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Australian Disaster Resilience Conference

Australian Government
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Disaster resilience and the National Ocean Account

A look at Australia's First National Ocean Account & Coastal Protection Service

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CONFERENCE AND EXHIBITION

22–25 AUGUST 2023
Brisbane Convention and
Exhibition Centre

Overview

- Background of the challenge

- Overview of Ecosystem Accounting

- Overview of the National Ocean Account

- Overview of sources and methods informing the coastal protection model

- Future opportunities

The Challenge

- Coastal flooding resulting from storm surge is expected to be exacerbated with the increasing frequency and intensity of storms over this century.

- This poses a risk to coastal communities, infrastructure and economically valuable land within the coastal zone.

- Recent studies have found that coastal ecosystems like mangroves and saltmarshes could decrease flood depths and save millions of dollars in flood damages.

How can Environmental Ecosystem Accounts help

Some of the questions Environmental Ecosystem accounts can address are:

- How much of the ecosystem resources are left?

- Is the ecosystem health improving?

- What services do ecosystem provide?

- What are the impacts of development on coastal resources?

- What are the measures that can lead to a balanced discussion on trade offs?

What are Ecosystem Accounts

BASED ON UNITED NATIONS SYSTEM OF ENVIRONMENTAL-ECONOMIC ACCOUNTING - ECOSYSTEM ACCOUNTING FRAMEWORK.

IT EXPANDS THE SYSTEM OF NATIONAL ACCOUNTS USED BY GOVERNMENTS TO TRACK THE PROGRESS OF THEIR ECONOMIES.
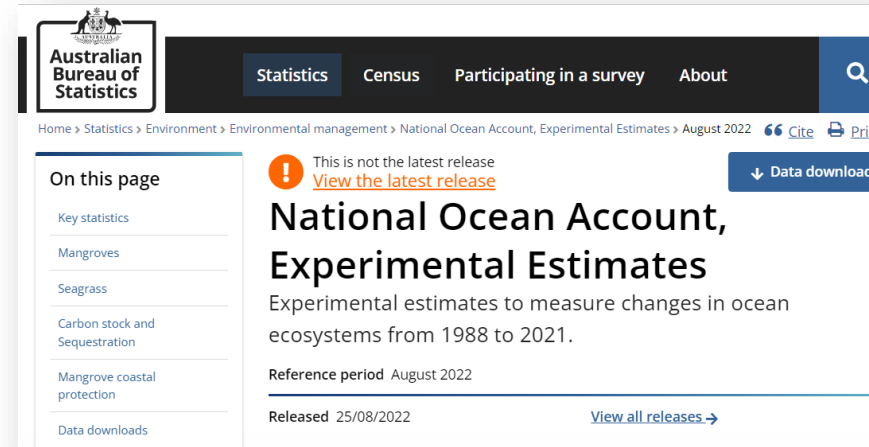
THIS DONE BY SHOWING THE INTERACTIONS BETWEEN ECOSYSTEMS AND THE ECONOMY BY LOOKING AT ECOSYSTEMS AND THEIR CONTRIBUTION TO HUMAN WELL-BEING IN THE FORM OF IDENTIFIABLE ECOSYSTEM SERVICES.

System of Environmental-Economic Accounting
Ecosystem Accounting

Source: SEEA Ecosystem Accounting, United Nations website

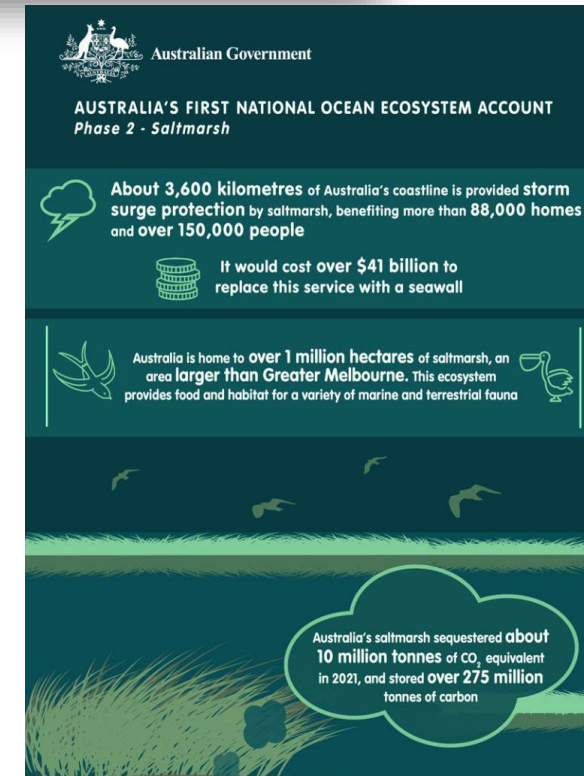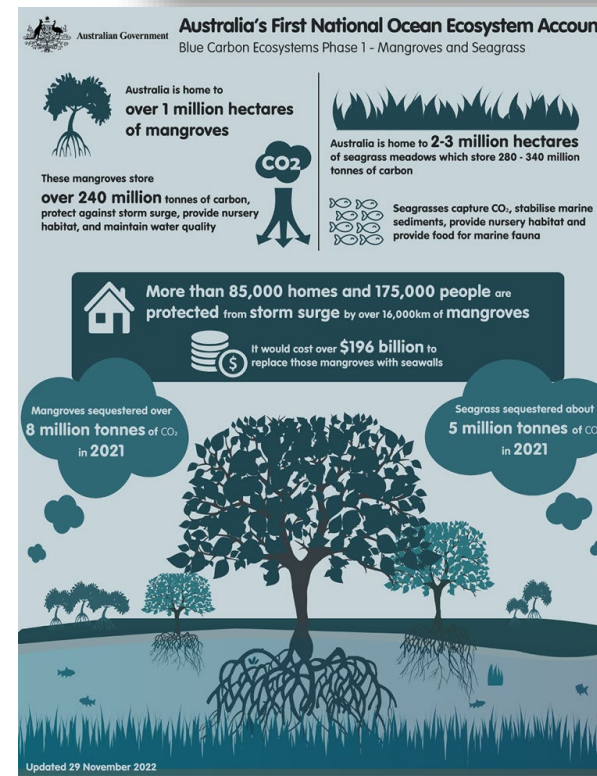# National Ocean Account

Partnership between ABS and DCCEEW

Climate mitigation and resilience focus.

Included only 'blue carbon' ecosystems –

Mangroves

Saltmarsh

Seagrass

Source: Environmental Economic Accounting, DCCEEW website
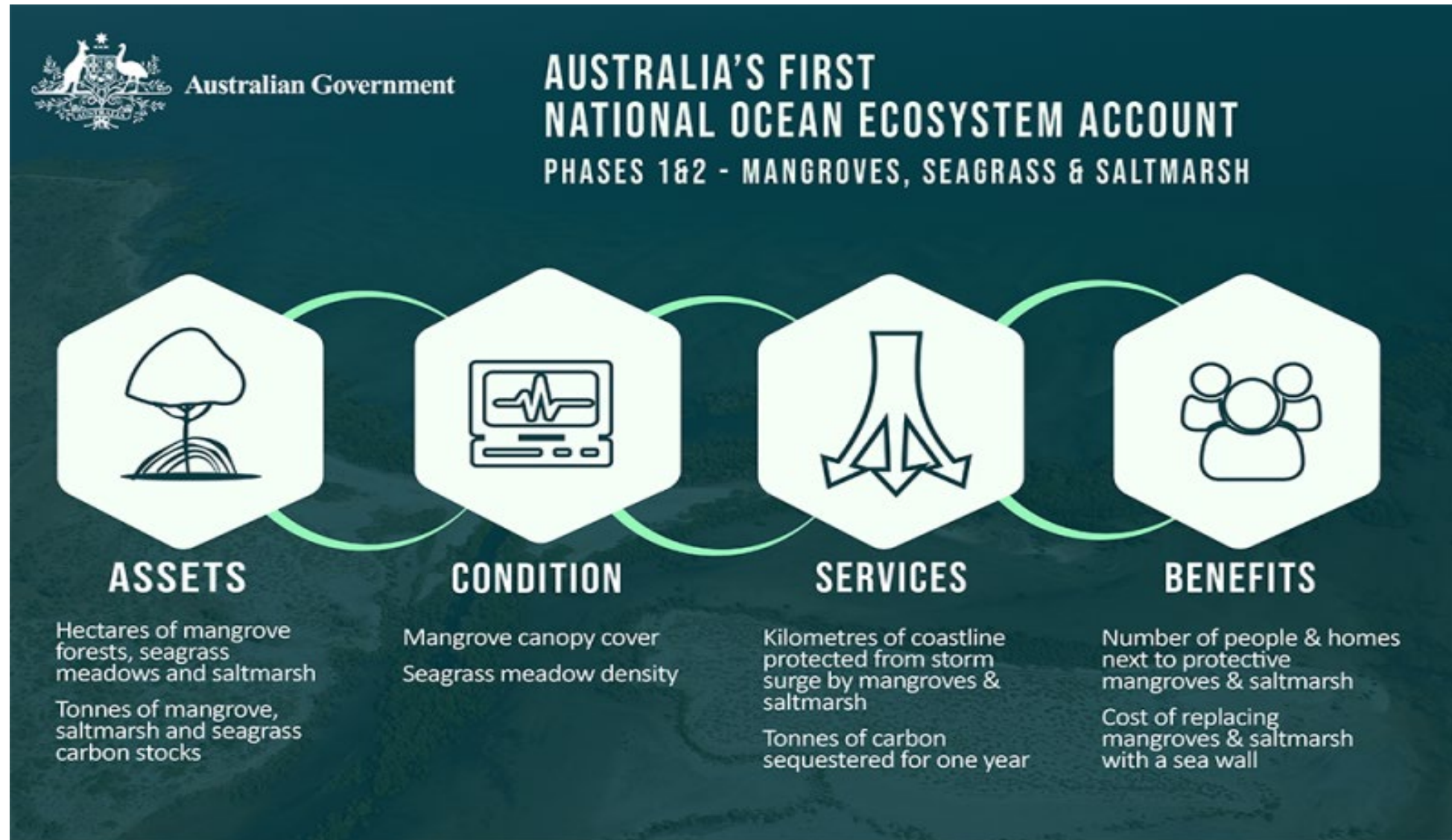
Coastal Protection Ecosystem Service

- The National Ocean Account looked at measuring coastal protection services offered by mangroves and saltmarsh ecosystems.

- A coastal protection model was developed by the ABS to measure coastal protection ecosystem service.

- The aim of the model was to identify:

  1. length of Australia's coastline,

  2. number of people and dwellings

  that were likely to be offered coastal protection from storm surge through these ecosystems.

- Model used represents a first attempt to consolidate the available information on coastal protection services and is limited by data sources available at the national scale.

Coastal Protection Model

Data sources

| Earth-observation	Survey
Saltmarsh data was sourced from an early draft of an experimental product commissioned from James Cook University by the Clean Energy Regulator. Provides information about the extent of saltmarsh for Australian coastline. **Mangrove** data was sourced from Geoscience Australia's (GA) Digital Earth Australia Mangrove Canopy Cover product. Provides information about the extent and canopy density of mangroves for Australian coastline. **Length of coastline** data was sourced from the GA DEA coastlines product to determine Australia's coastline.	**Population and dwelling** data was sourced from the ABS Census mesh block counts product that provided the usual resident population and total dwelling counts from the 2021 Census.

Coastal Protection Model

Assumptions

- Saltmarsh and mangroves that met the following requirements were assumed to provide coastal protection services:

  1. Located within 200m of the coastline, and

  2. had a defined belt width (perpendicular to the coast) of at least 40m for saltmarsh and at least 90m for mangroves.

- The protection afforded by these ecosystems was considered to be up to 1km from the coastline.
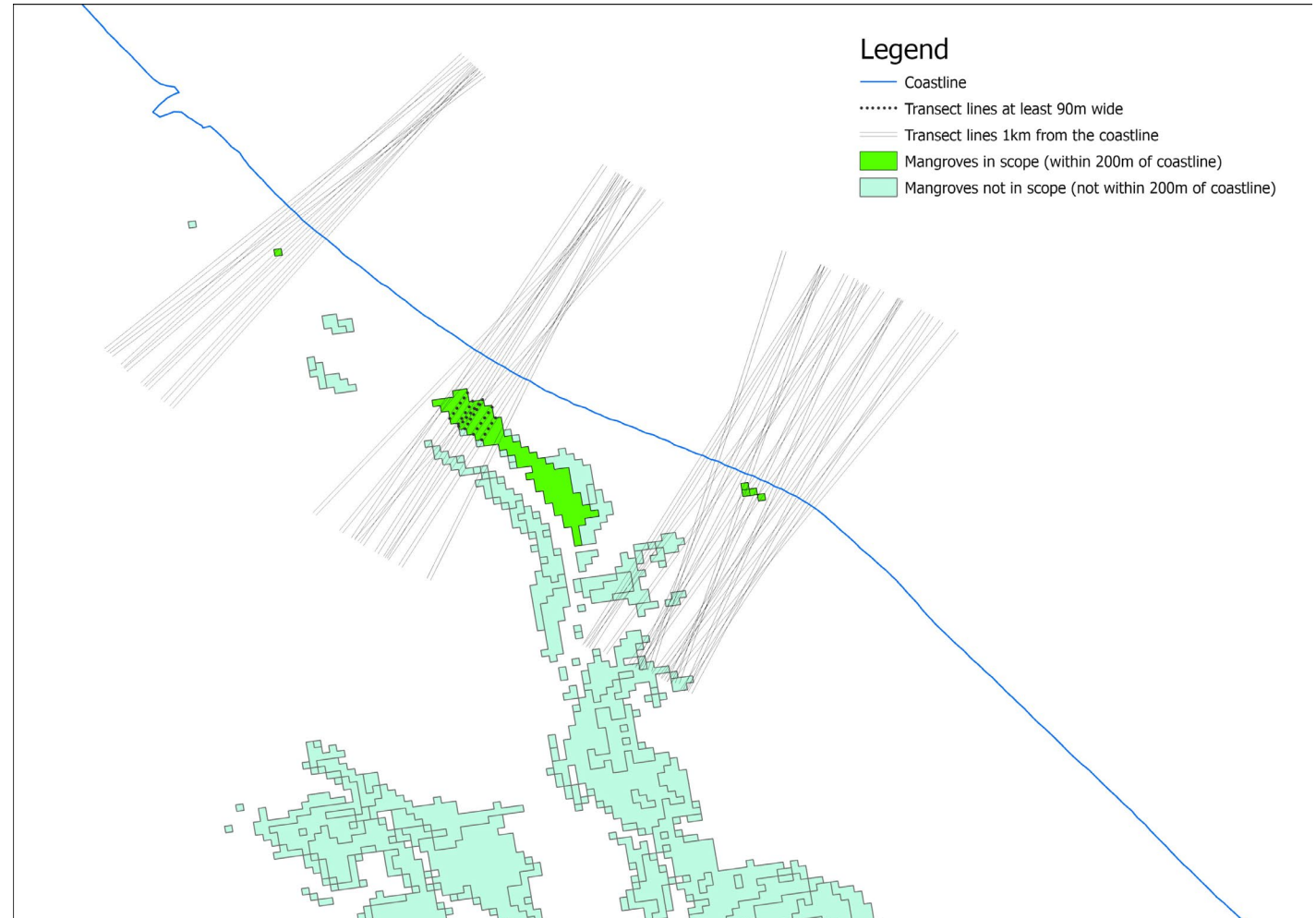
Coastal Protection Model

Step 1: Identify saltmarsh and mangroves that are within 200m of the coastline.

Legend
- Coastline
- Mangroves in scope (within 200m of coastline)
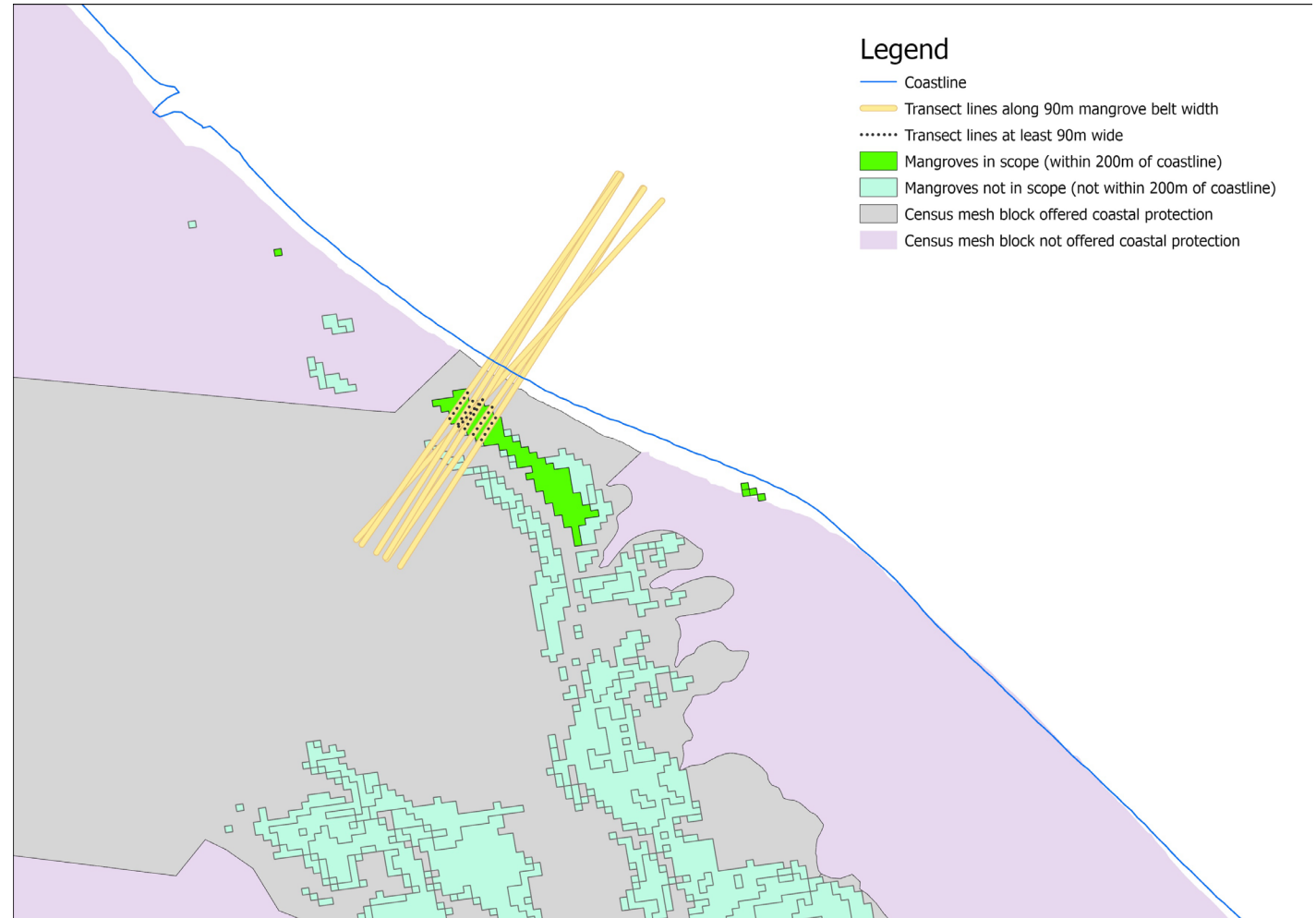- Mangroves not in scope (not within 200m of coastline)
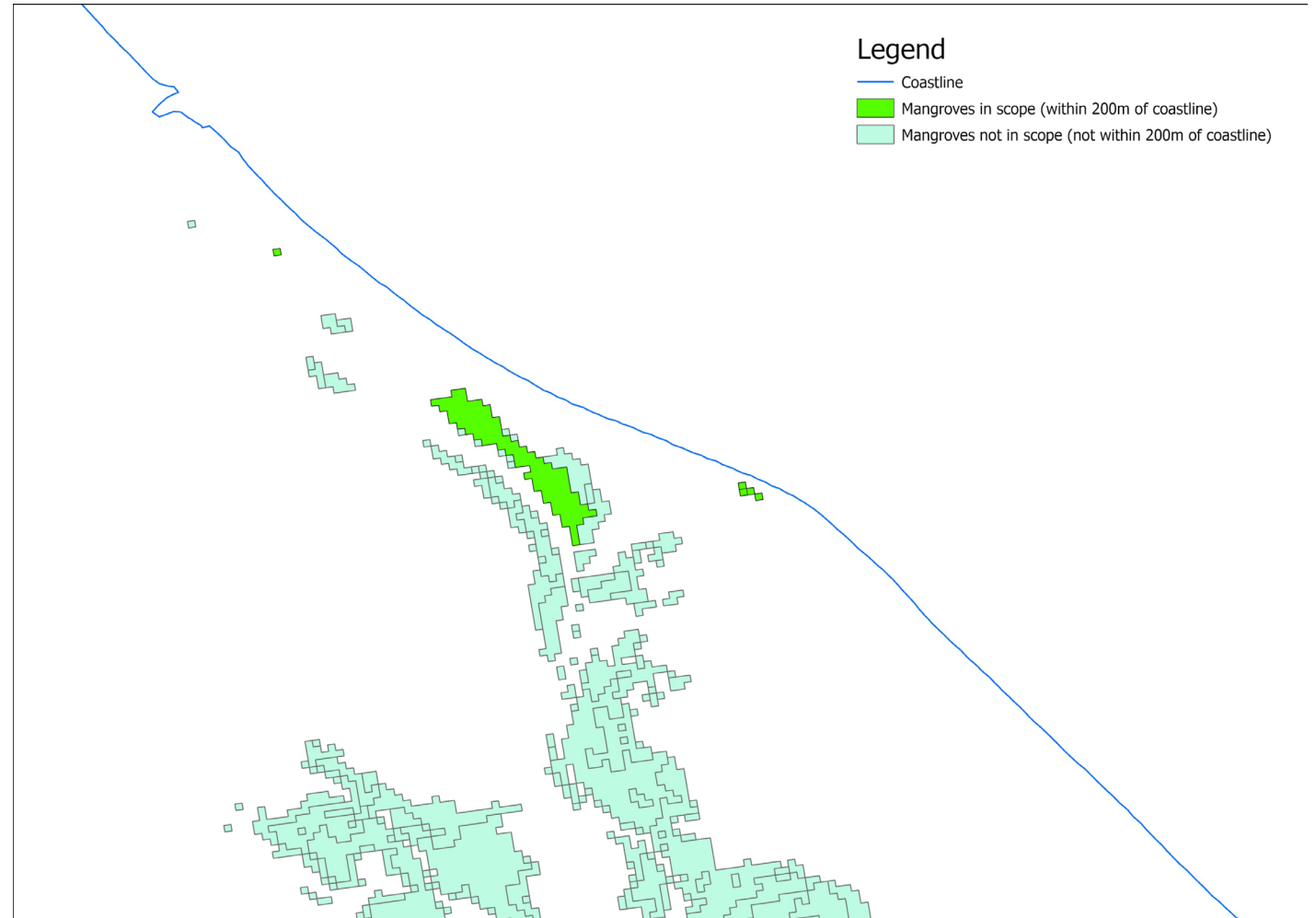
Coastal Protection Model

Step 2: Identify saltmarsh and mangroves that have a defined belt width (perpendicular to the coastline) of at least 40m for saltmarsh and at least 90m for mangroves.
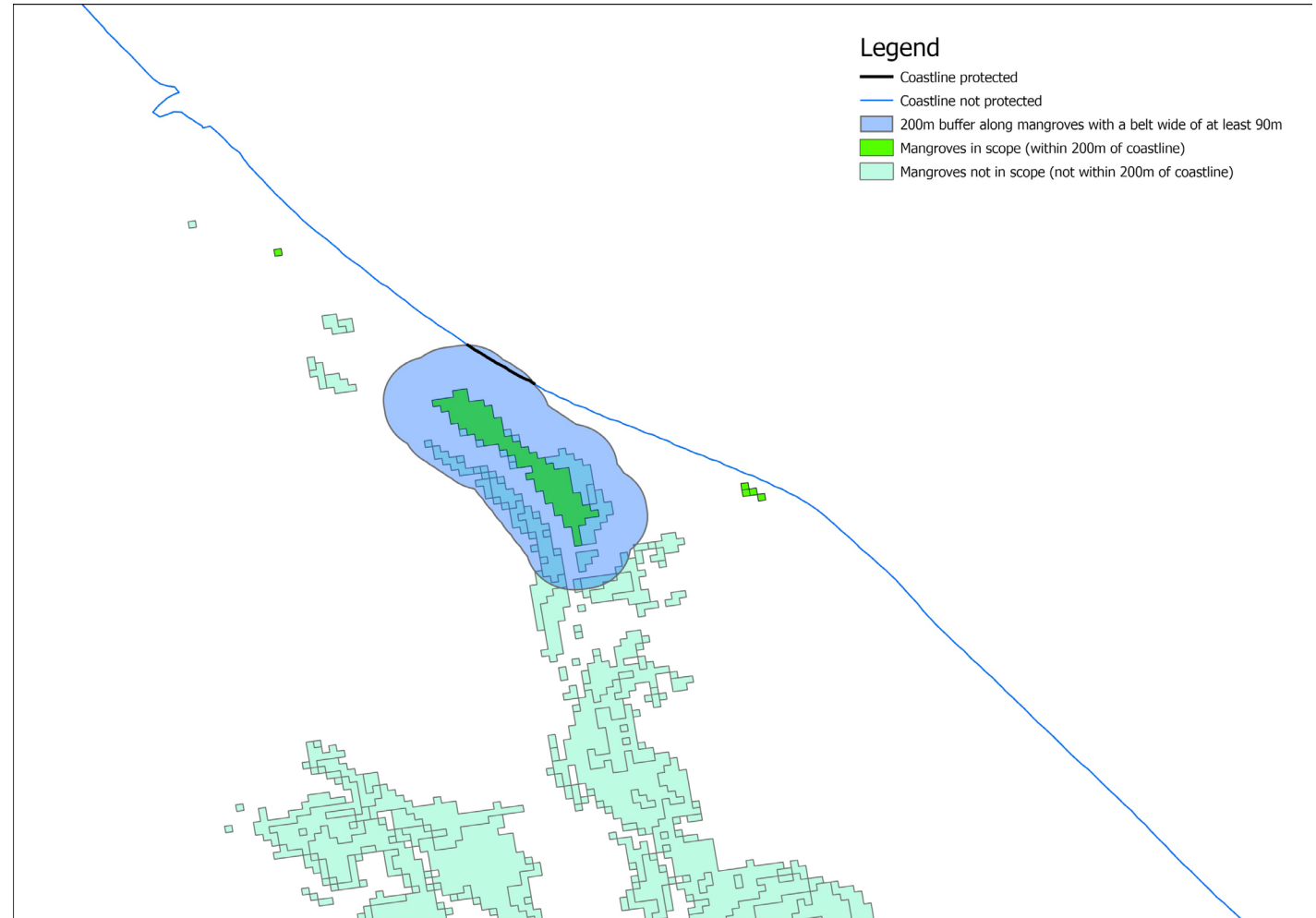

Legend
— Coastline
••••• Transect lines at least 90m wide
— Transect lines 1km from the coastline
■ Mangroves in scope (within 200m of coastline)
■ Mangroves not in scope (not within 200m of coastline)

Coastal Protection Model

Step 3: Identify population and dwellings offered protection by saltmarsh and mangroves.

Legend
- Coastline
- Transect lines along 90m mangrove belt width
- Transect lines at least 90m wide
- Mangroves in scope (within 200m of coastline)
- Mangroves not in scope (not within 200m of coastline)
- Census mesh block offered coastal protection
- Census mesh block not offered coastal protection

Coastal Protection Model

Step 4: Identify length of coastline offered protection by saltmarsh and mangroves.

Legend
- — Coastline protected
- — Coastline not protected
- ■ 200m buffer along mangroves with a belt wide of at least 90m
- ■ Mangroves in scope (within 200m of coastline)
- ■ Mangroves not in scope (not within 200m of coastline)
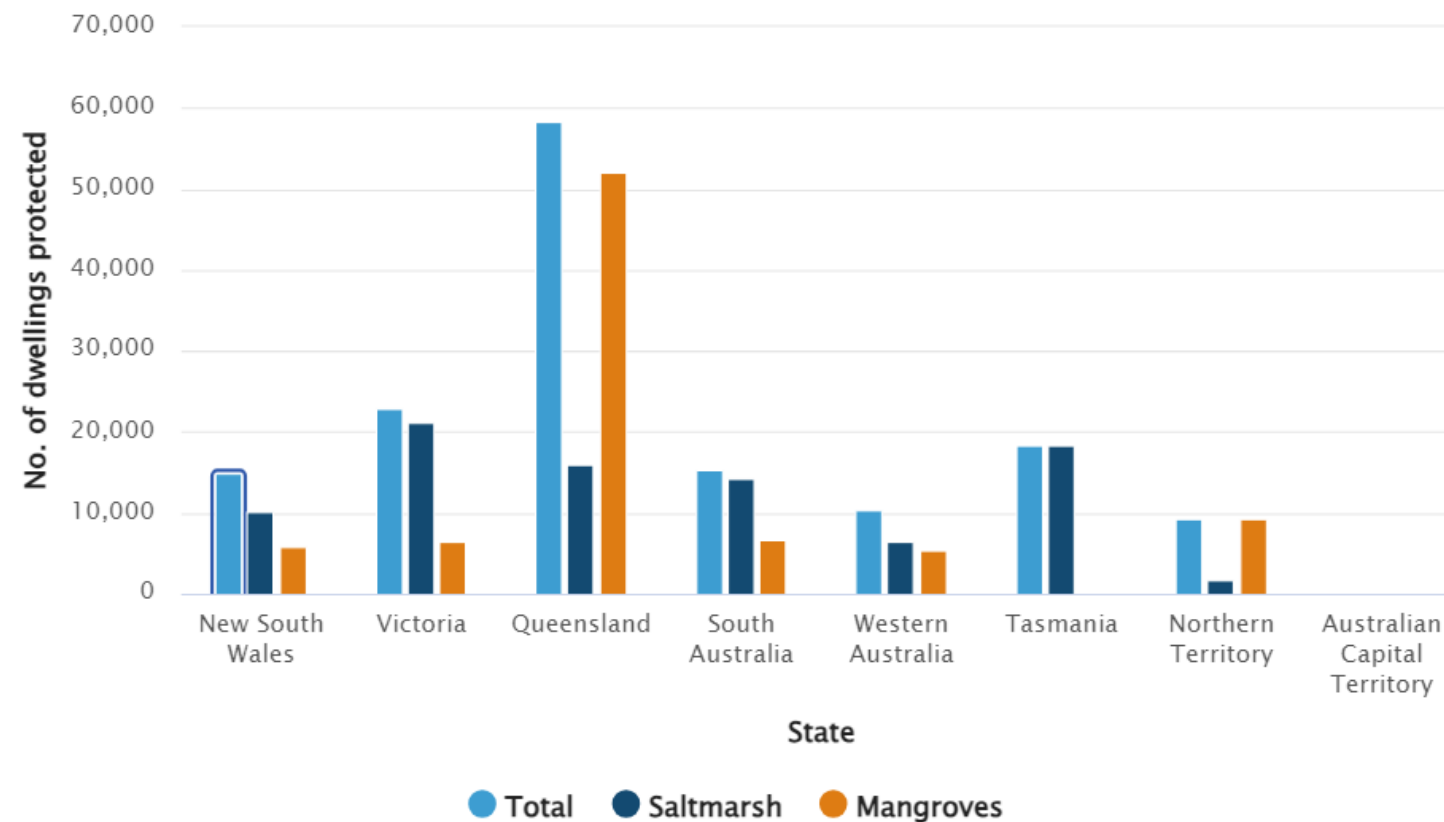
Coastal Protection Model

Results

- In 2021, 150 thousand dwellings were offered coastal protection by either saltmarsh, mangroves, or both.
  - 58 thousand (39.0% of total) were in Queensland.
  - 23 thousand (15.3% of total) were in Victoria.
- Saltmarsh protected 88 thousand dwellings.
  - 21 thousand were in Victoria.
- Mangroves protected 86 thousand dwellings.
  - 52 thousand were in Queensland.

Coastal protection services (mangroves and saltmarsh); dwellings protected, 2021
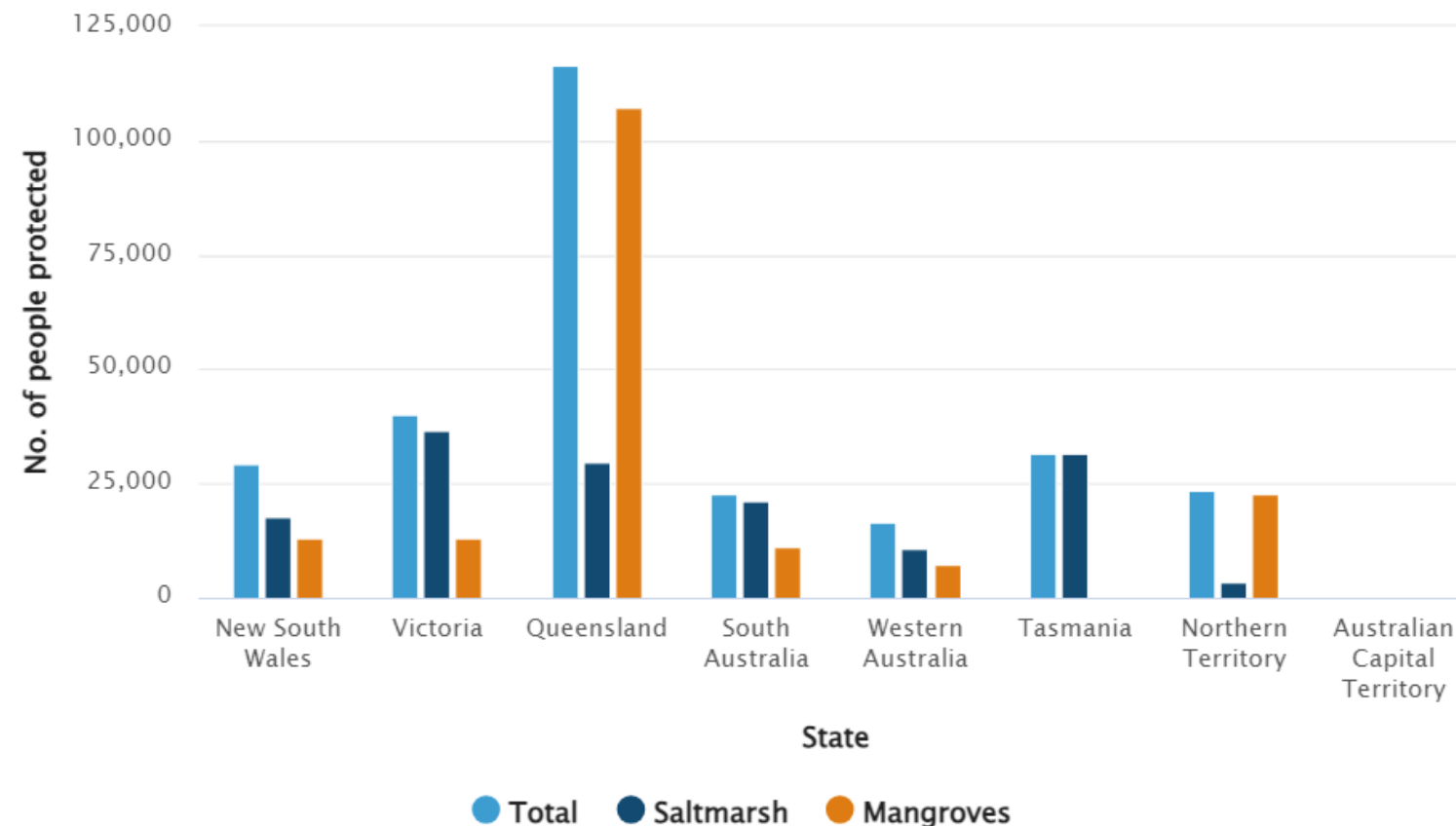
Coastal Protection Model

Results

- In 2021, 280 thousand people received coastal protection services from either saltmarsh, mangroves, or both.
  - 116 thousand (41.5% of total) were in Queensland.
  - 40 thousand (14.3% of total) were in Victoria.
- Saltmarsh protected 151 thousand people.
  - 37 thousand were in Victoria.
  - 32 thousand were in Tasmania.
- Mangroves protected 175 thousand people.
  - 107 thousand were in Queensland.
  - 23 thousand were in Northern Territory.

Coastal protection services (mangroves and saltmarsh); people protected, 2021
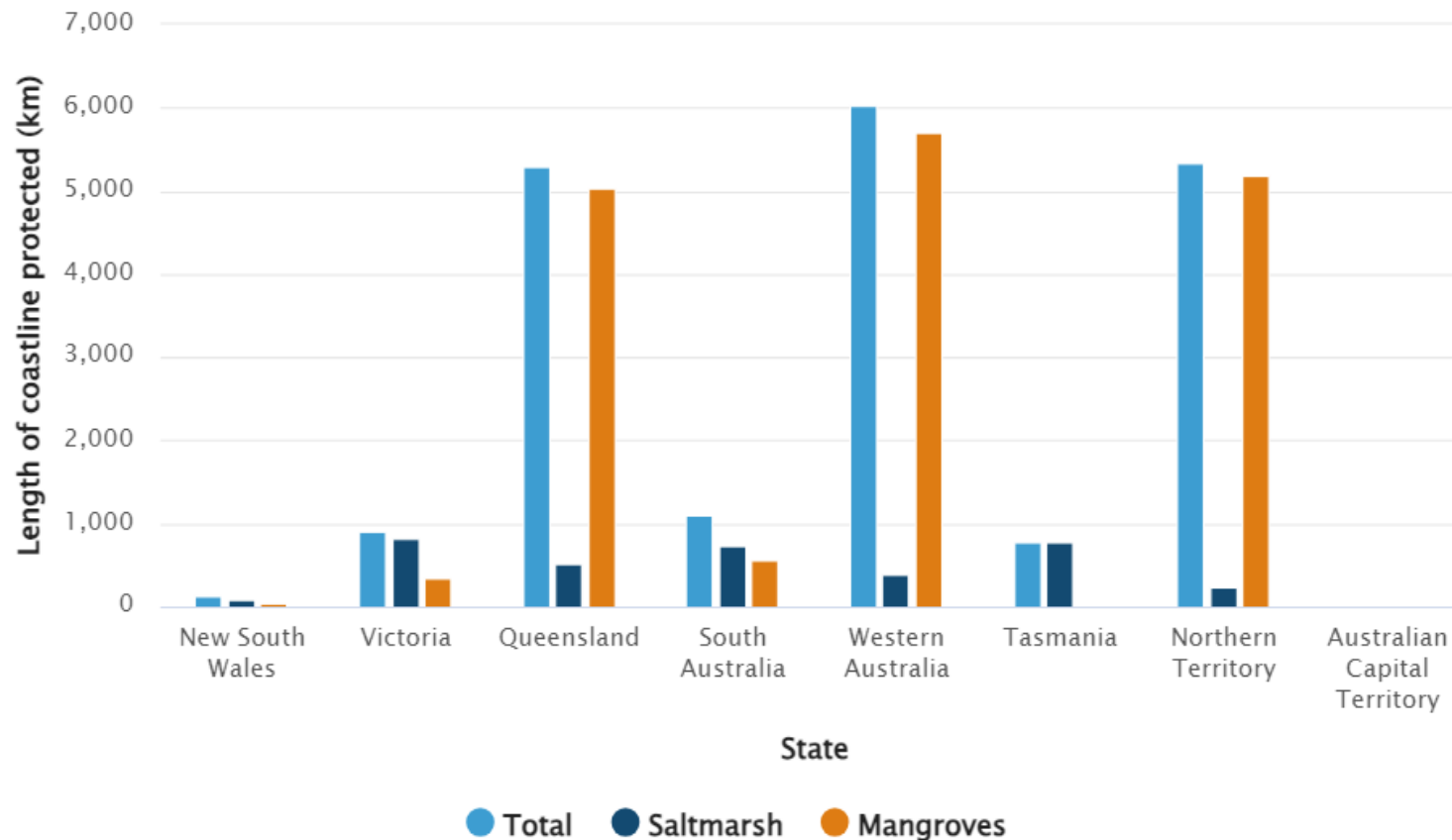
Coastal Protection Model

Results

- In 2021, 19.6 thousand km of Australia's coastline were offered coastal protection from either saltmarsh, mangroves, or both.
  - 6.0 thousand km (30.8% of total) were in Western Australia.
  - 5.3 thousand km (27.3% of total) were in Northern Territory.
- Saltmarsh protected 3.6 thousand km of coastline.
  - 826 km were in Victoria.
  - 773 km were in Tasmania.
- Mangroves protected 16.9 thousand km of coastline.
  - 5.7 thousand km were in Western Australia.
  - 5.2 thousand km were in Northern Territory.

Coastal protection services (mangroves and saltmarsh); coastline protected, 2021

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Coastal Protection Model

Limitations /reflections (limitation put on the model at that time)

- Model assumes a fixed extent inland of protection offered from mangrove forests and saltmarsh.
- Model assumes mangroves forests and saltmarsh within 200m of the coastline can provide protection due to their proximity to the coastline.
- Model doesn't take in to account biotic features like vegetation type or structure which can impact on protection offered by the ecosystem.
- Model doesn't take in to account abiotic features like topography or tidal hydrology.

Future work/improvements

- Condition of the ecosystem.
- Topological and hydrodynamic features that impact the distance inland that can be affected by wave damage.
- Protection offered to industries and businesses.

References

- [National Ocean Account, Experimental Estimates, November 2022 | Australian Bureau of Statistics (abs.gov.au)](#)

- [Towards a National Ocean Account | Australian Bureau of Statistics (abs.gov.au)](#)

- [What is EEA? | EEA (environment.gov.au)](#)

- [Wave attenuation over coastal salt marshes under storm surge conditions | Nature Geoscience](#)

- [Remote Sensing | Free Full-Text | Global Mangrove Extent Change 1996–2020: Global Mangrove Watch Version 3.0 (mdpi.com)](#)

Questions