

Earth Observations for Climate-Ready Aquaculture Management and Siting to Improve Food Security and Ocean Health in Palau, a Small Island Developing State

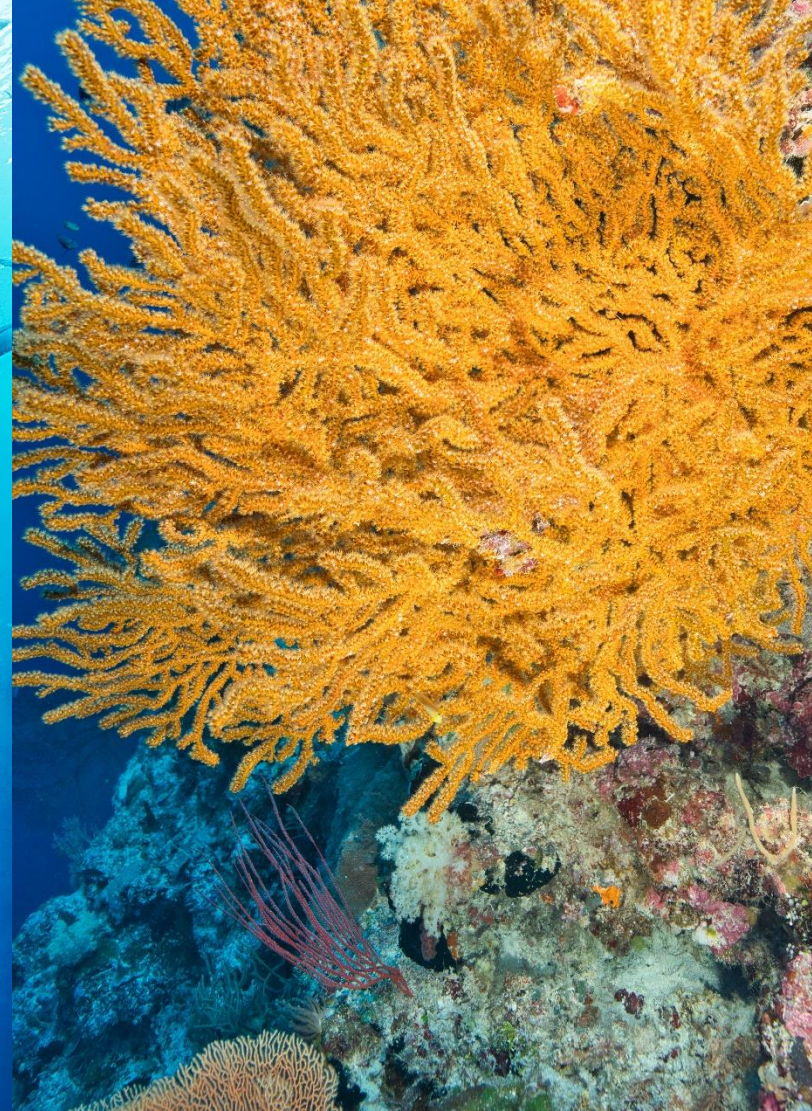
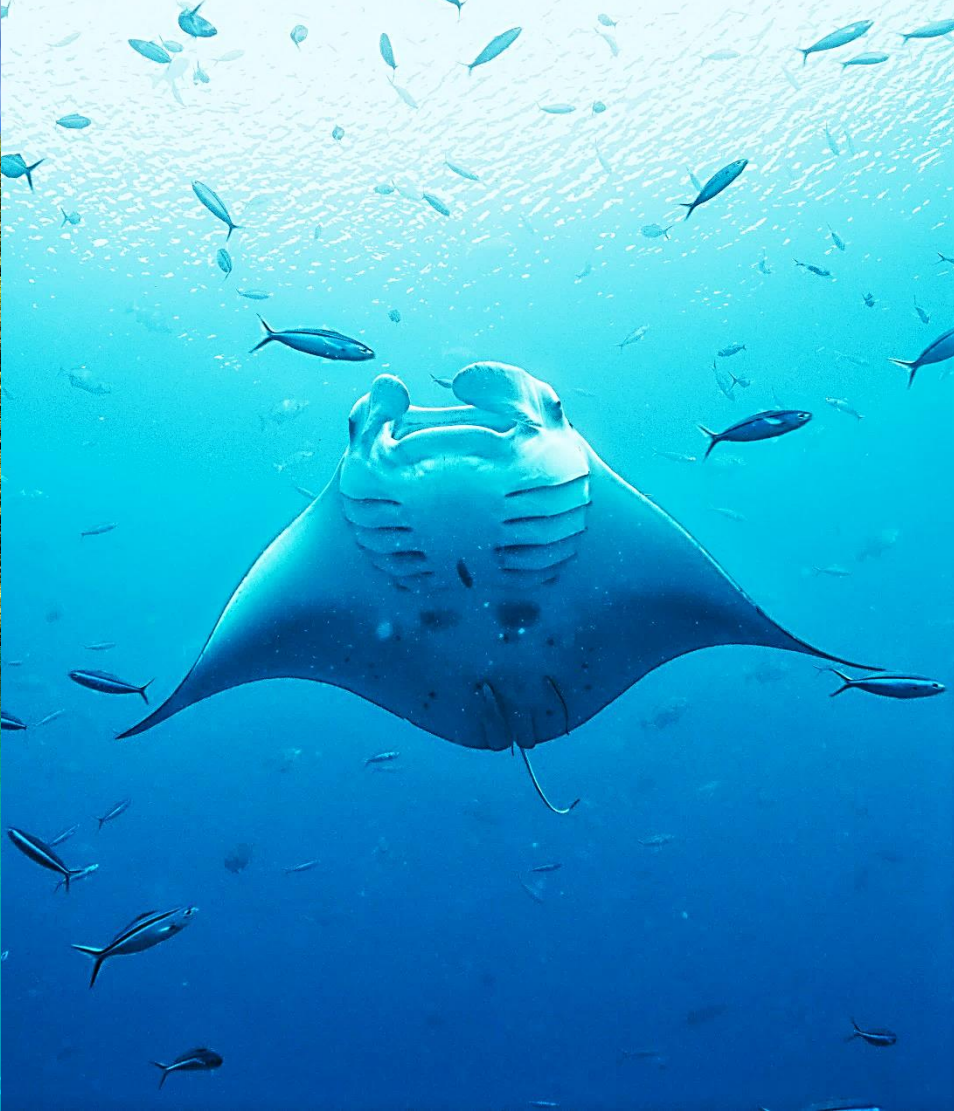
Robert Jones – Global Lead, Aquaculture
Jonathan MacKay – Spatial Scientist, Aquaculture

The Nature
Conservancy



Photo: Jez O'Hare

Palau is Critically Important to Marine Biodiversity



Palau Faces Significant Social Challenges

- Among highest per capita seafood consumption
- Local fish stocks in decline
- Health issues from a changing diet
 - Imports ~86% food resources
- Limited land availability

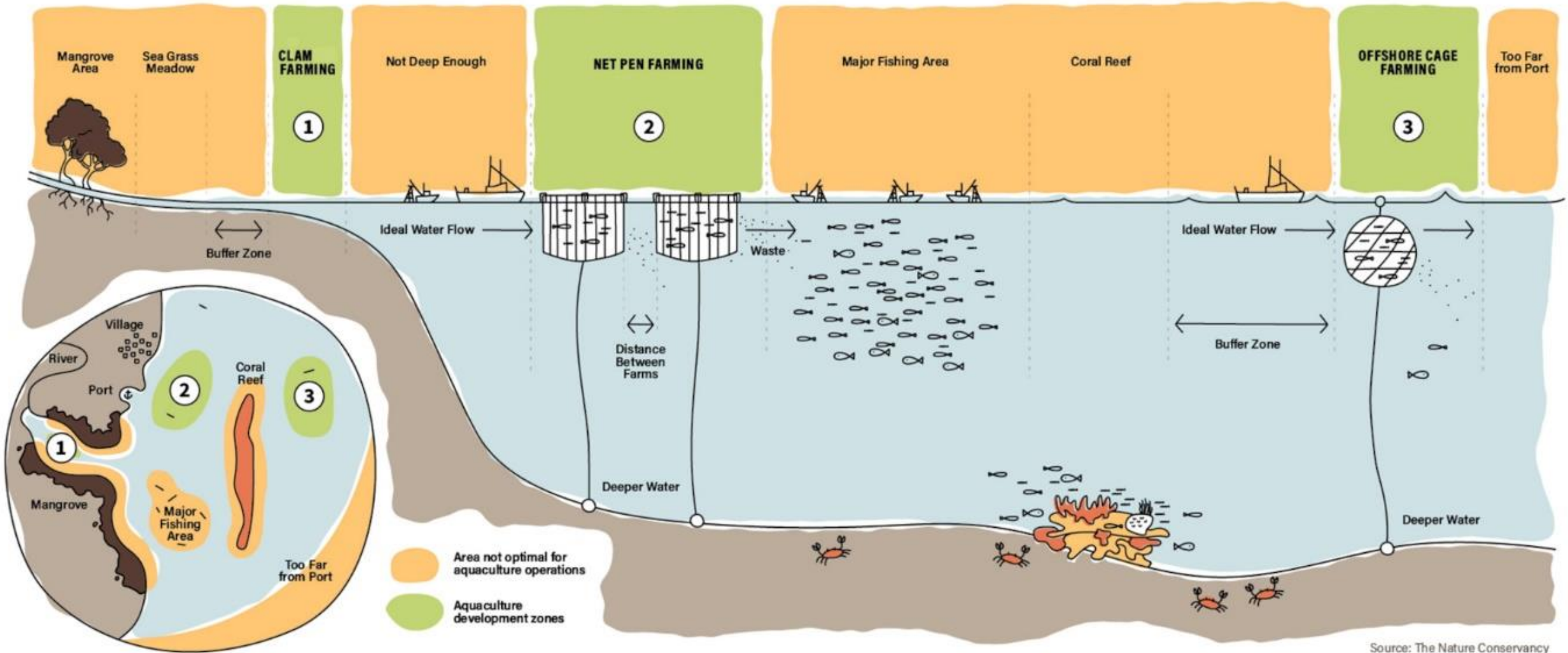


Aquaculture as a Solution

- Aquaculture is viewed by the Palaun Govt as a solution for food security and human health
- If done poorly environmental issues could occur – putting pristine resources at risk
- Project Objective: Identify optimal aquaculture sites within Palau:
 - Avoid environmental and social impacts of new aquaculture operations
 - Streamlining permitting process



SETTING UP MARINE AQUACULTURE FARMS IN PALAU



Source: The Nature Conservancy

**Year 1
2019**

**Year 2
2020**

**Year 3
2021**

**Year 4
2022**

Project planning and upfront stakeholder engagement



Co-development of aquaculture siting guidelines



Co-development of aquaculture spatial planning products



Trainings and mentorship to build spatial siting capacity and long-term knowledge transfer to Palauan government and stakeholders

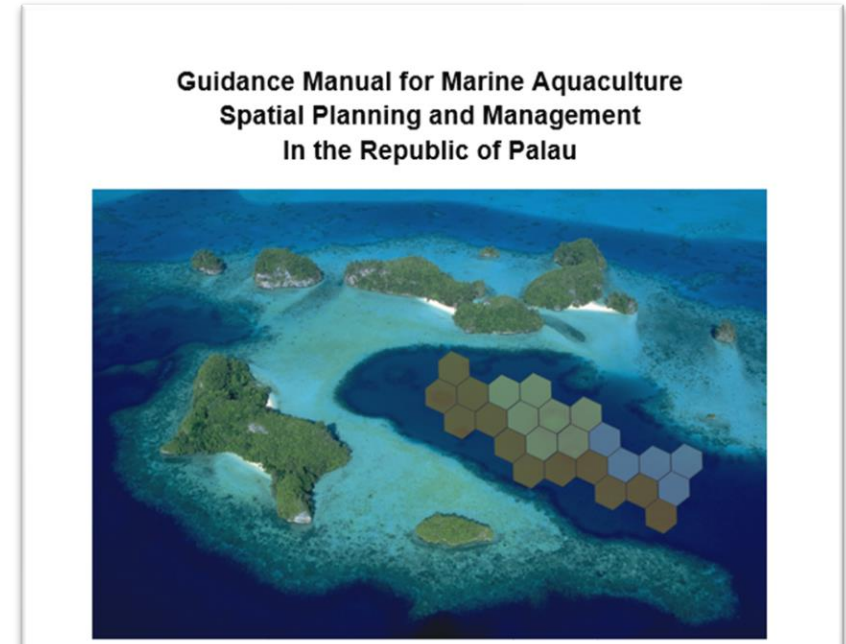


Establishing Rules for Aquaculture Spatial Management

Guidance Manual jointly developed with Palau Government

Rule development

- Best international practices
- Existing laws
- Stakeholder input

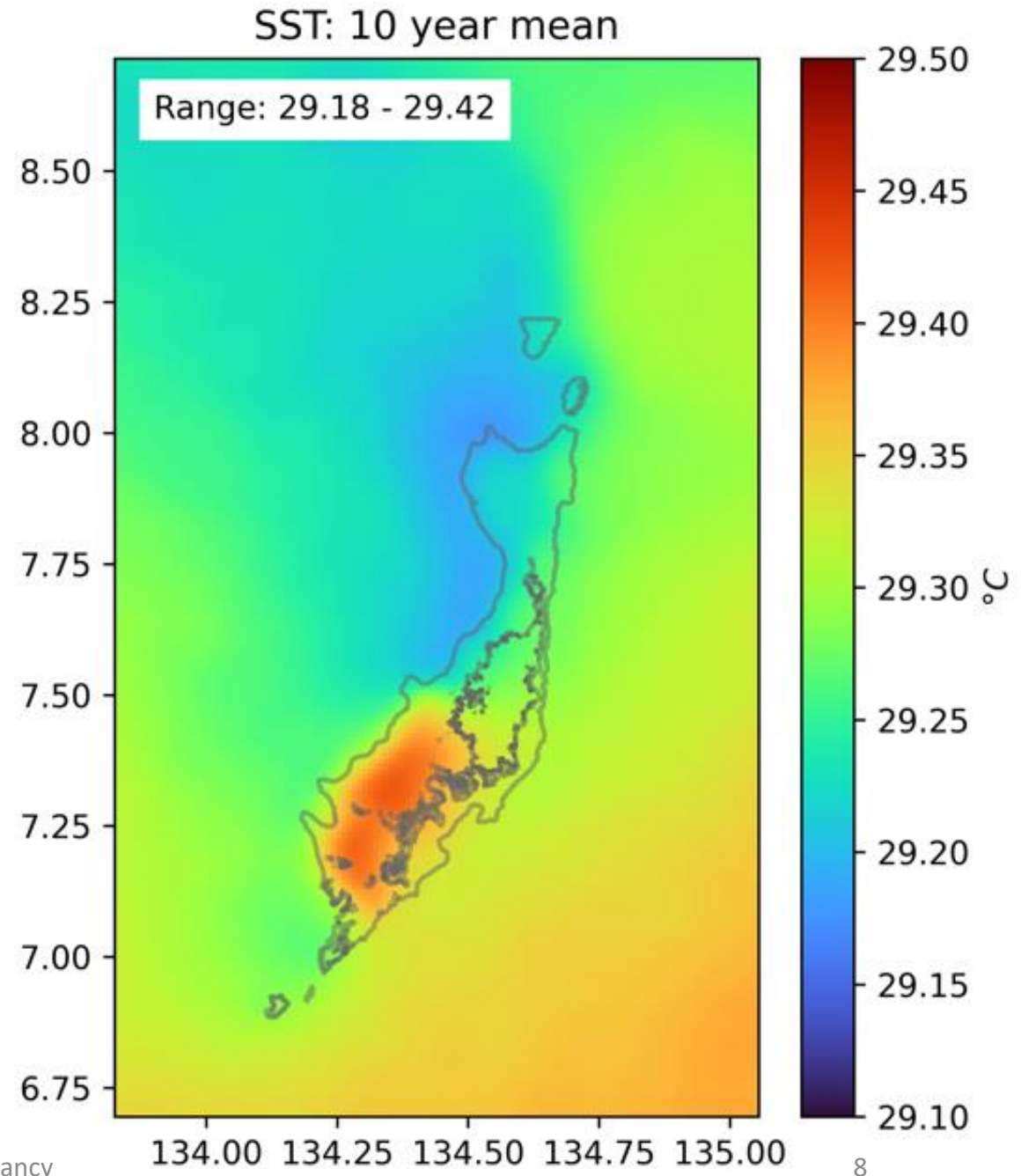


Marine Protected Areas	Areas associated with marine protected areas are poorly suitable for finfish aquaculture (score of 0.00) and site evaluation is necessary for clam aquaculture (score of 0.5)	Avoid natural resource management conflict with aquaculture operations.	Aguilar-Manjarrez, Soto and Brummett 2017 (and references therein), distance discussed and agreed upon in October 2019 workshop
<u>Social and Cultural</u>			
Dive and tourist sites	Areas within 100 m of dive and tourist sites are poorly suitable (score of 0.00).	Avoid user conflicts with dive and tourist sites.	Aguilar-Manjarrez, Soto and Brummett 2017 (and references therein), distance discussed and agreed upon in October 2019 workshop

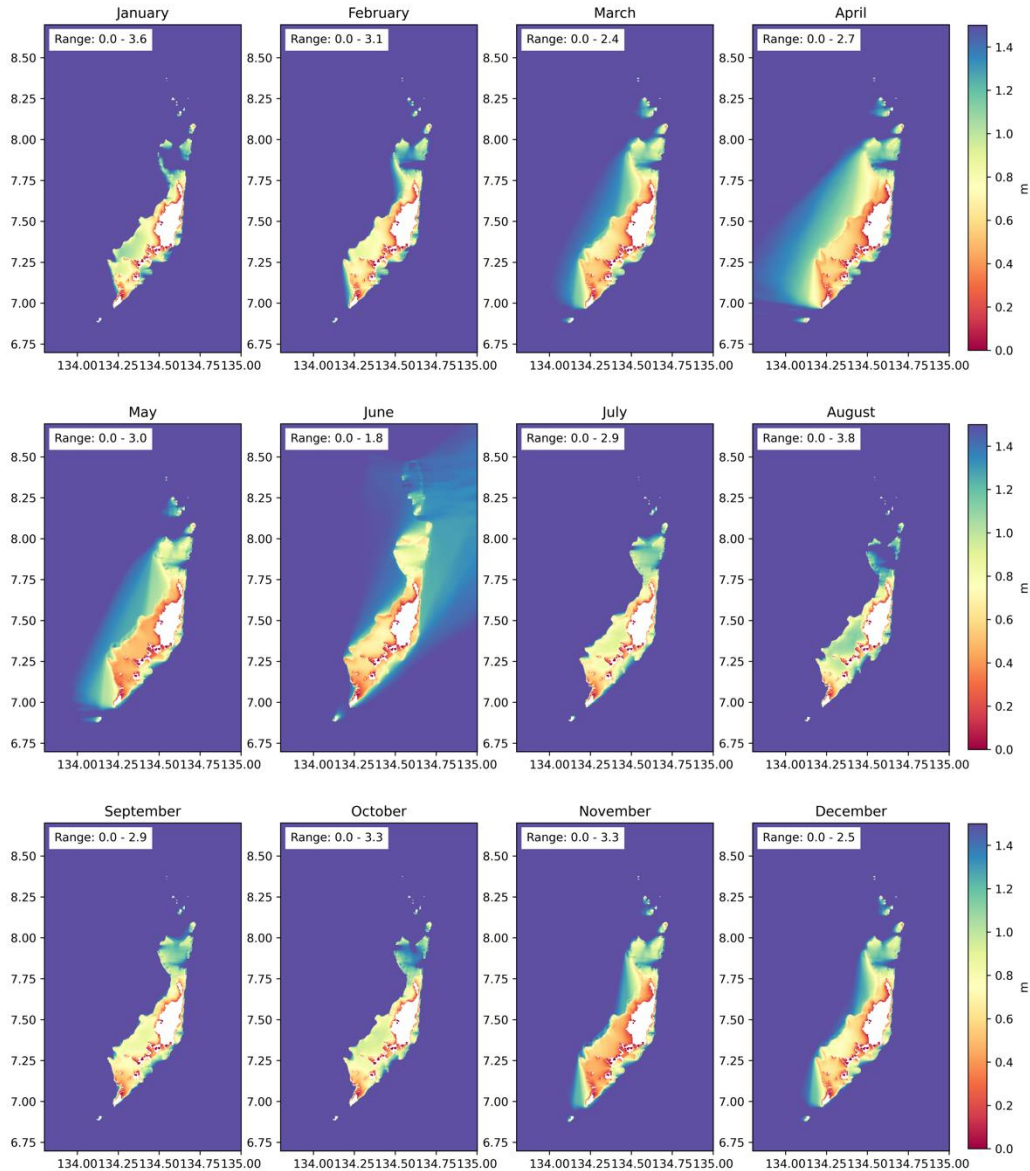
Suitability Analysis Data

35 Data Layers across 5 Categories:

- Environmental
- Natural Resources
- Social Cultural
- Infrastructure
- Climate Change



Hs: monthly 95th percentile



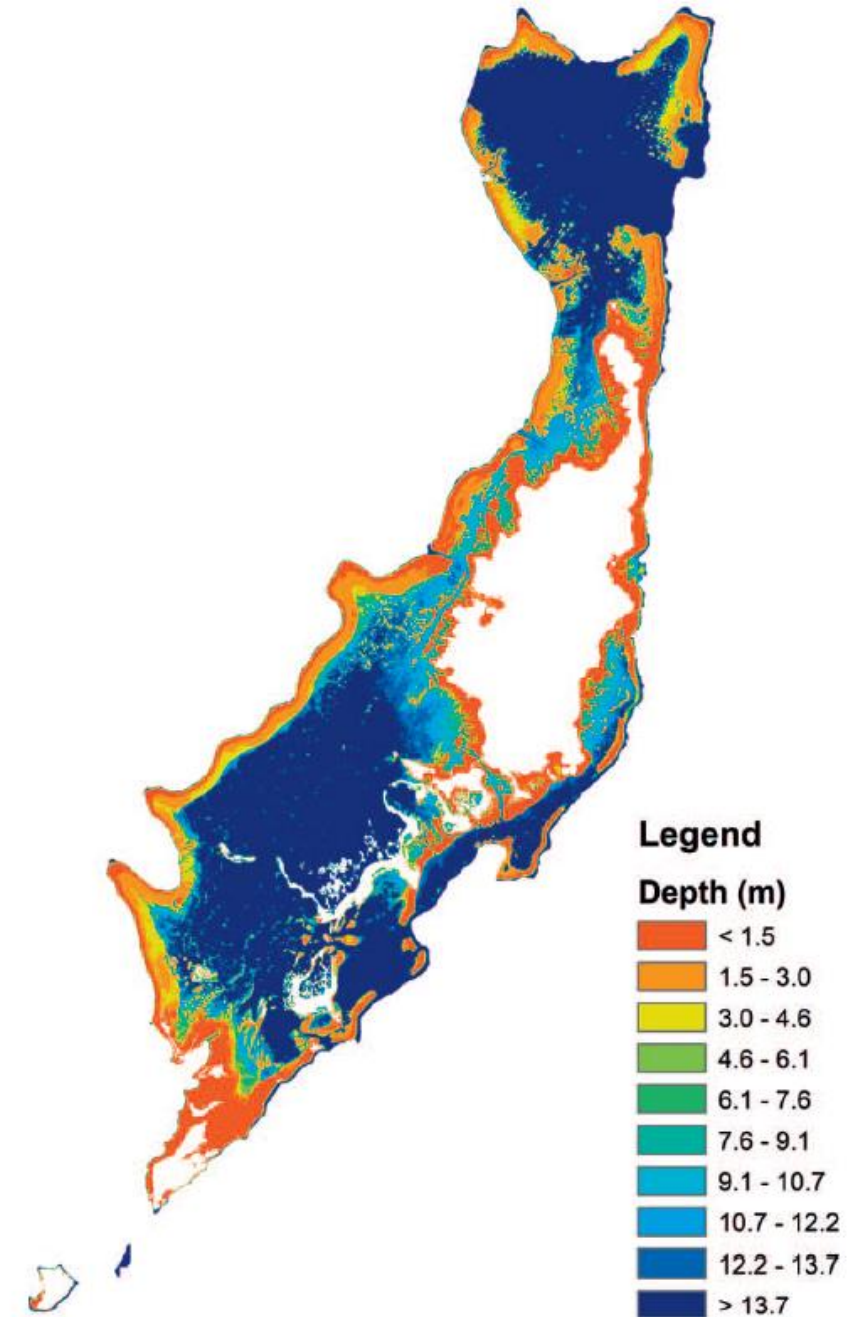
SWAN Wave Model

- 1 year wave climate data
- Significant wave height, direction, and period

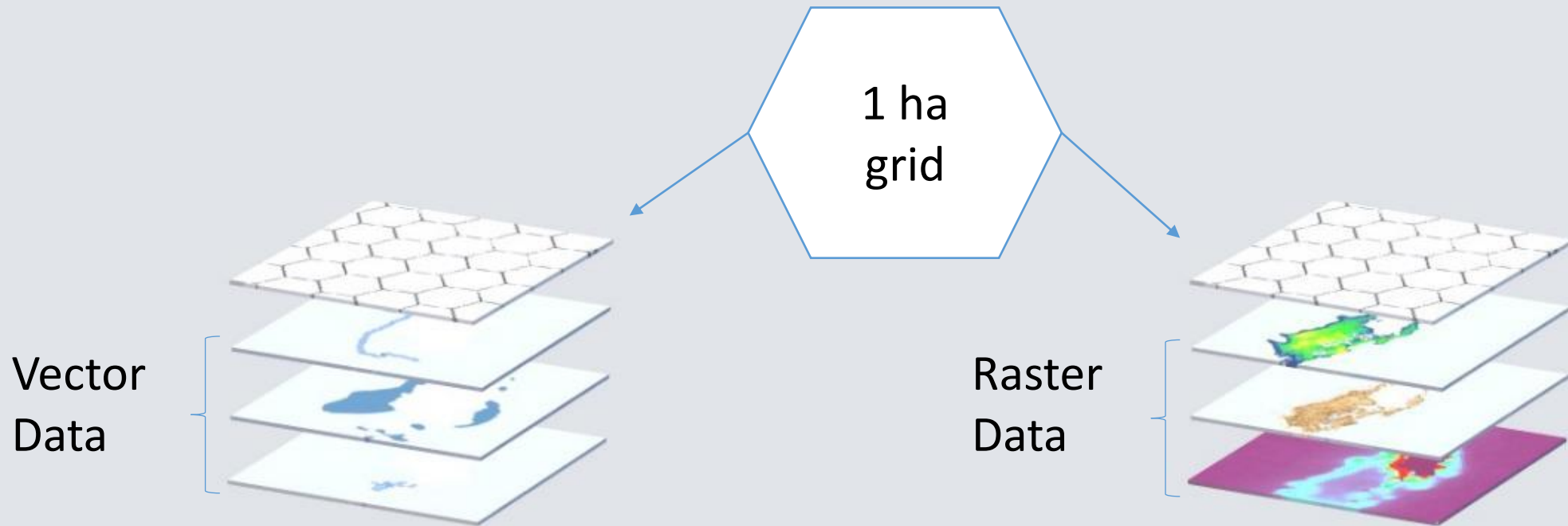
SDB

- Combining 20 Landsat-8 images and ground truthed data
- Published in Journal of Coastal Research

<https://doi.org/10.2112/JCOASTRES-D-20-00032.1>



Suitability Model



ALL LAYERS SUITABILITY CREATE SITE

Supporting Layers
Use the search to filter layers or expand the contents to browse

Begin typing to filter layers

▼ Palau Aquaculture Study

- ▶ Suitability Analysis
- ▶ Environmental
- ▶ Natural Resources
- ▶ Social and Cultural
- ▶ Infrastructure
- ▶ Navigation and Shipping



<https://maps.coastalresilience.org/palau/>

Capacity Building and Knowledge Transfer

- Hosted by Palau Community College
- 20 students
- 5 modules
 - Fundamentals of Spatial Analysis
 - Fundamentals of Remote Sensing
 - Data management, processing, and visualization
 - Palau siting and spatial analysis
 - Webmaps



An underwater scene featuring a large manta ray swimming in the foreground, with several smaller fish scattered throughout the blue water. The scene is captured from an overhead perspective, looking down into the water.

Thank You!

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