BLUE PROSPERITY FIJI

Ocean Use Survey Pilot Report

Vanua Navakavu, Rewa Province

May 2025

FIJI GOVERNMENT

VAITT INSTITUTE

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Figure 1: Fishers Cleaning Sea Urchins, Waiqanake, June 2024, photo © Ian Chute

1 ACRONYMS

BPC	Blue Prosperity Coalition
BPF	Blue Prosperity Fiji
EMLAB	Environmental Markets Lab, UCSB
EEZ	Exclusive Economic Zone
GOF	Government of Fiji
IAS	Institute of Applied Sciences, USP
LMMA	Locally Marine Managed Areas
MECC	Ministry of Environment & Climate Change
MOFF	Ministry of Fisheries & Forestry
MTA	Ministry of iTaukei Affairs
NROC	National Resource Owners Council
UCSB	University of California, Santa Barbara
USP	University of the South Pacific
OUS	Ocean Use Survey

2 ACKNOWLEDGEMENTS

The pilot Blue Prosperity Fiji Ocean Use Survey would not have been possible without the guidance and participation of the communities of Vanua Navakavu and the Rewa Provincial Council and the leadership of the Government of Fiji, including the Ministries of iTaukei Affairs, Fisheries, and Environment and Climate Change. This report was written by Brooke Dixon (Waitt Institute), Lekima Copeland (Blue Prosperity Fiji), and Peter Menzies (SeaSketch).

PROGRAMME PARTNERS

Ministry of iTaukei Affairs

The Ministry of iTaukei Affairs (MTA) leads the development, implementation, and monitoring of government programmes focused on the governance and wellbeing of the iTaukei people. It serves as a crucial link between Government, iTaukei institutions, and provincial administrations. The Ministry is the official custodian of records on iTaukei land, fishing grounds (i *Qoliqoli*), chiefly and traditional titles, and cultural heritage.

FIJI GOVERNMENT

Ministry of Fisheries

The Ministry of Fisheries leads Fiji's national efforts to sustainably manage marine resources, ensuring a whole-of-nation approach to fisheries governance. The Ministry remains committed to a sustainable blue economy and incorporation of climate resilience and practical adaptation solutions to benefit fisheries businesses, the broader sector, and communities.

Ministry of Environment

The Ministry of Environment is dedicated to promoting the sustainable use and development of Fiji's natural resources. Guided by the vision of a safe, healthy, and sustainable environment for all, the Ministry implements policies, legislation, and programmes that safeguard Fiji's environmental assets while fulfilling national obligations under regional and international agreements.

Waitt Institute

The Waitt Institute is a non-profit that partners with committed governments and local communities to create and implement sustainable ocean plans to benefit people, the economy, and the environment. The Waitt Institute brings a team of technical experts to help facilitate the policymaking process and capacity building for effective implementation and long-term success through expertise, funding, and tools focusing on marine spatial planning, blue economy, and sustainable fisheries. The Waitt Institute is the founding member and organizing body of the Blue Prosperity Coalition, which currently has Blue Prosperity partnerships with the Azores, Barbuda, Bermuda, Curaçao, the Federated States of Micronesia, Fiji the Maldives, Samoa, and Tonga.

SeaSketch

SeaSketch is an open-source mapping platform designed to enable participatory marine spatial planning processes developed by the McClintock Lab at the University of California Santa Barbara, National Center for Ecological Analysis and Synthesis. SeaSketch provides ocean planners, stakeholders, and the public with a tool that can be used to synthesize complex data and generate detailed reports to inform marine management decisions.

3 EXECUTIVE SUMMARY

Blue Prosperity Fiji (BPF) is a programme to support a healthy ocean, thriving communities, and prosperous economies in Fiji. Led by the Government of Fiji, the BPF programme will incorporate community consultations, scientific research, and traditional knowledge to sustainably manage 100% of Fiji's ocean space and designate 30% in fully protected areas while supporting ocean industries and fisheries management. The Ocean Use Survey is one tool utilized by Blue Prosperity programmes to engage stakeholders and fill knowledge gaps on where and how the ocean is used and valued, allowing policymakers to better understand the needs and priorities of communities to inform marine spatial planning. In June 2024, an Ocean Use Survey was piloted by a locally based team of facilitators in Vanua Navakavu in the Rewa Province, a recommendation stemming from the Natural Resources Owners Council (NROC) meeting in November 2023. Using this NROC platform, we worked closely with the Ministry of iTaukei Affairs and the respective Rewa Provincial Council to engage the Vanua of Navakavu. Initial consultations were undertaken with communities to seek approval concerning the OUS and the use of their customary fishing grounds boundaries on the SeaSketch platform. The pilot survey gathered 211 sector responses from 135 individual respondents, representing 359 individuals across eight ocean use sectors. Fishing was the most frequently mapped use, accounting for 127 sector responses, followed by recreation and tourism (46 responses). These findings underscore the central importance of fishing in the Vanua of Navakavu and highlight the diverse ocean uses within the i *Qoliqoli*. The results provide critical spatial data to guide ongoing marine spatial planning processes and ensure that local community priorities are integrated into future ocean management strategies for Fiji.

4 INTRODUCTION

4.1 Fiji

The Fijian archipelago, situated between 12-22 °S and 176 °E-178 °W, includes 332 islands with a combined land area of 18, 270 km^2 (Neall & Trewick, 2008). The three largest islands—Viti Levu (10,642 km^2), Vanua Levu (5,807 km^2), and Taveuni (437 km^2)—account for the majority of the landmass (Jenkins & Jupiter, 2011). In contrast, Fiji's ocean territory is vast: its Exclusive Economic Zone (EEZ) extends 200 nautical miles from its coastline and covers around 1.3 million km^2, or approximately 98% of the country's total territorial area (Harding et al., 2022). This disproportionate ration underscores the centrality of ocean space to Fiji's national jurisdiction, highlighting the importance of marine governance for the country's ecological and economic wellbeing.

Fiji's reliance on marine ecosystems is reflected in the fisheries sector, which contributed FJD 68 million to national real GDP in 2020 (Ministry of Fisheries, 2022). However, there remains a significant lack of data on the volume and economic value of marine resources extracted by coastal communities, a problem common across many Pacific Island Countries and Territories (PICTs) (Hanich et al., 2018). Coastal fisheries are frequently under-reported (Zeller et al., 2015) and are often overlooked by national decision-makers, who tend to focus on offshore pelagic fisheries (Basurto et al., 2017). This data gap has contributed to the persistent neglect of coastal fisheries in policy development and resource management (Hanich et al., 2018). Furthermore, many PICTs, including Fiji, still lack the capacity to effectively monitor small-scale fisheries (Batista et al., 2014).

Figure 2: Vanua Levu, Fiji, photo © Andy Estep

INTRODUCTION

Recent local studies have revealed the substantial economic value of coastal fisheries. For example, an assessment in a single district of Kadavu in 2019 estimated a gross value of FJD 16.6 million from marine resource harvesting. If extrapolated across the province's nine districts using household data, the estimated gross value of inshore fisheries could reach FJD 125 million. While such projections are tentative, they highlight the often-overlooked significance of small-scale coastal fisheries to livelihoods and national economies (Harding et al., 2022).

These small-scale fisheries are primarily conducted within Fiji's i *Qoliqoli,* nearshore customary fishing grounds, which collectively account for less than 3% of Fiji's entire EEZ. Although disputes over i *Qoliqoli* boundaries occasionally arise, the process of mapping Fiji's 410 i *Qoliqoli areas*, effectively formalizing traditional fishing rights for respective communities—has been largely completed. The iTaukei Affairs Board (iTAB) holds these i *Qoliqoli maps*, which are generally accepted as the authoritative reference for resolving boundary-related disputes (Sloan & Chand, 2014).

4.2 Ocean Use Survey

The Ocean Use Survey is a participatory mapping initiative designed to generate a comprehensive baseline of ocean use patterns and perceived value by engaging a wide range of stakeholders (Figure 1). Its primary objective is to address critical data gaps concerning the spatial distribution of ocean-based activities. Through this process, the survey identifies areas of importance to various stakeholder groups, captures community input, and produces actionable insights to inform marine spatial planning.

Utilizing the web-based SeaSketch platform, participants identify the ocean use sectors they are involved in, map the areas they actively use by drawing spatial polygons, and assign a relative value to each mapped area.

The resulting data are presented as heatmaps, where color intensity reflects the aggregated value of ocean spaces without disclosing individual responses. These maps support the evaluation of trade-offs among competing uses and help develop planning strategies that align with ecological, cultural, and socio-economic priorities—while minimizing disruptions to livelihoods, customary practices, and recreational activities.

5 METHODOLOGY

5.1 Planning

The Blue Prosperity Fiji Ocean Use Survey questionnaire was collaboratively designed by a government-led technical working group and socialized broadly with topical experts from April 2022 - March 2024. At the final workshop in March, the strategy for the pilot implementation of the Ocean Use Survey project in Vanua Navakavu was developed. The technical group included representation from the Attorney General's Office, Fiji Navy, Ministry of Environment and Climate Change, Ministry of Fisheries and Forestry, Ministry of iTaukei Affairs, National Trust of Fiji, the Waitt Institute, and the McClintock Lab at the University of California, Santa Barbara.

In June 2024, a locally based team of facilitators piloted the Ocean Use Survey in Vanua Navakavu (Figure 3), Rewa Province, following a recommendation from the Natural Resources Owners Council (NROC) meeting in November 2023. Leveraging the NROC platform, we collaborated closely with the Ministry of iTaukei Affairs and the Rewa Provincial Council to engage the Vanua of Navakavu. Initial consultations were conducted with community members to seek approval for the survey and to confirm the use of their customary fishing ground boundaries within the SeaSketch platform.

Figure 3: The OUS Team, Muaivuso, June 2024, photo © Turaga ni Koro

METHODOLOGY

5.1.1 Stakeholder Sectors

The working group broadly categorized all ocean use activities in Fiji into eight key stakeholder sectors for respondents to select from when completing the survey:

1. Aquaculture and Mariculture
2. Cultural Use
3. Development and Infrastructure
4. Exploration, Research, & Conservation
5. Fishing
6. Maritime Transportation
7. Recreation and Tourism
8. Waste Management

5.1.2 Survey Targets

To yield high resolution maps suitable for coastal planning at the community and sector level, a 90% confidence interval and a 10% margin of error were used to calculate statistically rigorous survey targets (Table 1) based on population data from the 2022 Village Profile Survey provided by the Rewa Provincial Office for registered villages in Vanua Navakavu. The following sample size formula was used to calculate targets:

$$\text{Sample Size} = \frac{\frac{z^2 \times p(1-p)}{e^2}}{z^2 \times p(1-p)}$$

Where N is the population size, e is the margin of error (0.10), and z is the z-score (1.65) which correlates with the desired confidence interval (0.9).

Table 1: Survey Targets

Registered Village	Population	Target – Individuals Represented
Muaivuso	131	45
Waiqanake	422	67
Nabaka	104	42
Ucuinamono	59	32
Total	**716**	**186**

METHODOLOGY

5.1.3 Survey Design

To participate in the Ocean Use Survey, respondents were required to provide a name, a location of primary residence via a point placed on a map, identify which sector(s) they represented, and provide spatial data on areas they find important (Figure 4). Respondents were asked to assign a quantitative value for each shape drawn in a single sector via a sliding scale with “Low” representing least valuable areas and “High” representing most valuable areas. Group responses, where multiple individuals contributed to or were reflected in a single response, were accepted.

Figure 4: An OUS Respondent, Muaivuso,, photo © Ian Chute

METHODOLOGY

5.2 Implementation

5.2.1 Facilitator Training

A locally based team of 14, including the Rewa Provincial Conservation Officer, participated in a 5-day Ocean Use Survey facilitator training programme prior to data collection. This standardized training is intended to ensure proficiency with the SeaSketch mapping tool, consistency and accuracy of the information administered to respondents, and objectivity and credibility of survey results.

5.2.2 Data Collection

Data collection for the Blue Prosperity Fiji pilot Ocean Use Survey project was conducted by a Fijian facilitation team from 10 June 2024 - 14 June 2024 (Figure 5). One additional day was spent conducting surveys in Vanua Navakavu on 18 July 2024 to achieve project objectives.

Survey responses were directly entered into the offline tool by survey facilitators or respondents. Individual and group responses were accepted, and respondents were permitted to record their use in multiple sectors.

Facilitators used simple random sampling and judgmental sampling methods to achieve established population-based targets in Vanua Navakavu villages.

Figure 5: An OUS respondent, Muaivuso, June 2024, photo © Ian Chute

METHODOLOGY

5.3 Analytics and Review

5.3.1 Analytics

Ocean Use Survey data are visually represented in the form of heatmaps, which use color to represent different values identified by respondents. The general steps of heatmap production involved aggregation of respondents' used areas and the application of spatial weighting based on respondents' assignment of value (Yates & Schoeman, 2013). Heatmaps were produced by the McClintock Lab at the University of California, Santa Barbara for each key stakeholder sector.

5.3.2 Review

In August 2024, the Ocean Use Survey team returned to Vanua Navakavu to host a community consultation concerning the draft heatmaps produced from the pilot implementation. The community felt that the draft heatmaps accurately represented their use and value of their customary fishing grounds and offered several key suggestions for improvement, including the addition of relevant labels to enhance the maps' clarity for those unfamiliar with the area or not accustomed to interpreting maps (Figure 6).

Following the community consultation, draft heatmaps were also presented to project chairs; Ministry of Environment and Climate Change, Ministry of Fisheries and Forestry, and Ministry of iTaukei Affairs for feedback before publishing.

Figure 6: Vanua Navakavu High Chief Turaga na Roko Beleni review draft heatmaps, photo © Ian Chute

6 RESULTS

During the pilot implementation of the Ocean Use Survey project in Vanua Navakavu, 135 individual respondents submitted 211 sector responses representing 359 individuals using the SeaSketch mapping tool.

- "Individual respondents" indicates the collective number of individuals who directly interacted with the survey tool.
- "Sector responses" indicates the total number of unique responses received in each sector of ocean use, as many respondents recorded use in multiple sectors.
- "Individuals represented" indicates the cumulative number of people represented, including those reflected through group responses who may or may not have been present during the survey exercise.

Data collected during the pilot Blue Prosperity Fiji Ocean Use Survey are summarized below.

6.1 Group Responses

- Recorded 282 group responses (more than one person represented)
- The average group size was 3 individuals
- The largest group surveyed was 34 individuals

Figure 7: OUS Respondents, Ucuinamono, June 2024

6.2 Participation by Residence

In total, 211 sector responses representing the ocean use patterns of 359 individuals (Figure 8) residing in the villages and settlements of Vanua Navakavu were collected, which exceeded all population-based targets (Table 2).

Table 1: Responses by Residence

	Residence	Population	Target: Population	Individual Respondents	Sector Responses	Individuals Represented
Vanua Navakavu	Muaivuso	131	45	25	46	80
	Waiqanake	422	59	67	98	168
	Nabaka	104	42	23	38	51
	Ucuinamono	59	32	12	19	33
	Other (Settlements)	N/A	N/A	8	10	27
Vanua Navakavu Total		**716**	**178**	**135**	**211**	**359**

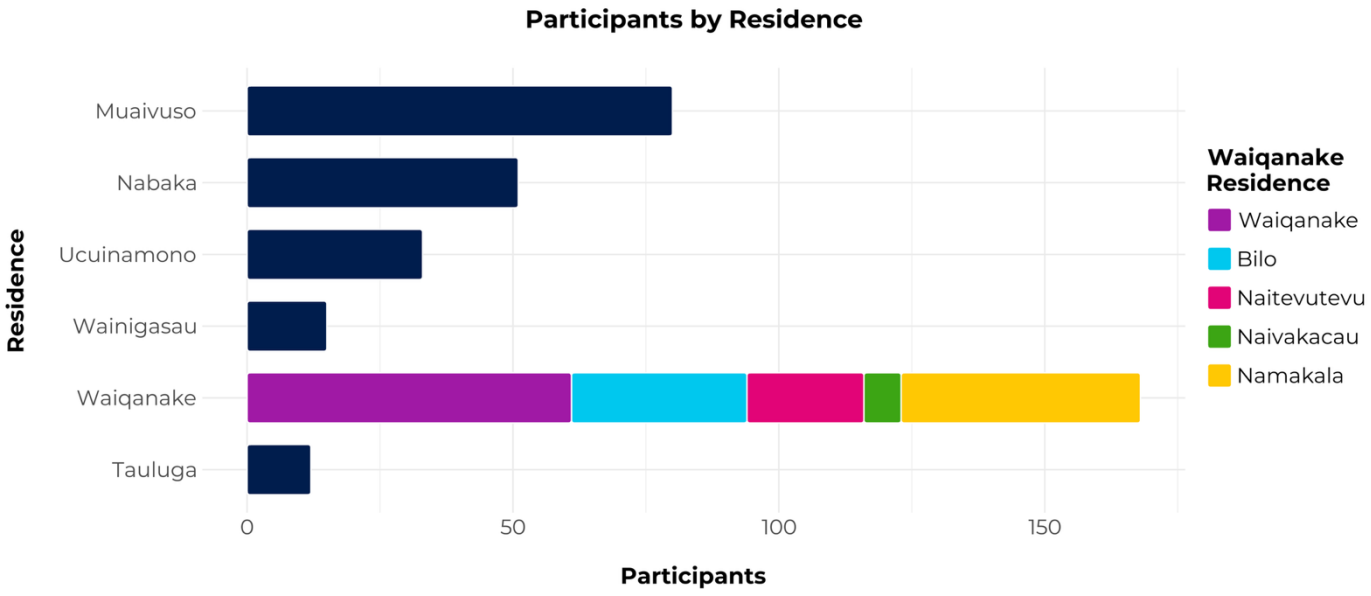

Figure 8: Participants by Residence

6.3 Respondent Demographics

Participants were prompted to select an age range, gender, and ethnicity for everyone reflected in their response, though these demographic questions were optional.

An age range was identified for 90% of individuals represented while gender and ethnicity were identified for 80% of individuals represented in the pilot Ocean Use Survey.

Most participants whose age range was identified fall in the 30-49 and 50+ year ranges, with 22% in the 18-29 range and 16% of age-identified individuals under the age of 18. Age range distribution was relatively consistent across location of residence (Figure 9).

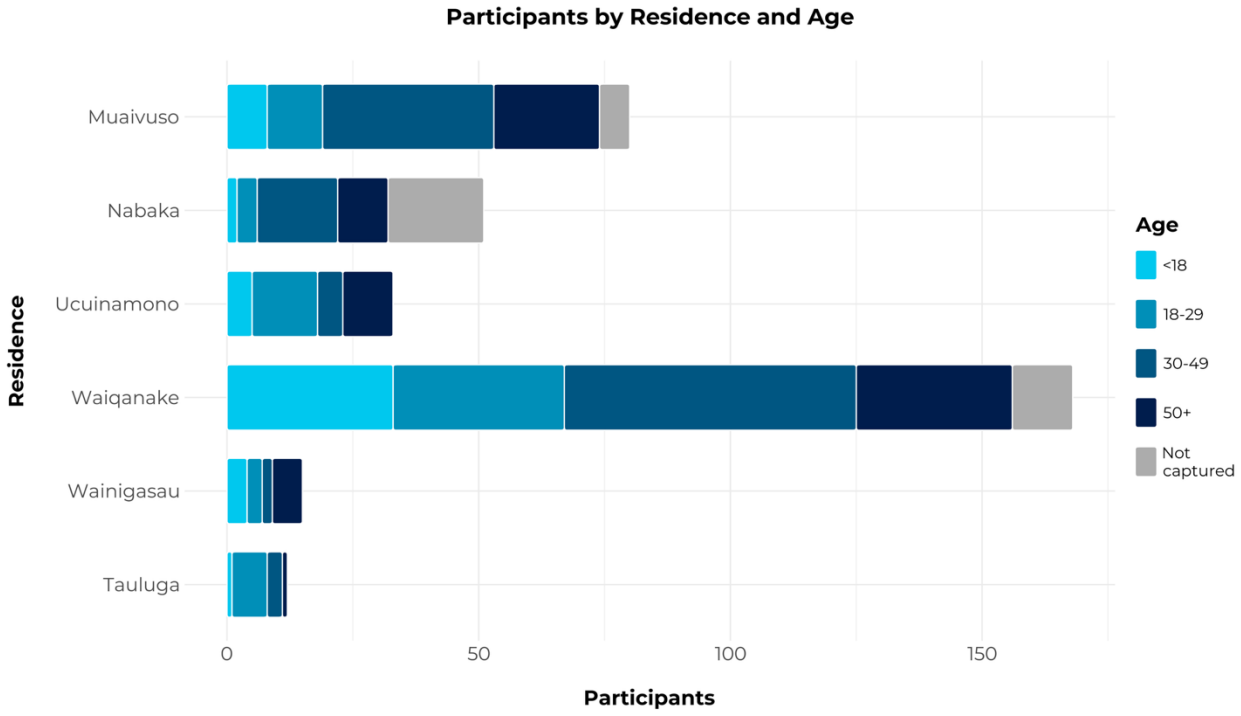

Figure 9: Participants by Residence and Age

53% of the total individuals reflected whose gender was identified in the Ocean Use Survey were male and 47% were female. In the villages of Nabaka and Ucuinamono there were more females represented than males (Figure 10).

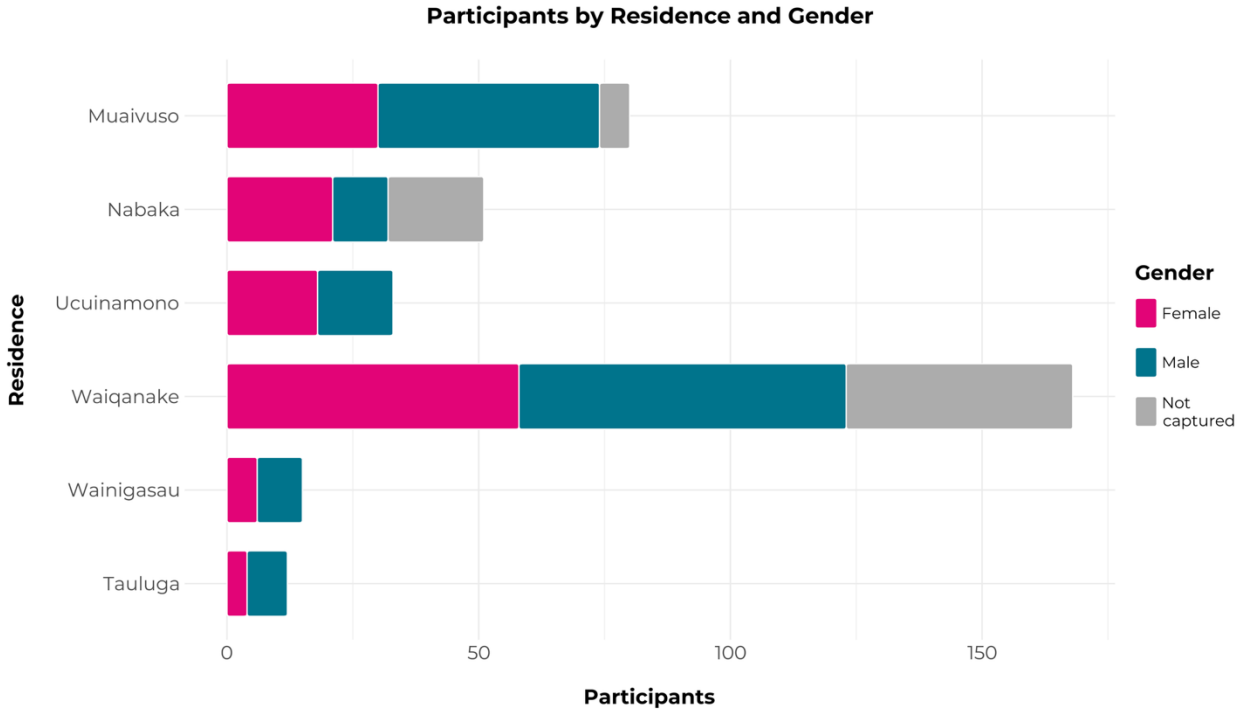

Figure 10: Participants by Residence and Gender

Of the participants who identified ethnicity, 95% were iTaukei, with the remaining 5% split between Indo-Fijian and Rotuman (Figure 11).

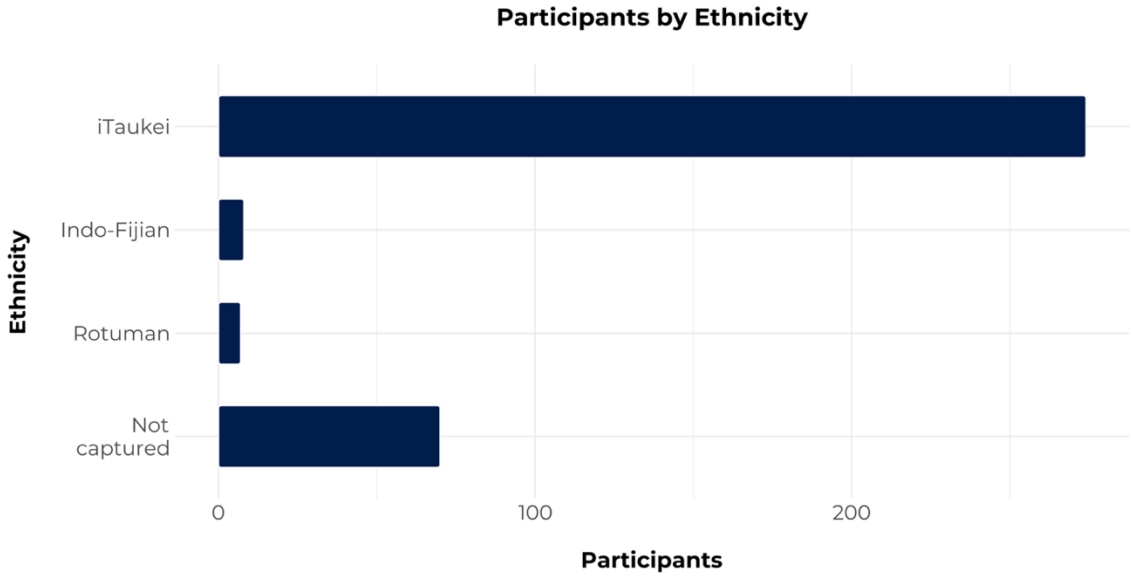

Figure 11: Participants by Ethnicity

6.4 Participation by Sector

Responses were collected in eight key sectors of ocean use, with 60% of the total sector responses submitted in the fishing sector and 22% indicating use in the recreation and tourism sector. Though participants were not limited to responding in a single sector of ocean use, only 40% of total respondents in Vanua Navakavu recorded use in more than one sector. Multi-sector respondents were asked how many individuals were represented within each use sector (Table 3). The largest number of individuals represented in a single sector for each response was used to calculate total representation for achievement of survey targets and reporting to reduce the risk of duplicate representation.

Table 3: Responses By Stakeholder Sector

Stakeholder Sector	Sector Responses	Individuals Represented	Shapes Drawn
Aquaculture & Mariculture	1	1	1
Cultural Use	7	15	13
Development & Infrastructure	5	13	8
Exploration, Research, & Conservation	9	15	9
Fishing	127	234	191
Maritime Transportation	7	12	7
Recreation & Tourism	46	151	59
Waste Management	9	29	9
Totals	**211**	**470**	**297**

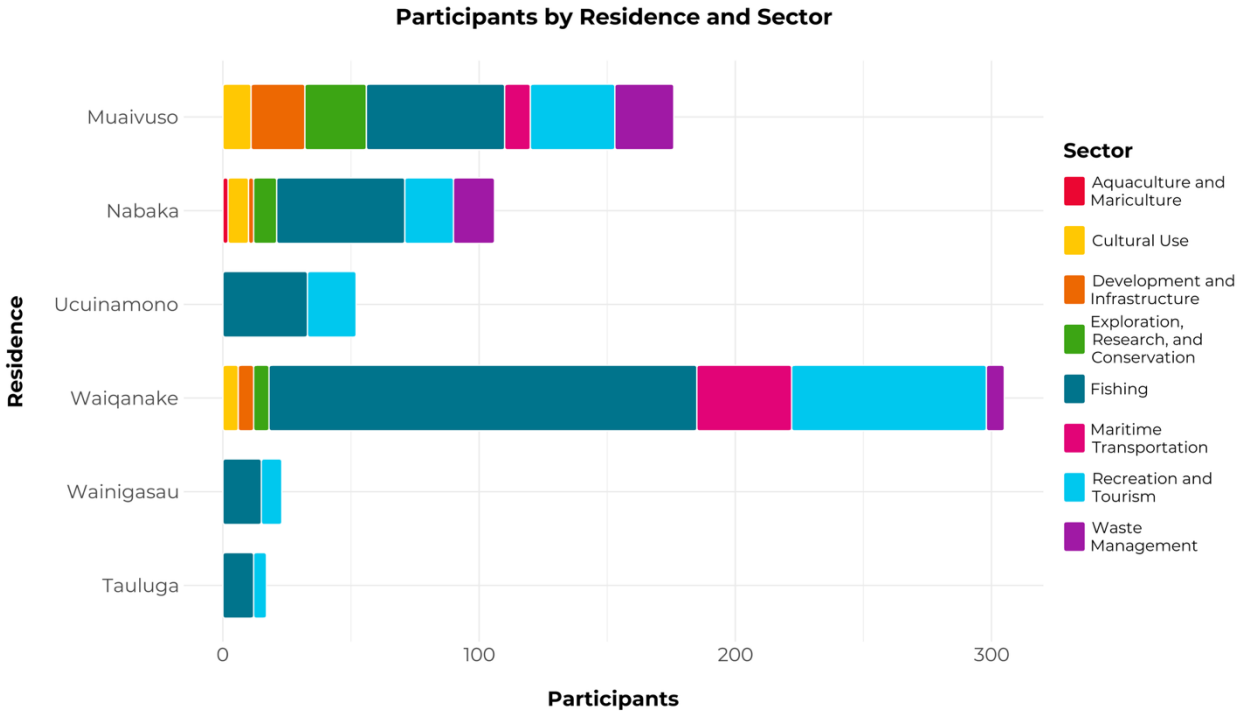

Figure 12: Participants by Residence and Sector

6.5 Heatmaps

Heatmaps which summarize survey responses collected during the pilot Ocean Use Survey implementation in Vanua Navakavu in each sector of ocean use with 3 or more shapes drawn are shown below. The number of shapes input into each heatmap are reported in the caption ("N").

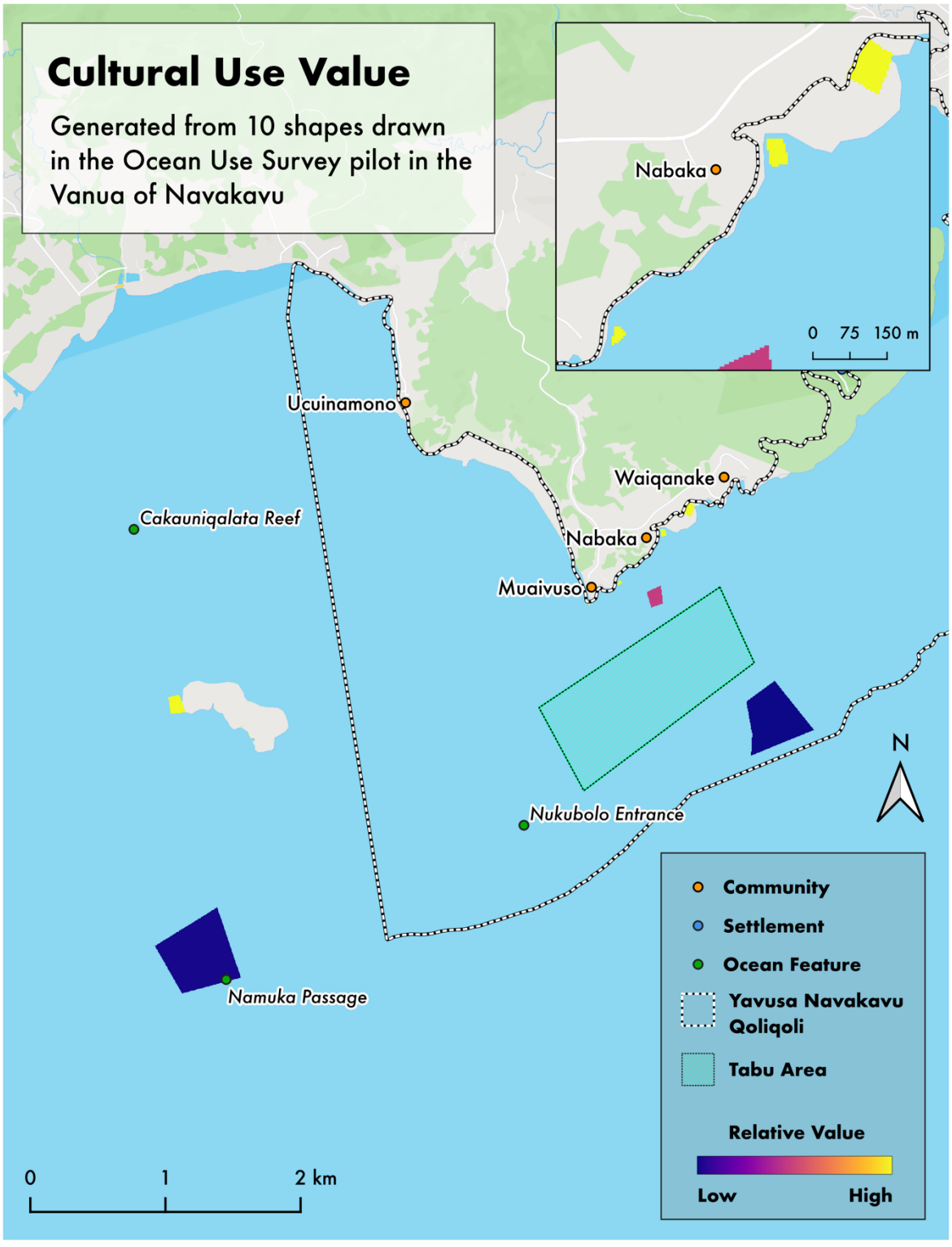

Figure 13: Cultural Use Heatmap (N=13)

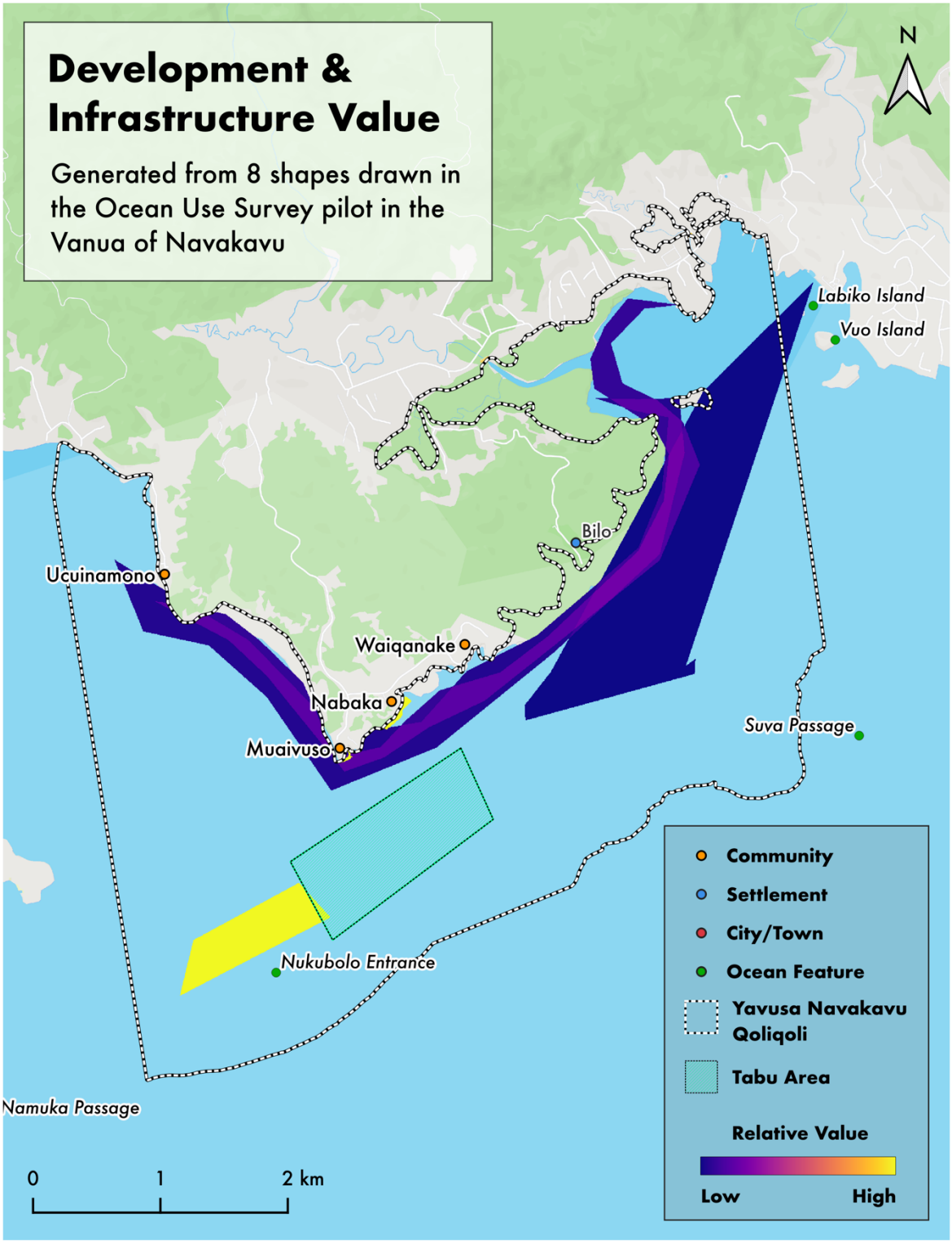

Figure 14: Development and Infrastructure Heatmap (N=8)

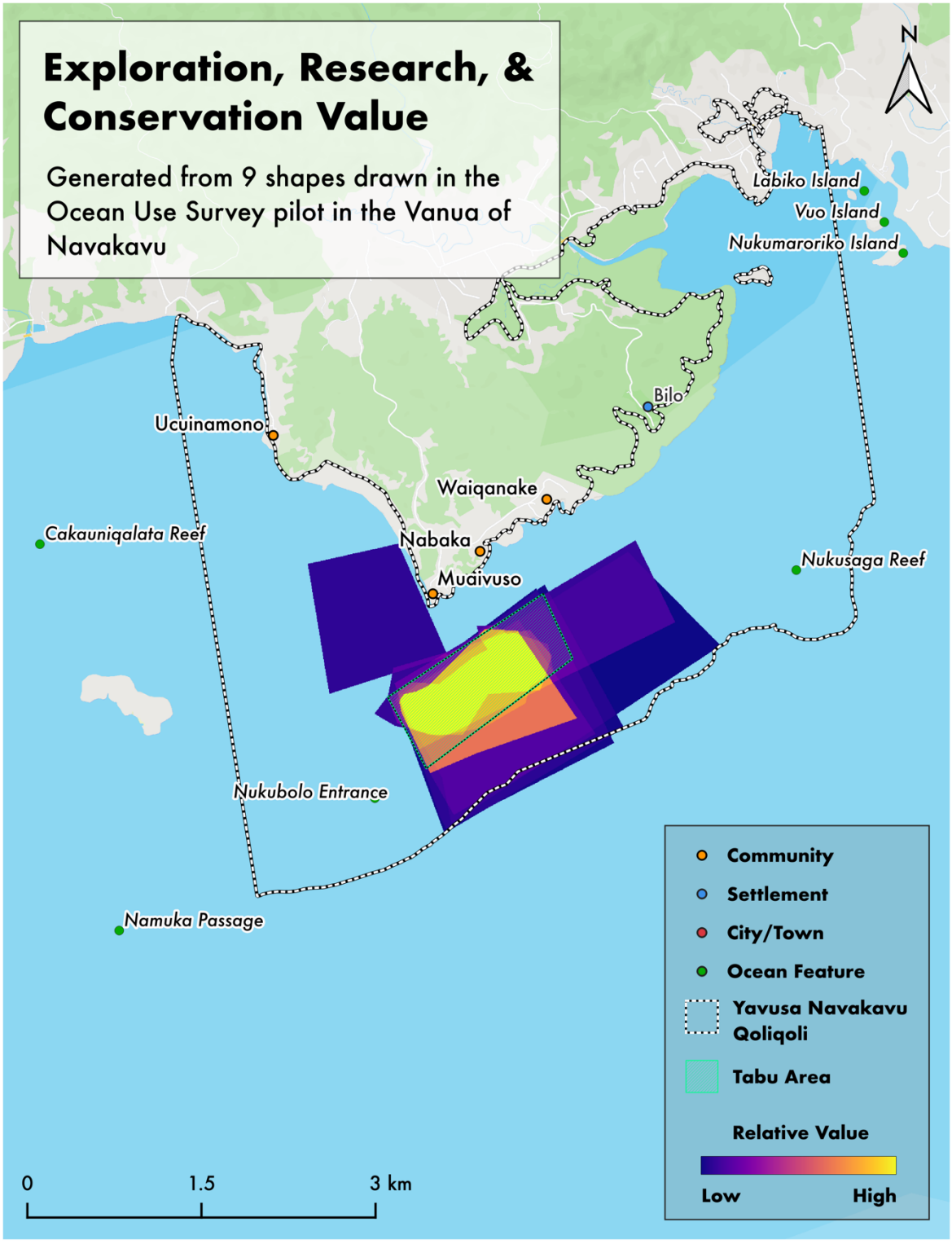

Figure 15: Exploration, Research, and Conservation Heatmap (N=9)

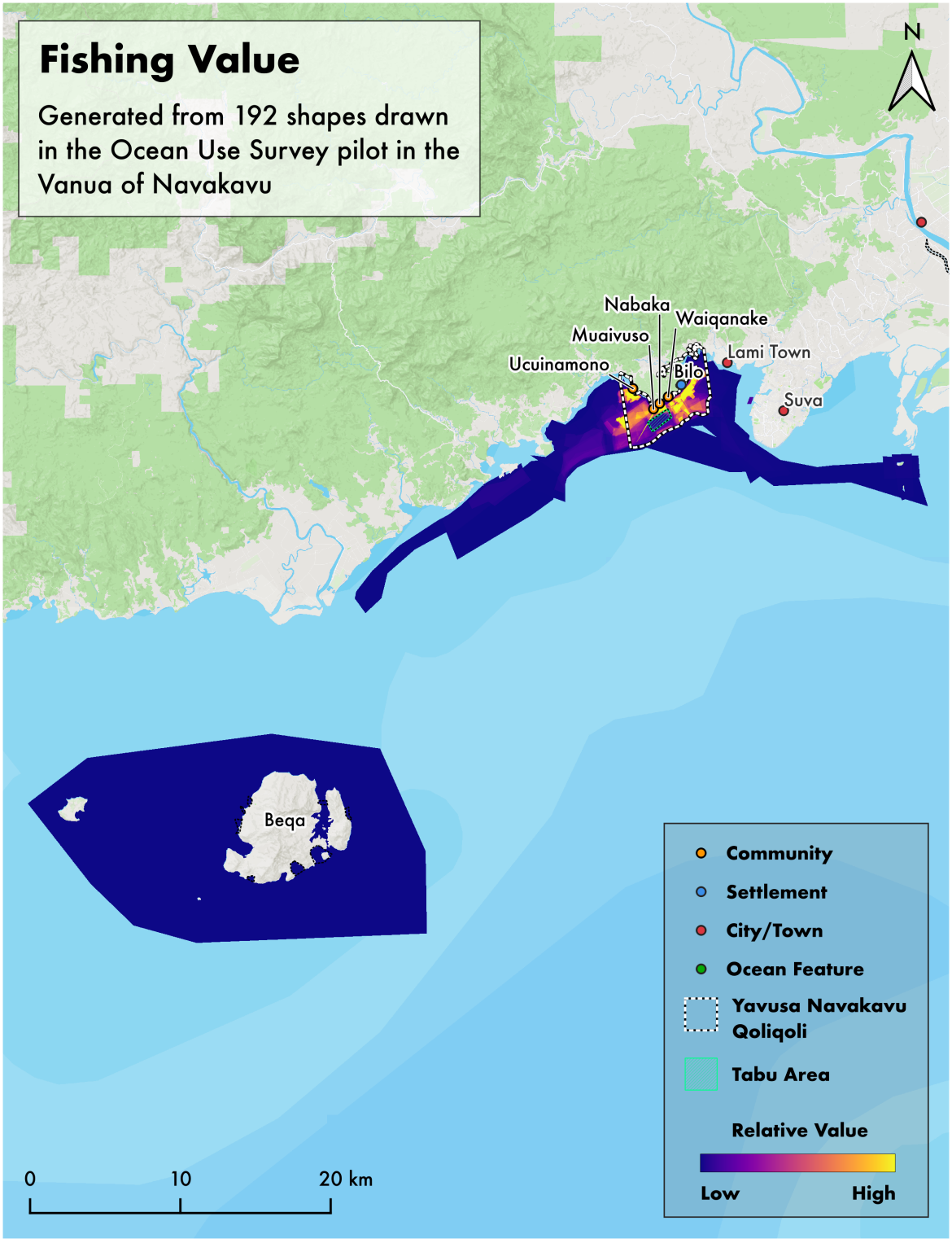

Figure 16: Fishing Heatmap (N=191)

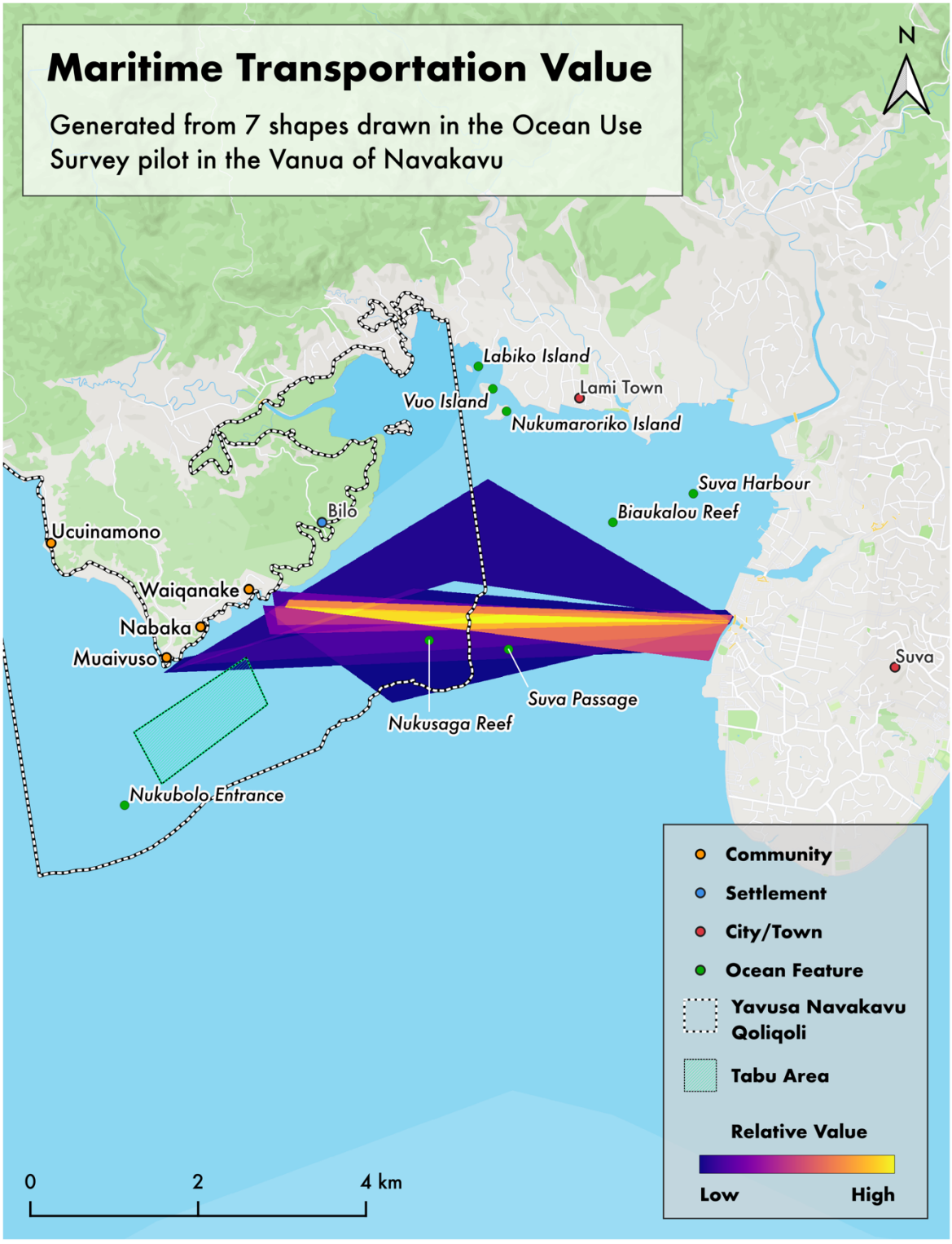

Figure 17: Maritime Transportation Heatmap (N=7)

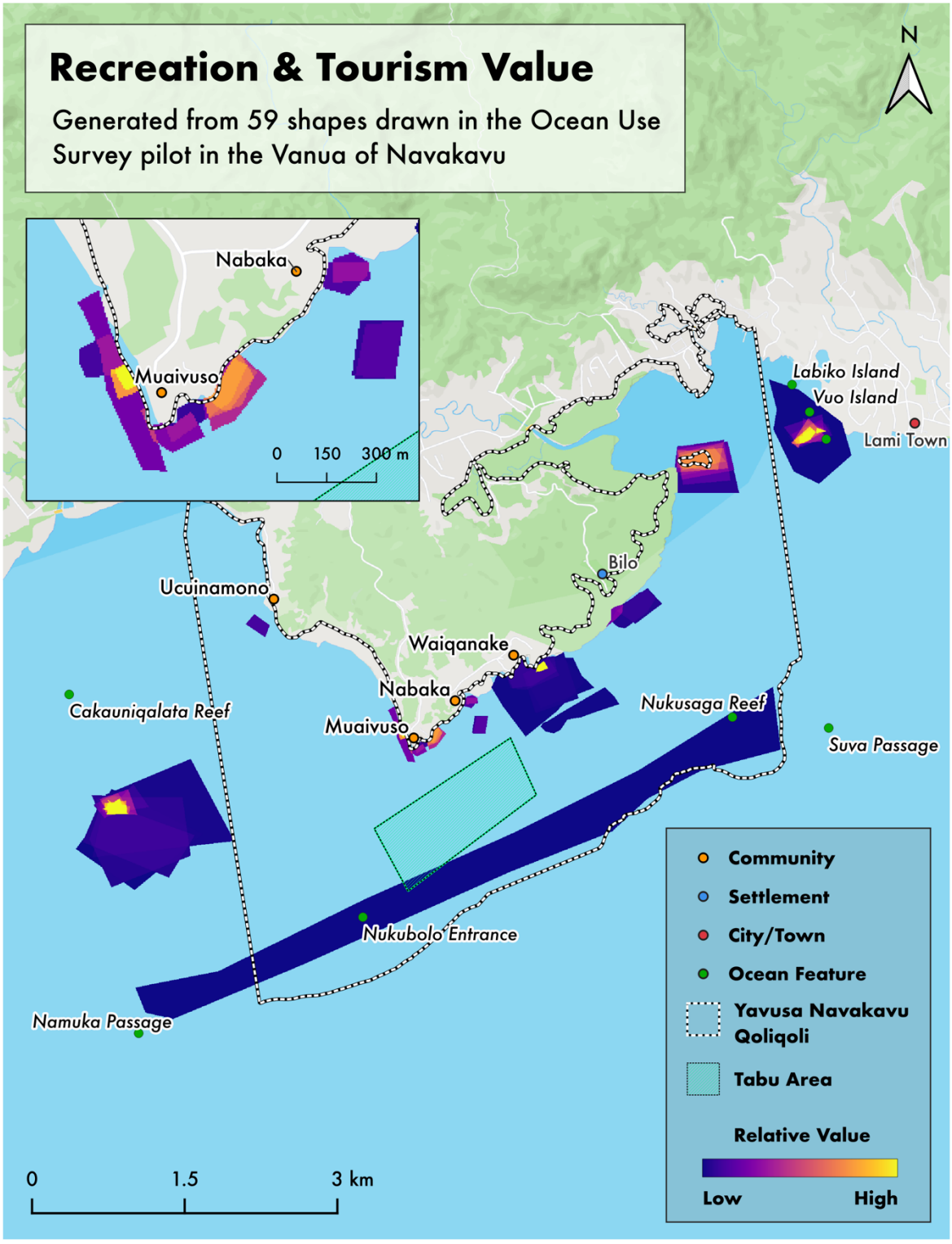

Figure 18: Recreation and Tourism Heatmap (N=59)

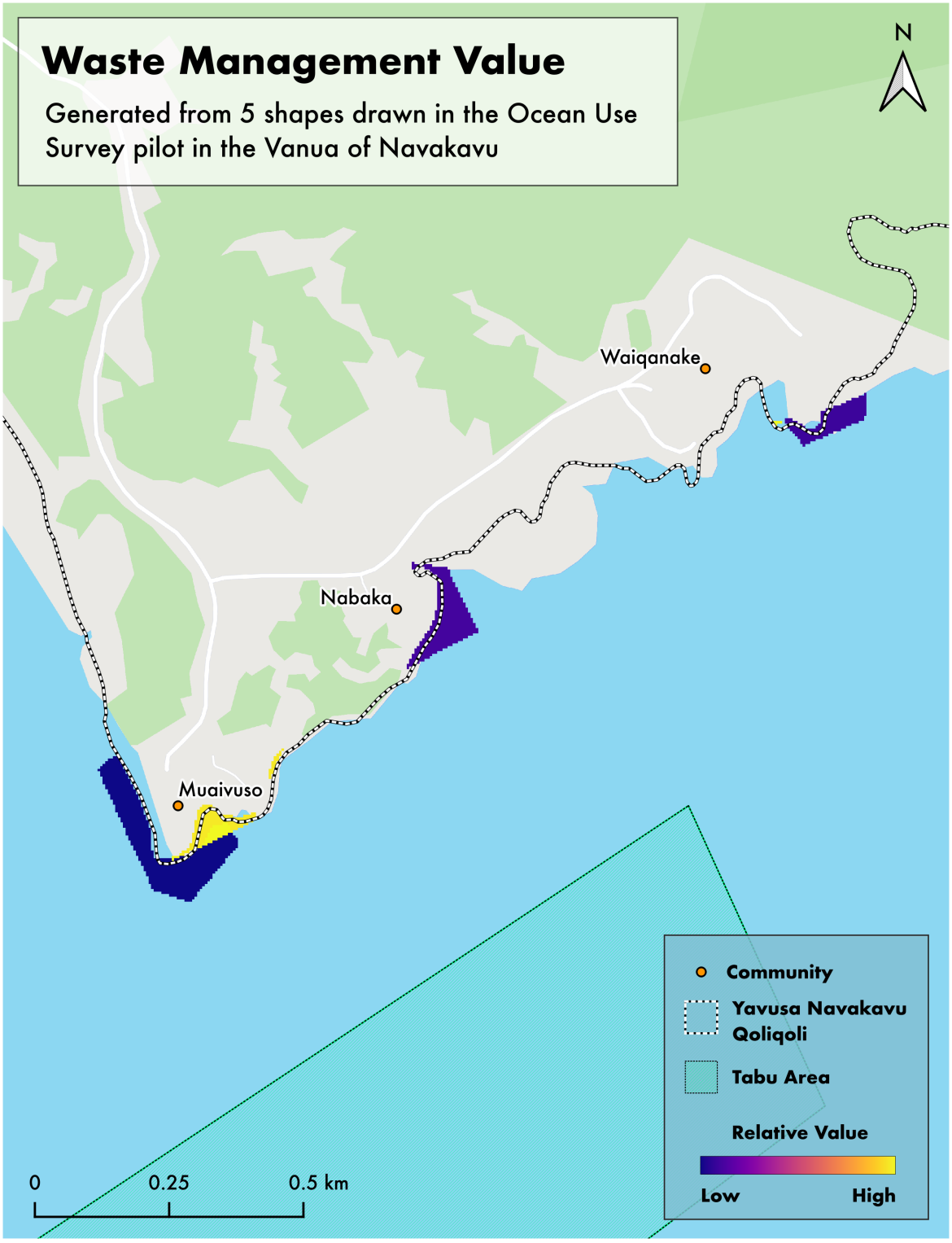

Figure 19: Waste Management Heatmap (N=9)

7 Discussion and Conclusion

This pilot Ocean Use Survey (OUS), conducted in the customary fishing grounds (i *Qoliqoli)* of the Vanua of Navakavu, demonstrates the application of the SeaSketch platform as a participatory mapping tool tailored for the Fijian context.

Analysis of spaces identified across seven OUS sectors revealed that fishing was the most frequently mapped use, with 191 shapes drawn. The high number of fishing-related responses is consistent with the central role of fishing in the daily livelihoods and food security of coastal communities in the Pacific (Harding et al., 2022). The remaining sectors were far less frequently mapped, ranging from 7 shapes (maritime transportation) to 13 shapes drawn (cultural use). Navakavu's proximity to Suva and easy access to roads and public transportation likely reduces the community's dependence on the ocean for daily transport and may explain a lower response rate in the maritime transportation sector. It is also important to note that cultural knowledge is often held by elders, chiefly households, and traditional leaders, and as such, cultural uses were primarily mapped in group settings by these individuals rather than by each respondent. Thus, the low number of mapped cultural use areas is more reflective of the way cultural knowledge is shared, rather than an indicator of relative importance to each individual or frequency of use in the community.

Notably, our fieldwork included surveys in settlements that are not formally recognized in the Ministry of iTaukei Affairs' census. Due to the absence of standardized population data for these communities, we did not set targets. Nevertheless, acknowledging that these settlements are situated on customary land and that residents have been granted access to land and sea resources for their livelihoods, we prioritized the inclusion of their perspectives. Accordingly, settlements were interviewed to the extent permitted by available time and resources.

The Vanua of Navakavu i *Qoliqoli* occupies a unique position at the interface of peri-urban and urban development in Fiji. It is adjacent to key national infrastructure, including the primary maritime port, fishing industry facilities, and maritime security and surveillance zones. These uses place significant pressures on the i *Qoliqoli*, especially as development proposals, such as port expansions, tourism projects, and coastal infrastructure continue to emerge. Given provincial development priorities, particularly in the greater Suva and Laucala Bay lagoons, participatory data generated from the Ocean Use Survey are an important baseline for balancing development needs with the protection of marine resources and community priorities.

This pilot implementation of the Ocean Use Survey in the Vanua of Navakavu demonstrates the potential of participatory mapping tools like SeaSketch to capture valuable spatial data on ocean uses, community priorities, and customary fishing grounds. The insights generated can not only inform local marine spatial planning efforts but also serve as a model for engaging communities in ocean governance processes across Fiji and the Pacific.

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9 Appendix A: Data Privacy Informed Consent

Ocean Use Survey Project:
Blue Prosperity Fiji (BPF) is a partnership between the Republic of Fiji and the Waitt Institute to implement 30% protection of Fiji's waters and support ocean management in three core areas; Marine Spatial Planning, Blue Economy, and Sustainable Fisheries. BPF is implementing a project on coastal ocean use mapping, known as an Ocean Use Survey, that aims to fill data gaps about ocean activities and ensure the knowledge of local ocean users in Fiji is integrated in the upcoming marine spatial planning process by asking respondents to indicate where they use and how they value ocean space.

Your Participation and Privacy:
Participation in this survey is voluntary. For the purposes of quality control, the entity that processes the data and the quality of the information may access the following personal data: name, email, and telephone contact. This data is only accessed by those entities listed below. In this sense, you may be contacted to confirm the conclusion of this interview. This data will only be used for this purpose, never being associated with the answers you provided and subsequently deleted.

Recipients of Personal Data (survey controllers and entities responsible for data treatment):
Waitt Institute I La Jolla, CA I United States I +1 858 551 4443 I Controller
McClintock Lab, UCSB I Santa Barbara, CA I United States I +1 805 893 8782 I Controller
Environmental Markets Lab, UCSB I Santa Barbara, CA I United States I +1 805 893 4058
Centre for Biodiversity and Conservation Science, UQ I St. Lucia, QLD I Australia I +61 3 8676 7004

Project Partners:
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Ministry of Environment and Climate Change
Ministry of Fisheries and Forestry
Ministry of Infrastructure
Ministry of Lands and Mineral Resources
Ministry of Rural and Maritime Development, Disaster Management
Attorney General's Office
Fiji Museum
Fiji Navy
National Trust of Fiji

Data Protection Officer (DPO): Will McClintock: will@ucsb.edu
In alignment with Fiji's 2013 constitution which provides for a right to privacy and the confidentiality of personal data:

- I was informed about the Ocean Use Survey project and the objectives of this project, which aims to collect information about ocean use and value in the Fiji
- I understood the information given to me
- I was assured that all data relating to my identification in this study are confidential and that their anonymity will be maintained
- I am aware that I can refuse to participate, interrupt participation, or withdraw my consent in the study at any time, without any kind of penalty
- I freely agree to participate in the aforementioned study
- I authorize the use of my contacts for the purposes of confirmation and/or validation of the data collected.

10 Appendix B: Survey Questionnaire

Sector	Initial Prompt	Required prompt(s) for each shape drawn	Optional prompt(s) for each shape drawn
Aquaculture & Mariculture	Use the map to indicate the most valued locations for this sector. You can draw multiple areas and prioritize them individually. Add as many polygons as needed to represent the areas that have value for this activity in this industry, then adjust their relative priority below. This information will be added to all other responses to create a heat map of the assessed areas. [New Shape]	How important is this area? [Low/Average/High Scale Bar] Please indicate which type(s) of aquaculture or mariculture you use or value this space for: Corals Giant Clams Mangrove Oysters Milkfish Mud Crabs Pearl Farming Prawn Shrimp Sea Cucumbers Seaweed Tilapia Other Please indicate the current status of space: Active Inactive	Please indicate the aquaculture or mariculture function(s): Aquarium Trade Future/Potential Site Land-Based (Effluent discharge) Other
Recreation & Tourism		How important is this area? [Low/Average/High Scale Bar] Which activity or activities do you use or value this space for: Birding Boating (motorized) Canoeing Cetacean Watching Conservation/Ecotourism Cruise Tourism Freediving Jet skiing Kayaking Kite Surfing Paddleboarding (SUP) Picnic Spots Sailing Sandbank Recreation SCUBA Diving Shark Feeding Snorkeling Surfing Swimming Wind Surfing Yachting (mooring & anchorage) Other Are there financial benefits derived from tourism in this area? [Yes/No]	

Sector	Initial Prompt	Required prompt(s) for each shape drawn	Optional prompt(s) for each shape drawn
Cultural Use	Use the map to indicate the most valued locations for this sector. You can draw multiple areas and prioritize them individually. Add as many polygons as needed to represent the areas that have value for this activity in this industry, then adjust their relative priority below. This information will be added to all other responses to create a heat map of the assessed areas. [New Shape]	How important is this area? [Low/Average/High Scale Bar] Please indicate which activity or activities you use or value this space for: Burial Site Chiefly Bathing Spot Dolphin Calling Fish Calling First Landing Spot Old Village Site Red Prawn Calling Sites Path of the Shade Sacred Site (with box) Shark Calling Sunken Islands Traditional Voyaging Turtle Calling Sites Underwater Springs Underwater Wrecks Other	
Development & Infrastructure		How important is this area? [Low/Average/High Scale Bar] Existing: Beacons Bridges Culverts FADs Flood Gates Floating Docks Floating Helipads Jetty Lighthouses Marina Port Power Plant Sea Walls Underwater Cables Other Planned: Beacons Coastal- Commercial Coastal- Private Energy FADs Floating Docks Foreshore Development Hotel Jetty Lighthouses Marina Port Power Plant Reclamation Road Town Other	Beacon Status: Working/Not Working

Sector	Initial Prompt	Required prompt(s) for each shape drawn	Optional prompt(s) for each shape drawn
Exploration, Research, & Conservation	Use the map to indicate the most valued locations for this sector. You can draw multiple areas and prioritize them individually. Add as many polygons as needed to represent the areas that have value for this activity in this industry, then adjust their relative priority below. This information will be added to all other responses to create a heat map of the assessed areas. [New Shape]	How important is this area? [Low/Average/High Scale Bar] Please indicate the type(s) of research and/or conservation activity you use or value this space for: Bird Nesting Sites Coral Restoration/Out planting Giant Clam Seeding Locally managed marine area Long-term Monitoring Sites Mangrove Rehabilitation Migratory Routes - Birds Migratory Routes - Cetaceans Spawning Sites Turtle Nesting Sites Relevant Areas for Nature Conservation (with box) Relevant Areas for Scientific Research (with box) Wave Buoy Deployment Other Please indicate the type(s) of exploration activity you use or value this space for: Mining Exploration Oil Exploration River Exploration Tourism Exploration Other	Please indicate the function(s) of this mining exploration space: Sand extract Areas of interest
Maritime Transportation		How important is this area? [Low/Average/High Scale Bar] Please indicate the type(s) of maritime transportation activity you use or value this space for: Inter-Island Transportation Commercial Transshipment Trade Other	Please answer the following questions if you use this space for inter-island transportation: Registration Status: Registered/Unregistered Vessel Type: Motorized/Non-Motorized Engine Size: 5-10hp/15-40hp/50-110hp/ 110+hp
Waste Management		How important is this area? [Low/Average/High Scale Bar] Please indicate the type(s) of waste management activity you use or value this space for: Disposal Composting Infrastructure Wastewater discharge Other	If "Other" Bury Burn Compost Community Dump Site Recycle
Sector	**Initial Prompt**	**Required prompt(s) for each shape drawn**	**Optional prompt(s) for each shape drawn**

Fishing	Use the map to indicate the most valued locations for this sector. You can draw multiple areas and prioritize them individually. Add as many polygons as needed to represent the areas that have value for this activity in this industry, then adjust their relative priority below. This information will be added to all other responses to create a heat map of the assessed areas. [New Shape]	How important is this area? [Low/Average/High Scale Bar] Please indicate the subsector(s) of fishing you use and value this space for: Artisanal Aquarium Commercial Recreational Subsistence Touristic Traditional Please indicate the method of fishing you do here: Big Game Bottom Longline Deep Sea Dropline Drifting Longline Dynamite Gill Nets Gleaning (hand collecting) Handline Traditional - Fish Poisons (i.e., herbs, vines, fruits) Chemical Pole and Line Spear Traditional Fish Drive Traps Trolling Underwater Breathing Apparatus Other	Please indicate the species you fish for here: Fish Barracuda Emperor Goatfish Grouper Grunts Jack/Trevally Mackerels Marlin Mullets Parrotfish Rabbitfish Rays Sharks Snapper Surgeonfish Tuna Turtles Other Invertebrates Black-Lip Pearl Oyster Cephalopods Coconut Crabs Giant Clam Lobsters Mangrove Crabs Prawns Sea Cucumber Sea Urchin Trochus Other Aquarium Fiji devil/South-seas Demoiselle Angelfish Butterflyfish Anthias Anenomefish Triggerfish Surgeonfish Coris Other Aquatic Plants Sea Grapes Seaweed Other Month(s) of the year you fish in this space January/February/March/April/ May/June/July/August/ September/October/ November/December

11 Appendix C: Heatmap Methodology

The heatmaps which summarize responses for each sector of ocean use are created using the Spatial Access Priority Mapping (SAPM) method (Yates & Schoeman, 2013). SAPM entails weighting locations of value based on "importance" and area. During the survey process, each respondent assigns importance, a relative value between 1 and 100, to each shape they draw on the map. Respondents have 100 points of importance to allocate among their shapes for a particular sector. Area is calculated after land is clipped from all shapes (any shapes located entirely on land are not included in heatmaps).

The ultimate "value" of each shape is calculated by multiplying importance by the number of individuals represented by the response and then dividing that product by the shape's area in square kilometers. In dividing by area, this approach attributes greater weight to smaller shapes—this is based on the rationale that the smaller an area of value is, the greater the loss of that space would be per unit area. Calculating the value of a given shape is summarized by the following equation.

$$value = \frac{individuals\ represented\ *\ importance}{area\ (km^2)}$$

The shapes from all responses within a sector are rasterized, burning in each shape's calculated value to overlapping pixels. All rasters are then summed to create a final aggregate heatmap. The pixel values of the resulting heatmap represent relative value in the associated ocean use sector. This general process is illustrated below.