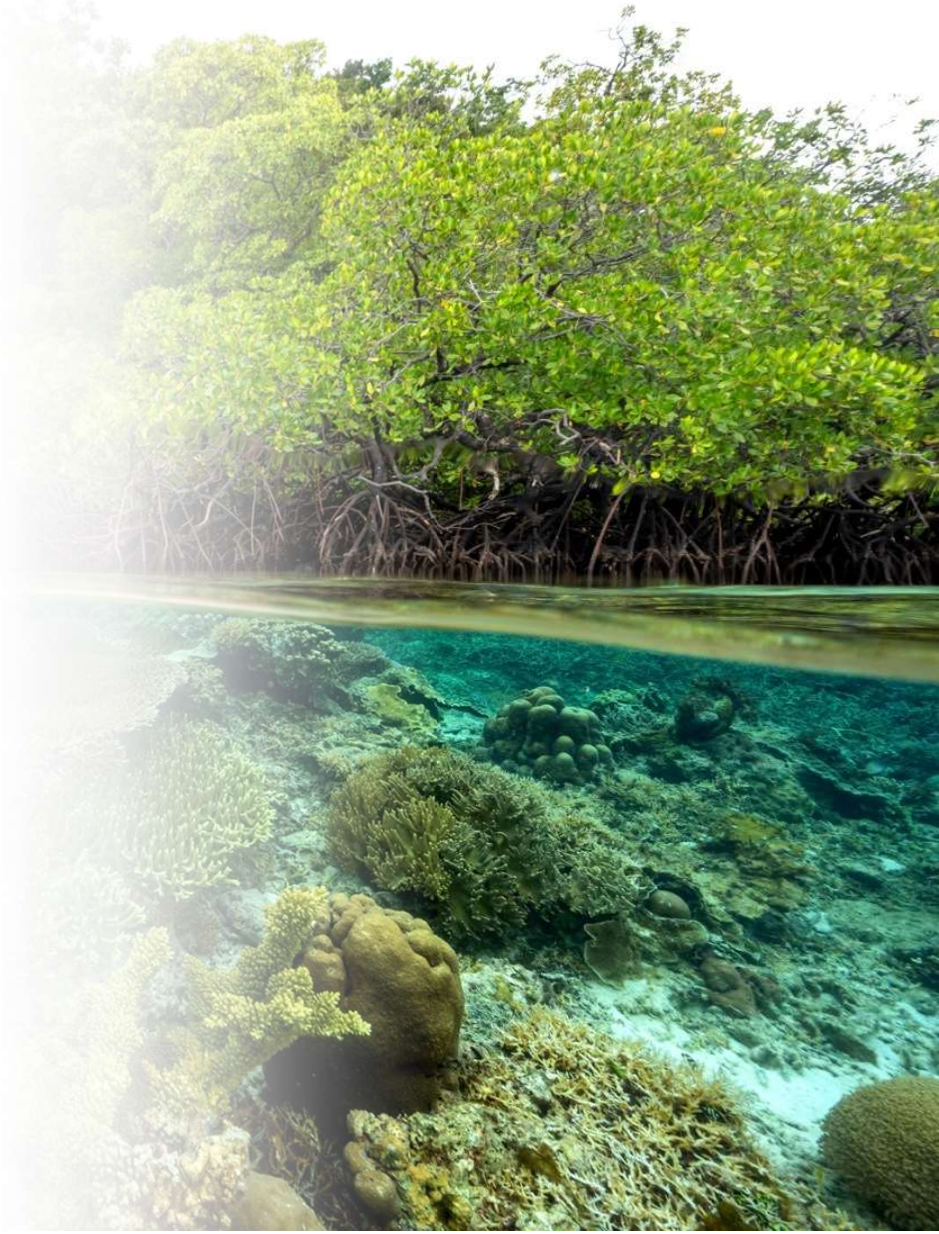
Risk financing solutions and transfer mechanisms to promote climate resilience for ecosystems

Proposed Approach for Solomon Islands

Output 4 under TA-6742 REG: Building Coastal Resilience through Nature-Based and Integrated Solutions

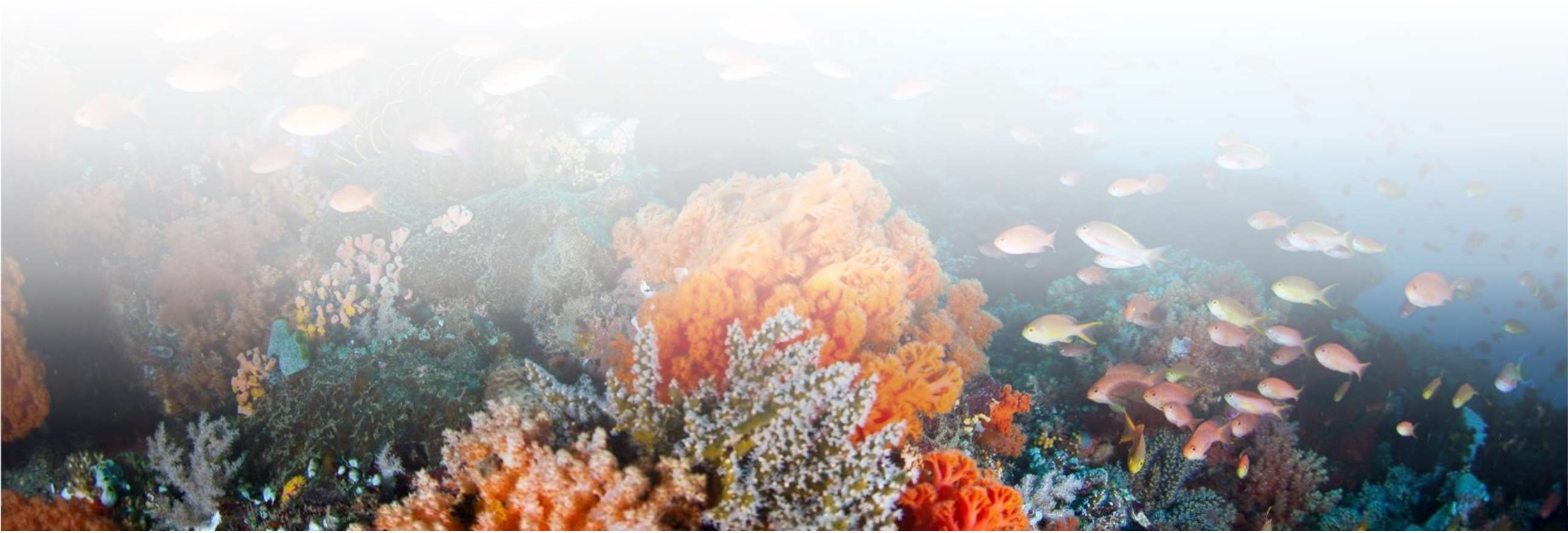
Location: Honiara (hybrid event)

Date: 8 March 2024 (8 –10 AM Honiara)



Project Purpose

Identify and make recommendations for the applicability of sustainable financing and risk management models and approaches for coral reef ecosystems in targeted, high-opportunity sites in four countries, namely Fiji, Indonesia, the Philippines and Solomon Islands, towards increasing the climate resilience of coastal businesses, communities and their livelihoods.



Project Objectives

- **Building the case for effective coral reef protection, restoration and sustainable management** by defining the range of goods and services they provide and quantifying the environmental, social and economic risks associated with their damage;
- **Implementing strong policies and governance approaches** to underpin their protection, restoration and sustainable management; and
- **Assessing viable options for sustainable financing and risk management** models and approaches, to optimize and complement the limited public funds allocated for coral reef protection and restoration.

Consulting team

Lead consultant: Landell Mills Limited in association with Swiss Re Group

Project focus in Solomon Islands – Arnavon Community Marine Park

- Developing a finance model and options for public-private financing of ACMP
- Determine Feasibility of an onshore coastal resilience management fund for ACMP
- Identify Pilot nature-based coral reef management and coastal resilience initiatives
- Climate Risk Assessment

Objectives of this meeting

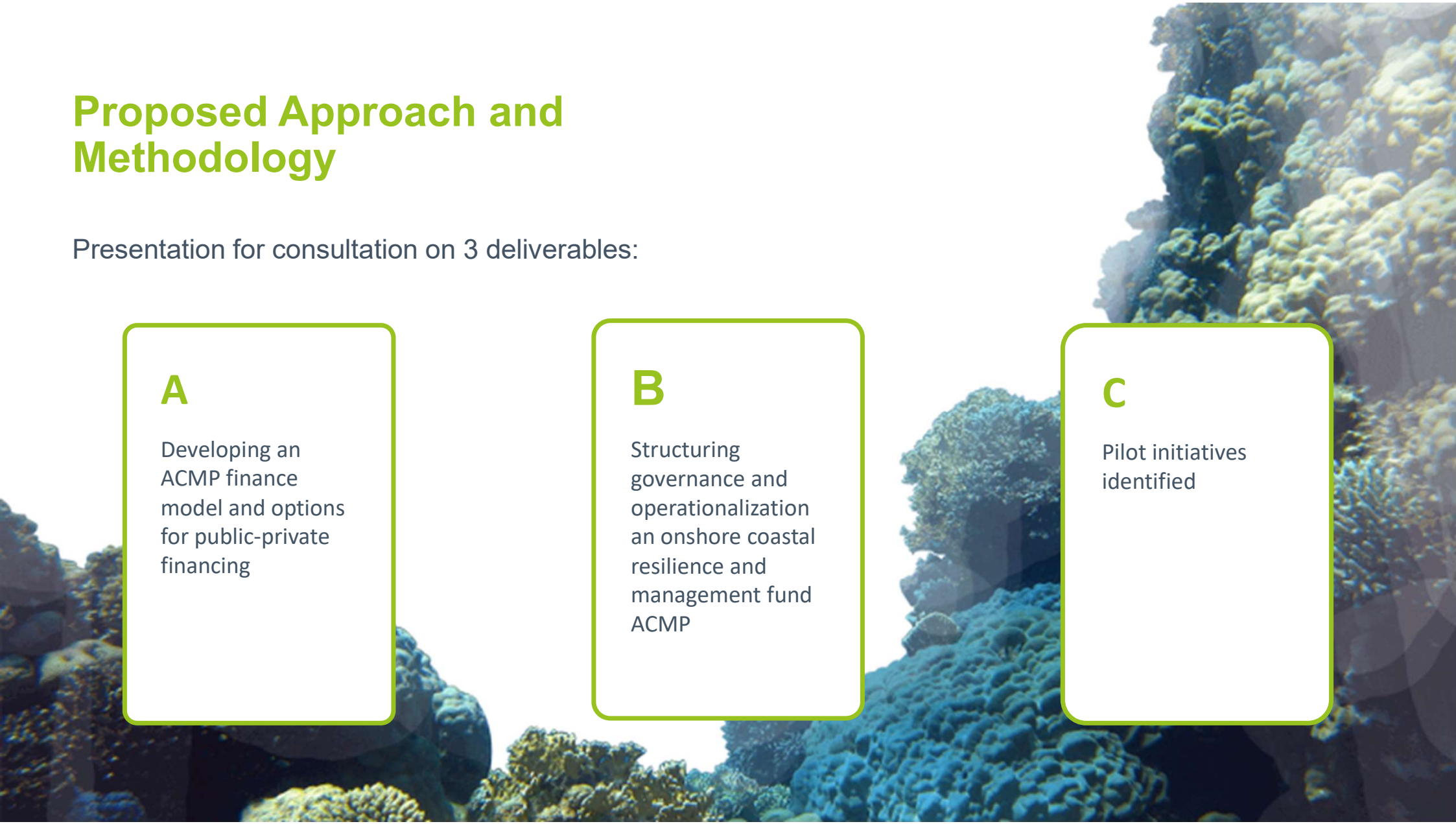
Understand stakeholder priorities

Obtain your feedback on the proposed approach

Proposed Approach and Methodology

Proposed Approach and Methodology

Presentation for consultation on 3 deliverables:



A

Developing an ACMP finance model and options for public-private financing

B

Structuring governance and operationalization an onshore coastal resilience and management fund ACMP

C

Pilot initiatives identified

A | Developing an ACMP finance model and options for public-private financing

MEETINGS

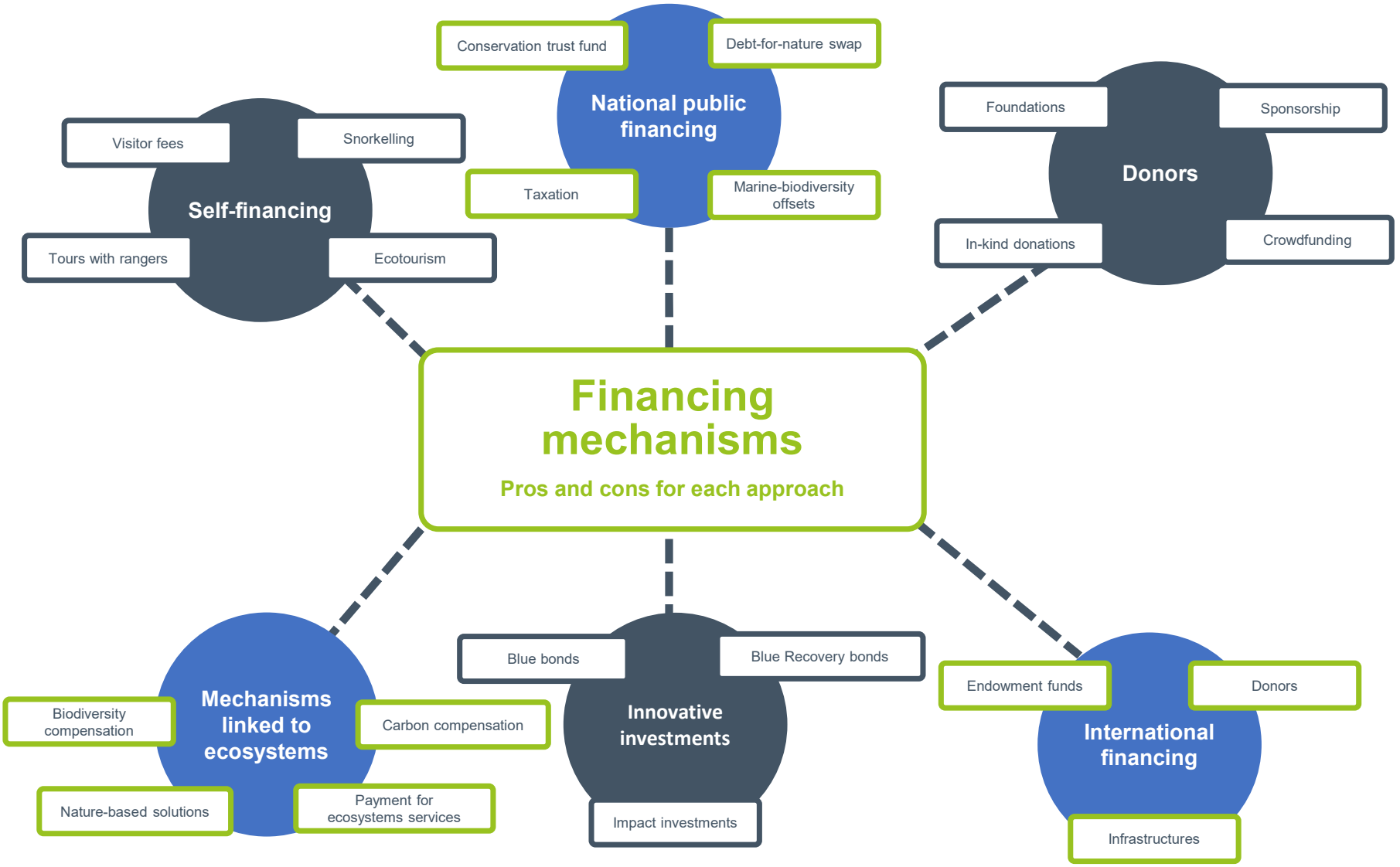
Involve the ACMP management committee during this process: selecting revenue and/or external funding options, using the business plan tool and adjusting financial information over time

STEPS

DELIVERABLES

Business plan document, annexes and calculation sheet (Excel)

landell-mills.com



B | Structuring governance and operationalization on onshore coastal resilience and management fund

MEETINGS

Consultation phase with ACMP Management Committee, MEDCM, MoFT on their objectives and main criteria for the fund. Follow development status of the Protected Areas Trust Fund (PATF)

Early assumptions of requests, open for further consultation:

- Blended finance approach (grants, investments, endowments)
- Channel different sources of funding towards ACMP
- National management

STEPS

DELIVERABLES

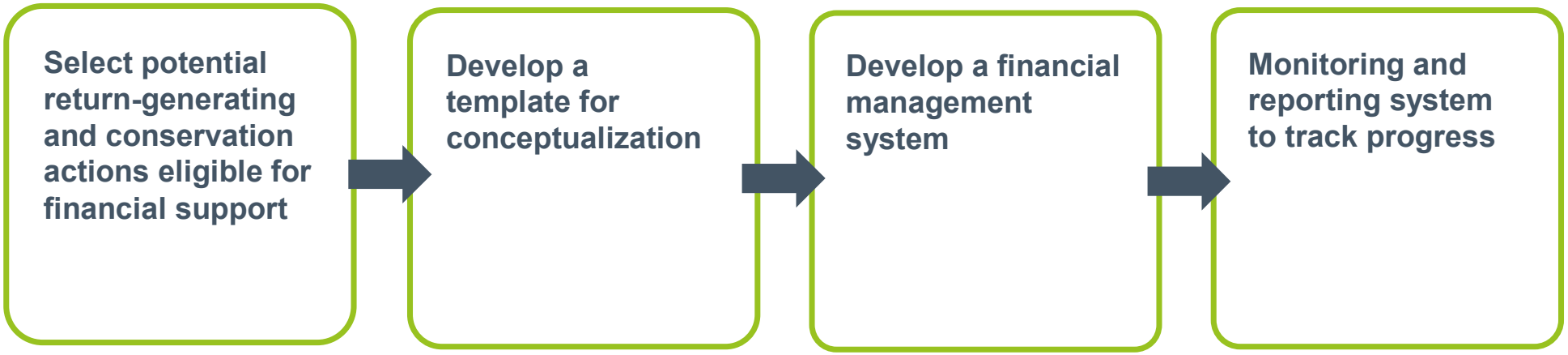
- Comparison, analysis and recommendations on different options
- Roadmap/action plan for the creation of the chosen option for the Fund

C | Pilot initiatives

MEETINGS

Consultation phase with ACMP Management Committee, Solomon Island project team including Gender Equality and Social Inclusion Specialist, Environmental safeguards specialist. Provide training to relevant stakeholders.

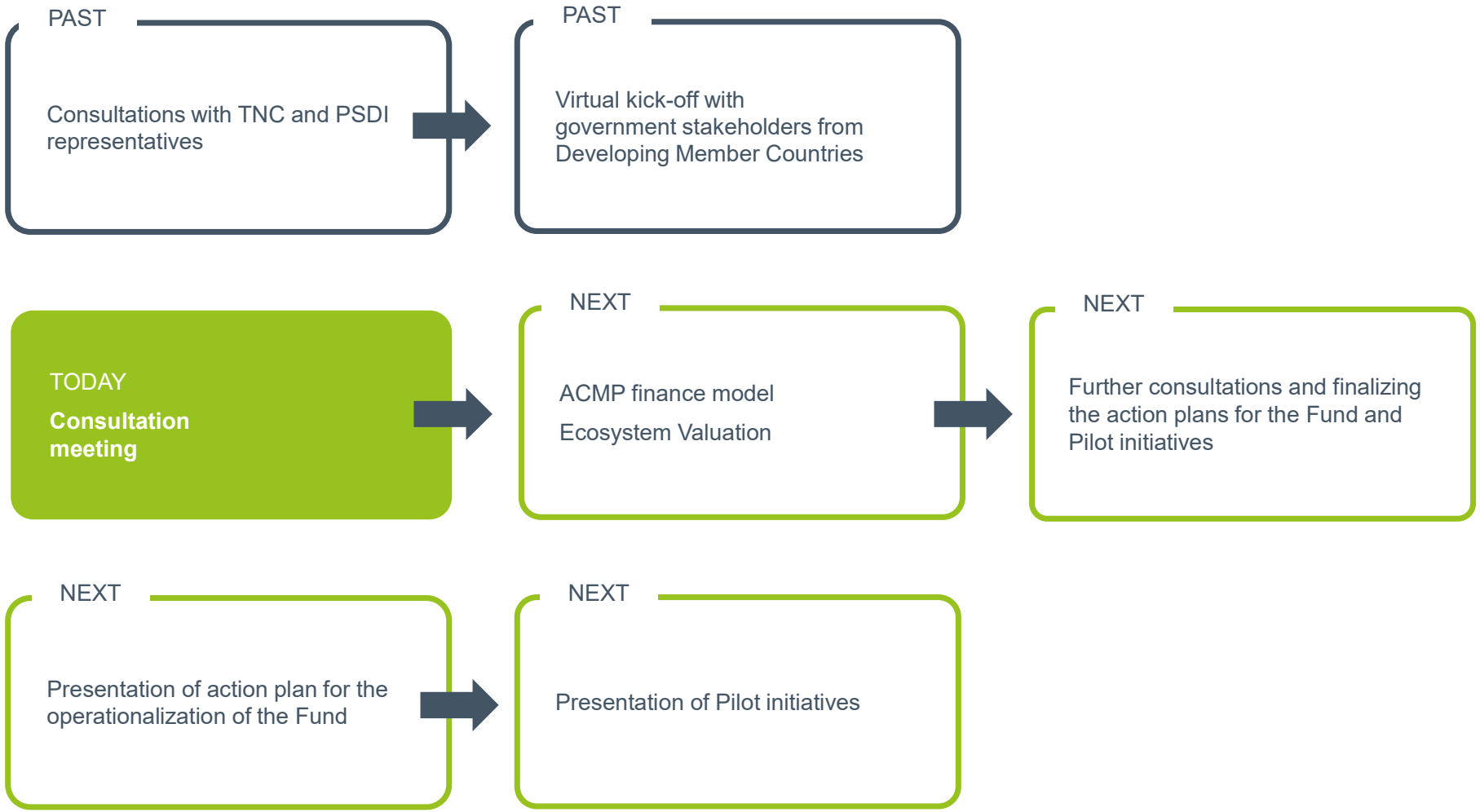
STEPS



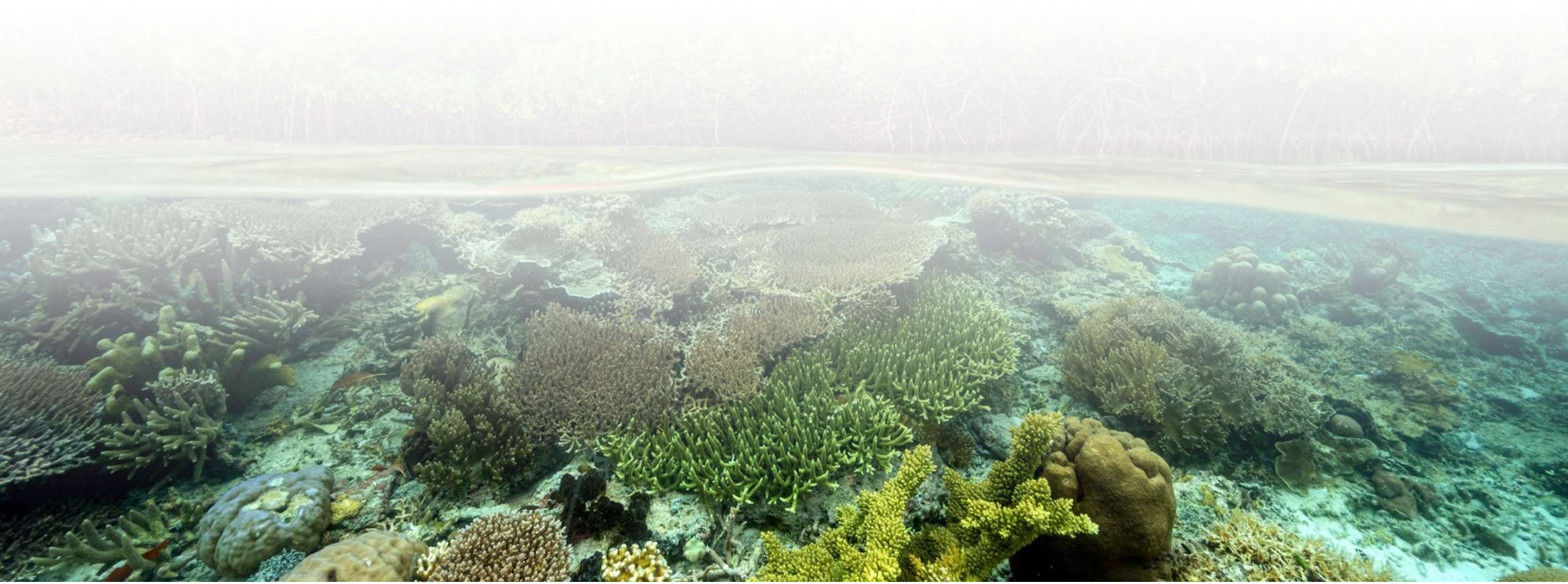
DELIVERABLES

Report to support future pilot initiatives

Timeline


PAST
Consultations with TNC and PSDI representatives
PAST
Virtual kick-off with government stakeholders from Developing Member Countries
TODAY
Consultation meeting
NEXT
ACMP finance model
Ecosystem Valuation
NEXT
Further consultations and finalizing the action plans for the Fund and Pilot initiatives
NEXT
Presentation of action plan for the operationalization of the Fund
NEXT
Presentation of Pilot initiatives

Ecosystem valuation



Overview of approach

Aim:

1) Inform the scope of the sovereign Trust Fund (ACMP vs Wider Arnavon Area)
2) Undertake valuation to inform financing for the Trust Fund through:
    I. identifying the nature and extent of potentially material ecosystem service values
    II. establishing who the beneficiaries are, and how much they benefit
    III. understanding what their 'willingness to pay' might be

Approach:

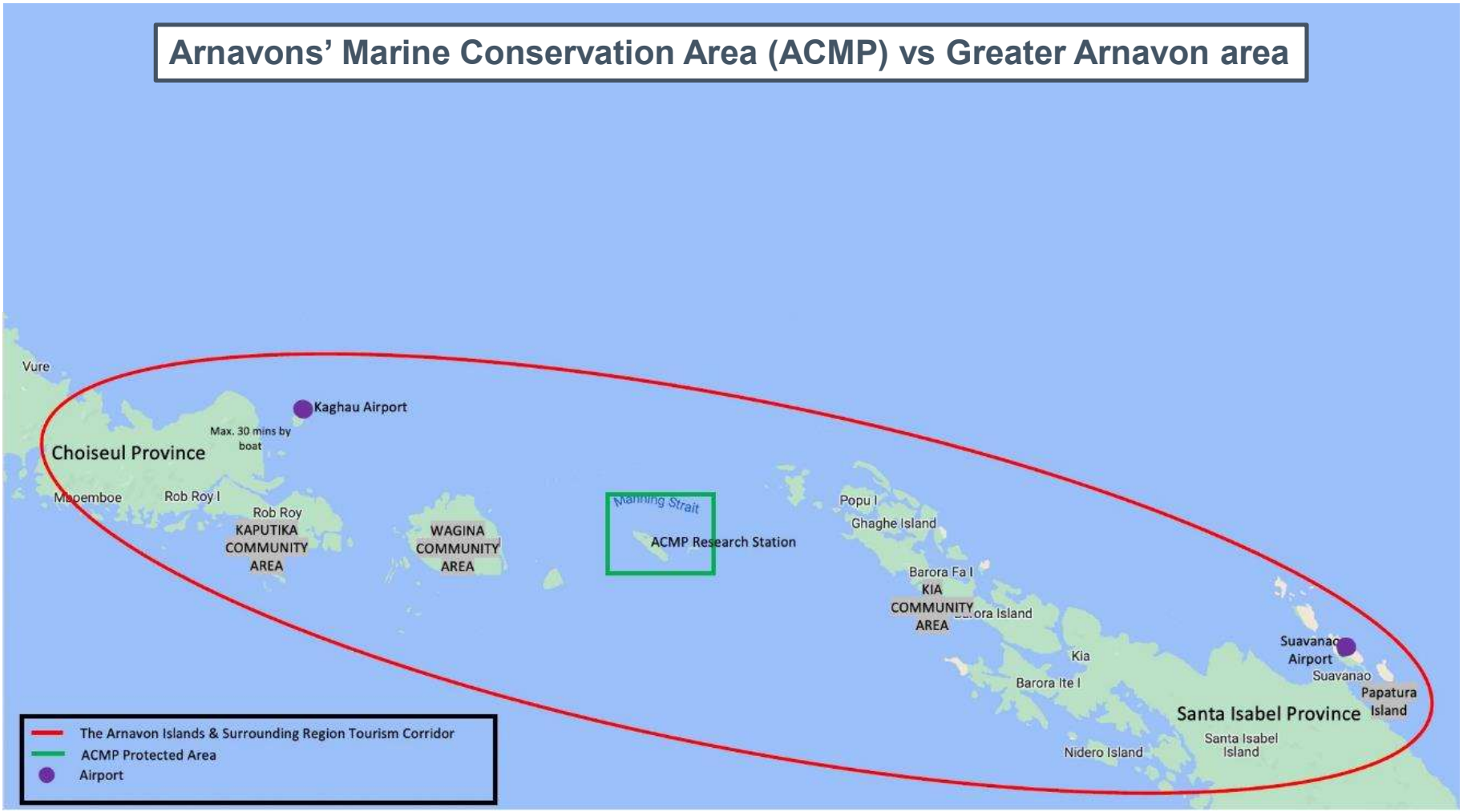
1) Undertake a high-level comparison of values for 'ACMP' versus the 'wider Arnavon area'
    - Desk-based comparison based on existing literature

2) Conduct a Natural Capital Assessment, following the 'Natural Capital Protocol', that involves:
    i) Scoping
        - Decide on specific objective, focus, scope and approach to the valuation
    ii) Measurement and valuation
        - Determine qualitative values for all ecosystem services
        - Determine monetary values for selected material ecosystem services
    iii) Apply
        - Set out the qualitative and monetary values linked to key beneficiaries

Data collection by national consultants, plus potentially commissioned surveys

SUSTAIN VALUE

Pilot Site in Solomon Islands



High level comparison of options: ACMP vs Wider Arnavon Area (1)

Ecosystem area, visitor numbers and estimated visitor fees

Topic	Metric	Arnavon CMP	Wider Arnavon Area
Approx total area		161 km^2	12,068 km^2
Ecosystem extent (benthic substrate <10m)	Reef Extent Area	17 km^2	1,001 km^2
	Area & % of corals	2.9 km^2 (38%)	188 km^2 (39%)
	Area & % of seagrass	0.12 km^2 (1.7%)	49 km^2 (10%)
	Area of mangroves	0 km^2	162 km^2
Visitor accommodation	Number of visitor accommodation units	1	14
	Number of beds	7	117
	Typical price per night per visitor (US$)	?	$45
Visitor numbers per year	International visitors	5-100	2,083
	Domestic visitors	125-150	>150
	International domestic expats visitors	?	60
	Cruise visitors	194	>200
	Yacht visitors	?	?
	Total annual visitors	350-500 ?	>2,500
Average estimated coral reef fees generated (US$/year)	2023 visits average	$405	$21,250
	2028 visits average	$6,075	$33,750
	2033 visits average	$8,100	$45,000

Tourism & fee data from: ADB-PSDI (2023) Situation Analysis – Tourism Destination Plan for ACMP

- Wider Area is magnitudes larger
- BUT visitor numbers and estimated fees not so much greater

SUSTAIN VALUE

High level comparison of options: ACMP vs Wider Arnavon Area (2)

Indicative qualitative ecosystem service values

Topic	Metric	Arnavon CMP	Wider Arnavon Area
Provisional estimated relative value of: • **coral reefs,** • **sea grass and mangroves (latter for wider area only)**	Tourism value	Low	Low - Medium
	Fish & invertebrate fishery value (subsistence and commercial)	Low – Medium (indirect only?)	Medium - High (indirect + direct)
	Aquarium trade	None?	None-Low?
	Coast protection value	Low	Low - Medium
	Conservation/non-use	Very High	Very High
	Research & education	Medium	Medium
	Potential carbon sequestration – blue carbon	Very Low	Medium? (depends on threats to/ loss of mangroves)
	Cultural values	Medium	High
Likely management costs		Low-Medium	High

Wider Area:

- Values likely to be only slightly greater
- BUT more development opportunities
- BUT also far greater management cost

SUSTAIN VALUE

Valuation - Scoping

Aim:

- Decide on specific focus, scope and approach to ecosystem service valuation

Key considerations to agree:

- Geographic area - ACMP and the Wider Arnavon Area
- Focus of natural capital:
  - Primarily corals, but also to a lesser extent, mangroves and seagrasses?
  - What about key organisms such as turtles – anything else?
- Time period : say 30 years?
- Qualitative valuation for all values (including cultural)
- Monetary valuation for:
  - Tourism/recreation
  - Fisheries (subsistence and commercial)
  - Coast protection
  - Non-use/conservation value
- Monetary valuation approach:
  - Key informant interviews
  - Existing site data and reports
  - Value transfer (studies at similar sites)
  - + Possibly additional surveys

SUSTAIN VALUE

Monetary Valuation methodologies

Tourism/recreation

- **Direct:** Total visitor days per coral-based activity/year x expenditure + consumer surplus
- **+ Indirect:** Total visitor days per year x expenditure/day x % trip linked to corals (park/marine ecosystems)

Fisheries (subsistence + commercial)

- Total value of fish (and inverts) caught/year – 'apportioned' to the corals (park/marine ecosystems)

OR

- Average productivity yield of fish and invertebrates (tons/ha/year) x price x area

Coast protection

- Difference in 'annual average flood damages' in 'with' and 'without' coral/marine ecosystem

OR

- Cost of providing equivalent coast protection function

Non-use/conservation value

- Total adult visitors x average 'willingness to pay' per visit for protection
- + Total local population x average 'willingness to pay' per household per year for protection

Plus potentially 'research and education value' + cultural value (qualitative)

SUSTAIN VALUE

Climate Risk Assessment Solomon Islands: Initial Results

ADB Reef Consulting Project
February 2024

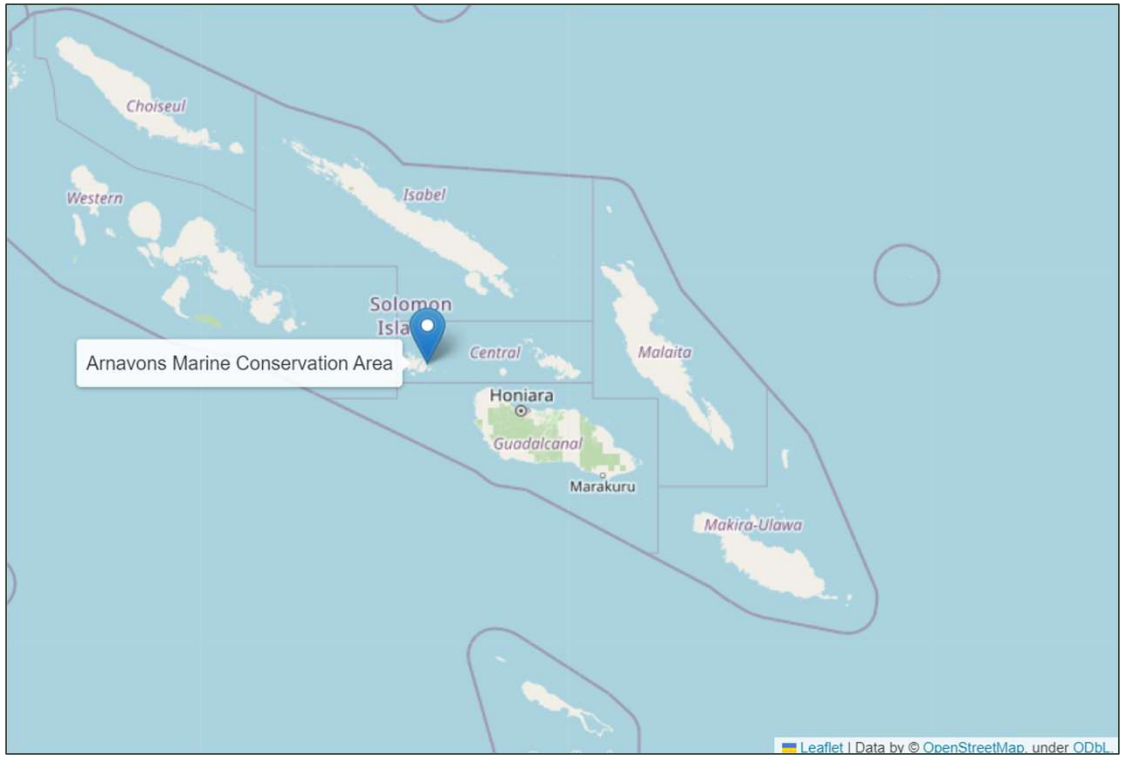
Climate Risk Assessment - Approach, methodology and considerations

Perils in scope

- Climate related perils only (not man-made)
- Flood, windstorm, storm surge, temperature / heat, preciptiation

Approach

- Desk-based assessment using Swiss Re's proprietary CatNat® and global datasets
- Conducted to a resolution of 20x20km (may be more granular for some perils).
- Current state based on historic details of perils in scope
- Potential exposures of those same perils based on a projection under SSP5-8,5 scenario for the year 2040.



Solomon Islands – Overview of initial results

- The Solomon Islands are prone to tropical cyclones, though not as extreme or frequent as other parts of the Pacific such as Philippines and Fiji.
- Hence the Arnavons Marine Conservation Area receives a "medium" rating for windstorms.
- The absence of large river bodies results in a low rating for flooding related risks, however the Solomon Islands site faces significant risk from extreme rainfall events.
- Note the level of exposure does not consider local population, reef health and/or related economic activity.
- Due to the size and location of the Solomon Island, there are limitations in the extent and granularity of data available.

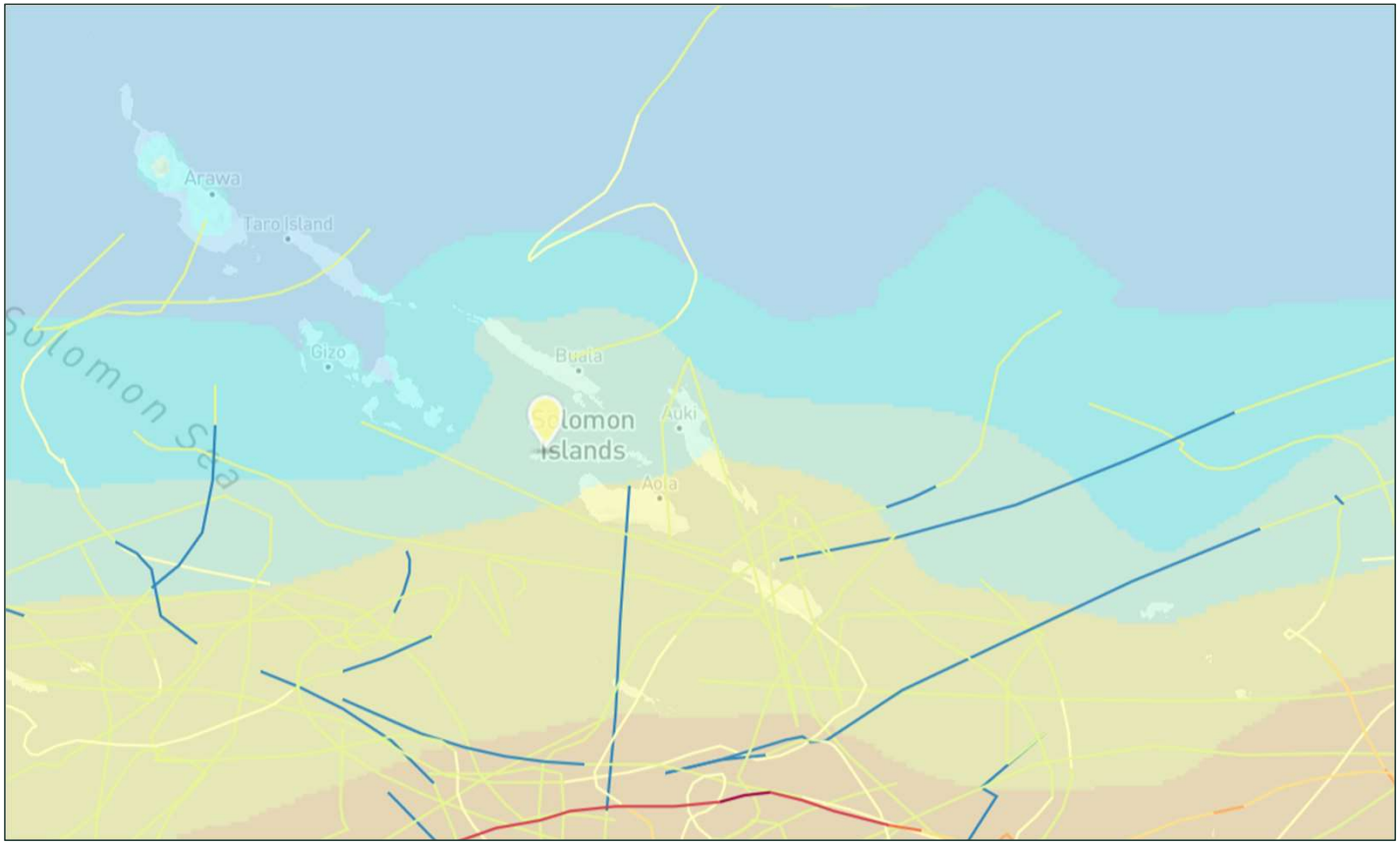
Site	Pluvial Flood	Fluvial Flood	Storm Surge	Windstorm
Arnavons Marine Conservation Area	Very Low	Very Low	Low	Medium

**Note - This assessment presents a streamlined qualitative perspective, summarising return periods and likelihood of occurrences across various inputs, measurement methods, and hazards. As stated earlier in this document, it includes assumptions that data from onshore sources aligns with offshore effects. The findings are converted into a numerical rating, aiding in the 'Initial Prioritization' process to inform preliminary site selection recommendations.*

Current Risk - CatNet® Natural Hazards Assessment – Country Maps

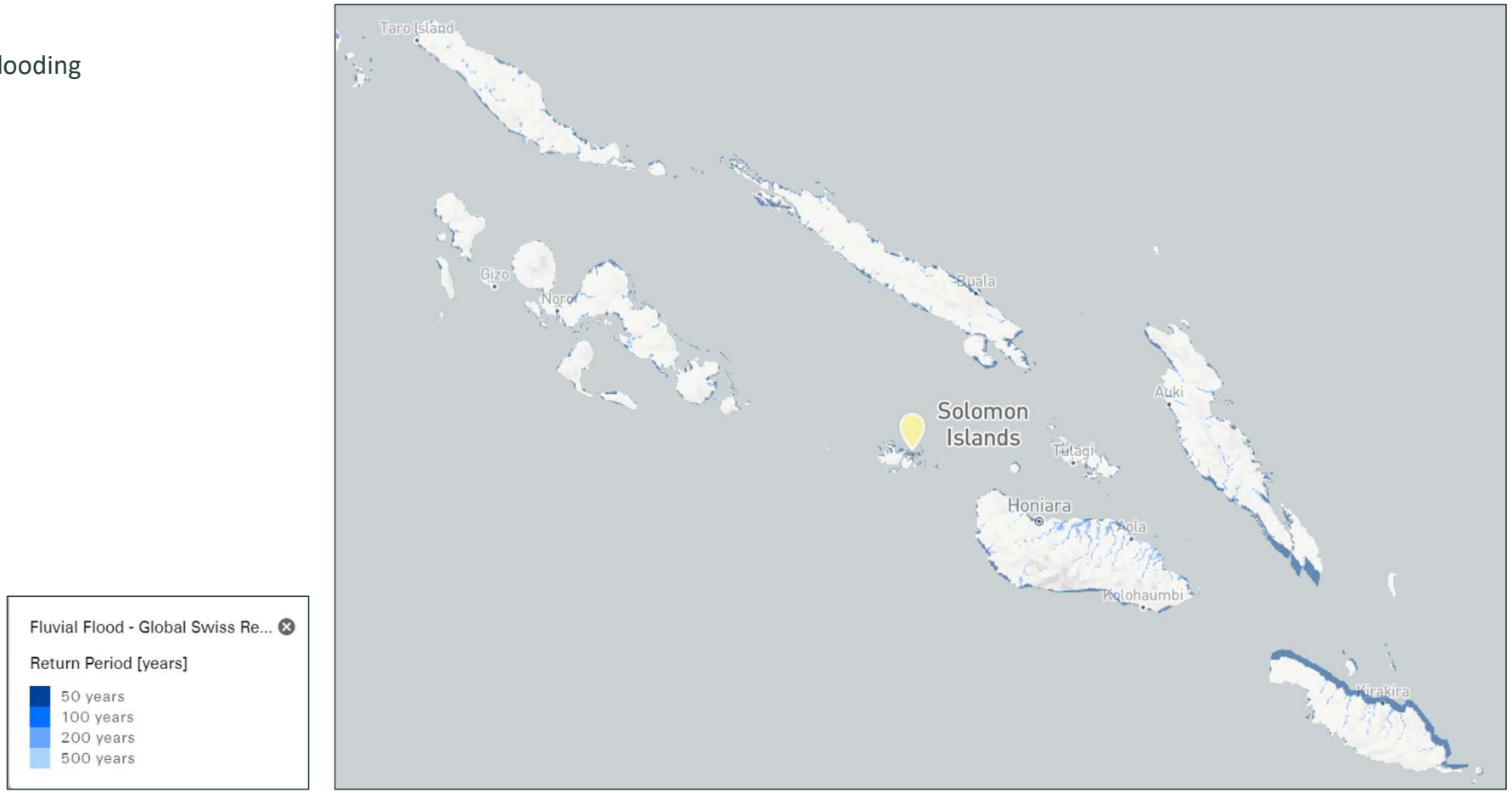
Windstorm risk

- 3 seconds peak gust with a return period of 50 years based on Swiss Re's proprietary wind loss models.
- Along with historical cyclone tracks until 2020



Current Risk - CatNet® Natural Hazards Assessment – Country Maps

Fluvial flooding



Future Risk - Assessment of Climate Risks – various scenarios

Air Temperature*	Scenario	Arnavons Marine Conservation Area
Current mean daily air temperature (°C)		26.99
Current days above 30 degrees		365.20
Current days above 35 degrees		n/a
Change in mean temperature (°C)	SSP 1-2.6	0.87
Change in mean temperature (°C)	SSP 2-4.5	n/a
Change in mean temperature (°C)	SSP 5-8.5	n/a
95th percentile temperature change (°C)	SSP 1-2.6	0.85
95th percentile temperature change (°C)	SSP 2-4.5	n/a
95th percentile temperature change (°C)	SSP 5-8.5	n/a
99th percentile temperature change (°C)	SSP 1-2.6	1.88
99th percentile temperature change (°C)	SSP 2-4.5	n/a
99th percentile temperature change (°C)	SSP 5-8.5	n/a

**Note - temperature is measured 2m above surface*
Sea surface temperature to be assessed separately

n/a = data not available

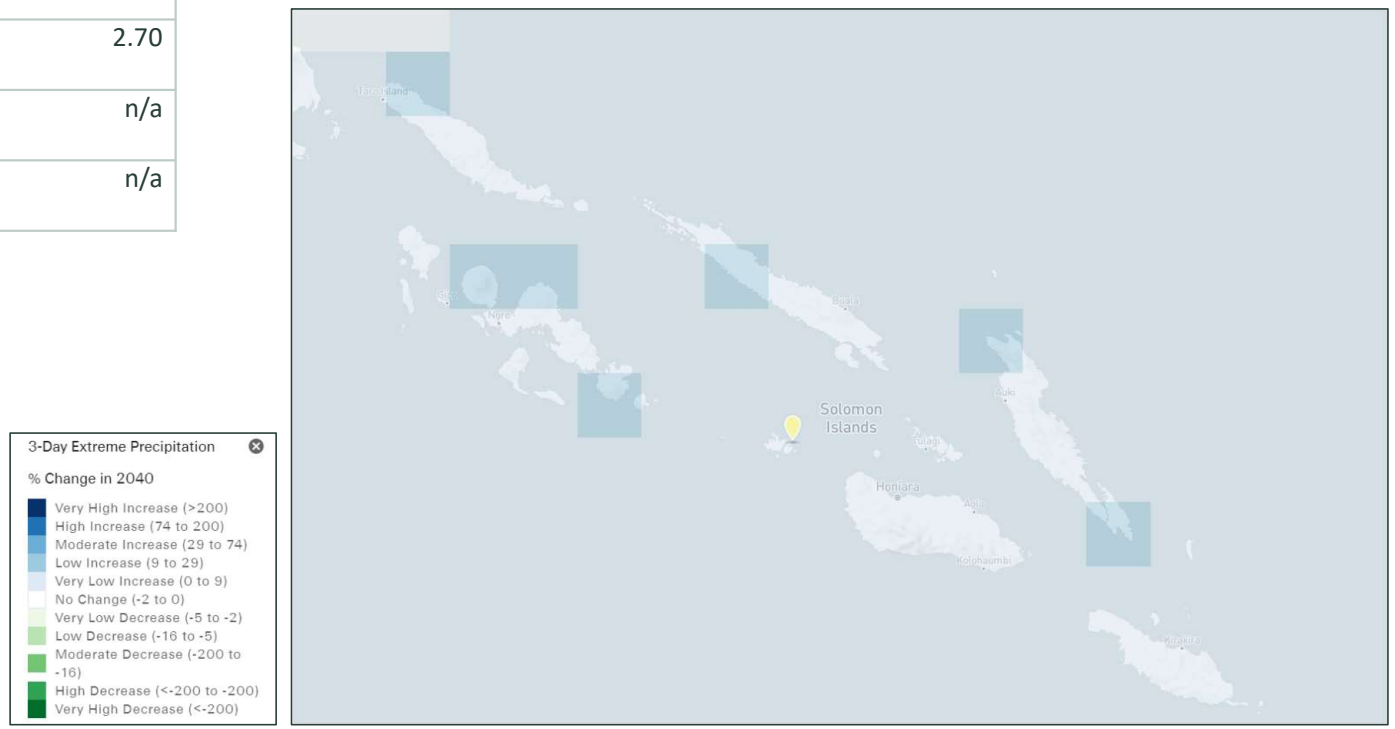
Heatwave	Scenario	Arnavons Marine Conservation Area
Current heatwave duration		54.31
Current heatwave frequency		1.52
95th percentile change in heat wave frequency	SSP 1-2.6	1.03
95th percentile change in heat wave frequency	SSP 2-4.5	n/a
95th percentile change in heat wave frequency	SSP 5-8.5	n/a
99th percentile change in heat wave frequency	SSP 1-2.6	2.29
99th percentile change in heat wave frequency	SSP 2-4.5	n/a
99th percentile change in heat wave frequency	SSP 5-8.5	n/a

Windstorm	Scenario	Arnavons Marine Conservation Area
Mean extreme windspeed today (m/s)		6.43
Change in extreme wind (m/s)	SSP 1-2.6	0.07
Change in extreme wind (m/s)	SSP 2-4.5	n/a
Change in extreme wind (m/s)	SSP 5-8.5	n/a

Future Risk - Assessment of Climate Risks – various scenarios

Precipitation	Scenario	Arnavons Marine Conservation Area
Max monthly precipitation (mm)		401.04
Extreme precipitation (mm)		19.13
Change in extreme precipitation frequency (%)	SSP 1-2.6	2.70
Change in extreme precipitation frequency (%)	SSP 2-4.5	n/a
Change in extreme precipitation frequency (%)	SSP 5-8.5	n/a

Percentage change in 2040 for 3-day extreme precipitation under SSP 5-8.5 scenario.



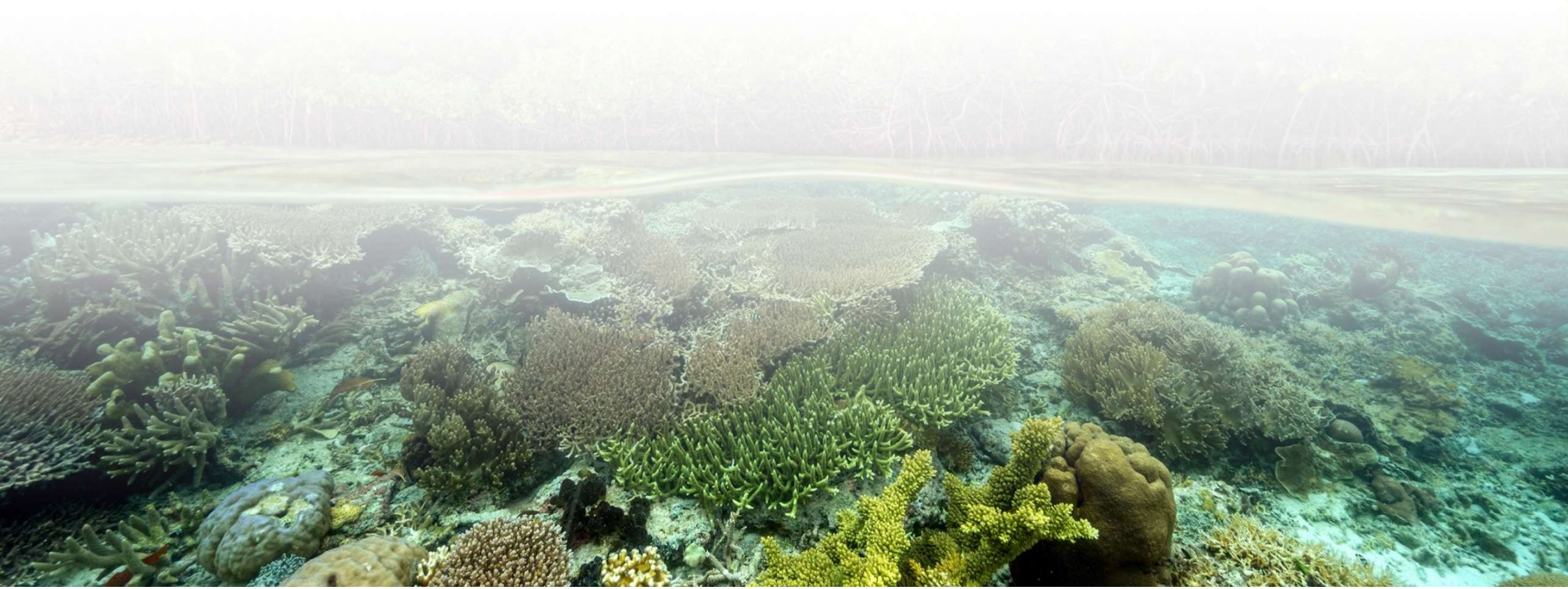
n/a = data not available

Sea level rise

Sea level rise at 2040 under scenario SSP 5-8.5

Models project a moderate increase of 0.15 to 0.2 meters

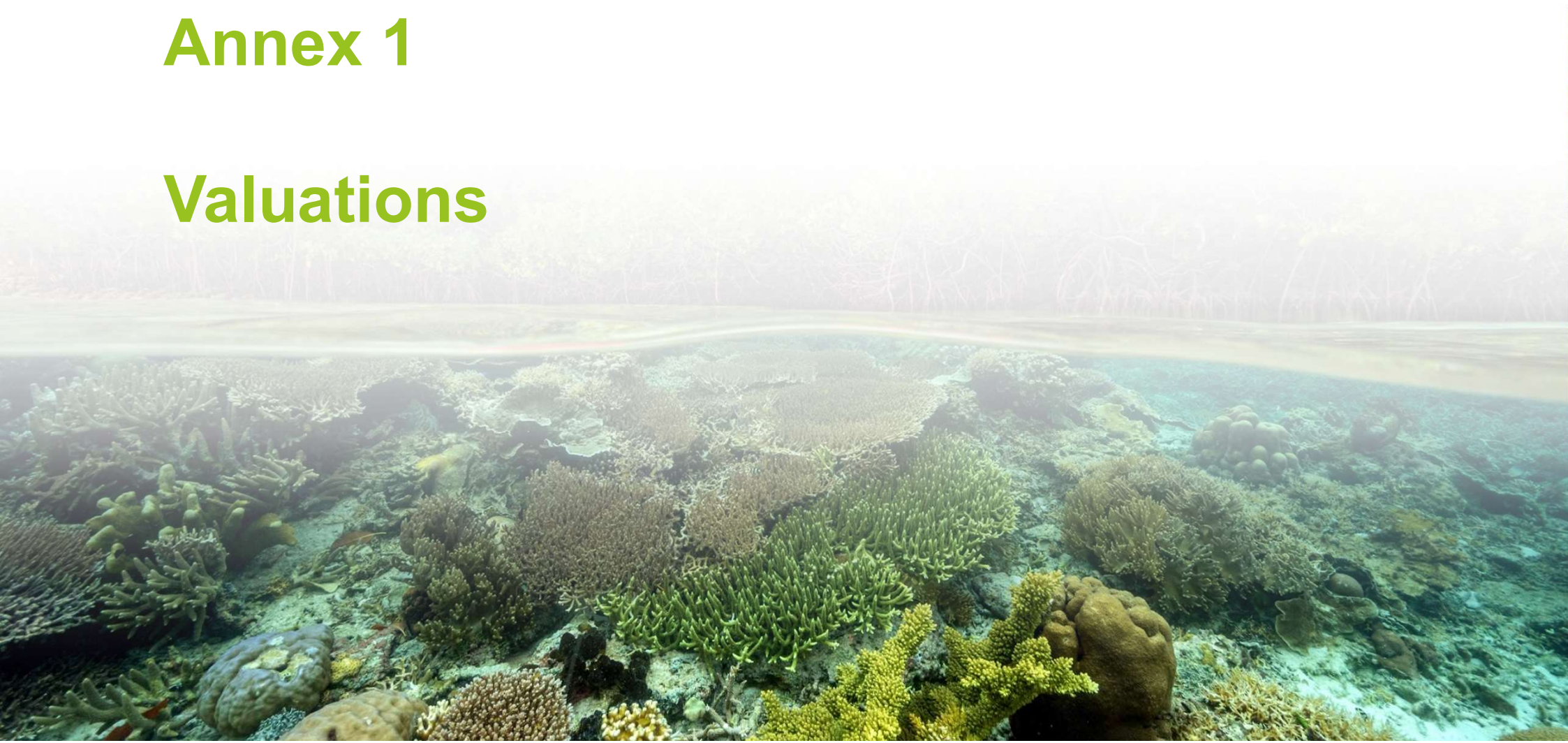
Discussion



Thank you

Annex 1

Valuations



Valuation of Tourism

Valuation formula:

1) Total visitor days per activity per year x site related value per day (expenditure + consumer surplus)

Example data needed	Proposed approach	Potential surveys
• **Number of visitors** by type per year • Ave number of **visitor days** in ACMP and in wider area • Ave **visitor expenditure** (per trip or per day) • **Consumer surplus** (extra enjoyment over what paid) • Importance of ecosystem for the trip • Predicted **changes in above** over 30 years • ***Tourists' willingness to pay** for site protection	• Obtain **existing relevant data**. • Undertake **key informant interviews** (e.g. Government Dept, tourism representatives, operators, some visitors – divers, yachties, others – some accommodation owners. • **Value transfer** (apply adjusted results from similar studies elsewhere).	• **Visitor questionnaire survey** • **Tourism operator questionnaire survey**

*Plus estimate visitors' 'willingness to pay' for ecosystem protection into a Trust Fund

SUSTAIN VALUE

Valuation of Fisheries (subsistence and commercial)

Valuation formula:

1) Total value of fish (and inverts) caught - apportioned to the corals (and mangroves & seagrasses)
2) OR Average productivity yield of fish and invertebrates (H-M-L tons/ha/year) x price x area

Example data needed	Proposed approach	Potential surveys
• Total **annual subsistence and commercial catch** (fish/invertebrate) for both areas • Value/cost of alternative protein for subsistence ($/kg) • **Fish market prices** and **cost of production** • **Fish catch apportioned** across the site (high, medium and low coral quality areas) • **Average sustainable yield** for high, medium and low quality reefs. • ***Fishers' willingness to pay** for site protection	• **Obtain existing relevant data**. • **Undertake key informant interviews** (e.g. Government Dept, fishery representatives, and some subsistence and commercial fishers. • **Apply 'value transfer'** (adjust results from similar studies elsewhere).	• **Fisher questionnaire surveys** (target a larger representative number of fishers – with as specific

*Plus understand fisher's 'willingness to pay' for ecosystem protection into a Trust Fund

SUSTAIN VALUE

Valuation of coast protection

Valuation formula:

1) Difference in 'annual average damages' in 'with' and 'without' ecosystems in place
2) OR Cost of providing equivalent coast protection

Example data needed	Proposed approach	Potential surveys
• Number of properties in flood areas (say 5, 25, 100, 200 and 500 year flood • Estimated damage cost per per depth • Change in flood depths without ecosystems • Erosion rate (m/yr) with and without ecosystems • Cost of relocating houses • Cost of providing an equivalent degree of protection • ***Households' willingness to pay** for site protection	• **Undertake key informant interviews** (e.g. local village representatives) • **Apply 'value transfer'** (adjust results from similar studies elsewhere if any are suitable).	• **Household questionnaire surveys** (target a representative number of houses)

*Plus understand local household's 'willingness to pay' for ecosystem protection into a Trust Fund

SUSTAIN VALUE

Valuation of non-use/conservation value

Valuation formula:

1) Total adult visitors x average 'willingness to pay' per visit for protection
2) PLUS total local population x average 'willingness to pay' per household per year for protection

Example data needed	Proposed approach	Potential surveys
• **Number of visitors** by type per year • Ave number of **visitor days** in ACMP and in wider area • **Willingness to pay** for site protection – of non-users • Predicted **changes in above** over 30 years	• Obtain **existing relevant data**. • Undertake **key informant interviews** (e.g. Government Dept, tourism representatives, operators, some visitors – divers, yachties, others – some accommodation owners. • **Value transfer** (apply adjusted results from similar studies elsewhere).	• **Visitor questionnaire survey** • **Household questionnaire survey** (across both islands)

The above value is specifically based on non-users' 'willingness to pay' for ecosystem protection into a Trust Fund

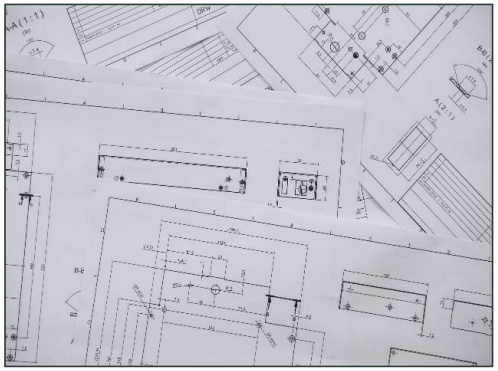
SUSTAIN VALUE

Swiss Re

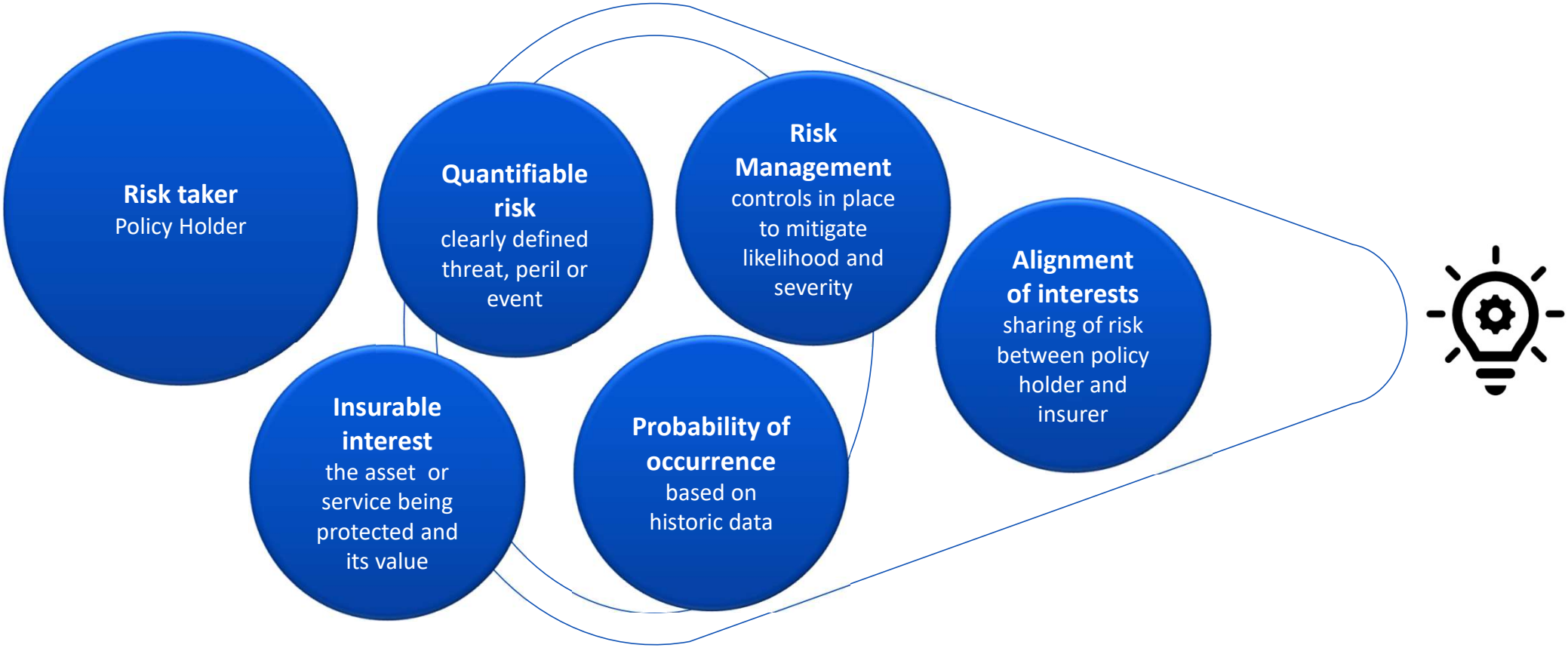
Annex 2

The role of insurance and risk management

The different roles of insurance and risk transfer

Insights	Enablement	Resilience Building	Compensation
			
Understand climate and physical risks and potential impacts to locations, assets and value chain	**De-risk and enable investment** by including insurance at planning stage to assure project delivery and returns	**Parametric insurance** index-based design, for early intervention, fast response post event, and recovery aid	**Traditional indemnity insurance** provides compensation for loss or damage post event

Fundamental Requirements for an insurance product



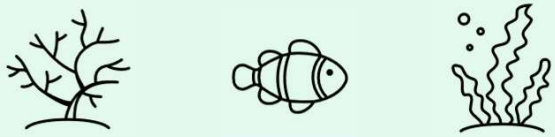
Potential Way Forward

Risk Management Approaches for Natural Coastal Assets

Insurance

Financing

Asset
Coral reef, mangroves, seagrass



Hazard
Natural or man-made, direct or secondary

Risk Management Approach
Holistic risk management incorporates all three approaches

1. Avoid

- Hazards are moved or redirected away from the site
- Insights and systems to better understand and inform planning and early warning

2. Recover and Restore

- Funds from an insurance pay out, triggered by an agreed threshold or post event, can be used to repair and rehabilitate
- Cover business interruption and loss of earnings due to a disaster event
- Restoration financed by government and third parties

3. Adapt

- Funds from an insurance pay out, triggered by an agreed threshold, can be used for early intervention and 'build back better'
- Upfront investment in risk reduction measures reduce the impact of future hazards

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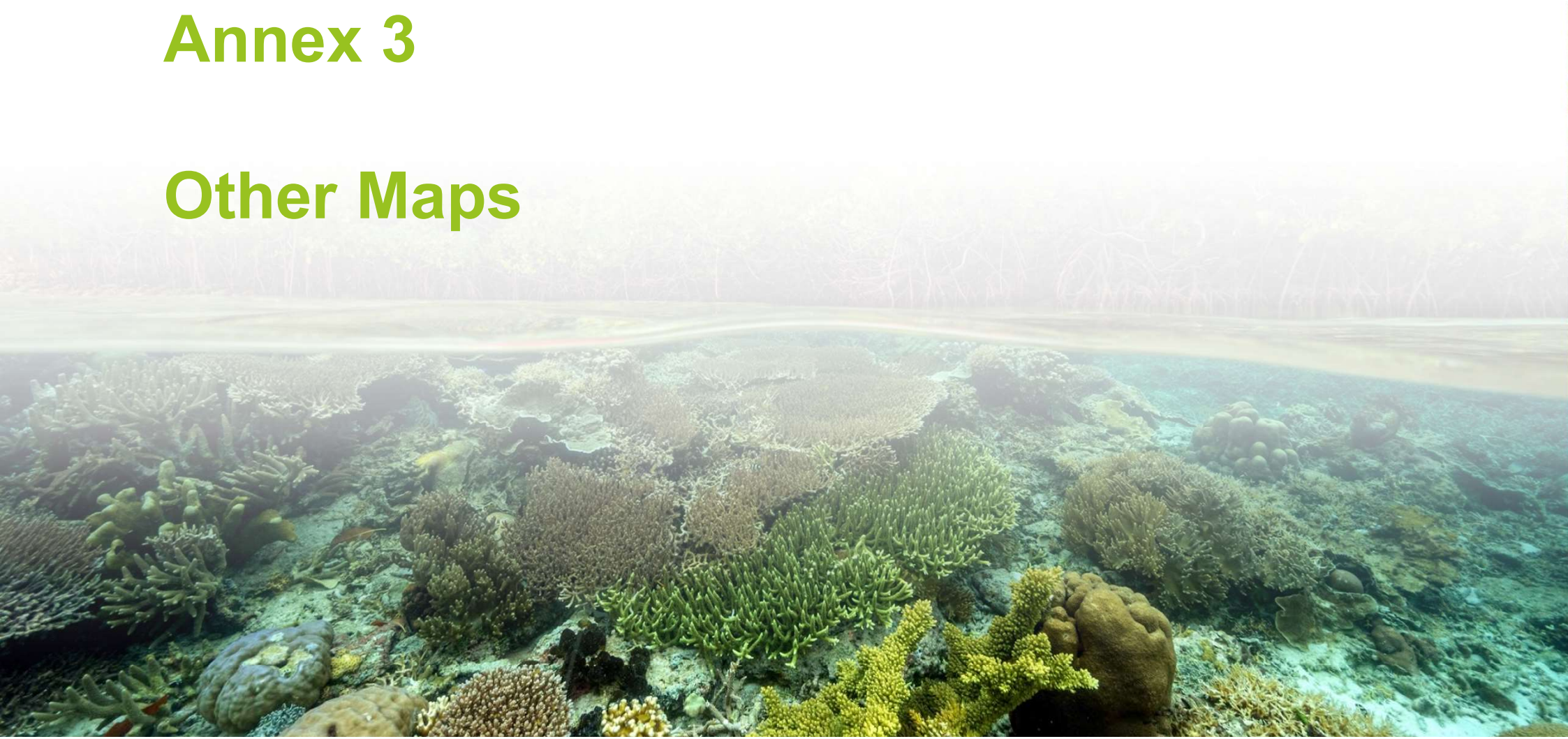
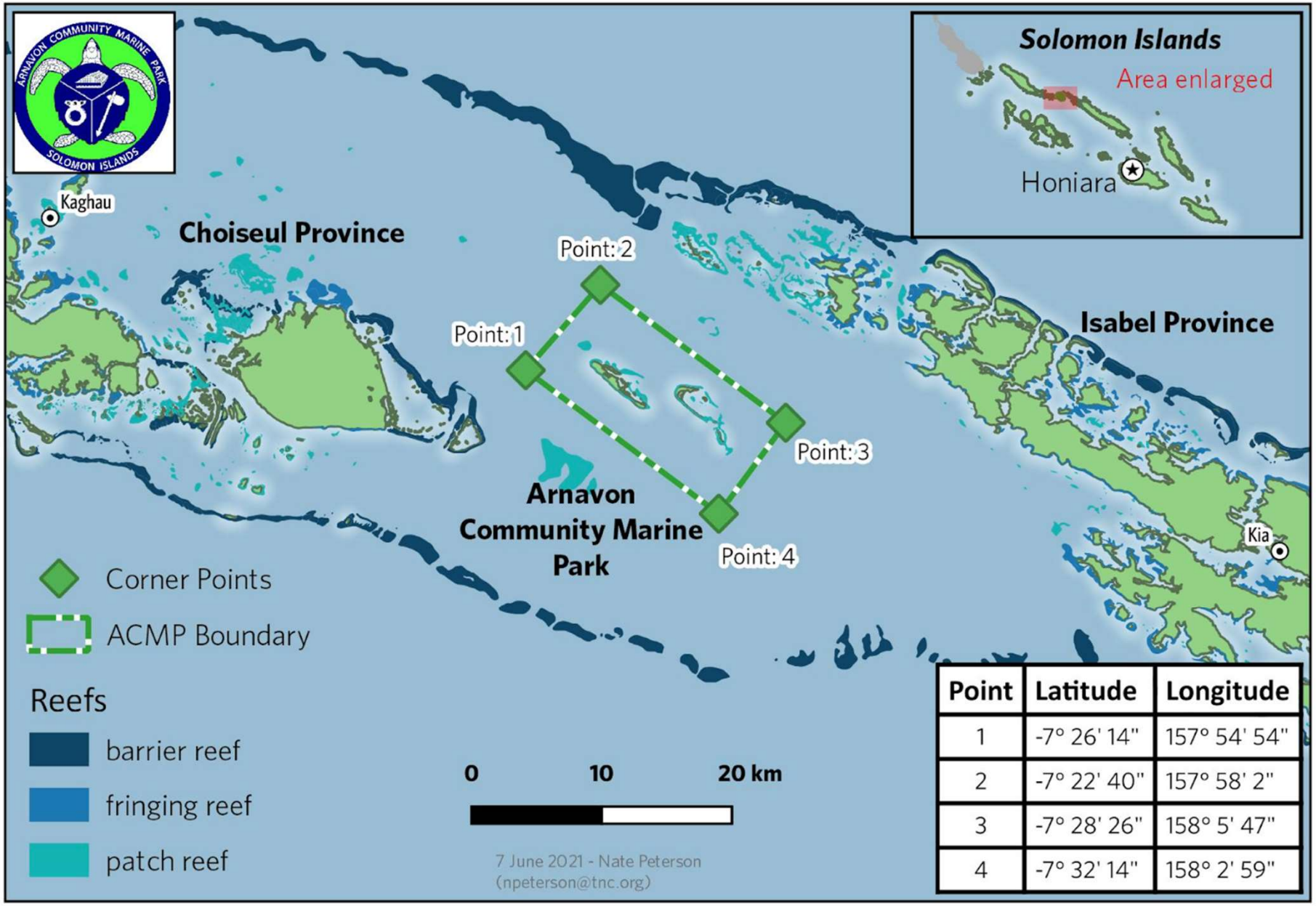
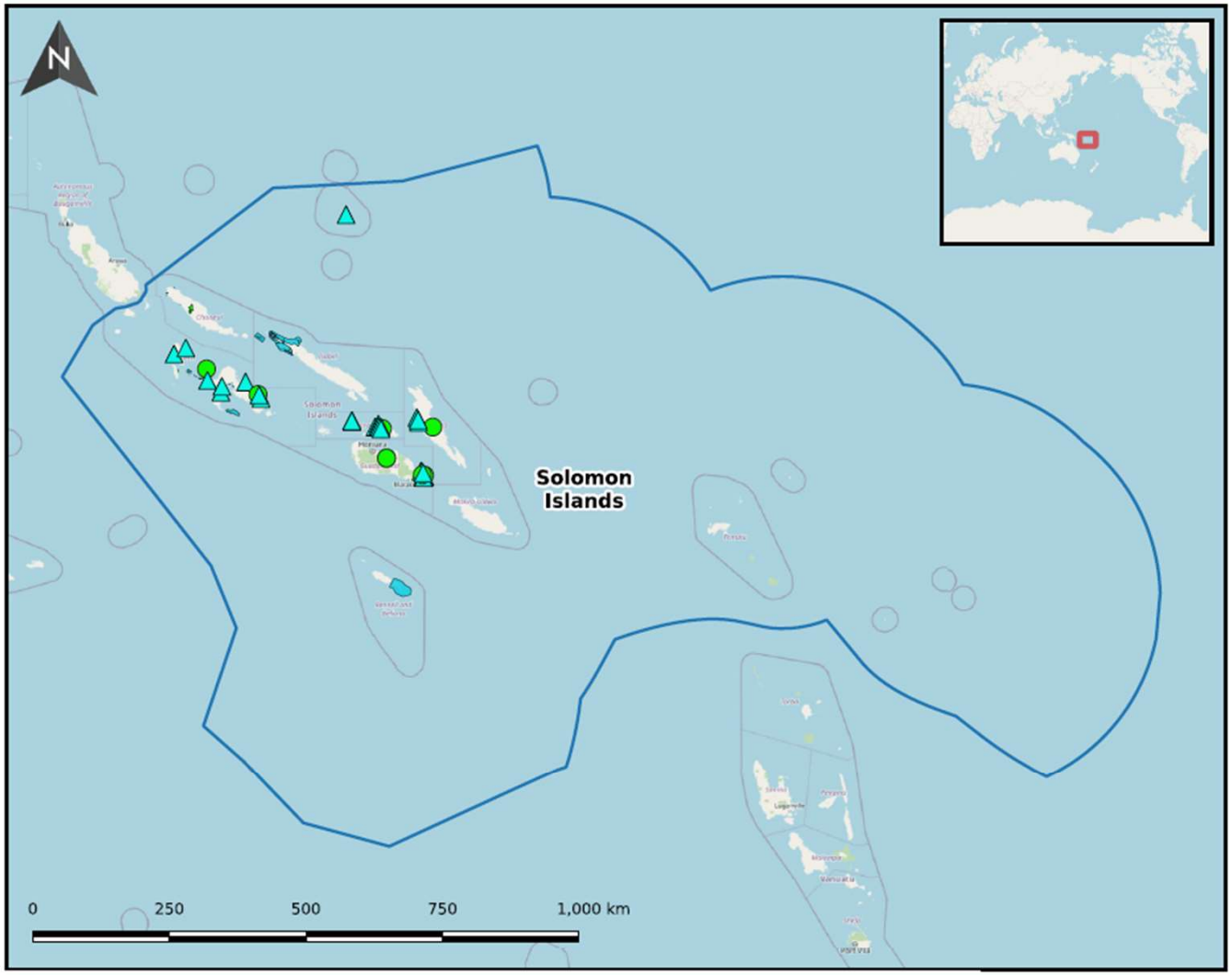
Annex 3

Other Maps





Point	Latitude	Longitude
1	-7° 26' 14"	157° 54' 54"
2	-7° 22' 40"	157° 58' 2"
3	-7° 28' 26"	158° 5' 47"
4	-7° 32' 14"	158° 2' 59"



Solomon Islands

Exclusive Economic Zone Area: 1,605,325 sq. km

Total Area Protected: 1,887 sq. km

Marine Protected Areas: 79
Designated: 35
Established: 39
Proposed: 3

Terrestrial Protected Areas: 15
Designated: 6
Established: 7
Proposed: 1

International Designations: Yes

Designated are recognized or dedicated through legal means. Established are recognized or dedicated through other effective means. Proposed is in a process to gain recognition or dedication through legal or other effective means.

- **Marine Protected Areas**
- **Terrestrial Protected Areas**
- **Marine Protected Areas**
- **Terrestrial Protected Areas**
- **Exclusive Economic Zones**

Project: Solomon Islands Protected Areas
Pacific Islands Protected Area Portal
Scale: 1:10,727,261
Date Accessed: 2024-02-29
For more information please visit:
https://pipap.sprep.org/country/sb

BIOPAMA
From Knowledge to Action for a Protected Planet

Data Disclaimer: Protected areas data was derived from the World Database on Protected Areas (WDPA) dataset (source: www.protectedplanet.net). Exclusive Economic Zone data was derived
from Flanders Marine Institute (2019). Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (200NM), version 11. Available online at http://www.marineregions.org/