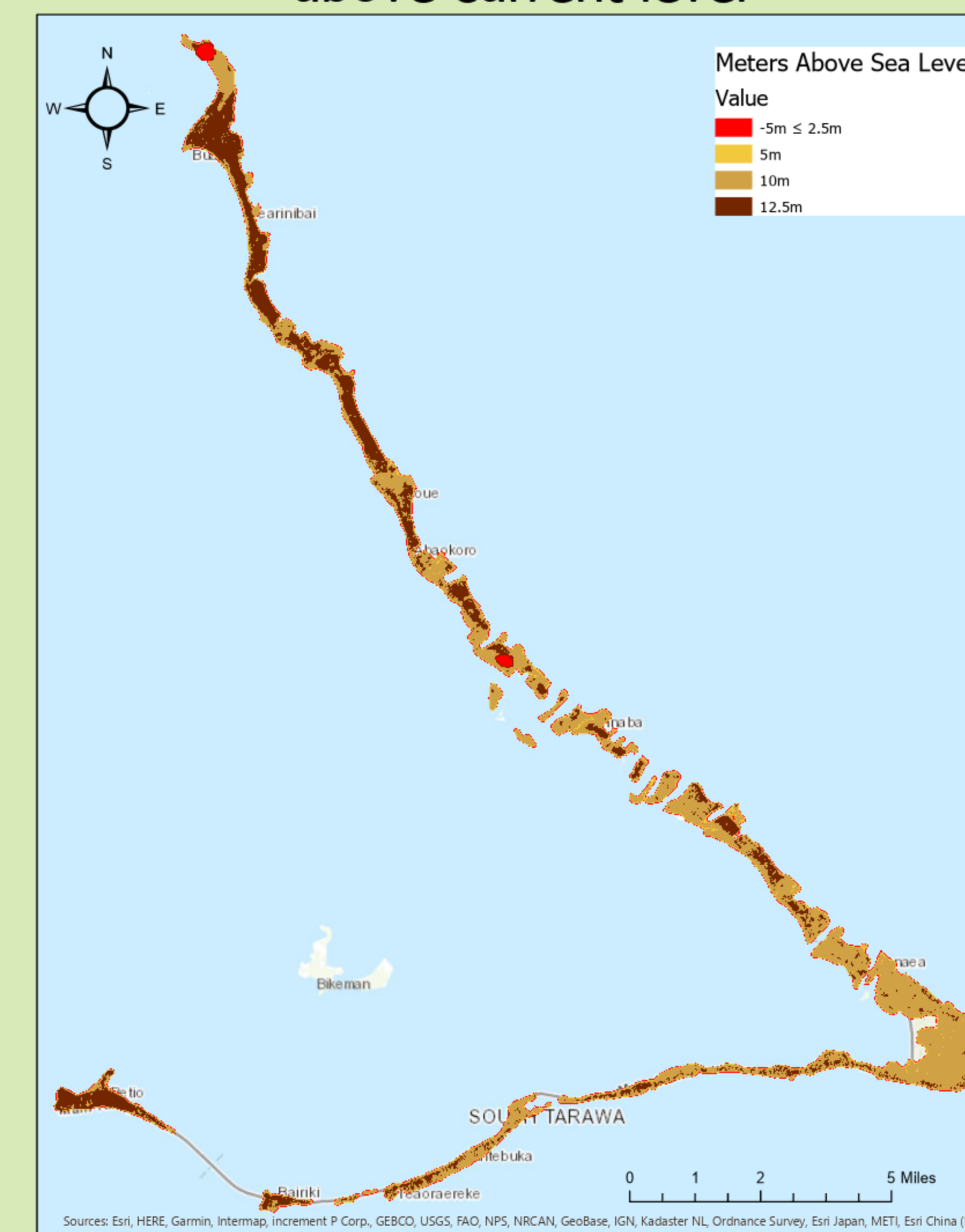


Figure 2: IPCC Project Sea Level with 90% Confidence Intervals (2)

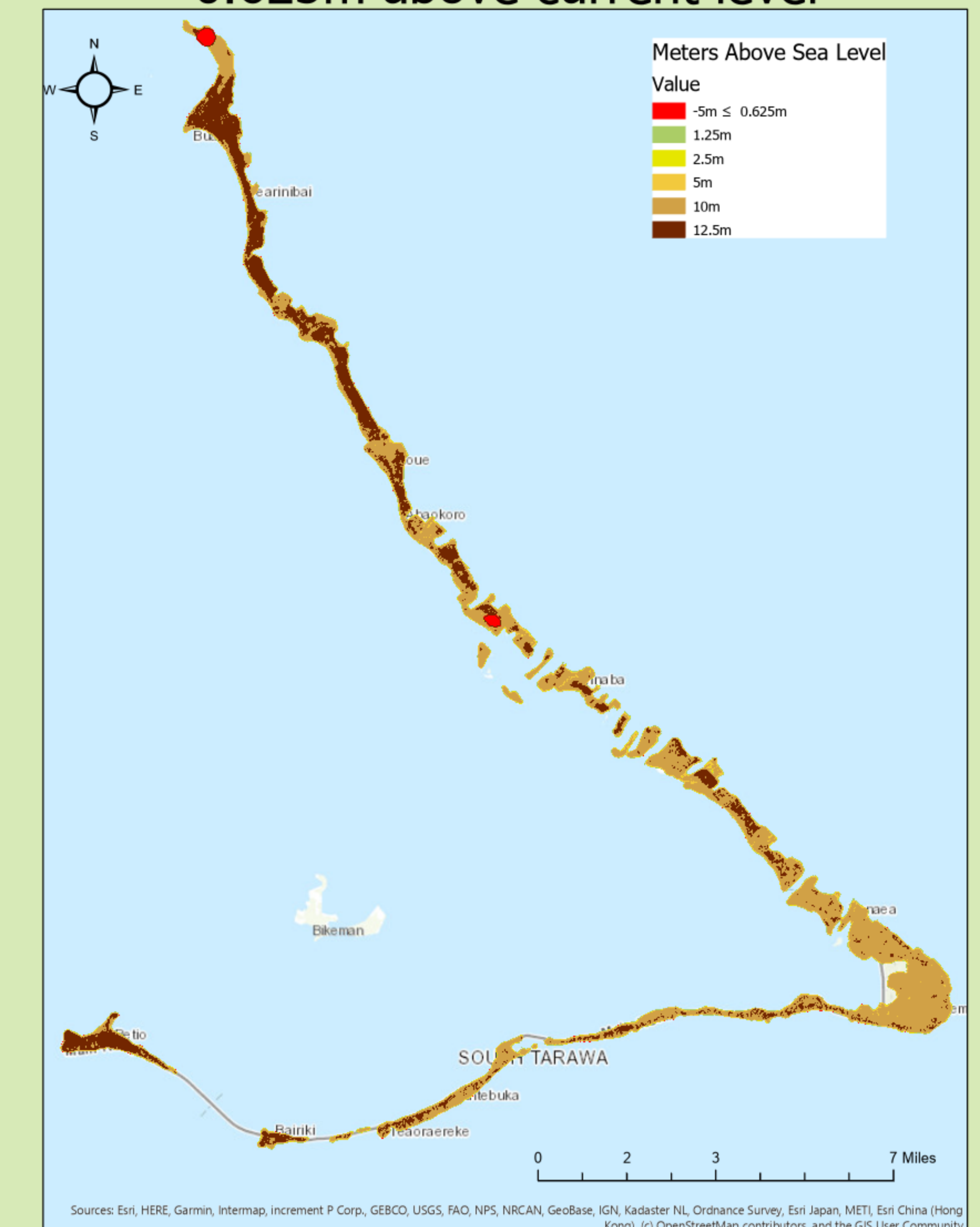
### Tarawa atoll at mean sea level of 0m above current level



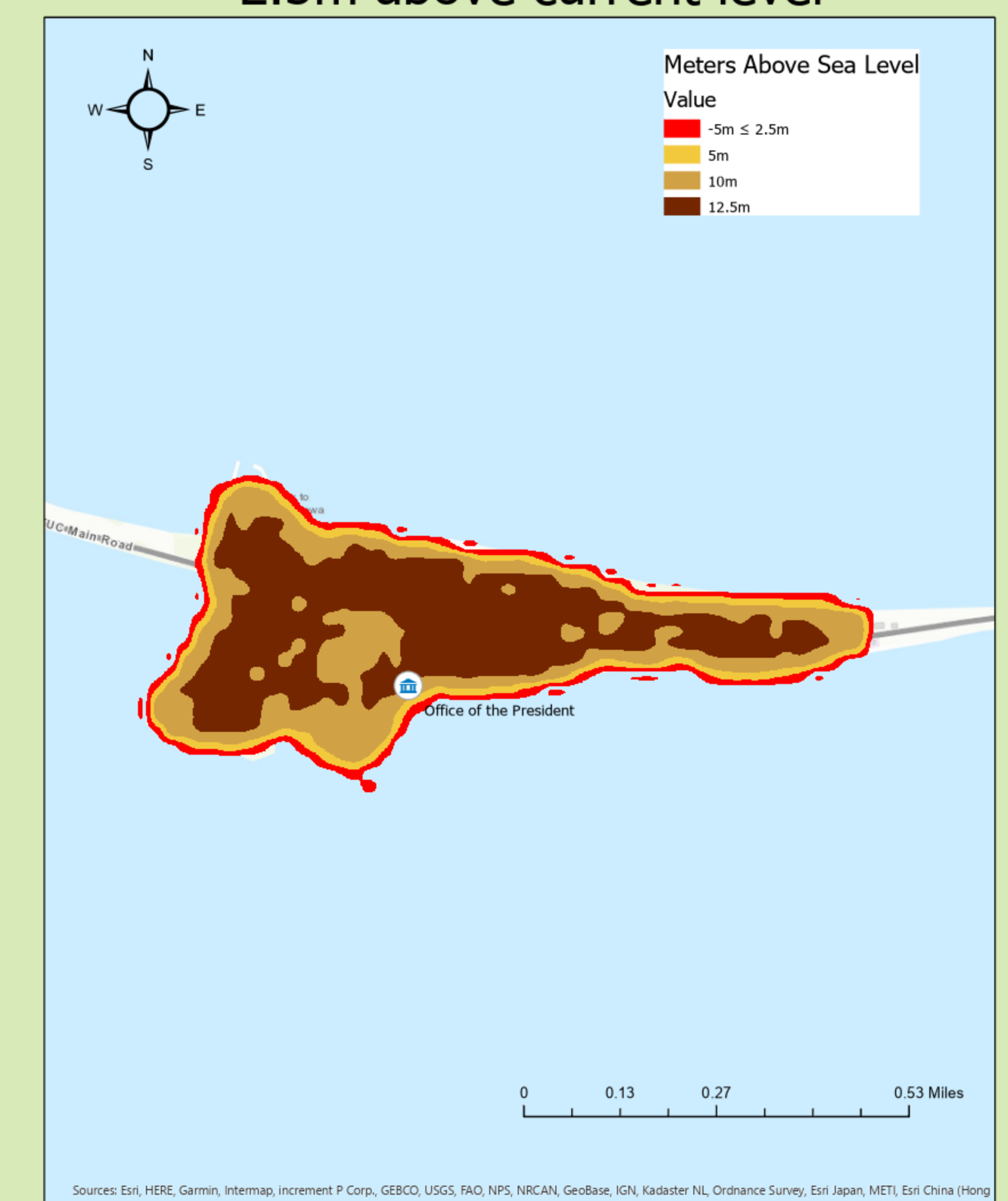
### Tarawa atoll at mean sea level of 2.5m above current level



### Tarawa atoll at mean sea level of 0.625m above current level



### Bairiki community at mean sea level of 2.5m above current level



### Sources

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