

# Detailed Insights: Palau

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## Welcome!

You have reached the CCN Inventory Tool Detailed Insights Report.

Congratulations! This geography has available data.

Potential data availability within the Inventory Tool ranges from Tier I, Tier II, or Tier III Carbon stock estimates.

This document includes country-specific insights and more detailed analysis, including carbon stocks, emissions factors, and ecosystem wetland area for mangrove, marsh, and seagrass habitats. This report details information for the selected geography, **Palau**.

Explore the rest of the dashboard for more exciting visualizations, map features and data.

Resources referenced to calculate estimates for **Palau** are listed below under ‘References’ at the end of this document.

If you have any questions or data you would like to add to the Coastal Carbon Network, please reach out to us at [CoastalCarbon@si.edu](mailto:CoastalCarbon@si.edu).

## Total Carbon Stock Estimates

Total Carbon stock estimates were calculated for each geography in total, and for mangrove, tidal marsh, and seagrass habitats when available.

We estimate that **Palau** contains a mean estimate of  $2.51039 \times 10^6$  metric tonnes soil Carbon.

We estimate that **Palau** contains between  $3.36586 \times 10^6$  to  $1.65491 \times 10^6$  metric tonnes of soil C to a depth of 1 m, with a mean estimate of  $2.51039 \times 10^6$  metric tonnes C.

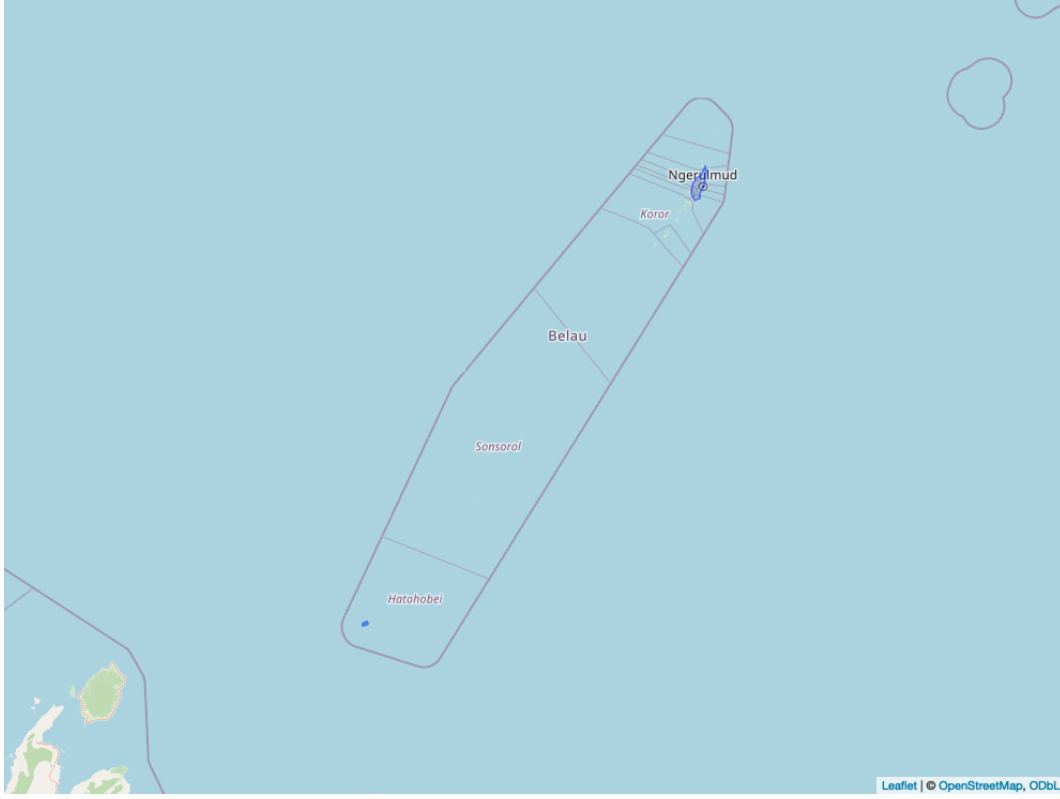


Figure 1: Palau

Table 1: Total Geography Level Carbon Stocks

Country	Territory	Total Stocks	Upper CI	Lower CI
Palau	Palau	2510387	1654912	3365861

This total estimate includes total mangrove soil carbon stocks, with a mean estimate of  $2.51039 \times 10^6$  metric tonnes of soil C to a depth of 1 meter.

This total estimate also includes total tidal marsh carbon stocks, ranging from NA to 0 metric tonnes of soil C to a depth of 1 m, with a mean estimate of 0

We estimate seagrass soil carbon stocks for **Palau** to have a mean estimate of  $8.63784 \times 10^5$

## Wetland Areas and Activities

We estimate mangrove area in **Palau** to be 4928 to 6506 hectares, with a mean estimate of 5612 hectares according to Global Mangrove Watch Bunting et al. (2018).

We estimate tidal marsh area in **Palau** to be 0 to 0 hectares, with a mean estimate of hectares according to Worthington et al. (2024).

We estimate seagrass area to be **Palau** to be a mean of 7998 hectares, according to McKenzie et al. (2020), which aggregates global seagrass data from a number of sources.

## Calculated Stocks and Emissions Factors

This section of the report details whether data is available to estimate Tier I, Tier II, or Tier III value estimates for tidal marsh, mangrove, and seagrass ecosystems in **Palau**.

If data for the selected country is available in the Coastal Carbon Atlas, we have applied a Tier II emission factor based on a simple average of country specific data queried from the Atlas.

Data from **Palau** included in the Coastal Carbon Atlas consists of 16 soil profiles from 16 watersheds. This data comes from 1 distinct habitat type(s).

In the case that there is not yet any country specific information in the Coastal Carbon Atlas, we instead applied IPCC Tier I estimate. IPCC Tier I estimates for mangrove, marsh, and seagrass ecosystems are listed below.

The table in this section also details whether the calculated Tier II value is significantly different from the estimated Tier I values. This is observed in the “Overlap” column.

Table 2: IPCC Tier I Value Estimates

Habitat	Mean	Lower_CI	Upper_CI
mangrove	386	351	424
marsh	255	254	297
seagrass	108	84	139

## Data Availability by Tier

Table 3: Availability of Tier I and Tier II Data

Country	Territory	Habitat	Tier	Overlap
Palau	Palau	mangrove	Tier II	Country-specific average overlaps Tier I
Palau	Palau	marsh	Tier I	No Tier II data available at this time
Palau	Palau	seagrass	Tier I	No Tier II data available at this time

## Tier I Carbon Stocks

This section includes Tier I Carbon Stocks included for **Palau**. In the case that all habitats; mangrove, tidal marsh, and seagrass have available Tier II estimates, please refer to Table 2: IPCC Tier I Value Estimates for applicable Tier I values.

Table 4: Tier I Carbon Stock Estimates

Country	Territory	Habitat	Mean Stock (MgHa)	Lower CI	Upper CI
Palau	Palau	marsh	255	254	297
Palau	Palau	seagrass	108	84	139

Good news! The selected country has Tier II data for each available habitat. Please refer to Table 2: IPCC Tier I Value Estimates for applicable Tier I estimates and Table 5: Tier II Carbon Stock Estimates.

## Tier II Carbon Stocks

This table includes Tier II Carbon Stock estimates for **Palau**. Estimates in this table were derived from data queried from the Coastal Carbon Atlas.

A selected country may have available Tier II values for one or multiple habitats, this is dependent on core data accessible through the Coastal Carbon Atlas. At the time of analysis, referencing Version 1.5.0, **Palau** represents a total of 16 cores across 1 distinct habitats.

Table 5: Tier II Carbon Stock Estimates

Country	Territory	Habitat	Mean Stock (MgHa)	Lower CI	Upper CI	Standard Error
Palau	Palau	mangrove	447	305	590	72.62063

## Tier III Carbon Stocks

Tier III carbon stocks were estimated, when available, from remote sensing data from Maxwell et al 2021 and Sanderman et al 2018. The table below details whether estimated values are available for **Palau**, and any overlap with associated Tier I or Tier II values.

If there are no Tier III estimates associated with the selected country and specific habitat of interest, please refer to above Tier I and Tier II tables.

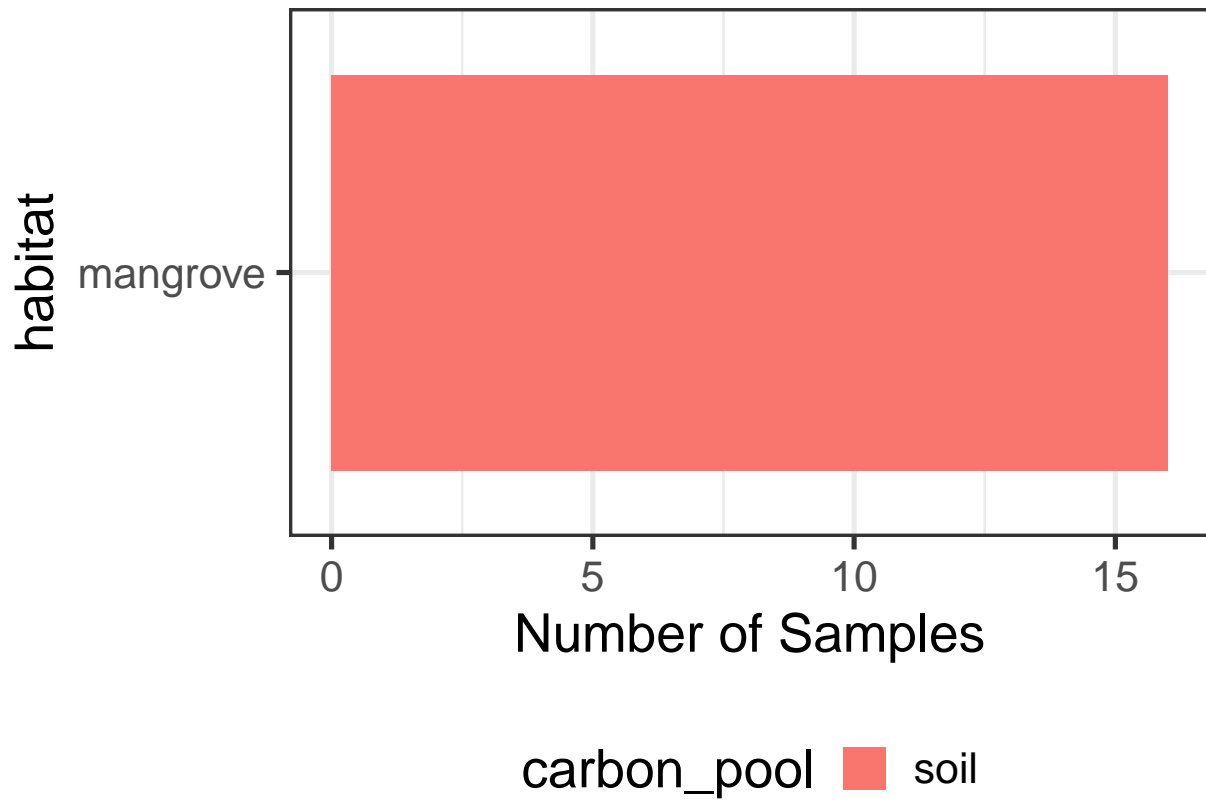
Table 6: Tier III Carbon Stock Estimates

Country	Territory	Habitat	Mean Stock (MgHa)	Lower CI	Upper CI
Palau	Palau	mangrove	593	458	728

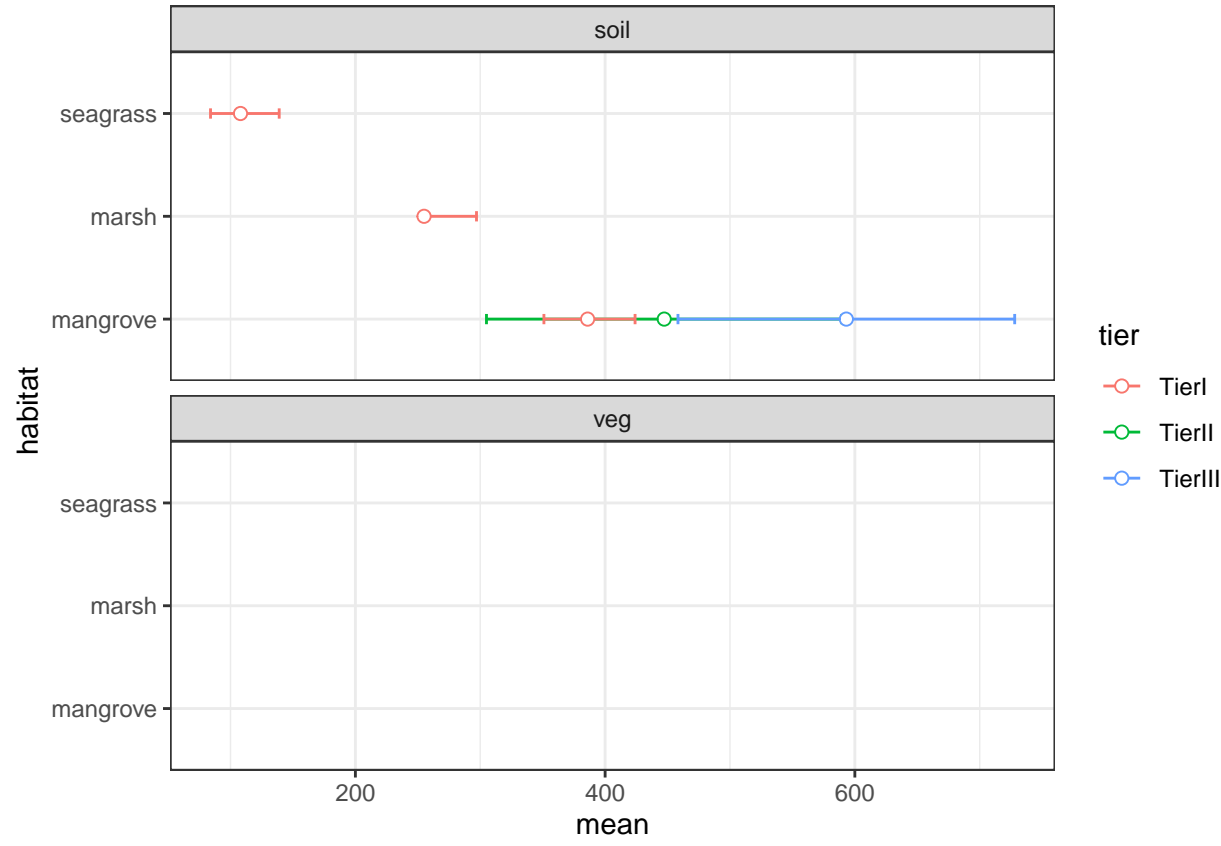
In the selected geography, Palau ,Tier III estimated stock MgHa values are greater than Tier II values estimated from Coastal Carbon Atlas Data. In this case, the Tier III Remote-sensing estimate overlaps country-specific average. Additionally, estimated Tier III stock values derived from remote sensing are greater than estimates Tier I values. In this case, the Tier III Remote-sensing estimate is significantly greater than Tier I estimate.

## Visualizations

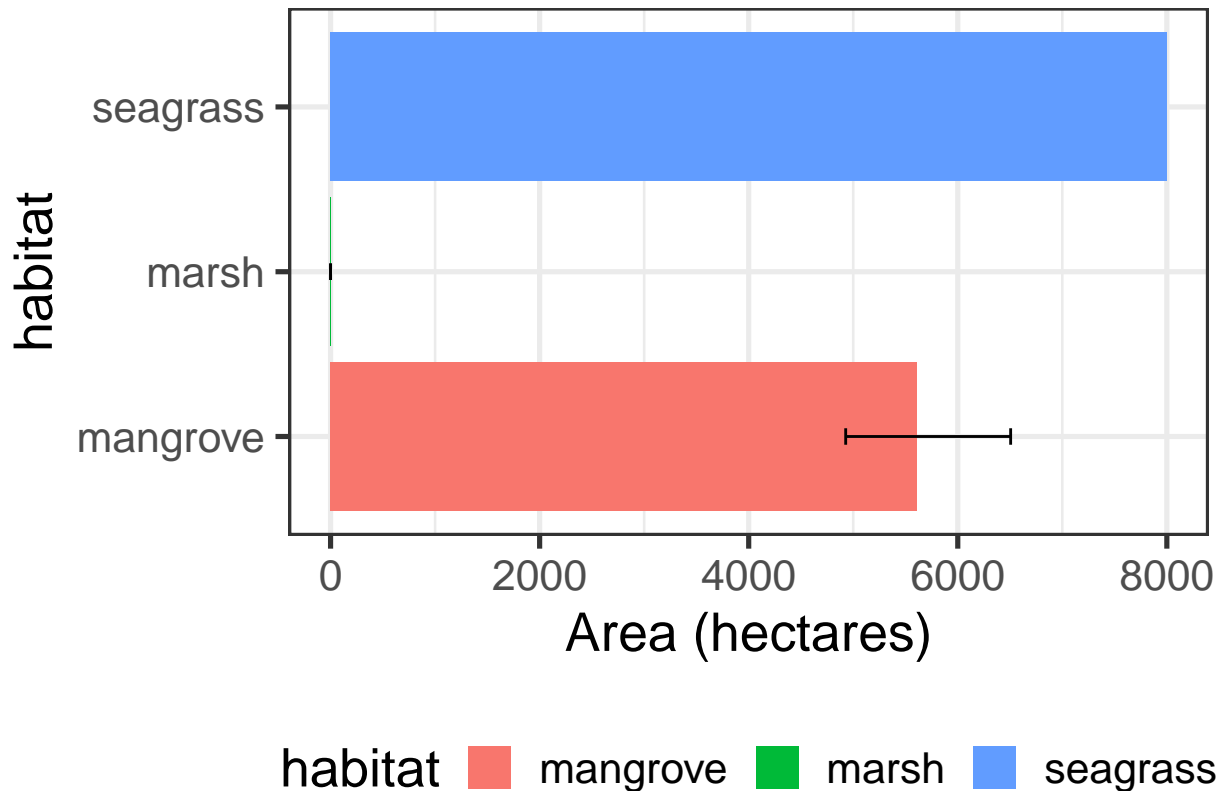
### 1. Data Metrics



2. Emissions Factors



### 3. Activity Data



### References

- Bunting, Pete, Ake Rosenqvist, Richard M. Lucas, Lisa-Maria Rebelo, Lammert Hilarides, Nathan Thomas, Andy Hardy, Takuya Itoh, Masanobu Shimada, and C. Max Finlayson. 2018. "The Global Mangrove Watch—a New 2010 Global Baseline of Mangrove Extent." *Remote Sensing* 10 (10): 1669. <https://doi.org/10.3390/rs10101669>.
- Donato, D. C., J. B. Kauffman, R. A. Mackenzie, A. Ainsworth, and A. Z. Pflieger. 2012. "Whole-Island Carbon Stocks in the Tropical Pacific: Implications for Mangrove Conservation and Upland Restoration." *Journal of Environmental Management* 97 (April): 89–96. <https://doi.org/10.1016/j.jenvman.2011.12.004>.
- MacKenzie, Richard A., Patra B. Foulk, J. Val Klump, Kimberly Weckerly, Joko Purbospito, Daniel Muriyoso, Daniel C. Donato, and Vien Ngoc Nam. 2016. "Sedimentation and Belowground Carbon Accumulation Rates in Mangrove Forests That Differ in Diversity and Land Use: A Tale of Two Mangroves." *Wetlands Ecology and Management* 24 (2): 245–61. <https://doi.org/10.1007/s11273-016-9481-3>.
- McKenzie, Len J, Lina M Nordlund, Benjamin L Jones, Leanne C Cullen-Unsworth, Chris Roelfsema, and Richard K F Unsworth. 2020. "The Global Distribution of Seagrass Meadows." *Environmental Research Letters* 15 (7): 074041. <https://doi.org/10.1088/1748-9326/ab7d06>.
- Sanderman, Jonathan. 2017a. "Global Mangrove Soil Carbon: Dataset and Spatial Maps." Harvard Dataverse. <https://doi.org/10.7910/dvn/ocyuit>.
- . 2017b. "Global Mangrove Soil Carbon: Dataset and Spatial Maps." Harvard Dataverse. <https://doi.org/10.7910/dvn/ocyuit>.
- . 2017c. "Global Mangrove Soil Carbon: Dataset and Spatial Maps." Harvard Dataverse. <https://doi.org/10.7910/dvn/ocyuit>.

Worthington, Thomas A., Mark Spalding, Emily Landis, Tania L. Maxwell, Alejandro Navarro, Lindsey S. Smart, and Nicholas J. Murray. 2024. “The Distribution of Global Tidal Marshes from Earth Observation Data.” *Global Ecology and Biogeography* 33 (8). <https://doi.org/10.1111/geb.13852>.