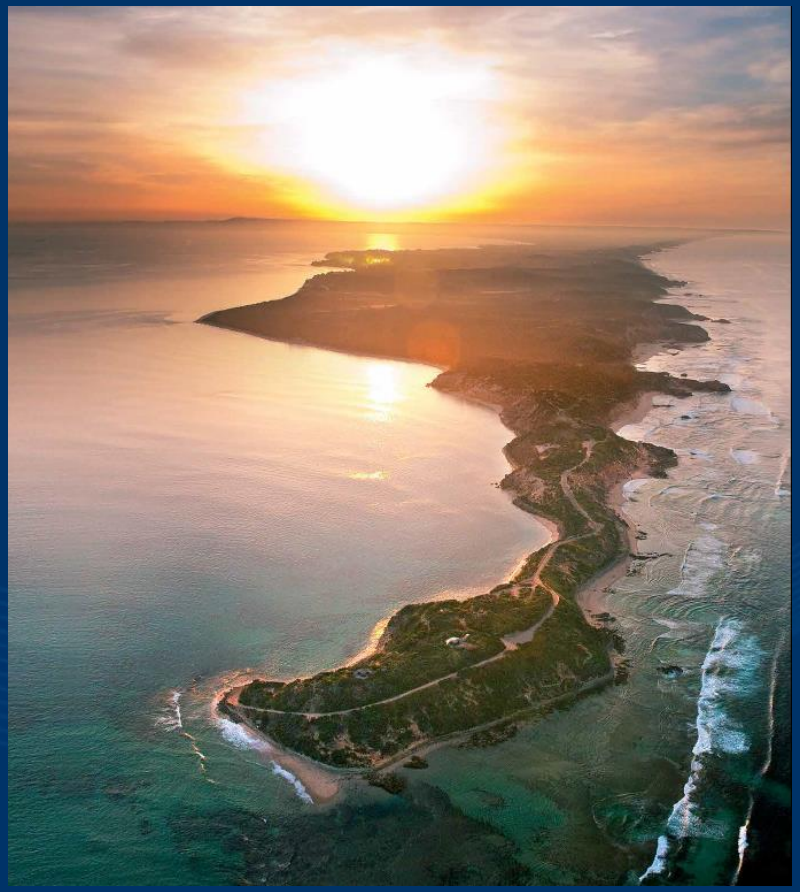
Nature-based Coastal Defense

Victorian Marine & Coastal Forum
2019

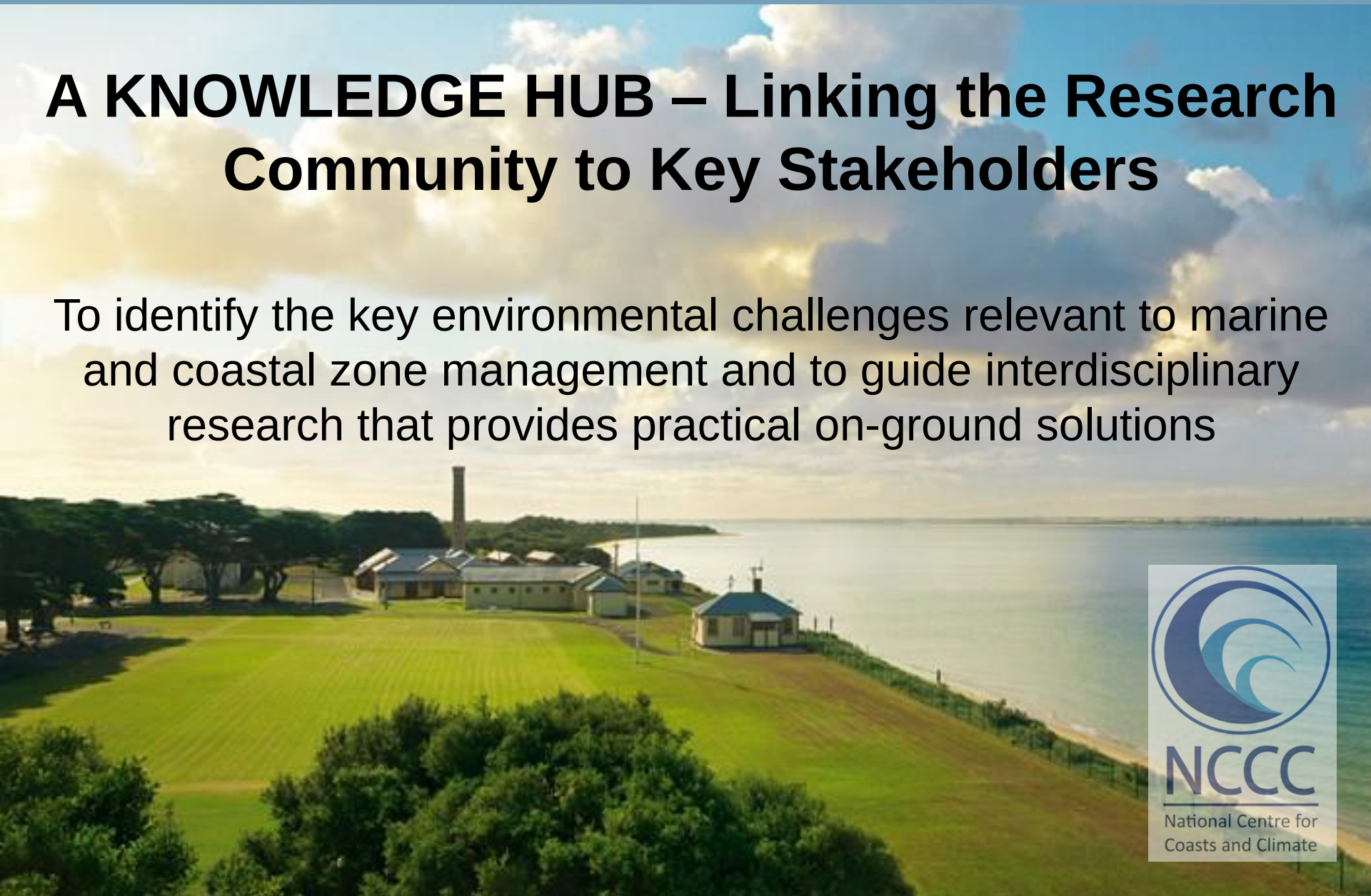


Setting the Scene

- National Centre for Coasts and Climate
- Challenges
- Solutions
- Case studies
- Outcomes
  - National guidelines
  - Next steps

A KNOWLEDGE HUB – Linking the Research Community to Key Stakeholders

To identify the key environmental challenges relevant to marine and coastal zone management and to guide interdisciplinary research that provides practical on-ground solutions



NCCC
National Centre for Coasts and Climate

Who we are





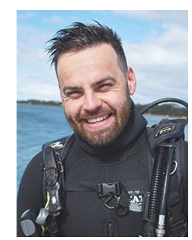
















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What we do

NCCC National Centre for Coasts and Climate

nccc.edu.au

Who we work with

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NCCC
National Centre for Coasts and Climate

Southern Cross University

The University Of Queensland
AUSTRALIA

DEAKIN UNIVERSITY

MONASH University

Earth Systems and Climate Change Hub
National Environmental Science Programme

CSIRO

VICTORIA State Government

Parks VICTORIA

NSW GOVERNMENT Department of Primary Industries

phillipisland nature parks

Melbourne Water

Port Phillip & Westernport CMA

CITY OF GREATER GEELONG

MORNINGTON PENINSULA Shire

COMMITTED TO A SUSTAINABLE PENINSULA

HOBSONS BAY CITY COUNCIL

Bellarine Bayside Coastal Management

WYNDHAM HARBOUR

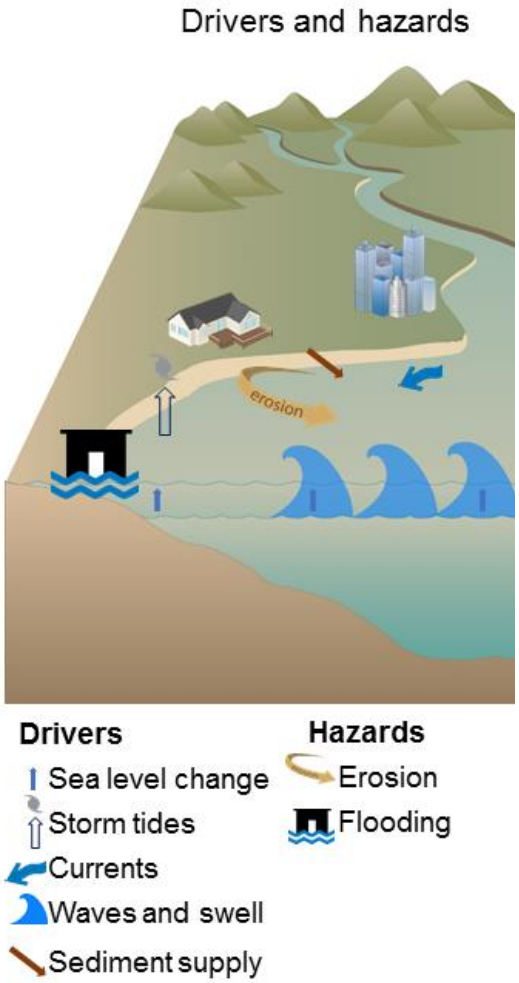
AQUATROPHIC Aquatic Biotechnology

PORT PHILLIP ecocentre

fish UNLIMITED

The Challenges

Multiple stressors reduce capacity for mitigation and adaptation

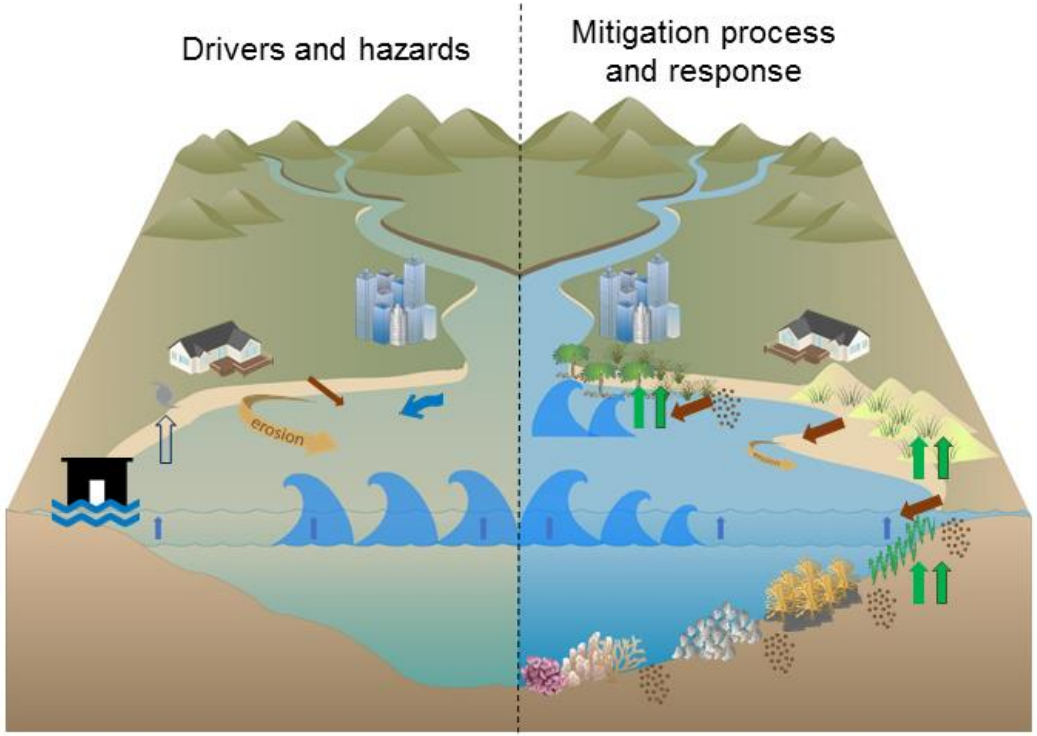


The Challenges

Hard engineering solutions are static, short-term and expensive

1115 seawalls, revetments and groynes along Victorian coasts ~ $630 million

The Solutions



Drivers
- Sea level change
- Storm tides
- Currents
- Waves and swell
- Sediment supply

Hazards
- Erosion
- Flooding

Process
- Build biomass
- Sediment flux
- Sediment deposition
- Increase shoaling and bed friction

Response
- Increase elevation
- Change in shore profile
- Wave attenuation

The Solutions

Ecological Engineering

Hard Hybrid Soft

33% 26% 26%

Gray, J.D.E., O'neill, K. & Qiu, Z. 2017. Coastal residents' perceptions of the function of and relationship between engineered and natural infrastructure for coastal hazard mitigation. *Ocean & Coastal Management* **146,** 144-156.

The Solutions

Nature-based Coastal Defence – Global Examples







Social acceptance based on evidence

Case studies

Eco-engineered Case Studies – Nationally and Victoria

What works where?

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International case studies

NCCC National Centre for Coasts and Climate

LSU

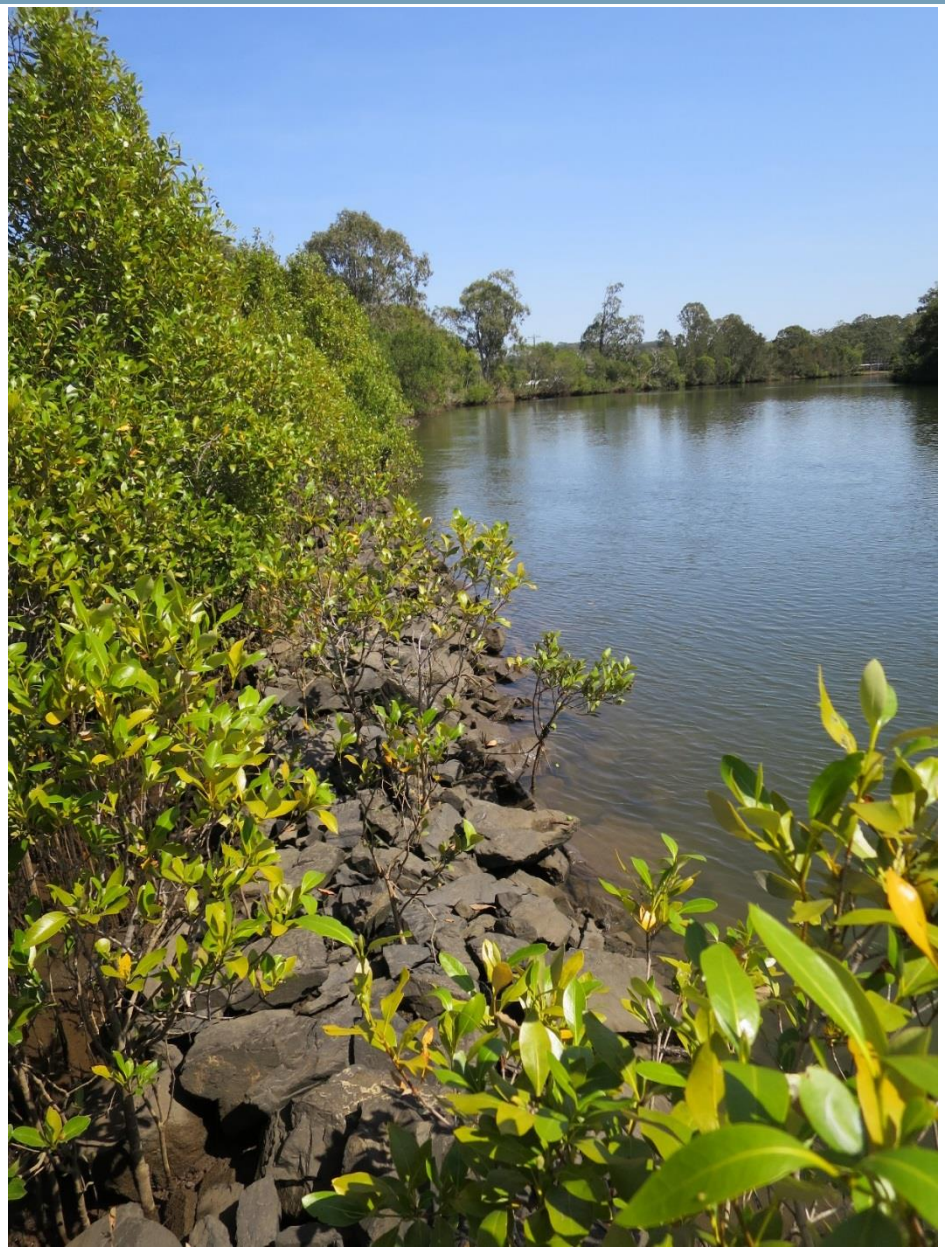
Dauphin Island Sea Lab · Alabama ·

RUTGERS THE STATE UNIVERSITY OF NEW JERSEY

WILLIAM & MARY VIMS VIRGINIA INSTITUTE OF MARINE SCIENCE SCHOOL OF MARINE SCIENCE

UNIVERSITY OF CENTRAL FLORIDA

National case studies



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Victorian Case Studies

SCIENCE INTO ACTION

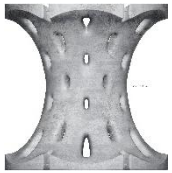
REEF DESIGN LAB

WESTERN PORT SEAGRASS PARTNERSHIP

Timeline

2018

- Jun — Project start
- Jul — Designing pods
- Aug
- Sep
- Oct — Pod manufacture
- Nov — Open houses
- Dec — Pod deployment

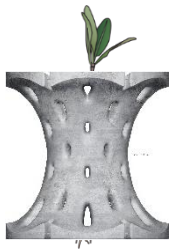


2019

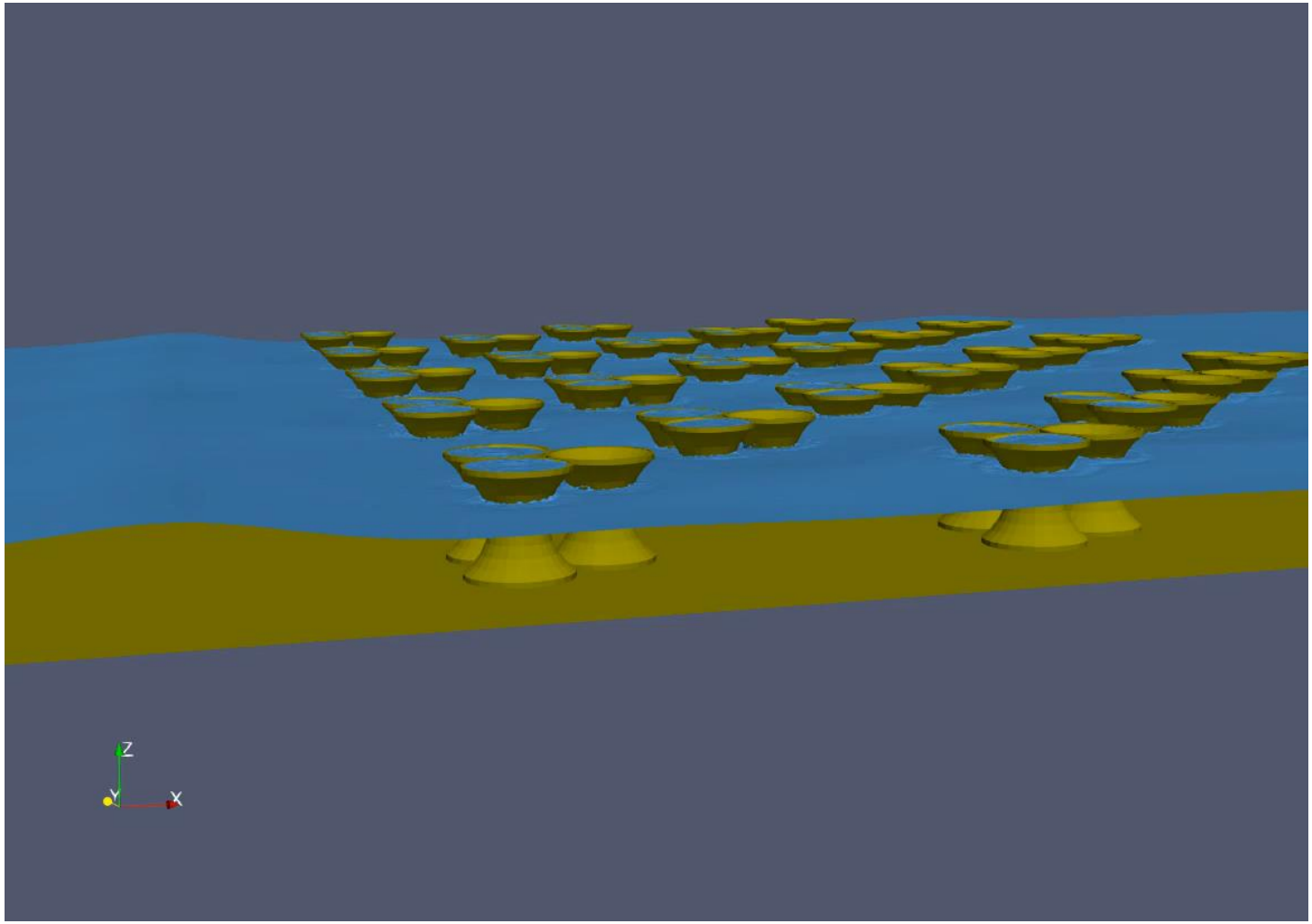
- Jan — Pod deployment
- Feb — & planting
- Mar — Post-monitoring
- Apr
- May
- Jun — Design 2 & planting
- Jul
- Aug
- Sep
- Oct
- Nov
- Dec

2020

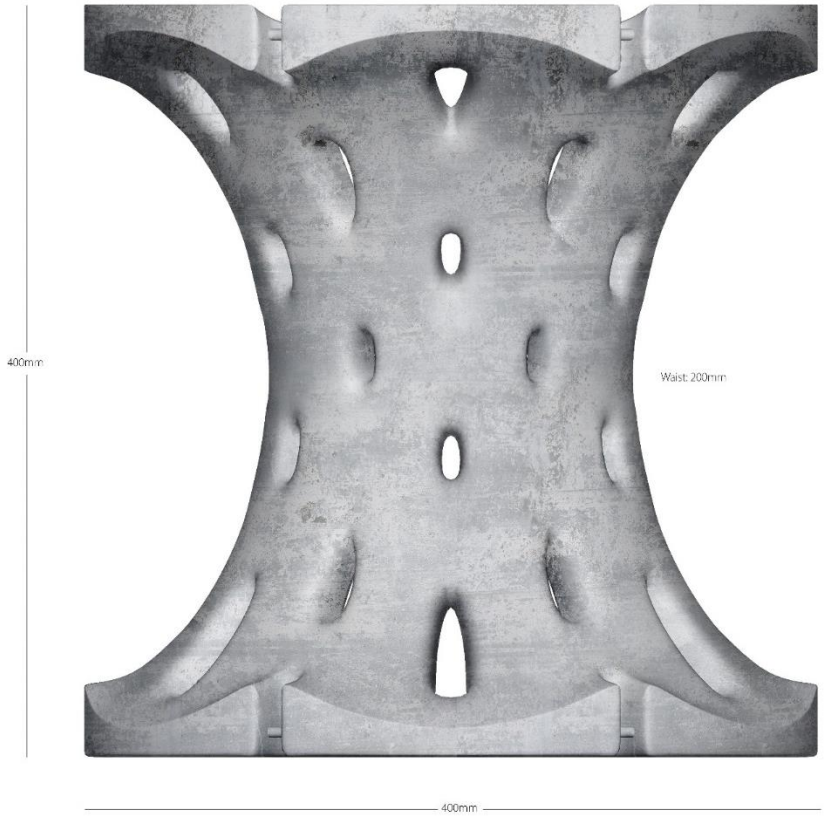
- Jan
- Feb
- Mar
- Apr
- May — Open houses
- Jun

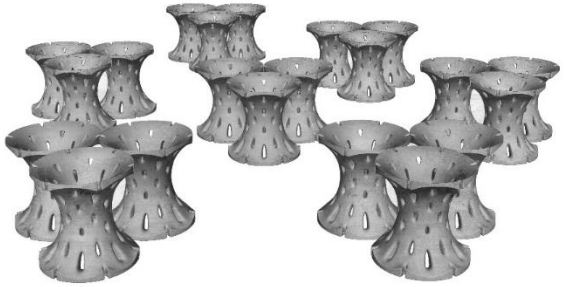


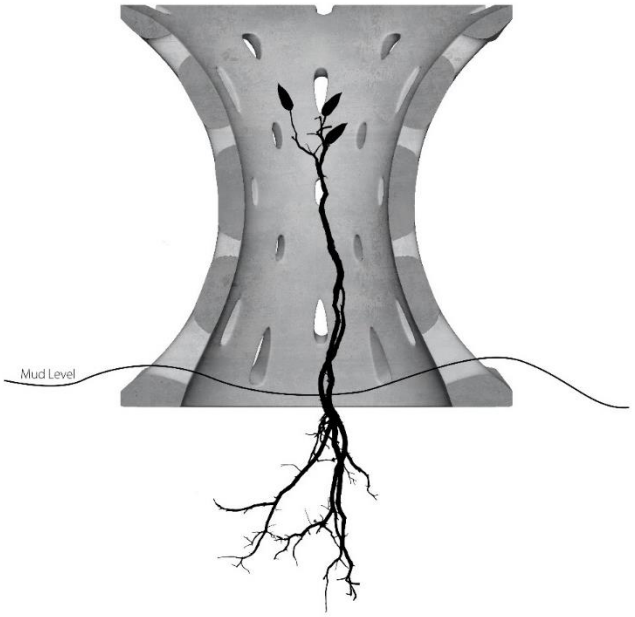
Victorian case study I



Victorian case study I







REEF DESIGN LAB

What we are measuring

Mangrove survival, growth & recruitment

Wave attenuation

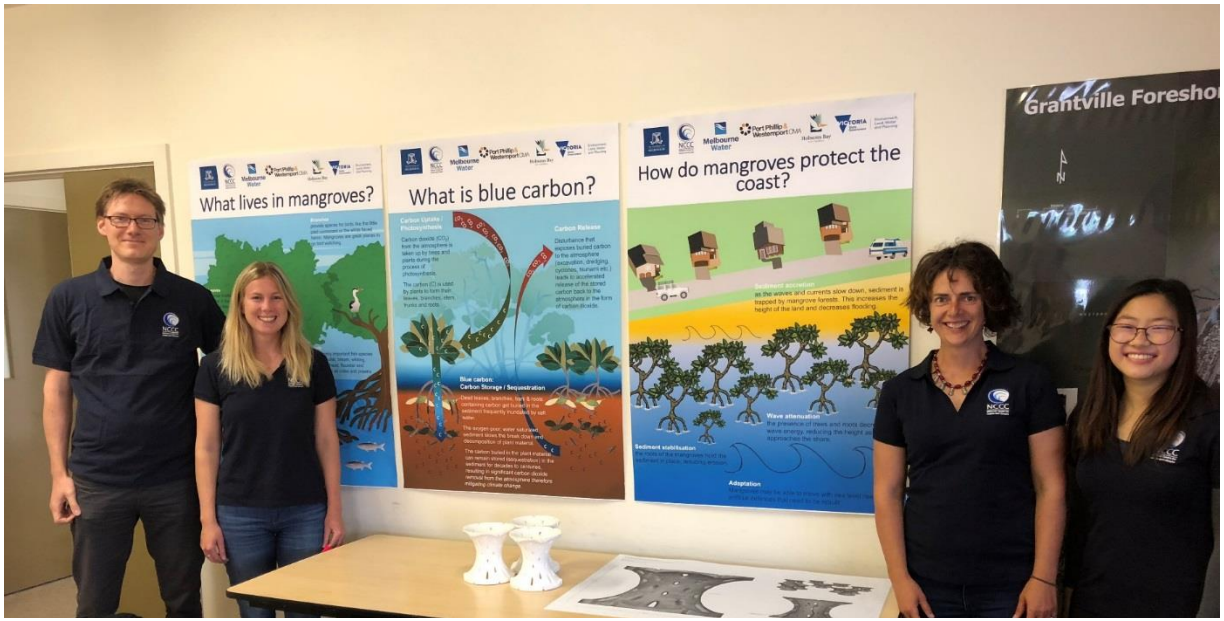
Structural stability

Fish assemblage

Sediment accumulation & shoreline stabilisation

Carbon storage

What we are measuring



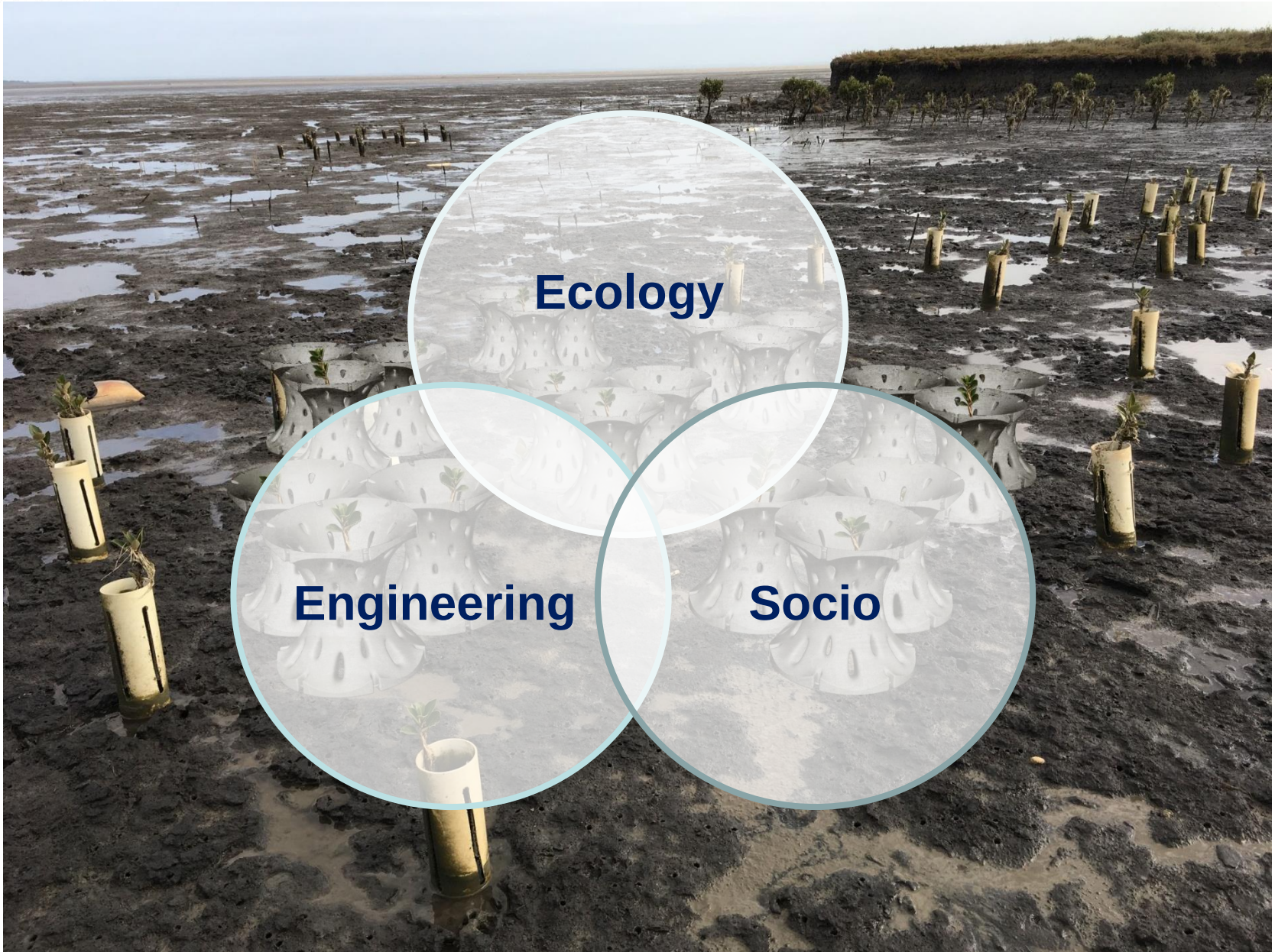
Perceptions of coastal erosion and flooding

Do you use, live or work on the Victorian coastal environment? If so, we are interested in understanding your views on how well the coast in Port Phillip and Western Port Bays are protected from flooding and erosion. Our survey takes approx. 10 mins to complete (we have tested it) and all results are confidential. Participants must be over 18 years old. Thank you for agreeing to take part.

Survey Link

Plain Language Statement

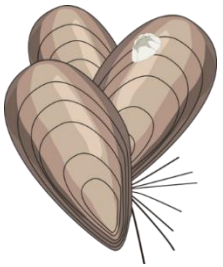
Building the case



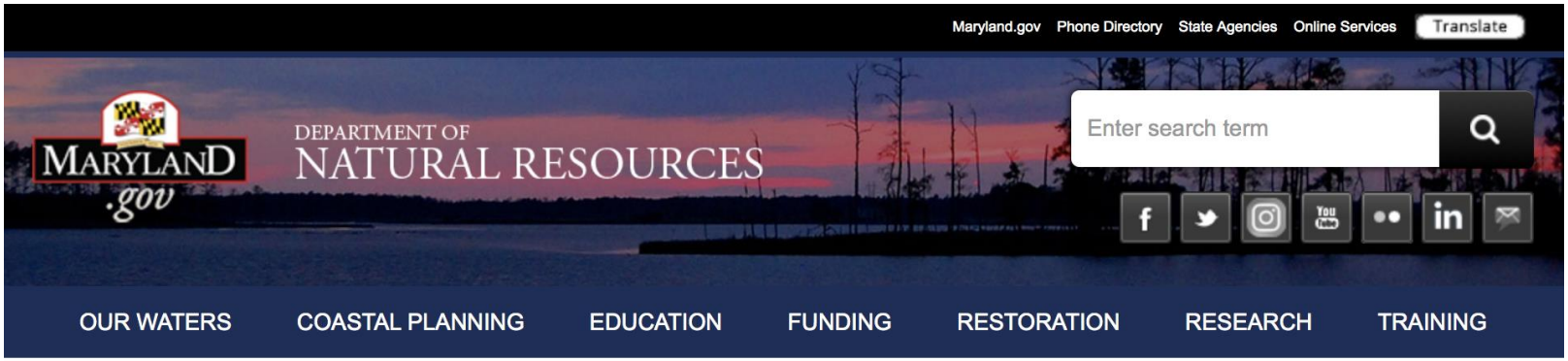
Victorian case study II

Victorian case study II

1:40 pm A living shoreline approach to building coastal resilience – artificial reef (Ralph Roob, City of Greater Geelong)



The Outcomes



Living Shorelines Laws

The Critical Area Program is designed to minimize adverse impacts on water quality that result from pollution; establish land use policies for development; and conserve fish, wildlife, plant habitats in the Chesapeake Bay Critical Area.

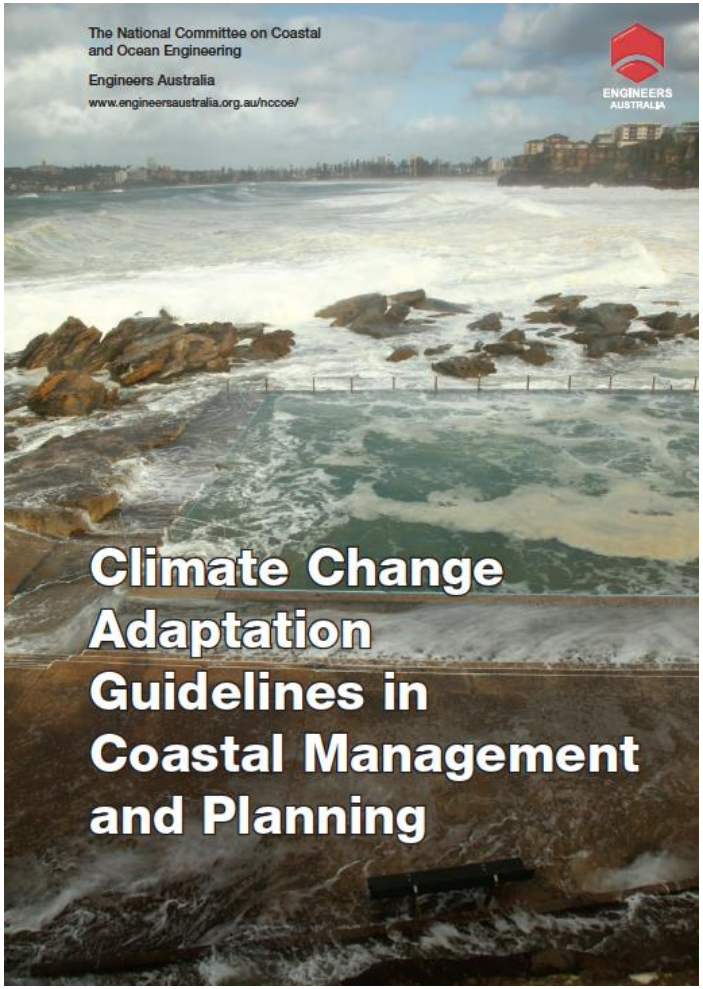
The Critical Area ordinances encourage the use of “soft” techniques to control erosion and improve shoreline habitat where applicable. Two new laws were passed in 2008 - the Living Shorelines Protection Act and the Revised Critical Area Laws.

Summary of the New Laws

- The 100-foot Buffer is expanded to 200 feet for new subdivisions in the RCA that remain RCA and and applies to projects requiring site plan approval and involves a change in land use in the RCA.
- The 200-foot Buffer does not apply to residential development on existing lots.
- Shore erosion control projects are now considered a type of "home improvement."
- Licensed home improvement contractors, marine contractors, builders, tree experts, landscaping firms, and others can lose their licenses for Critical Area violations.
- Living shorelines will be the preferred method to reduce erosion effective from October 1, 2008; except in areas where it can be demonstrated that these measures are not feasible.
- In making the feasibility determination, MDE will consider areas of excessive erosion, areas subject to heavy tides, and areas too narrow for effective use of nonstructural measures.
- A waiver process will be part of the regulatory structure.

The Outcomes

National Guidelines for Design & Implementation



The Roadmap

Developing National Guidelines for Nature-based Coastal Defense

2018

Project development and Stakeholder engagement and input

2018/2019

Case studies – Implementation and Community consultation

2019/2020

Case studies - Monitoring and evaluation

Mid 2020

National workshop on nature-based coastal defense

Cairns
July 2020

Late 2020

Nature-based guidelines in coastal management and planning

Next steps

Toolbox of solutions for nature-based solutions

Scaling up
Applicability
Social acceptance
Economic costs

Feedback?

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