

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

Prioritization workshop for Fiji

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

Location: Suva, Fiji

Date: 09 April 2024



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.

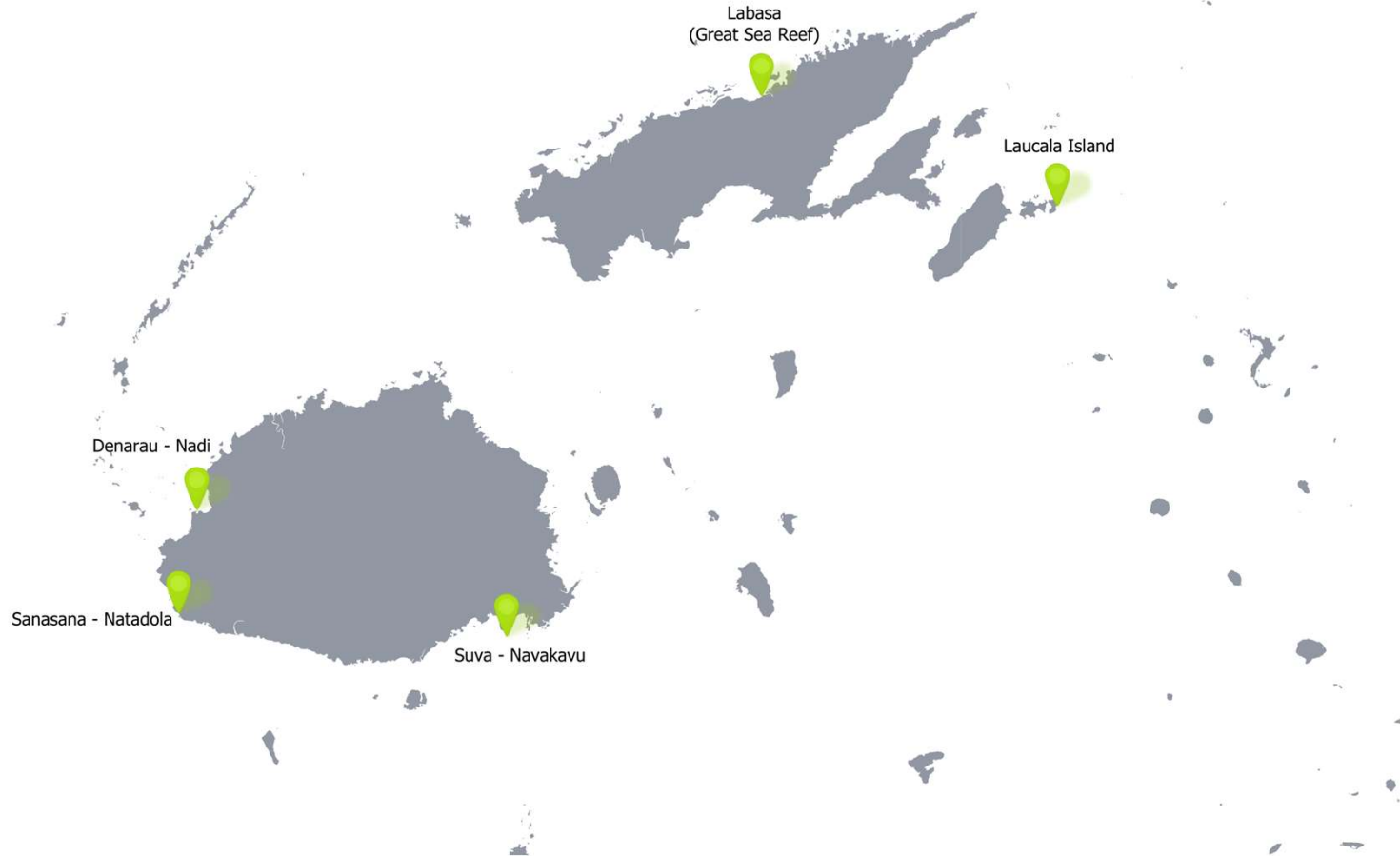


Consulting team

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

Local partner: WWF Pacific





Candidate Sites in Fiji

(based on ADB baseline studies)

Timeline

5 sites

PAST

September to November 2023

Development of **prioritization methodology & Inception report**

PAST

November 2023

Virtual kick-off meeting with regional stakeholders

PAST

November to February 2023

Prioritization assessment for 5 candidate sites including **initial climate risk assessment**

2 sites

TODAY

Agreement on 2 High Opportunity Sites in Fiji

NEXT

April to August 2024

Further investigations to assess suitability for coral reef finance and insurance for the agreed 2 High Opportunity Sites

NEXT

August 2024

Proposed Risk Financing Solutions for the agreed 2 High Opportunity Sites

1 site

NEXT

August 2024

Agree on 1 site for design of risk financing solutions and transfer mechanisms

NEXT

September/October 2024

Provide **recommendations on coral reef financing approaches**

NEXT

October to December 2024

Design the risk financing solutions and transfer mechanisms agreed

Objectives of this workshop

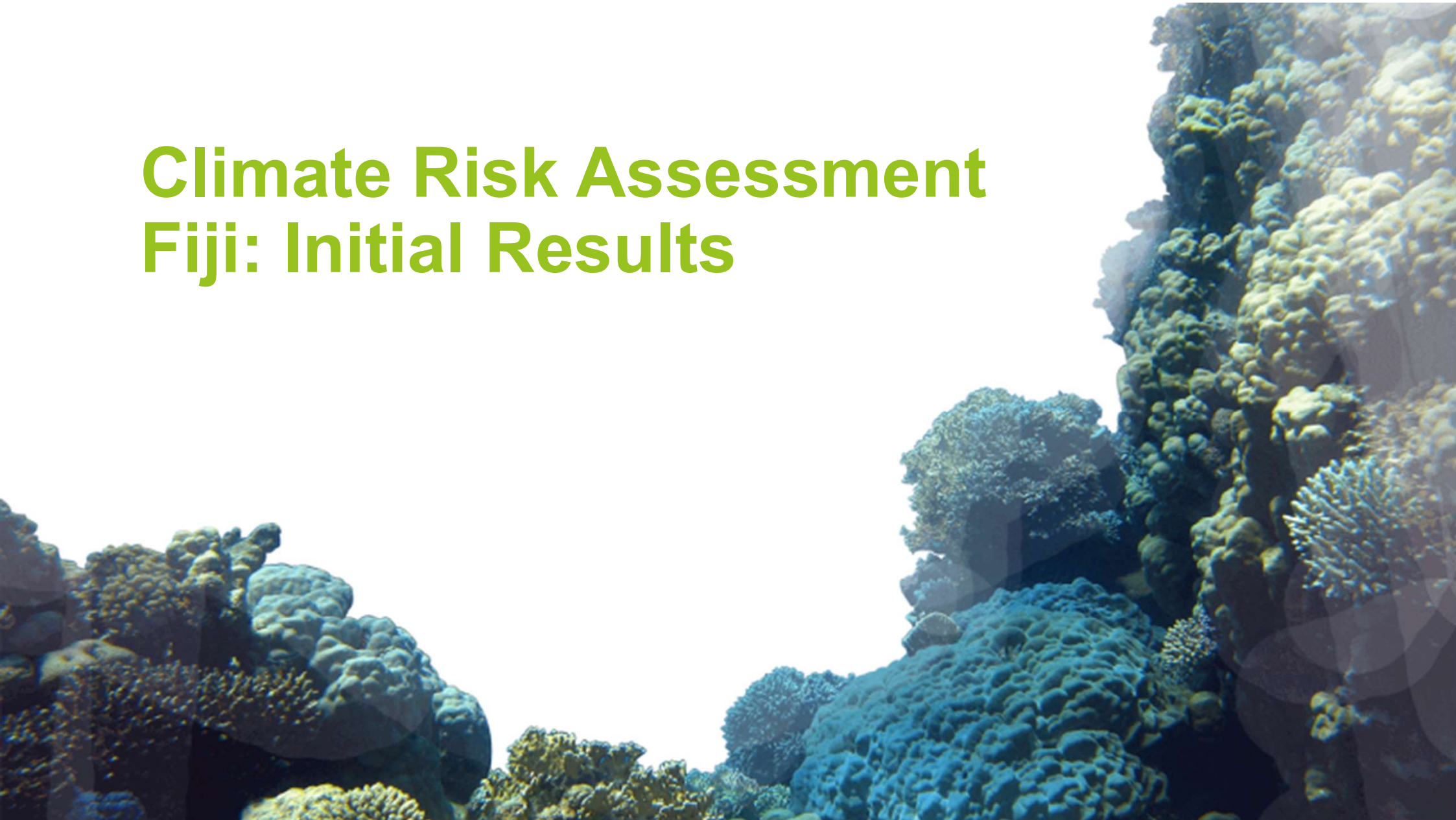


**Understand
stakeholder priorities**



**Collaboratively agree
2 High Opportunity
Sites for further
assessment**

Climate Risk Assessment Fiji: Initial Results



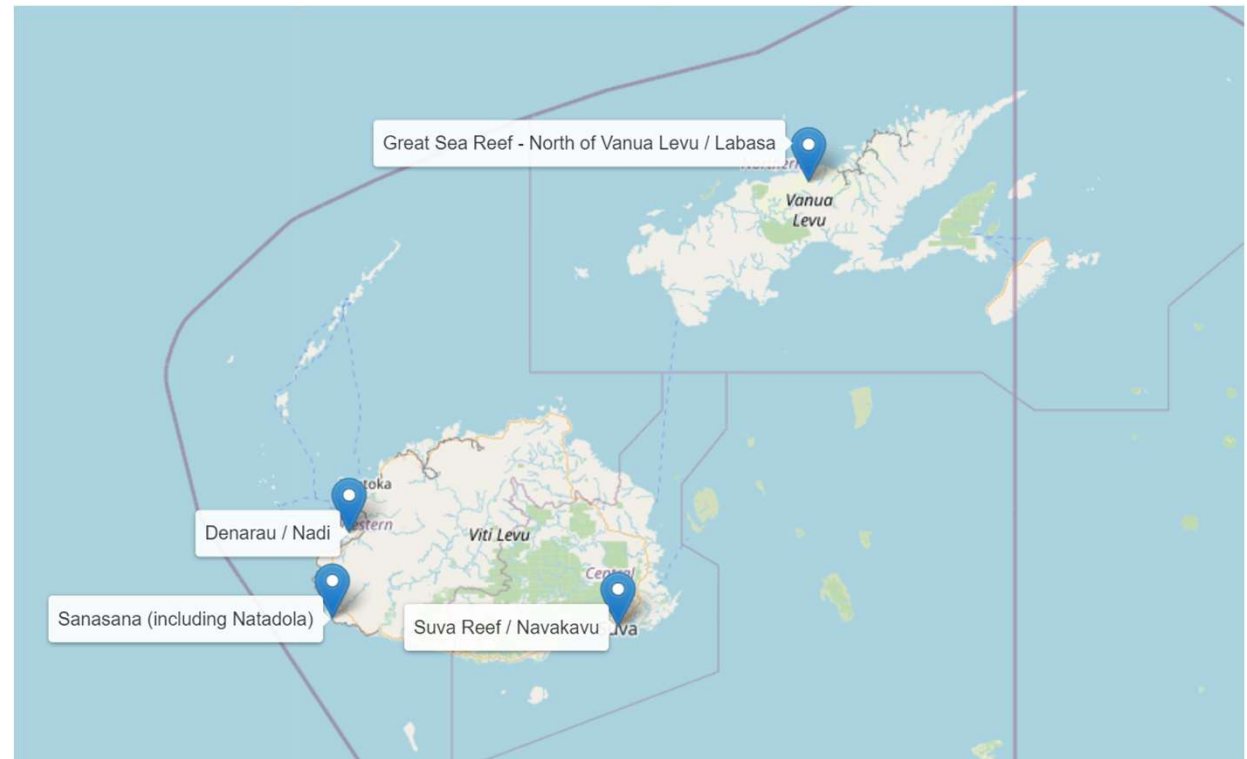
Climate Risk Assessment - Approach, methodology and considerations

Perils in scope

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

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.



Fiji – Overview of initial results

- Given the small nature of Fiji, the reef locations are located relatively close together and hence fall within the same 'medium-high' risk rating for windstorm.
- Within the nominated sites, Sanasana is in close proximity of a river, hence has the highest flooding risk within the cohort.
- Notably, the Great Sea Reef and Laucala Island sites are currently most exposed to heatwaves, a trend anticipated to persist in the future as the increase in heatwave intensity is expected to be consistent across Fiji.
- The Suva Reef and Great Sea Reef sites experience the highest levels of maximum and extreme rainfall. This pattern is evident in current observations and is also projected to continue in future climate scenarios.
- Note the level of exposure does not consider local population, reef health and/or related economic activity.

Site	Pluvial Flood	Fluvial Flood	Storm Surge	Windstorm
Suva Reef / Navakavu	Very Low	Very Low	Low	Medium High
Great Sea Reef - North of Vanua Levu / Labasa	Very Low	Very Low	Very Low	Medium High
Coral Coast / Denarau / Natadola	Very Low	Very Low	Very Low	Medium High
Laucala Island to the East of Taveuni	Very Low	Very Low	Very Low	Medium High
Sanasana (including Natadola)	Low	Low	Low	Medium High

**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

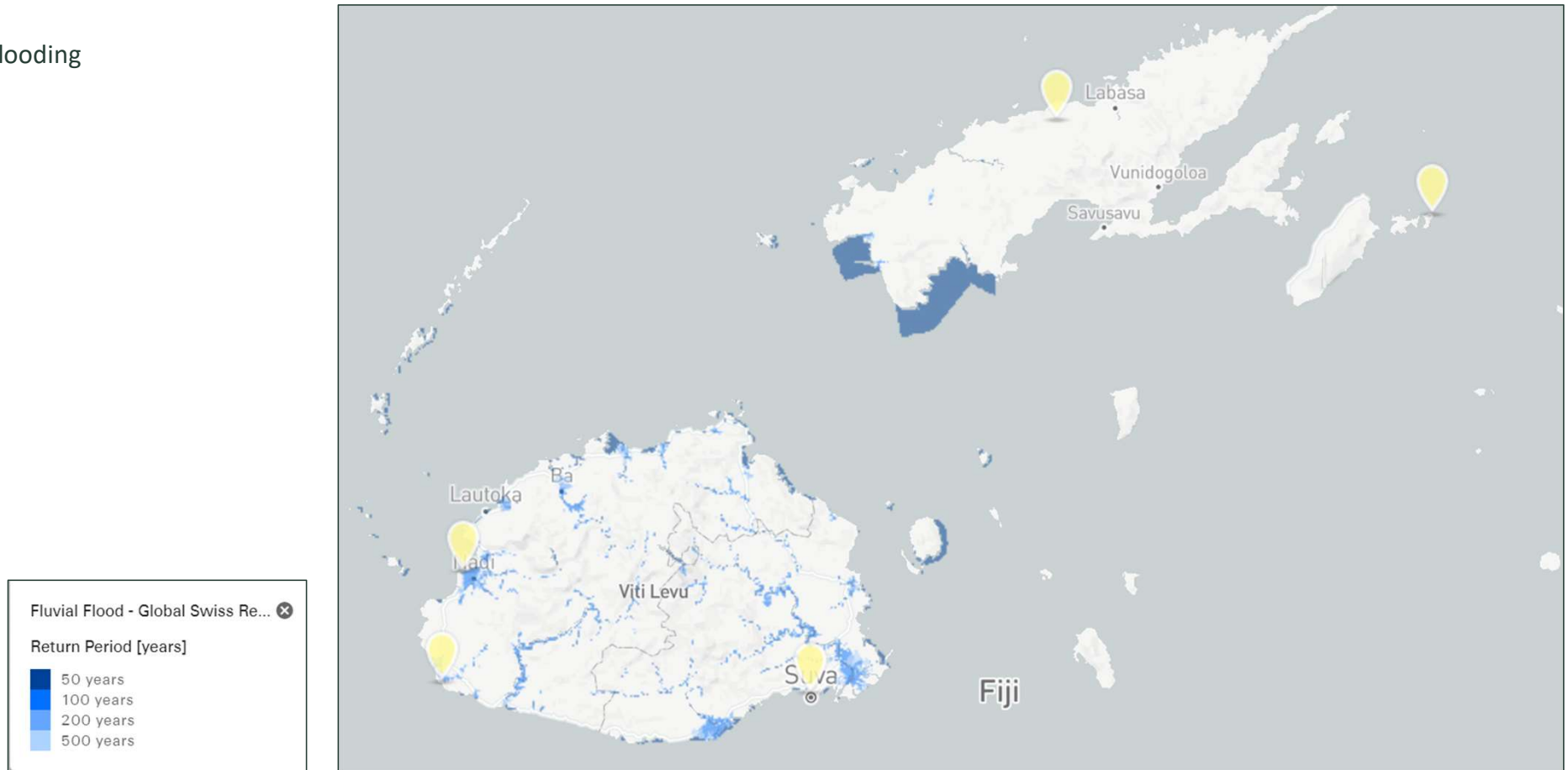
Windstorm risk

- 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



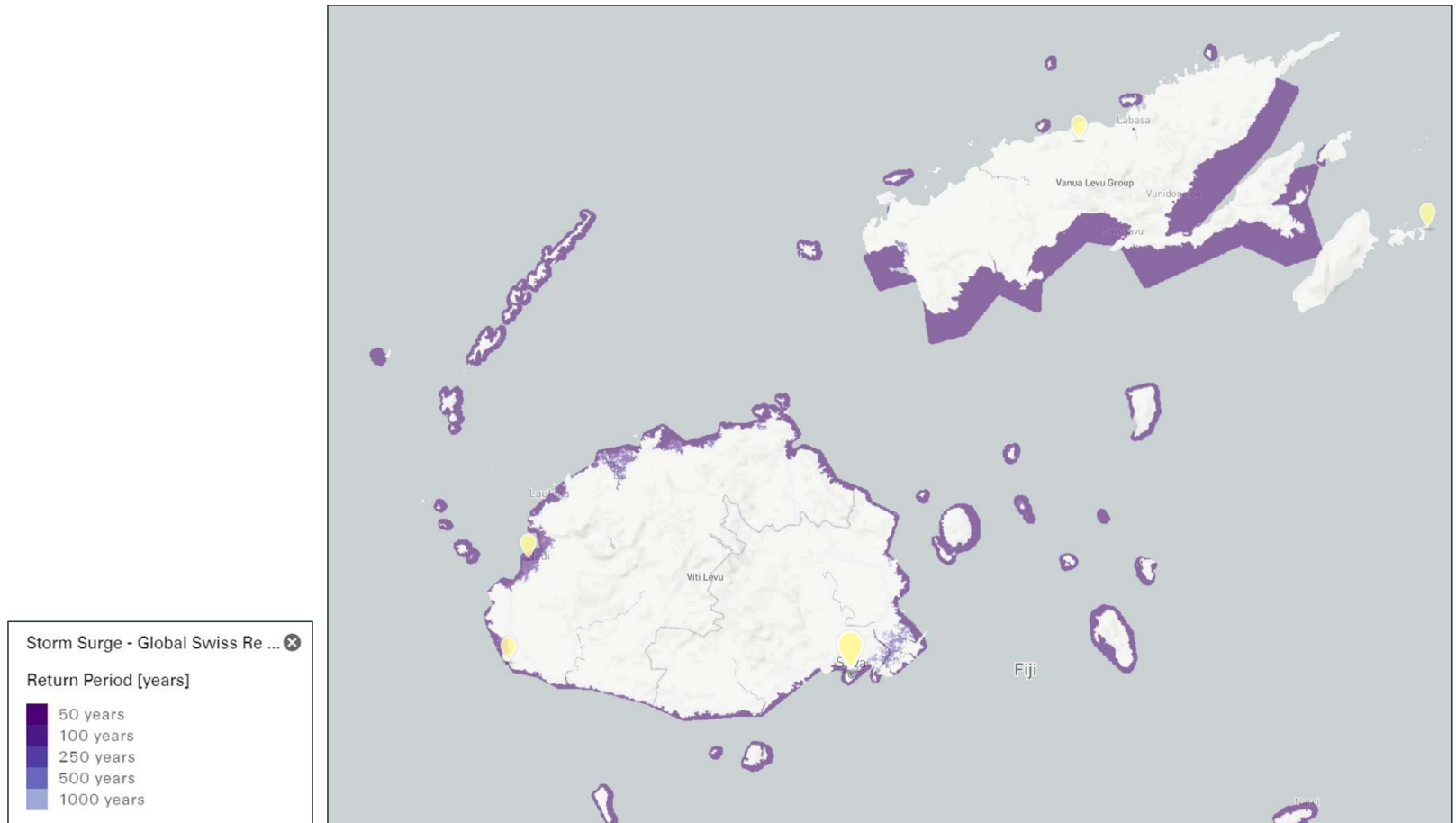
Current Risk - CatNet® Natural Hazards Assessment – Country Maps

Fluvial flooding



Current Risk - CatNet® Natural Hazards Assessment – Country Maps

Storm Surge



Future Risk - Assessment of Climate Risks Scenarios

Air Temperature	Scenario	Suva Reef / Navakavu	Great Sea Reef - North of Vanua Levu / Labasa	Denarau / Nadi	Laucala Island to the East of Taveuni	Sanasana (including Natadola)
Current mean daily air temperature (°C)		23.29	25.21	25.37	25.88	25.20
Current days above 30 degrees		70.80	224.90	229.37	283.30	212.20
Current days above 35 degrees		n/a	n/a	n/a	n/a	n/a
Change in mean temperature (°C)	SSP 1-2.6	0.66	0.73	0.71	0.71	0.67
Change in mean temperature (°C)	SSP 2-4.5	0.80	0.85	0.84	0.82	0.83
Change in mean temperature (°C)	SSP 5-8.5	0.97	1.03	1.04	1.00	0.99
95th percentile temperature change (°C)	SSP 1-2.6	3.18	1.42	2.09	1.71	3.59
95th percentile temperature change (°C)	SSP 2-4.5	2.42	0.98	1.39	1.00	2.91
95th percentile temperature change (°C)	SSP 5-8.5	2.60	0.88	1.21	0.85	2.88
99th percentile temperature change (°C)	SSP 1-2.6	3.21	2.69	2.72	2.93	3.18
99th percentile temperature change (°C)	SSP 2-4.5	2.12	1.84	2.18	1.93	2.14
99th percentile temperature change (°C)	SSP 5-8.5	3.04	2.16	2.32	2.10	3.43

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

n/a = data not available

Future Risk - Assessment of Climate Risks Scenarios

Heatwave	Scenario	Suva Reef / Navakavu	Great Sea Reef - North of Vanua Levu / Labasa	Denarau / Nadi	Laucala Island to the East of Taveuni	Sanasana (including Natadola)
Current heatwave duration		11.27	46.07	23.37	43.18	20.03
Current heatwave frequency		1.90	2.47	1.21	2.59	3.23
95th percentile change in heat wave frequency	SSP 1-2.6	3.87	1.73	2.55	2.08	4.37
95th percentile change in heat wave frequency	SSP 2-4.5	2.93	1.19	1.70	1.21	3.53
95th percentile change in heat wave frequency	SSP 5-8.5	3.17	1.07	1.48	1.03	3.50
99th percentile change in heat wave frequency	SSP 1-2.6	3.90	3.27	3.32	3.56	3.87
99th percentile change in heat wave frequency	SSP 2-4.5	2.57	2.24	2.65	2.35	2.60
99th percentile change in heat wave frequency	SSP 5-8.5	3.70	2.63	2.83	2.55	4.17

Future Risk - Assessment of Climate Risks Scenarios

Windstorm	Scenario	Suva Reef / Navakavu	Great Sea Reef - North of Vanua Levu / Labasa	Denarau / Nadi	Laucala Island to the East of Taveuni	Sanasana (including Natadola)
Mean extreme windspeed today (m/s)		3.58	5.17	6.49	9.46	7.35
Change in extreme wind (m/s)	SSP 1-2.6	0.06	0.07	0.06	0.11	0.06
Change in extreme wind (m/s)	SSP 2-4.5	0.13	0.13	0.12	0.17	0.12
Change in extreme wind (m/s)	SSP 5-8.5	0.08	0.09	0.09	0.13	0.09
Mean extreme windspeed today (m/s)		3.58	5.17	6.49	9.46	7.35
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Future Risk - Assessment of Climate Risks Scenarios

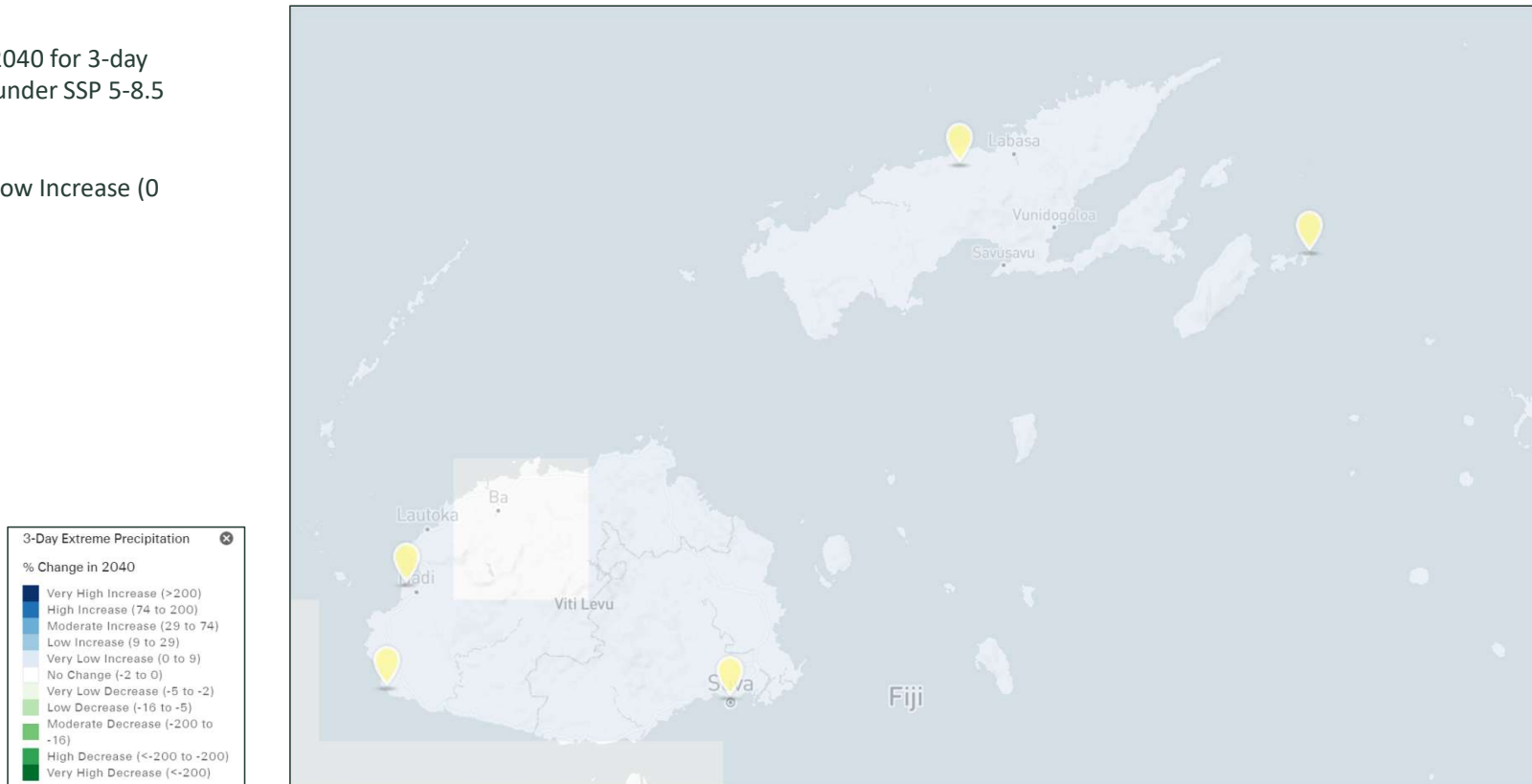
Precipitation	Scenario	Suva Reef / Navakavu	Great Sea Reef - North of Vanua Levu / Labasa	Denarau / Nadi	Laucala Island to the East of Taveuni	Sanasana (including Natadola)
Max monthly precipitation (mm)		361.71	329.15	268.63	268.74	250.45
Extreme precipitation (mm)		19.35	14.82	11.39	13.90	11.66
Change in extreme precipitation frequency (%)	SSP 1-2.6	7.97	3.84	1.75	2.57	8.46
Change in extreme precipitation frequency (%)	SSP 2-4.5	-5.43	3.03	0.55	2.99	-7.32
Change in extreme precipitation frequency (%)	SSP 5-8.5	5.44	4.06	1.44	4.10	5.48

Future Risk - Assessment of Climate Risks Scenarios

Precipitation

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

Models project a very low Increase (0 to 9 mm)

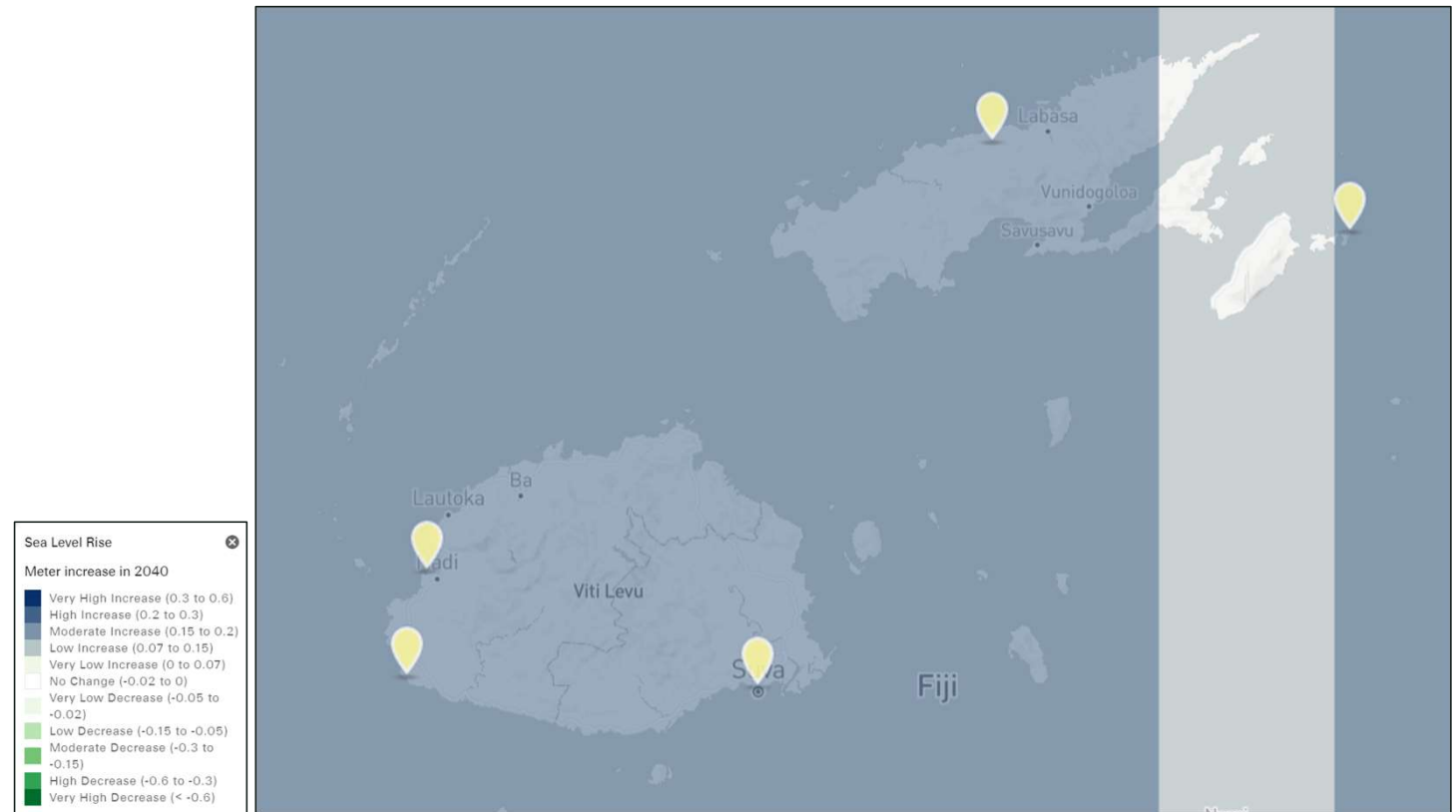


Future Risk - Assessment of Climate Risks Scenarios

Sea Level Rise

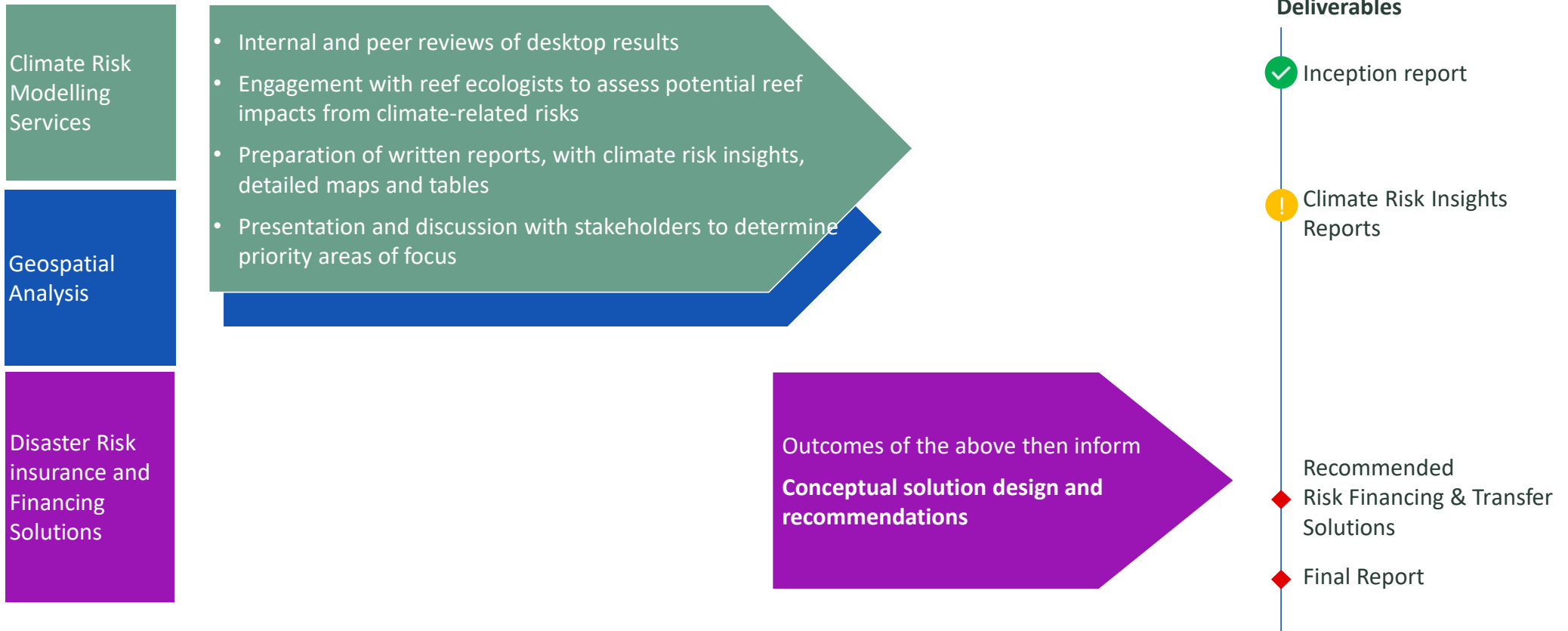
Sea level rise at 2040 under scenario SSP 5-8.5

Models project a high increase of 0.2 to 0.3 meters



^ Banding on the graphic is due to data visualisation issue, sea level models project constant prediction across entirety of Fiji.

Next Steps



Prioritization assessment



Prioritization approach

- Aim to select 2 'High Opportunity' sites from 5 'Candidate' sites
- Transparent and scientific evidence-based approach to help inform decision making
- Four categories evaluated: Risks, Corals, Socio-economic values and Governance

14 criteria scored

Each scored out of 5 (1 = worst, 5 = best)

Evidence/data from: Swiss Re, databases, ADB baseline report and Fiji based team

Each criteria also weighted

Weightings vary between 5 and 10 per criteria

Based on consulting team judgement
Total weighting 100

TODAY

**Stakeholders to provide feedback
on the ranking – to select 2 sites**

Prioritization criteria

Risks			Corals			Socio-economics					Governance		
Current flooding	Current wind	Human disturbances	Extent of corals	Bio-diversity value	Condition of coral	Coastal protection value	Local population in area	General tourism value	Diving/snorkelling value	Fisheries value	Stakeholder/Gov support for a scheme	Organisations set up to implement it	Protected area/coastal management status
Hazard from flooding (storm surges, fluvial & pluvial)	Hazard from wind and cyclones	Threats from: fishing, coastal development, on-shore & marine pollution - Plus maritime traffic.	Size of coral area	Diversity, abundance, iconic species & rarity of organisms	Degree that corals are in good condition (e.g. live coral cover %)	Relative value of shoreline protection provided by corals	Number of people living in the area - cities and coastal communities	Extent of hotels & restaurants - and overall value of tourism	Importance (extent) of diving and snorkelling in the vicinity	Importance of commercial and subsistence fisheries in the vicinity	Degree of stakeholder & government support for coral insurance at the site	Extent to which organisations at the site may be interested in supporting its implementation	Extent to which protected areas or coastal management is in place
Swiss Re		Databases	Databases + national consultants								Your feedback today	National consultants	Database + national consultants

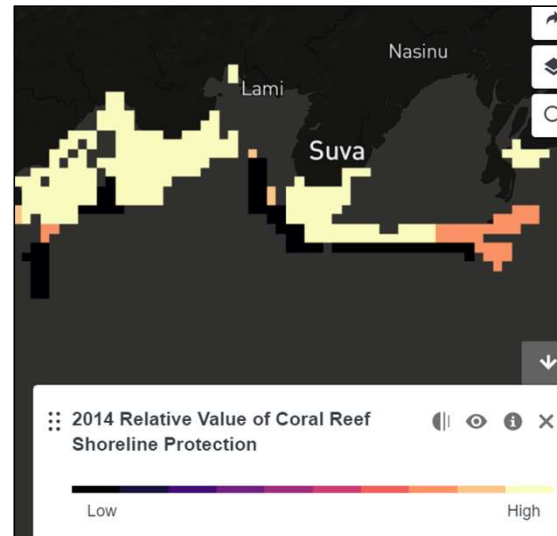
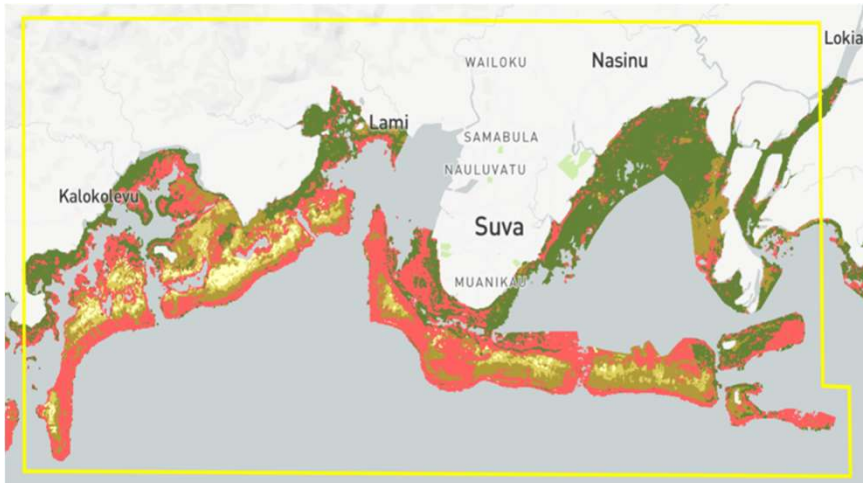
Weightings:

5	5	10	5	5	5	10	5	10	10	10	?	10	10
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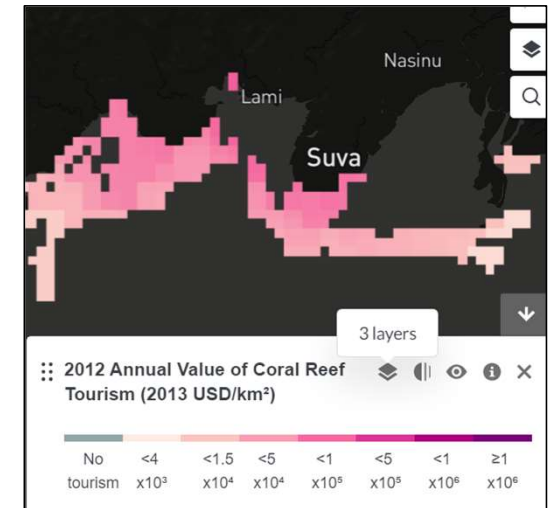


Suva - Navakavu

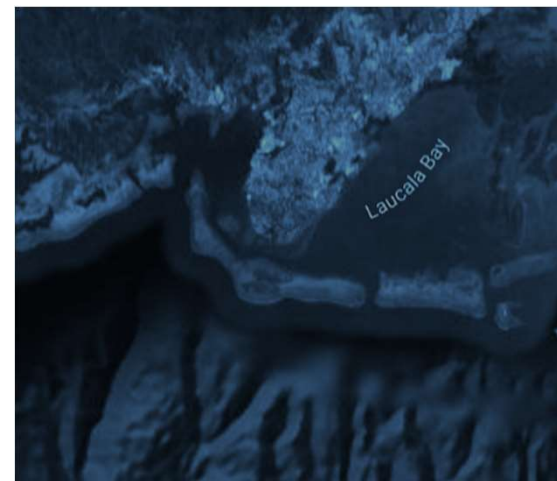
Suva - Navukavu



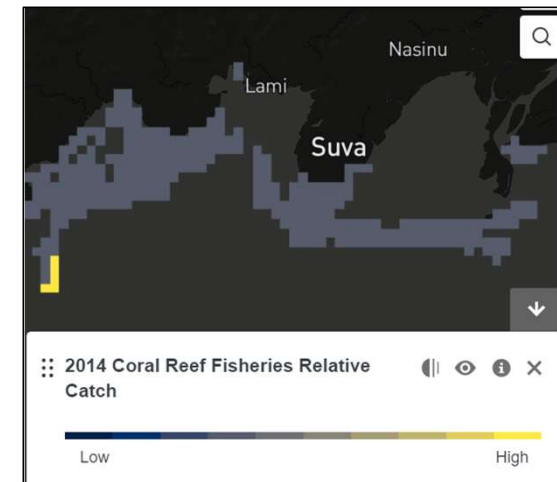
Coast protection value



Tourism value



Diving value



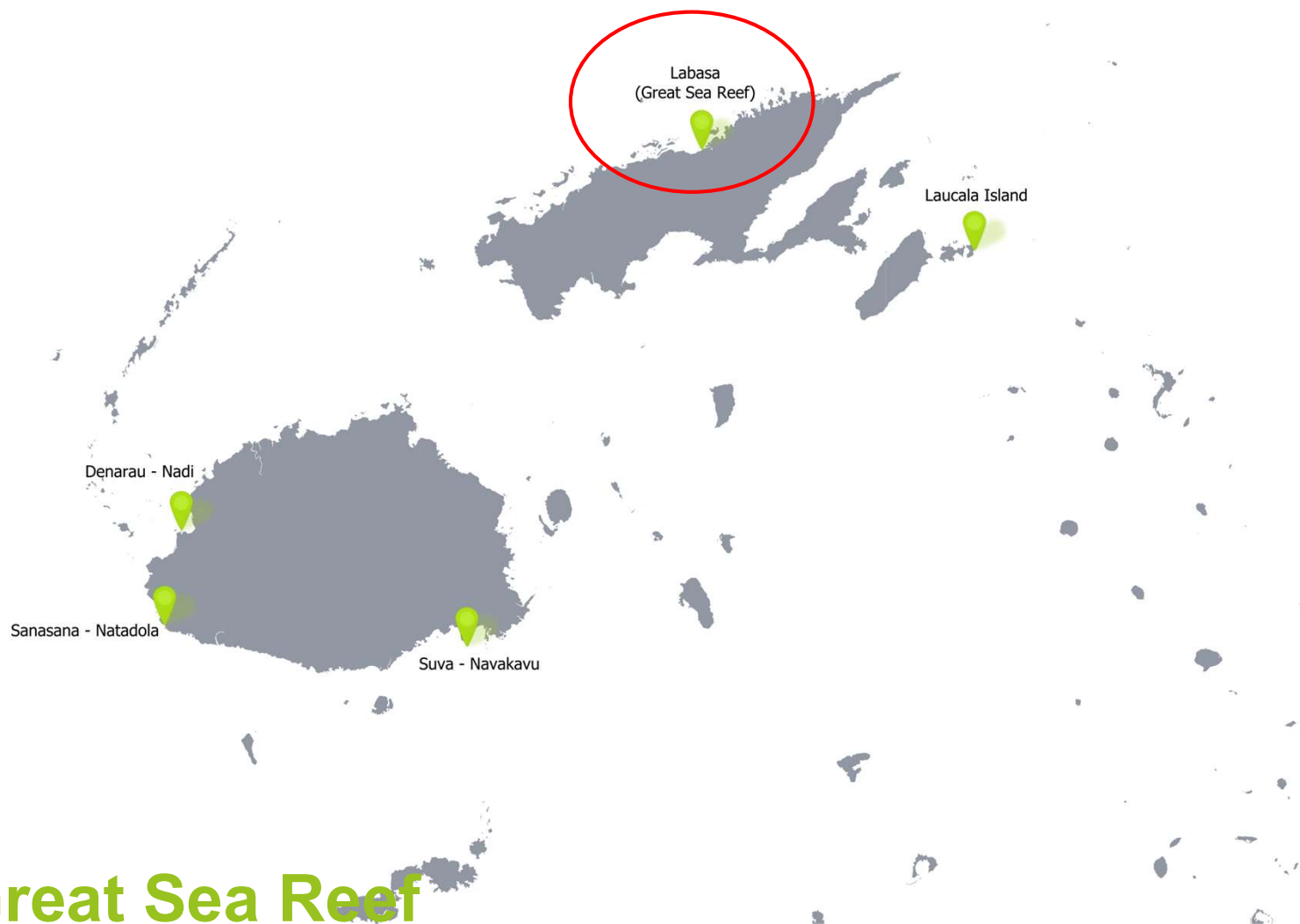
Fisheries value

Suva - Navakavu

Site	Ranking	Un-weighted total score	Risks			Corals			Socio-economics					Governance		
			Current flooding	Current wind	Human disturbances	Extent of corals	Biodiversity value	Condition of coral	Coastal protection value	Local population in area	General tourism value	Diving/snorkelling value	Fisheries value	Stakeholder/Gov support for a scheme	Organisations set up to implement it	Protected area/coastal management status
Suva Reef / Navakavu	1	41.6	3.0	4.0	5.0	2.5	2.0	2.0	5.0	5.0	2.3	1.3	3.0		4.0	2.5

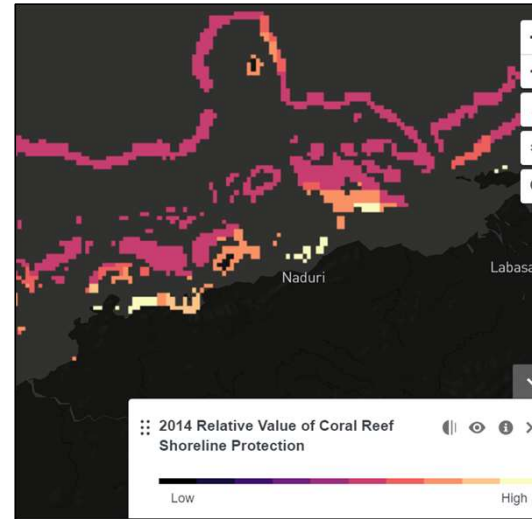
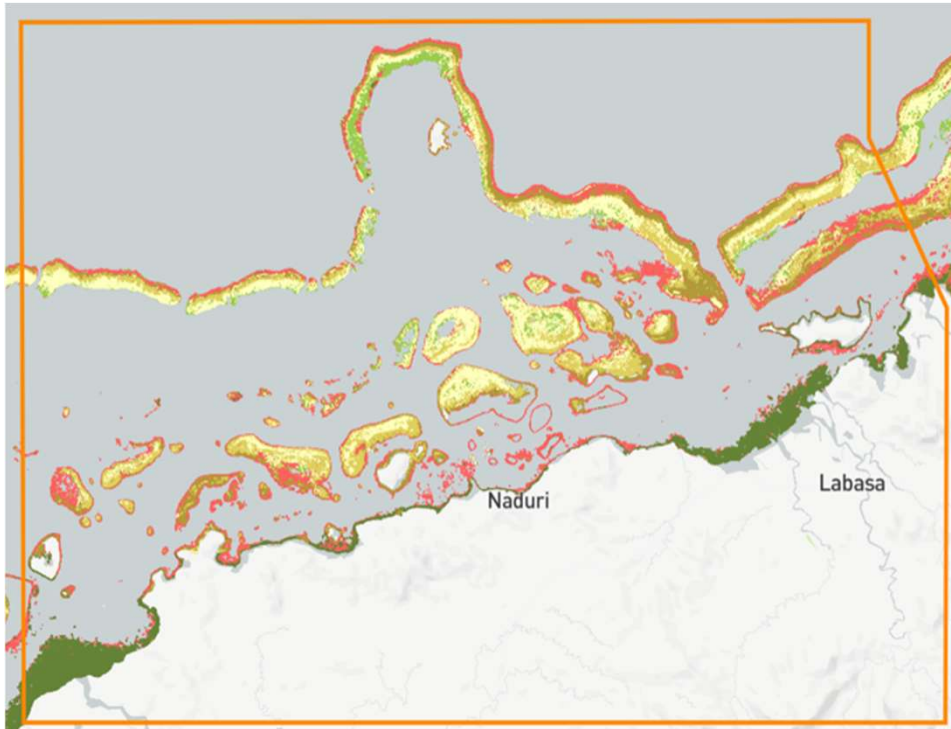
Consultant team weighting			5	5	10	5	5	5	10	5	10	10	10	0	10	10
			20		15		45			20						

Site	Ranking	Weighted total score	Risks			Corals			Socio-economics					Governance		
			Current flooding	Current wind	Human disturbances	Extent of corals	Bio-diversity value	Condition of coral	Coastal protection value	Local population in area	Tourism value	Diving/snorkelling value	Fisheries value	Stakeholder/Gov support for a scheme	Organisations set up to implement it	Protected area/coastal management status
Suva Reef / Navakavu	1	324	15	20	50	13	10	10	50	25	23	13	30		40	25

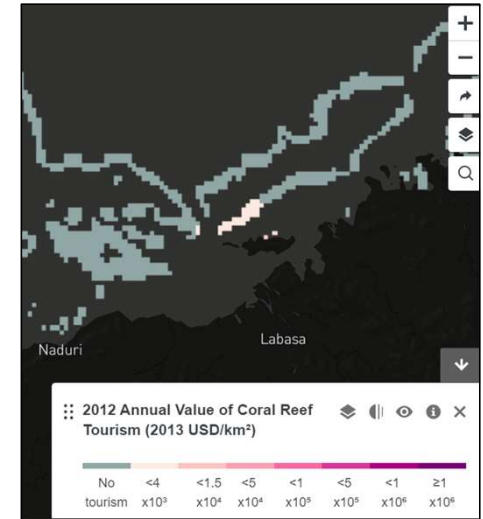


Labasa – Great Sea Reef

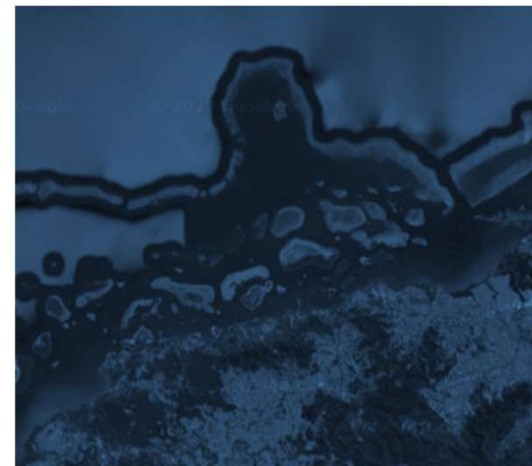
Labasa – Great Sea Reef



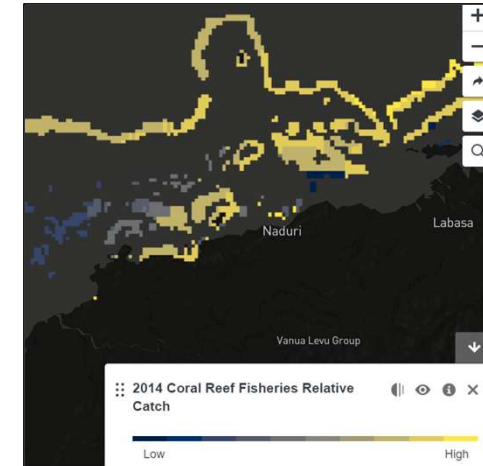
Coast protection value



Tourism value



Diving value



Fisheries value

Labasa – Great Sea Reef

Site	Ranking	Un-weighted total score	Risks			Corals			Socio-economics					Governance		
			Current flooding	Current wind	Human disturbances	Extent of corals	Biodiversity value	Condition of coral	Coastal protection value	Local population in area	General tourism value	Diving/snorkelling value	Fisheries value	Stakeholder/Gov support for a scheme	Organisations set up to implement it	Protected area/coastal management status
Labasa (Great Sea Reef)	3	39.8	1.0	4.0	3.0	4.5	4.0	4.0	3.5	2.5	0.8	1.0	4.0		4.0	3.5

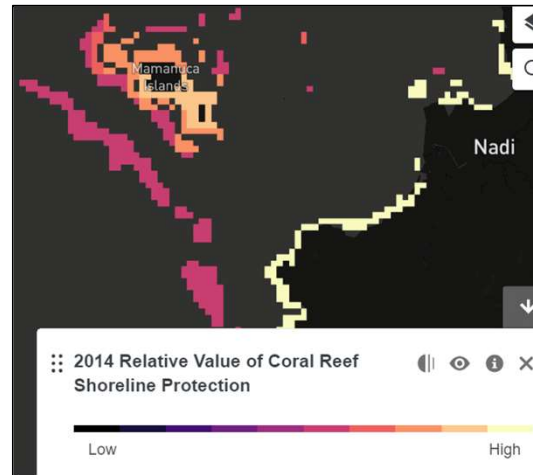
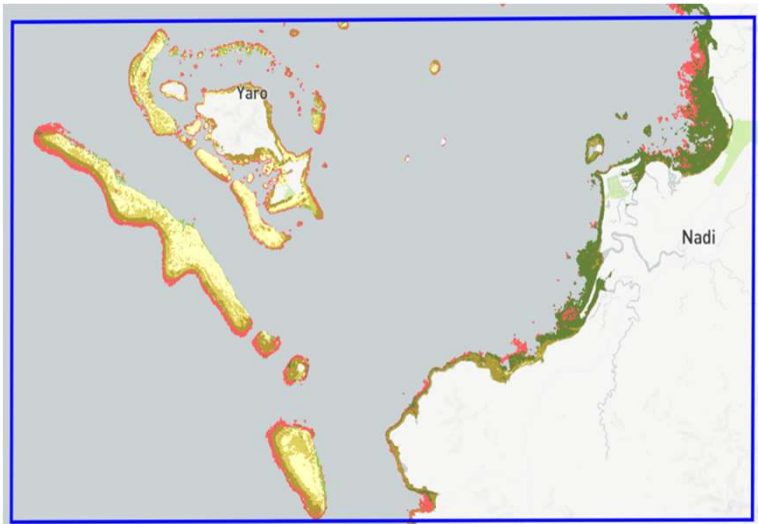
Consultant team weighting			5	5	10	5	5	5	10	5	10	10	10	0	10	10
			20		15			45			20					

Site	Ranking	Weighted total score	Risks			Corals			Socio-economics					Governance		
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Labasa (Great Sea Reef)	3	298	5	20	30	23	20	20	35	13	8	10	40		40	35

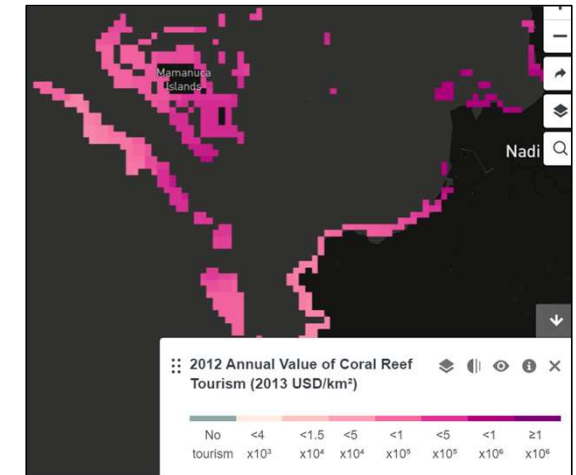


Denarau – Nadi

Denarau – Nadi



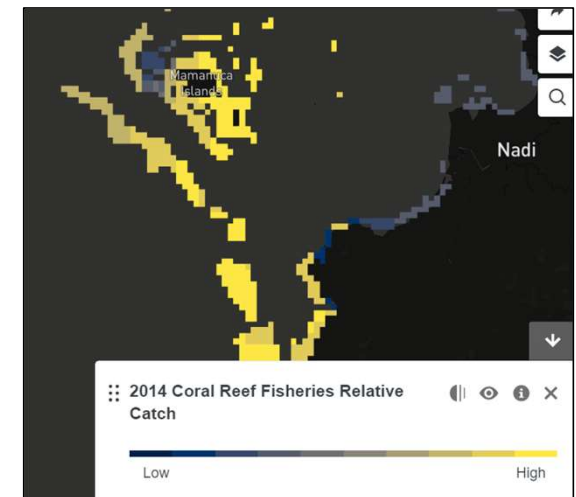
Coast protection value



Tourism value



Diving value



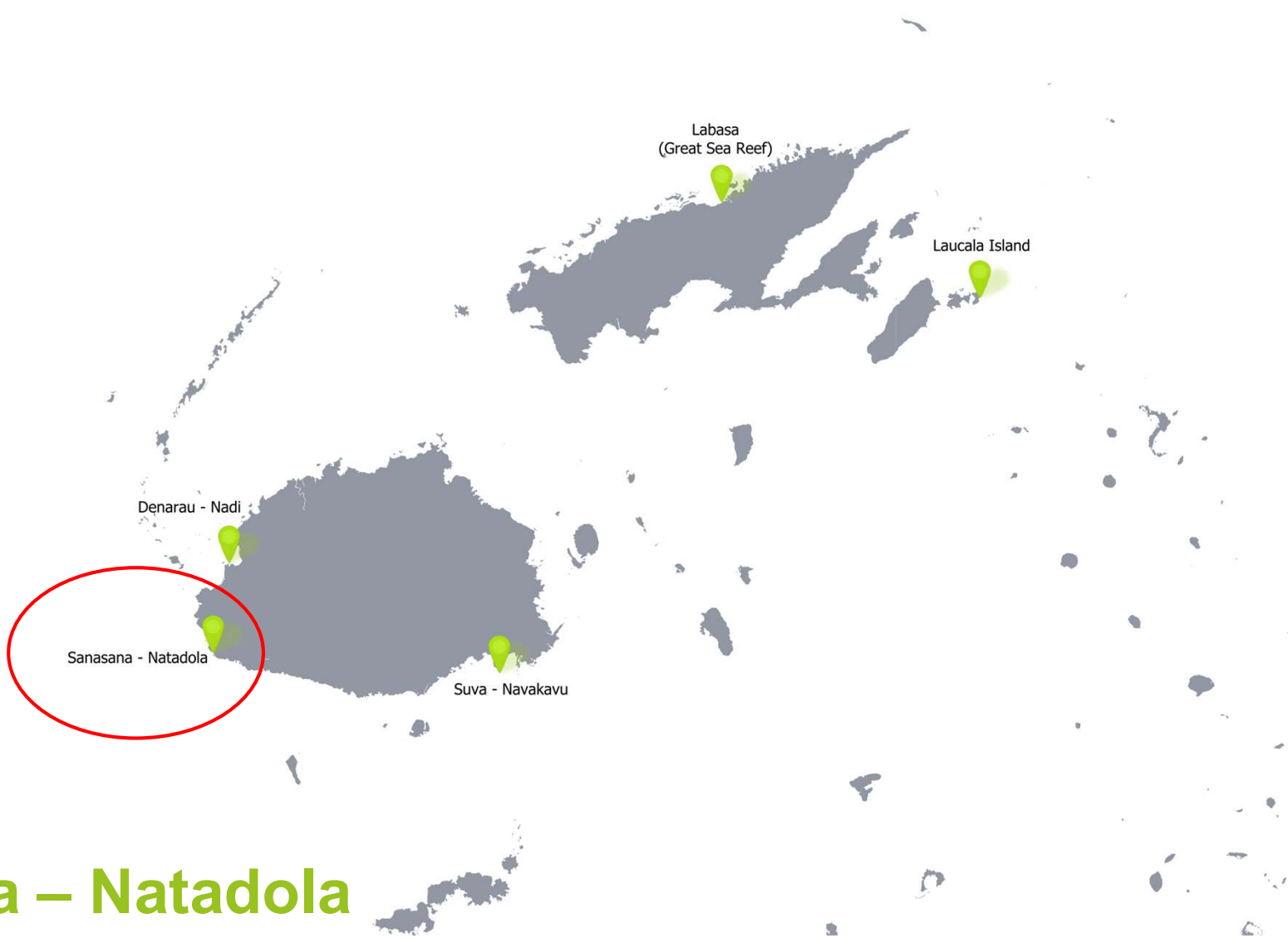
Fisheries value

Denarau – Nadi

Site	Ranking	Un-weighted total score	Risks			Corals			Socio-economics					Governance		
			Current flooding	Current wind	Human disturbances	Extent of corals	Biodiversity value	Condition of coral	Coastal protection value	Local population in area	General tourism value	Diving/snorkelling value	Fisheries value	Stakeholder/Gov support for a scheme	Organisations set up to implement it	Protected area/coastal management status
Denarau / Nadi (incl Mamanuca islands)	2	41.0	4.0	4.0	4.5	2.0	2.0	2.0	2.0	3.5	4.2	4.3	3.0		3.0	2.5

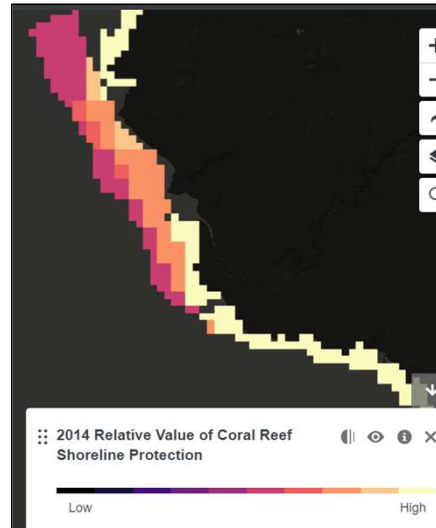
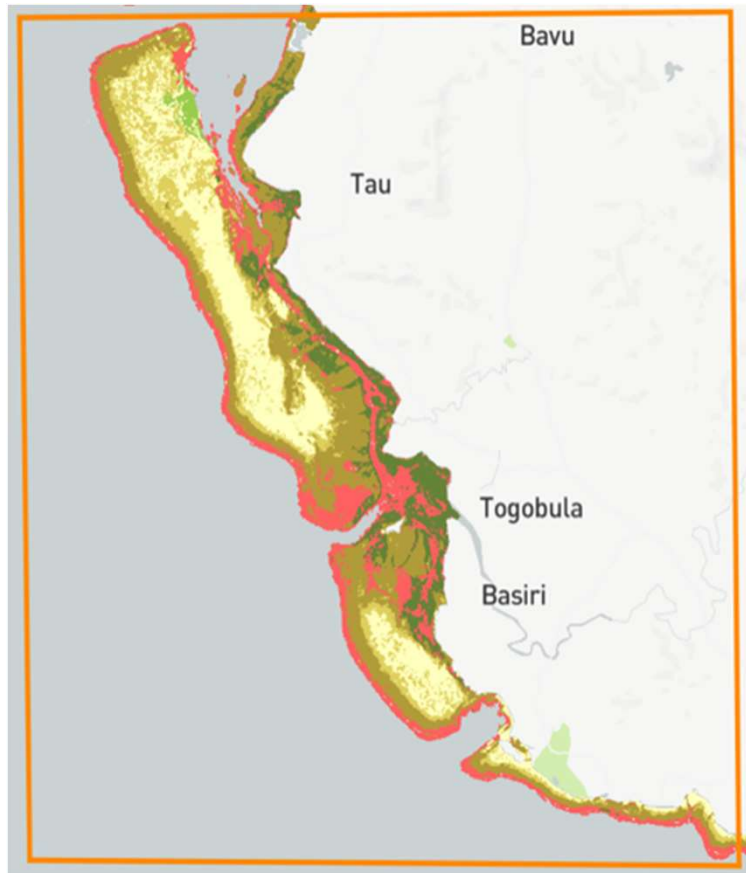
Consultant team weighting			5	5	10	5	5	5	10	5	10	10	10	0	10	10
			20			15			45					20		

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Denarau / Nadi (incl Mamanuca islands)	2	323	20	20	45	10	10	10	20	18	42	43	30		30	25

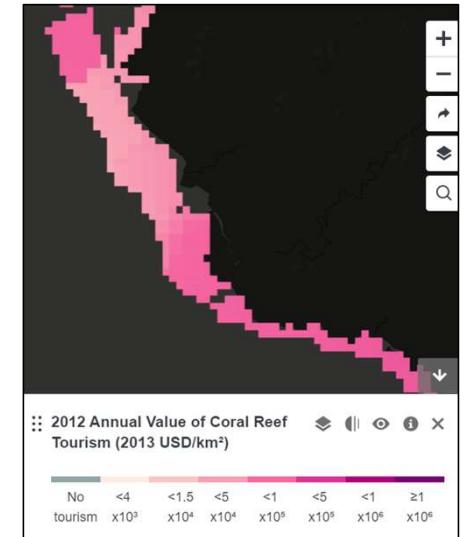


Sanasana – Natadola

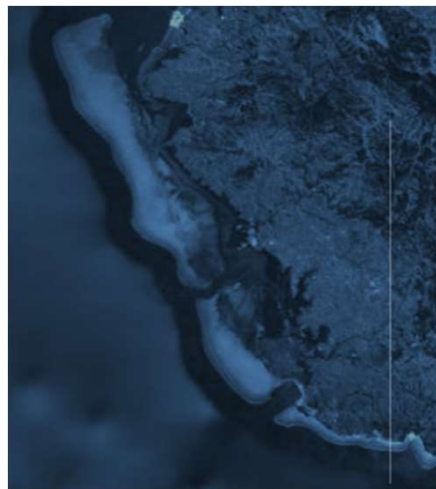
Sanasana - Natadola



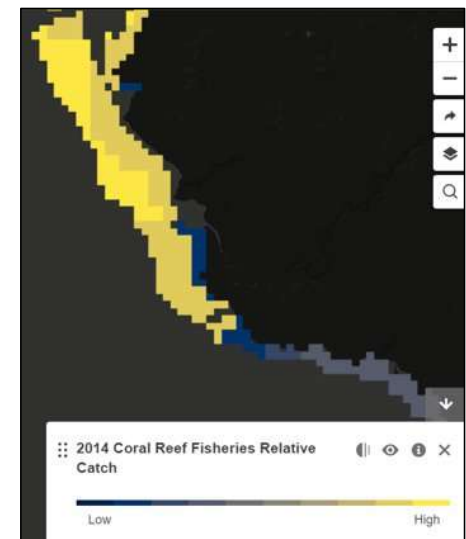
Coast protection value



Tourism value



Diving value



Fisheries value

Sanasana – Natadola

Site	Ranking	Un-weighted total score	Risks			Corals			Socio-economics					Governance		
			Current flooding	Current wind	Human disturbances	Extent of corals	Biodiversity value	Condition of coral	Coastal protection value	Local population in area	General tourism value	Diving/snorkelling value	Fisheries value	Stakeholder/ Gov support for a scheme	Organisations set up to implement it	Protected area/coastal management status
Sanasana / Natadola	4	38.5	3.0	4.0	4.5	2.0	2.0	4.0	4.0	2.5	2.7	2.0	2.8		3.0	2.0

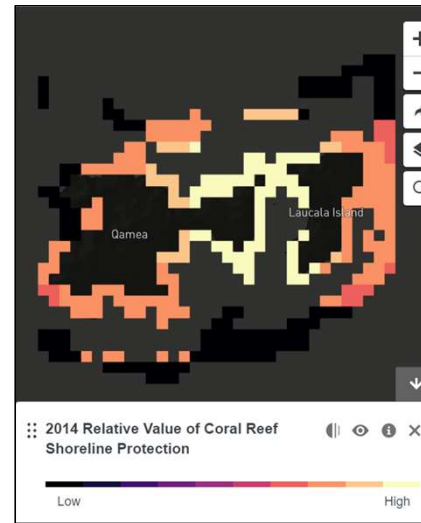
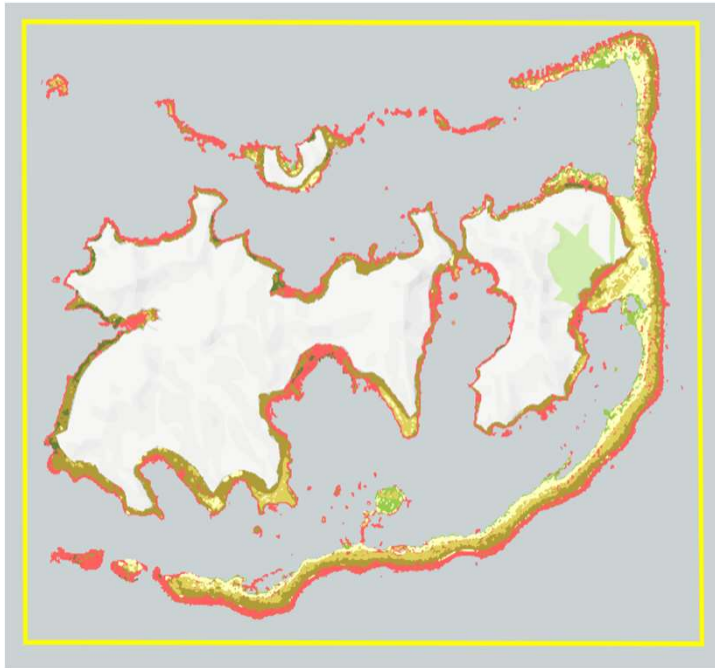
Consultant team weighting			5	5	10	5	5	5	10	5	10	10	10	0	10	10
			20		15			45			20					

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Sanasana / Natadola	4	298	15	20	45	10	10	20	40	13	27	20	28		30	20

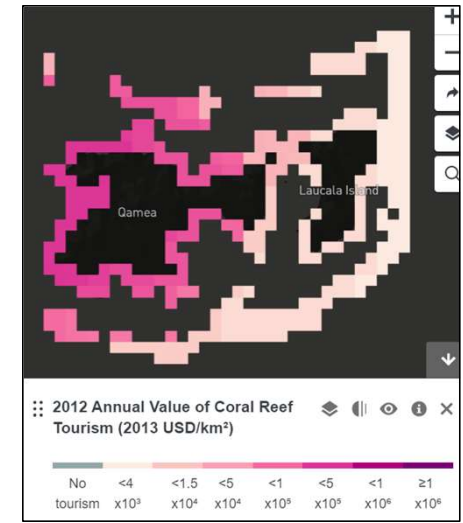


Laucala Island

Laucala Island



Coast protection value



Tourism value



Diving value



Fisheries value

Laucala Island

Site	Ranking	Un-weighted total score	Risks			Corals			Socio-economics					Governance		
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Laucala-Taveuni islands	5	32.2	1.0	4.0	2.0	1.5	4.0	4.0	3.5	1.0	2.7	2.0	1.5		3.0	2.0

Consultant team weighting			5	5	10	5	5	5	10	5	10	10	10	0	10	10
			20		15		45			20						

Site	Ranking	Weighted total score	Risks			Corals			Socio-economics					Governance		
			Current flooding	Current wind	Human disturbances	Extent of corals	Bio-diversity value	Condition of coral	Coastal protection value	Local population in area	Tourism value	Diving/snorkelling value	Fisheries value	Stake-holder/ Gov support for a scheme	Organisations set up to implement it	Protected area/coastal management status
Laucala-Taveuni islands	5	245	5	20	20	8	20	20	35	5	27	20	15		30	20

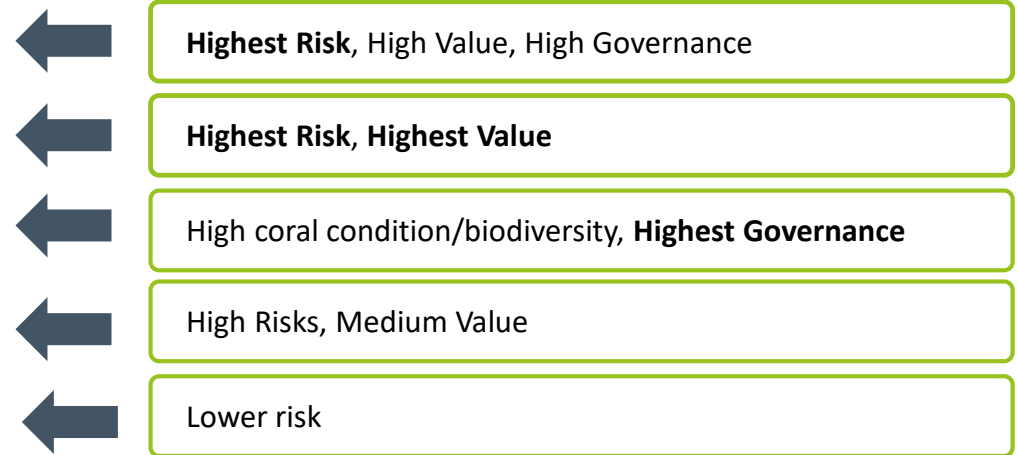
Weighted scores

Site	Ranking	Weighted total score	Risks			Corals			Socio-economics					Governance		
			Current flooding	Current wind	Human disturbances	Extent of corals	Bio-diversity value	Condition of coral	Coastal protection value	Local population in area	Tourism value	Diving/snorkelling value	Fisheries value	Stake-holder/Gov support for a scheme	Organisations set up to implement it	Protected area/coastal management status
Suva Reef / Navakavu	1	314	5	20	50	13	10	10	50	25	23	13	30		40	25
Sanasana / Natadola	4	293	10	20	45	10	10	20	40	13	27	20	28		30	20
Denarau / Nadi (incl Mamanuca islands)	2	308	5	20	45	10	10	10	20	18	42	43	30		30	25
Labasa (Great Sea Reef)	3	298	5	20	30	23	20	20	35	13	8	10	40		40	35
Laucala-Taveuni islands	5	245	5	20	20	8	20	20	35	5	27	20	15		30	20

= high criteria scores

Prioritization results

Candidate site	Ranking	Weighted total score
Suva Reef / Navakavu	1	314
Denarau/ Nadi (incl Mamanuca Islands)	2	308
Labasa (Great Sea Reef)	3	298
Sanasana / Natadola	4	293
Laucala – Taveuni Islands	5	245



Questions



Discussion on site selection



Thank you

