



WILDLIFE CONSERVATION SOCIETY  
FIJI COUNTRY PROGRAM  
ANNUAL REPORT 2020

Annual Report 2020  
Wildlife Conservation Society  
Fiji Country Program

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Cover page photo: Diverse reef system with healthy fish population in Kubulau inshore fringing. ©Tom Vieras/WCS



## FROM THE DIRECTOR



2020 was perhaps one of the most challenging year many of us have experienced, as the world grappled with the unprecedented COVID-19 health crisis and the subsequent social and economic effects. The crisis brought scientists and researchers together (albeit virtually) to relook at the critical link between human activities and the health of the environment that we live in and the animals and species we are surrounded by.

It is clear that environmental degradation of natural ecosystems is affecting human health. Simply put, the planet's health is vital in preventing future diseases. Fiji confirmed its first COVID-19 case on 19 March and the last instance of community transmission in April 2020. During this period, strict safety protocols were implemented by the Fijian Government to prevent the spread of the virus and was kept in place until July 2020. These included nationwide social distancing measures, lockdown, local and international travel restrictions and curfews. In compliance to this, WCS Fiji pulled all staff from field work and stopped all community engagements, joining the rest of the world working from home and attending virtual meetings.

Upon the lifting of domestic travel restrictions, the WCS team, with support from communities and partner organisations raced ahead to complete projects. Between August and December, three community sea cucumber management plans were launched, the first community pearl farm was established along with training workshops to build skills and enhance knowledge, women fishers and seafood vendors also received seafood handling and mud crab fattening training and supported the Government on the nationwide public consultation on Fiji's proposed 30% Offshore Marine Protected Area Network. The Watershed Interventions for Systems Health in Fiji (WISH Fiji) project closed the year by assisting communities in Bureta and Dama districts with the construction and repair works of their water infrastructure, routing clear water to more than 500 people.

This year was full of new lessons and which definitely shift the global environmental targets and strategies for the year 2021 to a new level through collaborative approaches which are necessary to secure our world for our future and the future generations.

Sangeeta Mangubhai  
Director  
WCS Fiji Country Program

## THE WCS FIJI TEAM

### Dr Sangeeta Mangubhai – Fiji Country Program Director



Sangeeta joined WCS in 2014. She has worked on marine science and conservation in Australia, East Africa, Indonesia and the South Pacific. She completed her Ph.D. in 2007 through Southern Cross University in Lismore, Australia, looking at reproduction and recruitment of corals in Kenya. She has been working on coastal fisheries, gender and fisheries, protected areas, marine spatial planning, payment for ecosystem services, environmental policy, and climate change. She sits on numerous national government committees, and is an editor for the journal Pacific Conservation Biology and the Pacific Community's Women in Fisheries Information Bulletin, and an adjunct Associate Professor with Southern Cross University in Australia. Sangeeta received a Pew Marine Fellowship in 2018.

### Artika Singh – Finance Director



Artika joined WCS in August 2019. She holds a Bachelor in Accounting from the Fiji National University and is currently pursuing her Master in Professional Accounting. She specializes in the public and private sector finance with over 14 years of experience. Prior to joining WCS, she worked as the Regional Finance Manager – Pacific for Live and Learn Environmental Education.

### Upashna Prakash – Finance and Administration Coordinator



Upashna first joined WCS in 2016 as a Finance and Admin Officer to support projects and operations of the organisation. She holds a Post Graduate Diploma in Commerce from the University of the South Pacific. She also completed studies in Professional Development (International) from the University of Southern Queensland, a Bachelor of Arts majoring in Accounting and Information Systems from USP.

### Fareea Ma – Technical Support Manager



Fareea joined WCS in 2019, and has a Bachelor of Science in International Relations. She started her career in the corporate sector managing multiple projects and leading organisational development before setting up and managing a social enterprise for more than 12 years. Fareea brings to WCS her expertise in managing projects and people, communicating with multiple level stakeholders and funders along with personal development skills to provide technical support to the organisation.

### Akanisi Caginitoba – Community Engagement Coordinator



Akanisi (Cagi) has been part of the WCS team since 2002. Cagi is a specialist in community-based management and leadership. She has assisted over ten districts develop ridge-to-reef management plans, and is currently developing pathways for integrating disaster risk reduction into community planning processes. She assists communities identify, design and raise funds for community projects, and oversees our post-cyclone relief work.

### Andrew Tukana – WISH Fiji Project Manager



Andrew joined WCS in June 2020 to manage the Watershed Interventions for Systems Health (WISH) in Fiji project. He gained his Ph.D. from the School of Veterinary and Biomedical Sciences at James Cook University in Townsville, Australia. Andrew's PhD research focused on the development and improvement of livestock disease surveillance systems in Fiji, Papua New Guinea, Vanuatu and the Solomon Islands. He primarily focused on detecting and determining the prevalence of diseases in livestock populations. He also has extensive experience working in the region as well as with the Ministry of Agriculture in Fiji and the Pacific Community (SPC) to improve food and nutritional security, improve livelihoods through climate change mitigation and adaptation.

### Yashika Nand – Science Coordinator



Yashika joined WCS in 2010. She has a Masters in Marine Science from the University of the South Pacific. Her Master's thesis focused on documenting coral diseases on Fijian coral reefs. Previously she worked for Fiji's Department of Fisheries as the lead coral researcher. Her expertise includes coral identification, coral health assessments, the aquarium trade fishery and more recently value chain analyses of coastal fisheries. She is leading work nationally to document the role and contribution of Indo-Fijians to the fisheries sector.

### Sikeli Naucunivanua – Agricultural Officer



Sikeli joined WCS in 2020. He has Bachelor in Agriculture Science from the University of the South Pacific in Western Samoa. After completing his Diploma in Agriculture from the Fiji College of Agriculture, Sikeli joined the Ministry of Agriculture. He spent nine years at the Ministry as an Agricultural Extension Officer, working with the communities on the islands of Vanuabalavu and Lakeba in the Lau Group. With his extensive knowledge of Fiji's agriculture sector, Sikeli served as a UNCBD MEA Liaison Officer under the partnership of Ministry of Environment and United Nations Development Programme for three years.

### Arishma Devi – Communications Officer



Arishma joined WCS in 2019. She has a Bachelor of Mass Media from the University of Mumbai, India and has worked for Fiji Sun as a Journalist for six years. Before joining WCS Fiji, Arishma was the Communications Officer at the Land Transport Authority, leading their Department of Communications. She is currently pursuing a Post Graduate Diploma in Diplomacy and International Affairs at the University of the South Pacific.

#### Sirilo Dulunagio – Community Engagement Officer



Sirilo (Didi) joined WCS in 2005. Originally from Kubulau and trained as a dive instructor, Didi provides a critical link between WCS activities and management implementation with the communities of Kubulau and adjacent districts. He is involved in both biological and socioeconomic surveys. Recently, Didi is working with communities and dive operators in Ra Province to support Fiji's largest marine protected area (established through a traditional *tabu*) and a voluntary contribution to the conservation scheme.

#### Eferemo Kubunavanua – Community Engagement Officer



Eferemo joined WCS in 2019. He has a Bachelor of Arts in Marine Affairs and Geography from the University of the South Pacific. He worked as a tutor at the University of the South Pacific, a Research Assistant at the Pacific Islands Forum Secretariat. Prior to joining WCS, Eferemo worked as a Research Officer for the iTaukei Land Trust Board. His interests lie in the area of species conservation and the preservation and documentation of traditional knowledge, particularly relating to marine ecosystems. With his role, Eferemo supports communities with natural resource management.

#### Waisea Naisilisili – Fisheries & Operations Support Officer



Waisea joined WCS in 2003 as a field collector and now works as a project officer. Waisea has previously worked at the Fiji Mineral Resources as a research assistant collecting mineral samples. Waisea specialises in coral reef fish surveys, socioeconomic surveys, and community catch monitoring. He is also a specialist in community engagement and supports communities improve the management of their locally managed marine areas.

#### Ingrid Qauqau – GIS and Remote Sensing Officer



Ingrid joined WCS in 2003. She graduated with a Bachelor of Environmental Science in 2002 from the University of the South Pacific. Ingrid specializes in general mapping, image analysis, remote sensing, spatial analysis, and habitat mapping. She is a member of the GIS user forum of Fiji.

#### Bulou Vutaieli Vitukawalu – Fisheries Officer



Vutaieli joined WCS in 2019 with a Master of Science degree from Mie University, Japan, specialising in Shallow Sea Aquaculture. Prior to joining, she was an intern at the Pacific Community (SPC). She was engaged as a volunteer with the World Wide Fund for Nature in Fiji from 2012 to 2014. In 2015, she was a research assistant with the University of the South Pacific and the International Union for Conservation of Nature. Vutaieli has experience working in Japan's eco-tourism sector, engaging with coastal fishing communities, traditional Japanese female divers and the Mikimoto pearl industry.

#### Ana Ciriwawa – Fisheries Officer



Ana joined WCS in 2019. She holds a Bachelor in Marine Science from the University of the South Pacific. Between 2015 to 2016, she devoted her time volunteering with WWF and Global Vision International in Fiji. Ana has worked as a Research Assistant at the School of Marine Studies at the University of the South Pacific in 2016. She brings to WCS her experience and skills in biological and socioeconomic surveys in local communities.

#### Mereia Ravoka – Community Engagement Assistant



Mereia (Mia) joined WCS in 2019. She has a Bachelor in Environmental Science from the University of the South Pacific. In her final year of tertiary education, Mia began volunteering at the Institute of Applied Science where she was exposed to community fieldwork. Later, she joined Fiji Locally Managed Marine Area Network as an intern and then a Graduate Assistant for 2 years.

#### Rosi Batibasaga – Fisheries Assistant



Rosi joined WCS in 2020. She is currently pursuing a Degree in Environmental Science from the University of the South Pacific. She has spent seven years in Fiji's conservation sector. Before joining as a staff member, Rosi worked as a volunteer for WCS where she was involved in conducting various surveys and community engagement.

#### Mohini Raj – Human Resources and Administrative Assistant



Mohini joined WCS in 2018. She holds a Bachelor in Management majoring in Human Resource Management and Industrial Relations Certificate in Business (Banking) and a Diploma in Business (Management), both from the Fiji Institute of Technology. Mohini worked as the secretary to the Managing Director and Group CEO for Foods Pacific Ltd and has over 15 years of administrative experience.

#### Derrick Robinson – Procurement and Administrative Assistant



Derrick joined WCS in 2020. He holds a Professional Diploma in Business Administration and a Postgraduate Certificate in Business Administration from the University of the South Pacific. Prior to joining WCS, Derrick worked for the United Nations Human Rights Office for 10 years as a logistics officer. He has experience from the tuna export and commercial longline fishing with practical knowledge in root crop and livestock poultry farming.

#### Sulia Vorata – Office Support and Cleaner



Sulia joined WCS in 2016. She takes care of the office and supports the staff in the preparation of field logistics and meetings.



## Volunteers

### Luke Uluiburotu



Luke joined WCS as a volunteer in 2020. He holds a Bachelor of Arts Majoring in Geography and Marine Affairs from the University of the South Pacific (USP). He also holds a Certificate IV in Training & Assessment Programme scholarship funded by the USP Pacific European Union Marine Partnerships Project. He joined WCS to assist with projects conducting socio-economic surveys and supporting logistics for field activities.

## Collaborating Students

### Brae Price



Brae completed a Master of Science at Curtin University, Australia in 2020. His research assessed the ecological and socioeconomic impacts of Cyclone Winston on coral reefs ecosystems and the communities that are dependent on them. His supervisors are Drs. Jordan Goetze, Sangeeta Mangubhai and Benjamin Saunders, and Professor Euan Harvey.

### Ana Samperiz



Ana Samperiz is a PhD candidate at Cardiff University investigating signals of water quality and environmental change detected from long-lived coral records collected from the Coral Coast and Ra in Fiji. She will be trying to link long-term records with land use patterns and climate change impacts in adjacent catchments. Her supervisors are Drs. Sindia Sodian, Ken Johnson, Erica Hendy, Eleanor John and Stacy Jupiter.



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## EXECUTIVE SUMMARY

The Vatu-i-Ra Seascape is an area of unique ecological value located between Fiji's two main islands incorporating the four provinces of Bua, Ra, Lomaiviti, and Tailevu, and their associated traditional fishing grounds and offshore channels. The Wildlife Conservation Society Fiji Country Program (WCS Fiji) is working with a diversity of partners to preserve the functional integrity of Fiji's Vatu-i-Ra Seascape to sustain biodiversity, fisheries, and intact linkages between adjacent systems from land to sea, thereby enhancing social-ecological resilience to disturbance, and improving quality and abundance of marine resources for Fiji's people and economy. This report highlights WCS achievements from January to December 2020, under our three main themes of Science, Management and Communication. We also highlight our engagement with national and regional policy and planning, and the links to Fiji's national priority strategies.

In 2020, WCS' scientific studies included:

- Size at maturity and spawning potential ratios for coral reef fish;
- Assessments of the critical role of women and Indo-Fijian fishers and traders in coastal fisheries;
- Mainstreaming gender and human rights-based approaches into coastal fisheries;
- Looking at the social, ecological, and political conditions in which the use of Marine Protected Areas and 'Other Effective Management Measures' are associated with positive outcomes for both people and nature, as well as the synergies and trade-offs that exist between multiple outcomes;
- Strengthening knowledge co-production in Locally Managed Marine Areas; and
- Socialising watershed health data from baseline surveys with communities to support communities develop village Water and Sanitation Safety Plans to reduce the risk of waterborne diseases.

In our efforts to help strengthen community-based natural resource management in the Vatu-i-Ra Seascape WCS:

- Supported three villages in Cakaudrove and Bua provinces finalise and launch their community sea cucumber management plans;
- Assisted in the installation of the first 1,000 pearl oyster spats for Va'ulele Village in Wailevu District as part of establishing their pearl oyster farm;
- Conducted mud crab fattening trainings with women mud crab fishers/sellers in Bua Province to help them fetch better prices for their catch;
- Facilitated a training for women seafood vendors in Vanua Levu to improve the capacity of women fishers to process, handle and sell seafood to domestic markets;
- Supported the fish warden trainings in villages;
- Supported water infrastructure interventions to reduce the risk of waterborne diseases in Dama District and Ovalau Island.

In 2020, WCS produced 13 scientific papers, 6 articles in bulletins, 2 guides for practitioners and supported the drafting of 3 management plans. Our scientific papers covered a variety of topics that included coral bleaching, fisheries, gender equity and social inclusion in coastal fisheries, and the impact of COVID-19 on small-scale fisheries.

## SCIENCE

The following sections present a synthesis of completed and on-going science projects by WCS and partners for 2020. All reports are available online at <https://fiji.wcs.org/Resources.aspx>

### *COVID-19 impact on fishing communities in Fiji*

**STATUS:** Ongoing

**FUNDING:** The David and Lucile Packard Foundation (Grant #2017–66580)

**PARTNER ORGANISATIONS:** Locally Managed Marine Area network (LMMA)

#### **OUTPUTS:**

- LMMA and WCS (2020) COVID19 Update #2: Fiji. 26 May 2020. LMMA Network.
- WCS (2020) COVID19 Update #4: COVID-19 Impact on Indo-Fijians in the coastal fisheries sector: FIJI. Wildlife Conservation Society, Suva.
- Bennett NJ, Finkbeiner EM, Ban NC, Belhabib D, Jupiter SD, Kittinger JN, Mangubhai S, Scholtens J, Gill D, Christie P (2020) The COVID-19 pandemic, small-scale fisheries and coastal fishing communities. *Coastal Management*. 48(4): 336–347.

#### **RESEARCH HIGHLIGHTS:**

The COVID-19 pandemic is an unprecedented health crisis in humanity's recent history with social and economic effects rippling across the globe. Economic effects from border closures, restrictions in movement, and market contractions have impacted all segments of society. Experience from previous natural disasters and economic disruptions has shown that there will be an increased pressure on natural resources, as countries look for opportunities for economic recovery. The national responses to the crisis have many potential implications for urban, peri-urban and rural communities, but these need better understanding if international and government responses are to be most effective, assisting those that are most vulnerable.

In May, WCS partnered with the Locally Managed Marine Area (LMMA) network to conduct surveys to document the impact of COVID-19 on the *iTaukei* coastal communities and the Indo-Fijian fishing communities. The studies were intended as a first step to inform other more extensive surveys (once national restrictions are lifted) or emergency responses. The data collected across ethnic groups, were examined through a gender lens. The results of this



Indo-Fijian fishers selling fish by the roadside stall. ©WCS



Fishers boarding the boat to go fishing. ©Margaret Fox/WCS

research were shared with the government and its partners, to contribute to dialogue, policy, and conservation and development practice.

The study was conducted three months after the first case of COVID-19 was reported in Fiji. Key results from the study summarised as below:

- At the time of the interview, just under half of the people interviewed in the *iTaukei* communities reported immigration of people back to their villages, averaging a 13% increase. Overall, a third of the people interviewed felt there was less fishing pressure than in February this year (pre-COVID-19 and cyclone Harold), while 45.8% stated it was the same, 16.7% stated it was more or a lot more. Just under a third of people suggested this reduction in fishing pressure was because of COVID-19 restrictions. Most people interviewed listed COVID-19 as a major event in their lives but there was little at that time to suggest there was any large impact to their food security or fisheries livelihoods.
- The majority (63.9 %) of coastal fisheries dependent Indo-Fijians interviewed reported only one source of income. COVID-19, Cyclone Harold and bad weather conditions had impacted the livelihoods of Indo-Fijians engaged in the commercial coastal fisheries sector in Fiji. Of those interviewed, 73.8% were affected by a decrease in fish sales which they attributed to declines in local customers and the shrinking of tourism markets. Just under 50% of respondents were affected by the reduction in the price of fish in all five markets surveyed. Based on prices provided by those interviewed, the percentage decrease in sale price ranged from 14.3–77.8% and averaged 36.5%. Just over 10% of respondents were affected by the lockdown and curfew hours that impacted their ability to fish, some were even stuck at sea due to curfew hours limiting when they could return home.

#### **NEXT STEPS:**

- Complete the study on the impact of COVID-19 on commercial *iTaukei* fishers and traders led by the University of the South Pacific (USP) and WCS.

#### **LINKS TO NATIONAL PRIORITIES:**

**NBSAP Implementation Plan TA 3 (Inshore Fisheries), Action 8.2a:** Perform stock assessment of inshore marine resources. **Green Growth Framework TA 3 (Sustainable Island and Ocean Resources):** (i) develop a natural resource management system which is inclusive and integrated, and continue capacity building and awareness programmes with all communities, emphasising supporting resource owners on the importance of proper environmental stewardship. **TA 4 (Inclusive Social Development):** increase women's capacity to participate in decision-making and leadership at all levels to development (from village to national government) by 2018. **Fiji National Gender Policy:** 5.7 Gender Statistics and Research, 5.19 Leadership, Training and Development



## *The role and contribution of non-Indigenous groups to the coastal fisheries sector in Fiji*

**STATUS:** Completed

**FUNDING:** John D. and Catherine T. MacArthur Foundation (Grant #16-1608-151132-CSD)

### **OUTPUTS:**

- WCS (2020) COVID-19 Update #4: COVID-19 Impact on Indo-Fijians in the coastal fisheries sector
- Nand Y, Mangubhai S, Audh R, Bhan N, Kumar A (2021) Valuing the contributions of Indo-Fijian fishers and traders to small-scale fisheries in Fiji. Wildlife Conservation Society. Report No. 01/21. Suva, Fiji.

### **RESEARCH HIGHLIGHTS:**

Non-indigenous (non-*iTaukei*) groups make up just under half of Fiji's population, and many rely on coastal fisheries resources for their subsistence and livelihoods. There is very little information published on how *non-iTaukei* ethnic groups, the largest being Indo-Fijians (or Fijians of Indian descent), contribute to the coastal fisheries sector and the challenges they face as sellers or traders.



WCS staff presenting data on Indo-Fijian fishing communities in Tavua. ©Arishma Devi/WCS

In 2019, a study was undertaken by WCS to document the roles and contributions of non-*iTaukei* groups to Fiji's coastal fisheries sector to: (a) better understand the diversity of coastal fisheries non-indigenous groups participate in, and their contribution to the local and national economy; (b) document the amount of dependence non-indigenous groups have on the coastal fisheries for food and livelihoods; and (c) understand the main challenges and barriers the groups face in Fiji's coastal fisheries sector. A total of 173 individuals were interviewed of which 139 were fishers and 34 traders.

In October 2020, the data from the surveys were presented to the Indo-Fijian fishing communities through a series of consultation workshops in the towns of Ba, Tavua, Rakiraki, Labasa and Savusavu. The participants were able to elaborate on issues they faced and identified their priority needs.

Findings from this work suggested that:

- i. Indo-Fijian fishing community fish in a diversity of fishing areas, ranging from coral reefs, oceanic, deep sea, mangroves, rivers and seagrass beds;
- ii. Indo-Fijian fishers are engaged in the fisheries sector as independent fishers, boat-owners, crew members and middlemen/middlewomen generally classified as traders;
- iii. They invest in coastal fisheries mainly for income (67.4%) and food (30.6%).

The completed report will provide guidance to the Ministry of Fisheries and partners on how to better support these important fisheries groups.



Indo-Fijian fisher of Ba providing comments at the workshop consultation for the Indo-Fijian fishing communities. ©Arishma Devi/WCS

#### **NEXT STEPS:**

- Publish the full report on the study;
- Presentation of the results to the Ministry of Fisheries and other local stakeholders;
- National level awareness and consultation workshops to present the results and further discuss the challenge of these groups and to find ways to better engage this group into coastal fisheries management.

#### **LINKS TO NATIONAL PRIORITIES:**

**NBSAP Implementation Plan TA 3 (Inshore Fisheries), Action 8.2a:** Perform stock assessment of inshore marine resources. **Green Growth Framework TA 3 (Sustainable Island and Ocean Resources):** (i) develop a natural resource management system which is inclusive and integrated, and continue capacity building and awareness programmes with all communities, emphasising supporting resource owners on the importance of proper environmental stewardship. **TA 4 (Inclusive Social Development):** increase women's capacity to participate in decision-making and leadership at all levels to development (from village to national government) by 2018. **Fiji National Gender Policy:** 5.7 Gender Statistics and Research, 5.19 Leadership, Training and Development.

## *Mainstreaming gender and human rights-based approaches into coastal fisheries*

**STATUS:** Ongoing

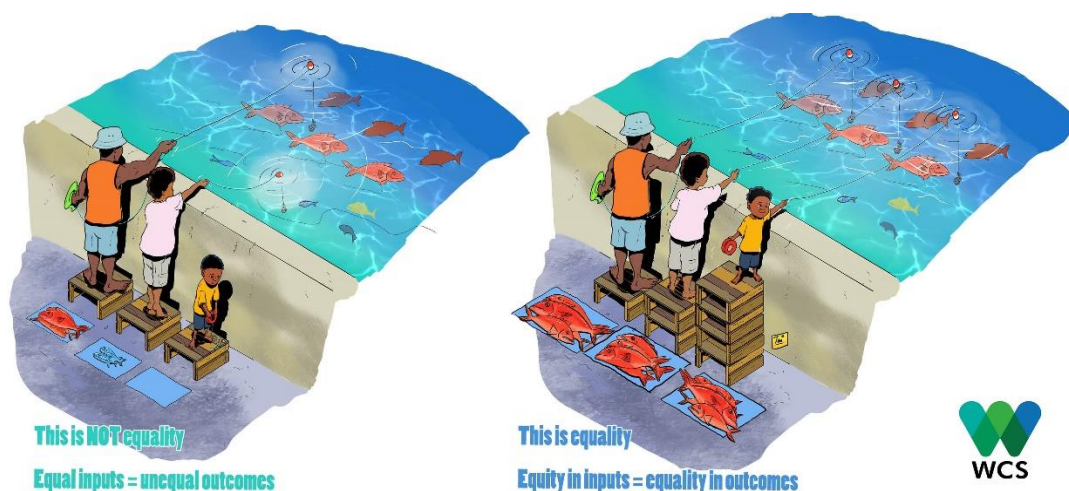
**FUNDING:** Pew Charitable Trusts

**PARTNER ORGANISATIONS:** SPC, James Cook University (JCU)

### **OUTPUTS:**

- Mangubhai S, Lawless S (2021) Exploring gender inclusion in small-scale fisheries management in Melanesia. *Marine Policy*. 123: 104287. <https://doi.org/10.1016/j.marpol.2020.104287>
- Lawless S, Cohen PJ, Mangubhai S, Kleiber D, Morrison T (2021) Gender equality is diluted in commitments made to small-scale fisheries. *World Development*. 140: 105348. <https://doi.org/10.1016/j.worlddev.2020.105348>
- Fisheries need to make gender inclusion a norm, not just 'reach' women, says Pacific study <https://news.mongabay.com/2021/01/fisheries-need-to-make-gender-inclusion-a-norm-not-just-reach-women-says-pacific-study/>
- Mangubhai S, Makhoul N, Kinch J and Kalsuak J (2020) Pacific handbook for gender and social inclusion in small-scale fisheries and aquaculture. Second edition. Pacific Community, Noumea.
- Delisle A, Mangubhai S, Kleiber D (2020) Module 6: Gender and social inclusion in community engagement. In: Mangubhai S, Makhoul N, Kinch J and Kalsuak J (eds.) Pacific handbook for gender and social inclusion in small-scale fisheries and aquaculture. Second edition. Pacific Community, Noumea.
- Gomese C, Kleiber D, Mangubhai S, Paniel C (2020) Building capacity for gender work in fisheries and aquaculture: examples from the Pacific. *Women in Fisheries Information Bulletin*. 32: 49–53

### **RESEARCH HIGHLIGHTS:**



In partnership with SPC, a consultant was hired to undertake a situational analysis of the gender and human rights laws and policies in six Pacific Island countries (Fiji, Kiribati, Samoa, Solomon Islands, Tonga, and Vanuatu) to identify opportunities to remove barriers to their application in coastal fisheries and aquaculture. The findings from the study was presented at an SPC online workshop from 15–17 July 2020 to present the



results to the six countries to get their inputs and improve on the recommendations of the report.

The second edition of the “Handbook for Pacific Gender and Social Inclusion in Small-Scale Fisheries and Aquaculture” will be launched in March 2021. WCS worked closely with SPC to contribute, review and finalise four additional modules for the handbook: (1) community engagement (WCS co-authored the module with Drs. Aurelie Delisle and Danika Kleiber); (2) livelihood projects; (3) small-scale fisheries management; and (4) offshore fisheries. SPC and WCS co-hosted a workshop to get the feedback and inputs of other Pacific Island practitioners on the modules.



Facilitators of the gender training in Vanuatu. ©WCS

Prior to the closure of Fiji’s international borders in March 2020, Dr. Sangeeta Mangubhai partnered Dr. Danika Kleiber (JCU), Chelcia Gomese (WorldFish) and Cedric Paniel (Oxfam Vanuatu) to develop and deliver gender training to Department of Fisheries staff and NGO partners in Vanuatu. The training,

hosted by the Ministry of Agriculture, Livestock, Forestry, Fisheries and Biosecurity, was held from February 25 to 26, 2020. During the workshop, we provided an opportunity for learning exchange and networking with gender development organizations in country (e.g. from Ministry of Women’s Affairs, CARE International, Oxfam, UN Women).

#### **NEXT STEPS:**

- Supporting SPC publish “Gender and human rights in coastal fisheries and aquaculture: A comparative analysis of legislation in Fiji, Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu”
- Submit a manuscript contrasting gender inclusion approaches used by fisheries vs. gender development practitioners in Melanesia.

#### **LINKS TO NATIONAL PRIORITIES:**

**Green Growth Framework TA 3 (Sustainable Island and Ocean Resources):** (i) develop a natural resource management system which is inclusive and integrated, and continue capacity building and awareness programmes with all communities, emphasising supporting resource owners on the importance of proper environmental stewardship. **TA 4 (Inclusive Social Development):** increase women’s capacity to participate in decision making and leadership at all levels to development (from village to national government) by 2018. **Fiji National Gender Policy:** 5.7 Gender Statistics and Research, 5.19 Leadership, Training and Development.



## *When does coastal conservation produce positive outcomes for people and nature?*

**STATUS:** Ongoing

**FUNDING:** Science for Nature and People Partnership (SNAPP)

**PARTNER ORGANISATIONS:** JCU, University of Michigan, World Wildlife Fund, University of Waterloo, University of Victoria, Brock University, RARE Indonesia, French National Centre for Scientific Research, Macquarie University, NCEAS and University of California, Duke University, University of Queensland

### **RESEARCH HIGHLIGHTS:**

The Convention on Biological Diversity and the Sustainable Development Goals underline the urgent need for transformations towards global sustainability. For our planet's oceans, a key target mandates that 10% of coastal and marine areas are to be managed through marine protected areas (MPAs) and other effective area-based conservation measures (OECMs). Many nations have made substantial progress towards meeting this target through establishing large MPAs. There has been slower progress in recognising the role of OECMs, which can include LMMAs with community-based and co-management governance. OECMs are an important approach to marine and fisheries management in many contexts, particularly in developing countries, where recognising local tenure and traditional practices is critical to ensuring equitable management. A key barrier to the recognition of OECMs by the global community is a lack of understanding of whether and how OECMs can deliver positive outcomes for people and nature.

With COVID-19 preventing travel, Drs. Sangeeta Mangubhai and Stacy Jupiter participated in an online SNAPP workshop to review the analysis and products being produced by the SNAPP working group. We aim to produce *new evidence* that can provide guidance to policy makers and practitioners on how environmental management can deliver equitable outcomes from protected and conserved areas to support healthy people and ecosystems.

### **NEXT STEPS:**

- Provide the first global synthesis examining the social and ecological outcomes of different types of coastal conservation measures.
- Build a decision support tool that will help stakeholders invest in and implement effective coastal conservation and management actions.

### **LINKS TO NATIONAL PRIORITIES:**

**Green Growth Framework TA 3 (Sustainable Island and Ocean Resources):** (i) develop a natural resource management system which is inclusive and integrated, and continue capacity building and awareness programmes with all communities, emphasising supporting resource owners on the importance of proper environmental stewardship.

## *What key features support fisheries' resilience to climate change impacts, and how can these features be recognized and enhanced in marine fishery management systems?*

**STATUS:** Ongoing

**FUNDING:** Science for Nature and People Partnership (SNAPP)

**PARTNER ORGANISATIONS:** Environmental Defense Fund (EDF), Gulf of Maine Research Institute, WorldFish, International Council for the Exploration of the Sea (ICES), National Oceanic and Atmospheric Administration (NOAA), Alaska Fisheries Science Center Cornell University, University of the Sunshine Coast, University of California, Harvard University, Iwate University, JCU, University of Tasmania, The Nature Conservancy (TNC), Food and Agriculture Organization of the United Nations (FAO), University of Waterloo, University of British Columbia, University of California, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Stockholm University, University of Hamburg, Environmental Law Institute, University of Kiel, University of Cape Town

### **RESEARCH HIGHLIGHTS:**

Marine fisheries provide income, jobs, and nutrition for millions of people, but impacts of climate change are altering the productivity and distribution of fish stocks and the flows of benefits from fisheries. In this context of increasing change and uncertainty, effective fishery management systems need to be designed to support resilience. This working group will synthesize interdisciplinary information to identify key features of resilience and develop guidance on approaches, processes, and tools that can help operationalize resilience in fisheries around the world. Using experiences and data from around the world, this team will identify features of fisheries that support resilience in the context of climate change. We will analyse case studies to evaluate the benefits of these attributes in fisheries that have already experienced climate impacts. Ultimately, the working group will develop a tool to help managers assess and enhance resilience in a wide variety of fisheries. The SNAPP working group will:

- Provide consensus view of the key features of climate-resilient fisheries and examples of application of these features in fishery management systems;
- Develop a decision support tool to help managers identify resilience capacity and needs, and to provide guidance on approaches to enhance resilience;
- Work with leaders of fishery management organizations to tailor results and products for global, national, and regional application in a variety of fisheries.

Given COVID-19 preventing travel, Dr. Sangeeta Mangubhai participated in an online SNAPP workshop to review the analysis and products being produced by the SNAPP working group.

### **LINKS TO NATIONAL PRIORITIES:**

Green Growth Framework TA 3 (Sustainable Island and Ocean Resources): (i) develop a natural resource management system which is inclusive and integrated, and continue capacity building and awareness programmes with all communities, emphasising supporting resource owners on the importance of proper environmental stewardship.

## Assessment of coral reefs around Vatu-i-Ra Conservation Park and Namena Marine Reserve, post-Cyclone Winston

**STATUS:** Completed

**FUNDING:** John D. and Catherine T. MacArthur Foundation (Grant #16-1608-151132-CSD), Bloomberg Philanthropies (Grant #)

### OUTPUTS:

- McClanahan TR, Darling ES, Maina JM, Muthiga NA, D'agata S, Leblond J, Arthur R, Jupiter SD, Wilson SK, Mangubhai S, Ussi AM, Guillaume MMM, Humphries AT, Patankar V, Shedrawi G, Julius P, Grimsditch G (2020) Large geographic variability in the resistance of corals to thermal stress. *Global Ecology and Biogeography*. 29: 2229–2247. <http://doi.org/10.1111/geb.13191>
- McClanahan TR, Darling ES, Maina JM, Muthiga NA, D'Agata S, Leblond J, Arthur R, Jupiter SD, Wilson SK, Mangubhai S, Ussi AM, Guillaume MMM, Humphries AT, Patankar V, Shedrawi G, Julius P, Grimsditch G (2020) Highly variable taxa-specific coral bleaching responses to thermal stresses. *Marine Ecology Progress Series*. <https://doi.org/10.3354/meps13402>

### RESEARCH HIGHLIGHTS:

The Namena Marine Reserve and Vatu-i-Ra Conservation Park collectively make up almost 80% of the area in Fiji, protected by local communities in partnership with the tourism industry and supported by WCS. In February 2016, a Category 5 Tropical Cyclone Winston passed through Fiji leaving behind a trail of destruction. The disaster greatly impacted the landscapes and communities situated in the Vatu-i-Ra Seascape.

Post cyclone surveys conducted in 2016 to assess and evaluate the impact of the cyclone and recovery potential of two coral reef systems found that the cyclone's 233 kilometres per hour winds and storm-surge induced waves damaged the two reef systems and communities that depend on them for food and livelihoods. In September 2020, a WCS led team of marine scientists surveyed the Namena Marine Reserve and Vatu-i-Ra Conservation Park to record any changes to the reefs since the 2016 Cyclone Winston.



Marine scientists during the science expedition in September 2020.  
©Tom Vierus/WCS

A total of 28 sites were surveyed inside and outside the two marine parks, and adjacent *tabu* areas closer to villages in Kubulau District where WCS has been working with local communities since 2005. These *tabu* areas were established by communities for food security and livelihoods. Data were collected on the benthic cover, habitat structure, coral genera, and fish size and abundance.

#### Key findings from the survey:

- Large areas of reef were seen covered by branching corals all roughly the same size and likely to be around four years in age. These new corals are covering surfaces and are providing new habitat for fish.
- Reef outside the Vatu-i-Ra Conservation Park was severely damaged during the cyclone and coral cover recorded in 2016 was around 10%. The results from the 2020 survey showed an increase in coral cover by 15% outside the park. The inside of the park was not critically affected and coral cover in 2020 reached its pre-cyclone levels of ~50%. In 2016, reefs that were severely damaged and had very low fish biomass, however the average fish biomass for some of these reefs has reached healthy standards of more than 1,000 kg/ha.
- Namena Marine Reserve showed similar recovery. Recovery in coral cover varied between reefs inside the reserve and outside. Recovery was much higher outside the reserve (9% in 2016 to 35% in 2020). Fish biomass recovery highly varied between sites where some sites showed an increase in fish biomass while other sites showed a decrease. This could also be due to the weather pattern during the time of the survey. Unlike Vatu-i-Ra, recovery potential of fish biomass in Namena varied so much that no clear pattern in recovery potential could be detected.

#### NEXT STEPS:

- Present results to the communities and the management committees that look after the Namena Marine Reserve and Vatu-i-Ra Conservation Park

#### LINKS TO NATIONAL PRIORITIES:

**NBSAP Implementation Plan Thematic Area 3 (Inshore Fisheries), Action 3.2b:** Monitor core set of existing MPAs for biodiversity and fisheries resources compared with unmanaged sites; **Action 8.2a:** Perform stock assessment of inshore marine resources. **Fiji Climate Change Policy Objective 5 (Adaptation), Strategy 5:** Support the ecosystem-based approach throughout Fiji, recognising that ecosystem services, such as food security, natural hazard mitigation and physical coastal buffer zones, increase resilience; and **Green Growth Framework Thematic Area 3 (Sustainable Island and Ocean Resources):** (i) develop a natural resource management system which is inclusive and integrated, and continue capacity building and awareness programmes with all communities, emphasising supporting resource owners on the importance of proper environmental stewardship, (ii) government to continue to work with community and civil society on initiatives such as the establishment of marine protected areas and community based fish wardens.



## *Strengthening knowledge co-production in Locally Managed Marine Areas: a Fijian case study*

**STATUS:** Ongoing

**FUNDING:** British Academy, John D. and Catherine T. MacArthur Foundation (Grant #16-1608-151132-CSD)

**PARTNER ORGANISATIONS:** Fiji Locally Managed Marine Area (FLMMA), Locally Managed Marine Area (LMMA), Middlesex University, College of London

### **RESEARCH HIGHLIGHTS:**



Community planning workshop ©WCS

Community-based co-management is hailed as the solution to natural resource decline experienced by rural communities worldwide. It involves decentralised resource management which responds to social and conservation goals. The LMMA network in Fiji is one of the most extensive networks of community-based co-management sites in the world.

After 14 years of existence, the FLMMA network is seeking to identify lessons learned, to provide guidance to stakeholders about inputs and organisational processes that generate knowledge and decisions that deliver sustainable resource use and management. Although co-management takes many forms, a core concept is that knowledge and decisions about local resource management are generated by integrating traditional ecological knowledge with scientific knowledge. Such 'co-produced knowledge' is hypothesised to generate decisions that are locally-relevant, context specific and culturally acceptable. A project was launched in 2018 to evaluate the impact of knowledge co-production on the success or failure of LMMAs in delivering social and ecological benefits, and to identify contextual factors that are conducive to success. Data were collected from 2019 to 2020. The results are currently being analysed.

### **NEXT STEPS:**

- Build a decision support tool that will help stakeholders invest in and implement effective coastal conservation and management actions.
- Produce a technical report on the key findings, and present to the FLMMA network partners.

### **LINKS TO NATIONAL PRIORITIES:**

**NBSAP Implementation Plan Thematic Area 3 (Inshore Fisheries), Action 3.2b:** Monitor core set of existing MPAs for biodiversity and fisheries resources compared with unmanaged sites; **Green Growth Framework Thematic Area 3 (Sustainable Island and Ocean Resources):** (i) develop a natural resource management system which is inclusive and integrated, and continue capacity building and awareness programmes with all communities, emphasizing supporting resource owners on the importance of proper environmental stewardship, (ii) government to continue to work with community and civil society on initiatives such as the establishment of marine protected areas and community based fish wardens.

## MANAGEMENT

The following sections present a synthesis of completed and ongoing activities that have strengthened and supported community-based natural resource management in Fiji in 2019.

### *Spreading district-scale ecosystem-based management in Bua Province*

**STATUS:** Ongoing

**FUNDING:** John D. and Catherine T. MacArthur Foundation (Grant #16-1608-151132-CSD)

**PARTNER ORGANISATIONS:** Bua Provincial Council Office, *iTaukei* Affairs Board (iTAB), *iTaukei* Lands and Fisheries Commission (TLFC), cChange Pacific, Bua Yaubula Management Support Team (BYMST), Fiji Locally Managed Marine Area (FLMMA)

#### **HIGHLIGHTS:**

All nine districts in Bua Province have endorsed their individual EBM plans, which sit under the broader Integrated Coastal Management Plan for Bua Province. In March, representatives from the nine districts, members of the Resource Management Committee (RMC) from Bua Province, Wailevu District in Cakaudrove Province and Udu and Macuata District, Macuata Province congregated to reflect and deliberate on the successes and the challenges they faced in natural resource management. WCS invested in mentorship and training (e.g. project management, governance, EBM plan implementation, environmental legislation) of members of the BYMST, nine district RMCs, 54 village RMCs, as well as 18 customary leaders from Bua Province. WCS updated “A Facilitator’s Guide for Ecosystem-Based Management Planning in Fiji” with new information to better guide integration of disaster risk reduction planning. RMCs in each of the districts in Bua Province implemented a diversity of activities in 2020, including: organic farming (Navakasiga); tree nursery establishment (Bua, Kubulau, Solevu, Vuya, Wainunu); waste management (Vuya); and launching of two village-level sea cucumber management plans (Nadi, Wainunu).

#### **LINKS TO NATIONAL PRIORITIES:**

**Recommendation 2:** Develop ICM plans at the provincial levels which when considered together will suggest the make-up of the National ICM Plan. **Implementation Plan TA 6 (Protected Areas), Strategy 2:** Expand protected area network in priority sites at the national level and provincial level to achieve national targets, **Objective 2.2:** By 2014, develop management structures and implement paths to gazettal at highest priority sites, **Actions 2.2b-c;** and **NBSAP Implementation Plan TA 3 (Inshore Fisheries), Strategy 4:** Design new ecologically relevant inshore MPAs, **Objective 4.6:** By mid-2014, 25% of the communities will have established new management structures for new MPAs, **Action 4.6a:** Consult with communities at priority regions outside of existing MMAs to establish new MPA management structures. **Climate Change Policy Adaptation Strategy 5:** Support the ecosystem based management approach throughout Fiji, recognising that ecosystem services, such as food security, natural hazard mitigation and physical coastal buffer zones, increase resilience. **Green Growth Framework TA 3 (Sustainable Island and Ocean Resources):** (i) develop a natural resource management system which is inclusive and integrated, and continue capacity building and awareness programmes with all communities, emphasising supporting resource owners on the importance of proper environmental stewardship, (ii) government to continue to work with community and civil society on initiatives such as the establishment of marine protected areas and community based fish wardens.

## *Island-scale EBM planning for Lomaiviti Province*

**STATUS:** Ongoing

**FUNDING:** John D. and Catherine T. MacArthur Foundation (Grant #16-1608-151132-CSD), Blue Action Fund (Grant #02-05-2018-21)

**PARTNER ORGANISATIONS:** Lomaiviti Provincial Council Office, Lomaiviti Yaubula Management Support Team (LYMST), Koro Island Yaubula Management Support Team (KIYMST), Ovalau Yaubula Management Support Team (OYMST)

### **HIGHLIGHTS:**

After the launch of the island-scale ecosystem-based management (EBM) plan, the 14 traditional chiefs of the 14 villages on Koro Island collaborated to open a fund to assist the KIYMST. The KIYMST held a meeting in February to deliberate on the various projects that would be implemented under the plan.

The draft management plan for Ovalau Island is undergoing a final review by communities and other stakeholders and will be launched in mid-2021. The plan encompasses Fiji's old capital Levuka, listed as a UNESCO World Heritage Cultural Site, and includes management rules for networks of community protected areas and best land-sea management practices. Socialization of the Ovalau island-scale EBM plan was done in September and October 2020. The OYMST visited all 25 villages to raise awareness on the EBM plan and the proposed protected areas within the island. Using skills gained through a Gender Equity and Social Inclusion training, WCS staff worked towards the increased engagement of women and youth in RMCs and/or activities implemented by RMCs, and built their confidence to provide inputs into village-level decisions on natural resource management.

### **NEXT STEPS:**

- Finalisation of and the launch of the Ovalau Island EBM management plan.

### **LINKS TO NATIONAL PRIORITIES:**

**Recommendation 2:** Develop ICM plans at the provincial levels which when considered together will suggest the make-up of the National ICM Plan. **NBSAP Implementation Plan TA 6 (Protected Areas), Strategy 2:** Expand protected area network in priority sites at the national level and provincial level to achieve national targets, **Objective 2.2:** By 2014, develop management structures and implement paths to gazettal at highest priority sites, **Actions 2.2b-c;** and **NBSAP Implementation Plan TA 3 (Inshore Fisheries), Strategy 4:** Design new ecologically relevant inshore MPAs, **Objective 4.6:** By mid-2014, 25% of the communities will have established new management structures for new MPAs, **Action 4.6a:** Consult with communities at priority regions outside of existing MMAs to establish new MPA management structures. **Climate Change Policy Adaptation Strategy 5:** Support the ecosystem based management approach throughout Fiji, recognising that ecosystem services, such as food security, natural hazard mitigation and physical coastal buffer zones, increase resilience. **Green Growth Framework TA 3 (Sustainable Island and Ocean Resources):** (i) develop a natural resource management system which is inclusive and integrated, and continue capacity building and awareness programmes with all communities, emphasising supporting resource owners on the importance of proper environmental stewardship, (ii) government to continue to work with community and civil society on initiatives such as the establishment of marine protected areas and community based fish wardens.

## Watershed Interventions for Systems Health in Fiji (WISH Fiji)

**STATUS:** Ongoing

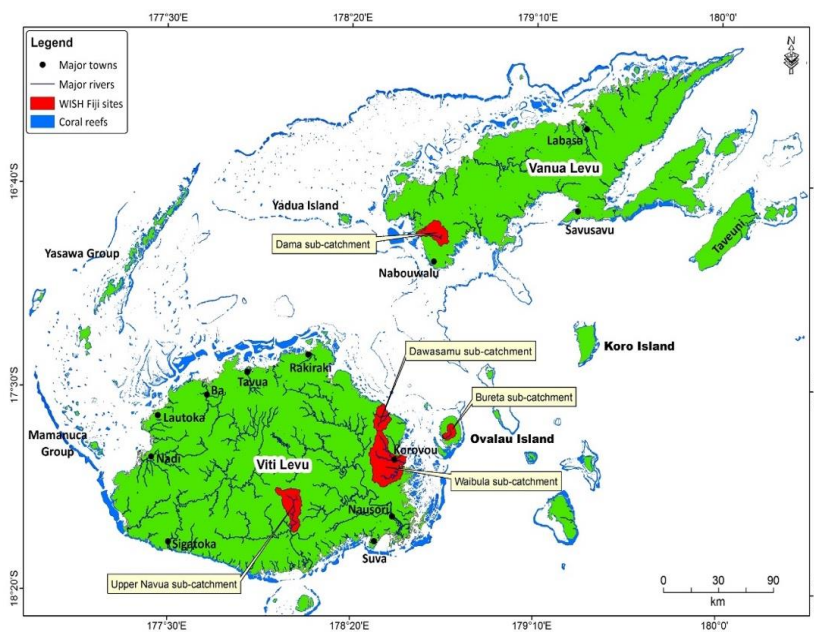
**FUNDING:** Bloomberg Philanthropies (Grant #111340), Australian Department of Foreign Affairs and Trade

**PARTNER ORGANISATIONS:** Fiji National University, University of Sydney, Edith Cowan University, Ministry of Health and Medical Services, Ministry of Environment and Waterways, World Health Organization (WHO), Pacific Committee (SPC), George Institute for Global Health

### OUTPUTS:

- Duff H, Faerron Guzmán C, Almada A, Golden C, Myers S (2020) "Typhoid and Torrents: The Link Between Downstream Health and Upstream Actions." Planetary Health Case Studies: An Anthology of Solutions. 2020; [https://doi.org/10.5822/phanth9678\\_6](https://doi.org/10.5822/phanth9678_6)
- Jenkins A, Jupiter SD, Capon A, Horwitz P, Negin J (2020) Nested ecology and emergence in pandemics. The Lancet Planetary Health 4:e303. [https://doi.org/310.1016/S2542-5196\(1020\)30165-30160](https://doi.org/310.1016/S2542-5196(1020)30165-30160)

### HIGHLIGHTS:



Map of five project sub-catchment sites in Fiji

WCS Fiji launched a national campaign and multi-sectorial partnership called Watershed Interventions for Systems Health in Fiji (WISH Fiji) in 2018. Five priority sub-catchments were selected through a national workshop with government stakeholders based on geographic, environmental, and disease data: Bureta, Dama, Dawasamu, Waibula and Upper Navua

WISH Fiji is focused on targeted and integrated upstream catchment management and policy implementation to reduce the spread of disease and improve downstream ecosystem conditions across these five sub-catchments. Free, Prior and Informed Consent (FPIC) was received from 29 villages to participate in the project. Since its inception, we have completed baseline surveys to identify areas and activities that pose a high disease risk for local communities, and have completed Water and Sanitation Safety Plans (WSSPs) for 50% of the project villages. Briefly, the WSSP process involves workshops with each village, including representatives from village-level WSSP committees to: (a) present back the results



of the baseline surveys, highlighting areas or activities that pose high disease risk for local communities and downstream corals; (b) identify, map out, and assess hazards, hazardous events, risks, and existing control measures being used; and (c) develop an incremental improvement plan with specific interventions to address the main risks identified and ranked. The WSSPs include information about disease risk factors, and the potential interventions to reduce those risks.

### Project Objectives

WISH Fiji aims to:

1. Reduce incidence and occurrence of water-related diseases such as typhoid, diarrhoea, dengue and leptospirosis;
2. Reduce downstream runoff of sediments and nutrients to coral reefs through good catchment management practices;
3. Assess the impact of catchment interventions through regular monitoring;
4. Strengthen the implementation of policies to reduce land-based pollution.



WISH Fiji field staff collecting water sample from the community tank. ©Arishma Devi /WCS

### Working across five sub-catchments



Villagers from Bureta District on Ovalau Island help build the dam. ©Mereia Ravoka/WCS

Community engagement and field work resumed for WCS Fiji staff in mid-July after the Fiji Government eased COVID-19 restrictions on travel and gathering size. Staff presented back data from the baseline surveys to the 29 communities. The data highlighted risk factors that influence the prevalence or susceptibility of a community to water-related diseases. The data was used to assist in the development of the WSSPs and the WSSP process was used to assist communities in identifying other interventions to improve their water and sanitation infrastructure. Through this process, land management practices such as agriculture, forestry and livestock-keeping that require modification or improvement to further minimise and prevent disease risk to communities, and ensure ecosystems are healthy and productive will be identified.

The WISH Fiji team together with the local communities have identified interventions to improve catchment management and human health in the five sub-catchments. The team is

going through the process of identifying the highest priority interventions and plan to implement them in 2021.

Two urgent interventions were carried out in 2020 with the first in the Bureta sub-catchment. A new dam with a collection box and a sedimentation chamber was built to help reduce sedimentation and improve the quality and supply of drinking water to the three villages of Naviteitei, Nasaga and Tai, a settlement, a health centre, a school and the Levuka airport. Two reservoirs in the Bureta sub-catchment were refurbished to improve access to water supply for over 400 people. In November, the villagers with support from the WISH Fiji project, Fiji's Mineral Resources Department, the Bua Provincial Administrator's Office, Bua Provincial Council Office and village-level Water and Sanitation Committee, repaired the broken solar pump for the Tavulomo Village in Dama District in Bua Province, restoring their primary source of water. In the aftermath of Tropical Cyclone Harold that passed through Fiji in April 2020, the Ministry announced an outbreak in the leptospirosis, typhoid and diarrhoea (LTD) cases in cyclone affected areas. To help curb the outbreak, WISH Fiji joined the fight against the LTDs by cleaning the St. Giles Hospital in Suva.



Villagers of Bureta District building the collection box with a sedimentation chamber at the dam site.  
©Mereia Ravoka/WCS



Repairing of the borehole pump at Tavulomo Village, Dama District, Bua Province. ©Eferemo Kubunavanua/WCS

#### NEXT STEPS:

- Prioritisation of interventions to be implemented in the five sub-catchments and carrying out selected interventions.
- Complete a policy gap analysis and produce policy briefs for discussion with key government ministries.

#### LINKS TO NATIONAL PRIORITIES:

**Fiji Climate Change Policy Objective 5 (Adaptation), Strategy 9:** Build the capacity of the health and agriculture sectors to respond effectively to climate sensitive diseases, including the strengthening of disease surveillance and control systems, and early warning mechanisms for climate sensitive human and livestock diseases. **Fiji Ministry of Health Strategic Plan (2011 – 2015): Objective 2.3:** Reduce confirmed cases of typhoid by 75% by 2015; **Objective 2.7:** Reduce incidence rates of leptospirosis by 50% by 2015; and **Objective 7.1:** Increase the proportion of people with access to safe water. **Recommendation 2:** Develop ICM plans at the provincial levels which when considered together will suggest the make-up of the National ICM Plan.



## *Improving effectiveness of inshore fisheries management systems in Fiji to achieve sustainable ecological, social and economic outcomes*

**STATUS:** Ongoing

**FUNDING:** The David and Lucile Packard Foundation (Grant #2017-66580), John D. and Catherine T. MacArthur Foundation (Grant #16-1608-151132-CSD), Blue Action Fund (Grant # 02-05-2018-21)

**PARTNER ORGANISATIONS:** Ministry of Fisheries, Fiji Environmental Law Association (FELA), Biospherics, World Wide Fund for Nature (WWF), Fiji Locally Managed Marine Area (FLMMA)

### **OUTPUT:**

- Prince J, Lalavanua W, Tamanitoakula J, Tamata L, Green S, Radway S, Loganimoce E, Vodivodi T, Marama K, Waqainabete P, Jeremiah F, Nalasi D, Naleba M, Naisilisili W, Kaloudrau U, Lagi L, Logatabua K, Dautei R, Tikaram R, Sloan J, Mangubhai S (2020) Spawning potential surveys in Fiji – a new song of change for small-scale fisheries in the Pacific. Conservation Science and Practice. e273, <https://doi.org/10.1111/csp2.273>

### **HIGHLIGHTS:**

Our fisheries work focuses around three key objectives: (1) improving fisheries management systems; (2) developing effective legislation, policy, and management frameworks; and (3) strengthening governance of inshore fisheries.

**Sea cucumber fishery:** Three villages in Vanua Levu have launched the community-level sea cucumber management plan. In September and October 2020, Natuvu Village in Wailevu District in the Province of Cakaudrove and Sawani Village and Saolo Village in Wainunu District in Bua Province committed to the management plan developed by the villagers and their traditional leaders with support from the Ministry of Fisheries and WCS through several consultations between 2016 and 2019.



Sawani Villagers with the Minister for Fisheries, Semi Koroilavesau and WCS Fiji Country Program Director, Dr Sangeeta Mangubhai at the launch of the sea cucumber management plan. ©Arishma Devi/WCS

Fiji currently has a moratorium on sea cucumber fishing but the villagers see this as a step forward by planning for their future when the moratorium is lifted. The plan addresses the social, economic, and ecological issues associated with harvesting and processing of the fishery identified by men and women fishers. Through the plan, the villagers committed to adhering to the recommended size limits for harvests and training on post-harvest processing of sea cucumbers. Fish wardens also have a role to ensure fishers comply with the rules in the management plan.

### **Fish Warden Training:**



In October, a three-day fish warden training was conducted in Sawani and Navunievu villages in Bua Province. In December, another fish warden training was conducted for the existing and new fish wardens of 11 villages from Nakorotubu District in Ra Province. The graduating fish wardens will be tasked to monitor the Vatu-i-Ra Conservation Park and surrounding waters within their customary fishing ground. A total of 69 men and women fish wardens were trained.

Women of Nakorotubu District in Ra Province participate in Fish Warden Training. ©Sirilo Dulunaqio/WCS

**National Fish Warden Strategy:** Two Fish Warden Forums were held in the Northern Division in 2015 and 2018. The Ministry of Fisheries and WCS co-hosted Fish Warden Forums in Central and Western divisions in March 2019, to obtain inputs into a national fish warden strategy. The issues faced by community fish wardens in the Northern, Central and Western divisions are similar, and include: (i) unclear roles and responsibilities; (ii) lack of compensation for time and effort; (iii) inadequate training; (iv) unclear processes for dealing with offenders; and (v) poor communication and coordination between fish wardens and enforcement agencies. Based on the inputs from fish wardens and from other enforcement agencies, a draft of the National Fish Warden Strategy has been completed and submitted to the Ministry of Fisheries for their final review.

### **LINKS TO NATIONAL PRIORITIES:**

**NBSAP Implementation Plan Thematic Area 3 (Inshore Fisheries), Action 8.2a:** Perform stock assessments of inshore fisheries. **Green Growth Framework TA 3 (Sustainable Island and Ocean Resources):** (i) develop a natural resource management system which is inclusive and integrated, and continue capacity building and awareness programmes with all communities, emphasising supporting resource owners on the importance of proper environmental stewardship.



## *Supporting women in fisheries as a strategy to strengthen and expand marine conservation in Fiji*

**STATUS:** Ongoing

**FUNDING:** Blue Action Fund (Grant #02-05-2018-21), Kerrest Johnson Family Charitable Fund (Grant #111835)

**PARTNER ORGANISATIONS:** Ministry of Fisheries

### **HIGHLIGHTS:**



Preparing bamboo growing in their village as building materials for their mud crab pens. ©Ana Ciriya/WCS

At the beginning of the year, WCS introduced the mud crab project to 13 villages in Bua Province. Free, Prior and Informed Consent (FPIC) process was subsequently conducted in the four villages that indicated interest to pursue the project, namely Tavulomo Village in Dama District, Bua Lomanikoro and Tiliva Village in Bua District and Tavea Village in Lekutu District. This was followed by a gender and risk assessment of the villages and a scoping exercise.

In December 2020, women fishers from these four villages underwent a two-day skill-building workshop on mud crab fattening and post-harvest handling aimed at improving local livelihoods. The initiative provided a platform for the fishers to learn about processes and techniques that assist in the identification of quality mud crabs that can fetch better prices in the market. The women learned how to identify berried mud crabs to avoid catching them and those that had full packed meat to fetch better prices. Fishers further learnt and built mud crab fattening pens and walkways through the mangroves with locally available natural materials.

### **NEXT STEPS:**

- Creation of summary mud crab management plans for the communities.

### **LINKS TO NATIONAL PRIORITIES:**

**NBSAP Implementation Plan TA 3 (Inshore Fisheries), Action 3.2b:** Monitor core set of existing MPAs for biodiversity and fisheries resources compared with unmanaged sites; **Action 8.2a:** Perform stock assessment of inshore marine resources. **Green Growth Framework TA 3 (Sustainable Island and Ocean Resources):** (i) develop a natural resource management system which is inclusive and integrated, and continue capacity building and awareness programmes with all communities, emphasising supporting resource owners on the importance of proper environmental stewardship. **TA 4 (Inclusive Social Development):** increase women's capacity to participate in decision making and leadership at all levels to development (from village to national government) by 2018. **Fiji National Gender Policy:** 5.7 Gender Statistics and Research, 5.19 Leadership, Training and Development.

## *Nature's Strongholds: Supporting women in fisheries in Fiji's Vatu-i-Ra Seascape*

**STATUS:** Ongoing

**FUNDING:** Oceans 5-Vibrant Oceans Initiative (Grant #), Kerrest Johnson Family Charitable Fund (Grant #111835)

**PARTNER ORGANISATIONS:** cChange was there to present on the 4FJ Fish Smart Campaign

### **HIGHLIGHTS:**



Participants of the Women in Fisheries training in Labasa with WCS staff getting ready for their practical session.  
©Bulou Vitukawalu/WCS

In November, women seafood vendors from the Labasa and Nabouwalu markets and communities including Tavulomo, Tiliva, Tavea and Kavewa villages of Bua Province were engaged in a three-day Women in Fisheries training conducted by WCS. The training was aimed at improving the capacity of women fishers to process, handle and sell seafood to domestic markets. It provided a platform for

WCS and the women seafood vendors to better understand priority issues for women in the marketplace through presentation and group work. The participants were also introduced to the 4FJ Fish Smart Campaign to better understand the importance of selecting fish at the correct size of maturity for sale. Participants received an intensive theory and practical session on safe seafood handling, fish assessment upon arrival, hygiene and processing. The training was led by a nutrition scientist from the Fiji National University.

### **NEXT STEPS:**

- Create a training manual on seafood handling, hygiene and processing for the next women in fisheries training;
- Supporting women seafood vendors in their engagement with relevant authorities to help improve their markets.

### **LINKS TO NATIONAL PRIORITIES:**

**NBSAP Implementation Plan TA 3 (Inshore Fisheries), Action 3.2b:** Monitor core set of existing MPAs for biodiversity and fisheries resources compared with unmanaged sites; **Action 8.2a:** Perform stock assessment of inshore marine resources. **Green Growth Framework TA 3 (Sustainable Island and Ocean Resources):** (i) develop a natural resource management system which is inclusive and integrated, and continue capacity building and awareness programmes with all communities, emphasising supporting resource owners on the importance of proper environmental stewardship. **TA 4 (Inclusive Social Development):** increase women's capacity to participate in decision making and leadership at all levels to development (from village to national government) by 2018. **Fiji National Gender Policy:** 5.7 Gender Statistics and Research, 5.19 Leadership, Training and Development.

## *Establishing community pearl oyster farm*

**STATUS:** Ongoing

**FUNDING:** Blue Action Fund

**PARTNER ORGANISATIONS:** J. Hunter Pearls, Pacific Community (SPC)

**OUTPUT:**

Vitukawalu B, Mangubhai S, Ma F, Dulunaqio S, Pickering T, Whitford J (2020) Establishing a community pearl oyster farm in Vatulele Village, Fiji. SPC Fisheries Newsletter 160: 46-47

**HIGHLIGHTS:**

Va'ulele Village in Wailevu District, Cakaudrove Province has established the first community pearl meat oyster farm in Fiji through a private sector-community partnership with J. Hunter Pearls Fiji (JHP) as the private sector partner, the Pacific Community (SPC) providing technical knowledge and WCS facilitating the development of the community. A series of workshops and trainings were carried out to build capacity of the villagers and pearl farm team. In August, WCS conducted a financial literacy and business planning training for the community to help understand the business and financial aspects of the project and the setting up of a Va'ulele pearl farm committee. The pearl oyster farm infrastructure was installed within the village iqoliqoli (traditional fishing rights area) in October and the first batch of 1,000 metres of spat collectors were deployed the following month.



Installing the spat collectors onto the Va'ulele community farm. ©Bulou Vitukawalu/WCS



In December, a pearl biology and pearl farming techniques training was conducted by SPC. This project is expected to economically benefit more than 180 people from the village as the farm grows to supply the pearl meat to potential markets which JHP is working on developing. If found to be a viable livelihood project, the process will be fine-tuned to be replicated in other villages as it (i) improves economic livelihoods (ii) provides opportunities for employment and development, and (iii) supports non-extractive sustainable fisheries and protection of the environment.



Participants of the pearl farm business planning workshop. ©Fareea Ma/WCS



Learning how to tie the correct knots during the pearl farm technical workshop. ©Bulou Vitukawalu /WCS

#### **NEXT STEPS:**

- Deploy 2,000 metres of spat collectors in the next eight months;
- Continue training of the villagers on administrative, farm maintenance and oyster harvesting skills;
- Begin training for the second community pearl farm at the Urata Village;
- Complete the establishment of legal entities to manage the pearl farm and village trust.

#### **LINKS TO NATIONAL PRIORITIES:**

**NBSAP Implementation Plan TA 3 (Inshore Fisheries), Action 8.2a:** Perform stock assessment of inshore marine resources. **Green Growth Framework TA 3 (Sustainable Island and Ocean Resources):** (i) develop a natural resource management system which is inclusive and integrated, and continue capacity building and awareness programmes with all communities, emphasising supporting resource owners on the importance of proper environmental stewardship. **TA 4 (Inclusive Social Development):** increase women's capacity to participate in decision making and leadership at all levels to development (from village to national government) by 2018. **Fiji National Gender Policy:** 5.7 Gender Statistics and Research, 5.19 Leadership, Training and Development.



## *Sustainable financing for local community protected areas*

**STATUS:** Ongoing

**FUNDING:** John D. and Catherine T. MacArthur Foundation (Grant #16-1608-151132-CSD), Blue Action Fund

**PARTNER ORGANISATIONS:** Ra Provincial Council, Volivoli Resort, Nai'a Cruises, Pacific Community (SPC), Fiji Environmental Law Association (FELA), BirdLife International, YachtHelp

### **OUTPUT:**

Mangubhai S, Sykes H, Manley M, Vukikomoala K, Beattie M (2020) Contribution of tourism-led marine conservation agreements to natural resource management in Fiji. *Ecological Economics*. 171: doi.org/10.1016/j.ecolecon.2020.106607

### **HIGHLIGHTS:**



Participants of the fish warden training. ©Sirilo Dulunaqio/WCS

This year, the Vatu-i-Ra Conservation Park Management Committee opened a bank account to help manage and maintain their funds. A two-week Class 6 Boat Master training was conducted by Maritime Safety Authority of Fiji with support from WCS to train 10 people from Nakorotubu District in Ra. The graduates will be piloting the Vatu-i-Ra Conservation Park's monitoring and enforcement boat.

As part of the continuing efforts to safeguard and maintain the Park, the Ministry of Fisheries, with support from WCS, also conducted a three-day fish warden training in Nayavutoka, Nakorotubu District. A total of 29 people including three women from 11 villages of the Nakorotubu District participated in the training which will enable them to support the monitoring and surveillance of the Vatu-i-Ra Conservation Park and their surrounding customary fishing grounds (*qoliqoli*).

To obtain more information on the Park, visit website access: <https://www.vatu-i-ra.org/>

### **Next Step:**

- Purchase enforcement boat for the Vatu-i-Ra Management Committee for the monitoring and surveillance of the Vatu-i-Ra Conservation Park.

### **LINKS TO NATIONAL PRIORITIES:**

By providing means to alternate revenue streams, this activity in principle supports **NBSAP Implementation Plan TA 3 (Inshore Fisheries), Strategy 9:** Reduce demand for marine natural resources and biodiversity products. However, monitoring will be required to evaluate whether revenue is additive or alternative. **TA 3 (Protected Areas), Strategy 3:** Develop sustainable finance mechanisms for new and existing protected areas. **Action 3.1d:** Ensure meaningful participation and provide equitable incentives and remuneration to resource owners for Protected Area establishment and management.

## *Kilaka Forest Conservation Area*

**STATUS:** Ongoing

**FUNDING:** Harvey and Heidi Bookman, John D. and Catherine T. MacArthur Foundation (13-104090-000-INP)

**PARTNER ORGANISATIONS:** Nadicake *mataqali*, iTaukei Land Trust Board (TLTB), Ministry of Forests, Ministry of Environment, Kubulau Resource Management Committee (RMC)

### **HIGHLIGHTS:**

The Kilaka Forest Conservation Area (KFCA) is a 402-hectare block of one of the last native rainforests on Fiji's second largest island of Vanua Levu, within the heart of the Vatu-i-Ra Seascape, where WCS focuses its conservation investments. The KFCA lease agreement was issued to WCS by the iTaukei Lands Trust Board on 22 June 2017 for a period of 99 years effective from 01 January 2017 for a total land area of 402 hectares that was subject to a final survey. This survey to confirm the exact park boundary was carried out in 2020 and has recently been concluded. The new lease title is currently being processed by the Fiji Ministry of Lands for approval and the initiation of the final process for the issuance of the KFCA Lease Title.

To support the monitoring of the park, horses were purchased for the forest wardens to make their enforcement rounds faster and more efficient. The three new signages that were installed the previous year have helped boost the visibility and awareness to the general public.

### **LINKS TO NATIONAL PRIORITIES:**

**NBSAP Implementation Plan TA 6 (Protected Areas), Strategy 1:** Identify gaps in biodiversity protection against national targets. **Strategy 2:** Expand protected area network in priority sites at the national level and provincial level to achieve national targets. **Green Growth Framework TA 6 (Freshwater Resources and Sanitation Management):** Adoption of watershed management plans using integrated water resources management principles for major rivers, waterways and drainage systems.

## ENGAGING WITH NATIONAL AND REGIONAL POLICY AND PLANNING

The following sections present a synthesis of ways that WCS Fiji has participated in development of national and regional conservation and resource management policies and planning in 2019.

### *Protected Area Committee*

WCS participated in the national Protected Areas Committee (PAC) under the Ministry of Waterways and Environment, established under the Environmental Management Act (2005). WCS Fiji Director, Dr. Sangeeta Mangubhai continued to chair the Marine Working Group for PAC. The focus of the meeting was the commitment by Fiji to protect 30% of its seas by 2020. WCS and NGO partners supported the three lead Ministries – Environment and Waterways, Fisheries, and Foreign Affairs – to undertake the first round of public consultations in the Northern (Labasa, October 19–20), Western (Lautoka, October 22–23) and Central and Eastern (Suva, October, 28–29) divisions.

### *Marine Protected Areas Advisory Committee*

WCS participated in the national Marine Protected Area Technical Advisory Committee chaired by the Ministry of Fisheries, established under the Offshore Fisheries Management Decree (2012). The focus of the meeting was the commitment by Fiji to protect 30% of its seas by 2020. WCS and NGO partners supported the three lead Ministries – Environment and Waterways, Fisheries, and Foreign Affairs – to undertake the first round of public consultations. A separate consultation conducted by the Ministry of Fisheries was held on 26 October 2020 with the offshore fishing industry, which has raised strong objections to the MPAs if they proceed as fully no-take, prohibiting industrial fishing in their waters. The next steps are for the core working group to compile and assess the written feedback received from national consultations in order to determine how the feedback should inform any modifications to the candidate offshore MPA network.

### *CITES Management Authority*

Dr. Sangeeta Mangubhai continued to serve on the CITES Management Authority for Fiji.

### *Climate Finance Sectoral Working Group*

Dr. Sangeeta Mangubhai, was appointed to the Climate Finance Sector Working Group focusing on “Ecosystems and Ecosystem Services and Sustainable Land Management” to support the Fiji Government’s Climate Change and International Cooperation Division on: climate change and climate finance best practices; programs and projects; lessons learned; public policies and plans; assessment of proposals to the Green Climate Fund; and the development of projects aligned to these priorities. The Working Group will also support all stakeholders in Fiji to strengthen their capacity to access both international and domestic climate finance.

## 2020 PUBLICATIONS

### *Journal Articles*

Grantham et al. (2020) Anthropogenic modification of forests means only 40% of remaining forests have high ecosystem integrity. *Nature Communications* <https://doi.org/10.1038/s41467-41020-19493-41463>

Jenkins A, Jupiter SD, Capon A, Horwitz P, Negin J (2020) Nested ecology and emergence in pandemics. *The Lancet Planetary Health* 4:e303. DOI:[https://doi.org/310.1016/S2542-5196\(1020\)30165-30160](https://doi.org/310.1016/S2542-5196(1020)30165-30160)

Prince J, Lalavanua W, Tamanitoakula J, Tamata L, Green S, Radway S, Loganimoce E, Vodivodi T, Marama K, Waqainabete P, Jeremiah F, Nalasi D, Naleba M, Naisilisili W, Kaloudrau U, Lagi L, Logatabua K, Dautei R, Tikaram R, Sloan J, Mangubhai S (2020) Spawning potential surveys in Fiji – a new song of change for small-scale fisheries in the Pacific. *Conservation Science and Practice*. e273, <https://doi.org/10.1111/csp2.273>

McClanahan TR, Darling ES, Maina JM, Muthiga NA, D’agata S, Leblond J, Arthur R, Jupiter SD, Wilson SK, Mangubhai S, Ussi AM, Guillaume MMM, Humphries AT, Patankar V, Shedrawi G, Julius P, Grimsditch G (2020) Large geographic variability in the resistance of corals to thermal stress. *Global Ecology and Biogeography*. 29: 2229–2247. DOI: 10.1111/geb.13191

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Bennett NJ, Finkbeiner EM, Ban NC, Belhabib D, Jupiter SD, Kittinger JN, Mangubhai S, Scholtens J, Gill D, Christie P (2020) The COVID-19 pandemic, small-scale fisheries and coastal fishing communities. *Coastal Management*. 48(4): 336–347. <http://dx.doi.org/10.1080/08920753.2020.1766937>

MacNeil et al. (2020) Global status and conservation potential of reef sharks. *Nature* <https://doi.org/10.1038/s41586-020-2519-y>

Sterling EJ, Pascua P, Sigouin A, Gazit N, Mandle L, Betley E, Aini J, Albert S, Caillon S, Caselle JE, Cheng SH, Claudet J, Dacks R, Darling ES, Filardi C, Jupiter SD, Mawyer A, Mejia M, Morishige K, Nainoca W, Parks J, Tanguay J, Ticktin T, Vave R, Wase V, Wongbusarakum S, McCarter J (2020) Creating a space for place and multidimensional well-being: Lessons learned from localizing the SDGs. *Sustainability Science*. <https://doi.org/10.1007/s11625-020-00822-w>

Dacks R, Ticktin T, Jupiter S, Friedlander A (2020) Investigating the role of fish and fishing in sharing networks to build resilience in coral reef social-ecological systems. *Coastal Management*. <https://doi.org/10.1080/08920753.2020.1747911>

Piovanno S, Lemons GE, Ciriyaawa A, Batibasaga A, Seminoff JA (2020) Diet and recruitment of juvenile green turtles at two foraging grounds in Fiji, South Pacific inferred from in-water capture and stable isotope analysis. *Marine Ecology Progress Series*. 640: 201-213 [doi.org/10.3354/meps13287](https://doi.org/10.3354/meps13287)



Mangubhai S, Sykes H, Manley M, Vukikomoala K, Beattie M (2020) Contribution of tourism-led marine conservation agreements to natural resource management in Fiji. *Ecological Economics*. 171: doi.org/10.1016/j.ecolecon.2020.106607

Campbell SJ, Darling ES, Pardede S, Ahmadia G, Mangubhai S, Amkieltiela, Estradivari, Maire E (2020) Remoteness and fishing restrictions support fish biomass and trophic structure on Indonesia's coral reefs. *Conservation Letters*. DOI: 10.1111/conl.12698

Beger M, Wendt H, Sullivan J, Mason C, LeGrand J, Davey K, Jupiter S, Ceccarelli D, Dempsey A, Edgar G, Feary D, Fenner D, Gauna M, Grice H, Kirmani SN, Mangubhai S, Purkis S, Richards Z, Rotjan R, Stuart-Smith R, Sykes H, Yakub N, Bauman A, Hughes A, Raubani J, Lewis A, Fernandes L (2020) Marine bioregions in the Southeastern Pacific to support integrated ocean governance. *Marine Pollution Bulletin*. 150: <https://doi.org/10.1016/j.marpolbul.2019.110710>

### ***SPC Bulletins***

Thomas A, Mangubhai S, Fox M, Lalavanua W, Meo S, Naisilisili W, Ralifo A, Veitayaki J, Waqairatu S (2020) The critical contribution of women fishers to food security and livelihoods in Fiji. Summary for Decision-Makers. Wildlife Conservation Society, Suva, Fiji. 6 pp.

Vitukawalu B, Mangubhai S, Ma F, Dulunaqio S, Pickering T, Whitford J(2020) Establishing a community pearl oyster farm in Vatulele Village, Fiji. *SPC Fisheries Newsletter* 160: 46-47

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Vitukawalu B, Mangubhai S, Berdejo V, Naleba M, Nand Y, Ieli P (2020) Addressing barriers and constraints to gender equality and social inclusion of women seafood sellers in municipal markets in Fiji. *SPC Women in Fisheries Information Bulletin*. 31: 30-25

### ***Reports***

Nand Y, Mangubhai S, Naisilisili W, Tamanitokula J, Dulunaqio S (2020) Assessment of Coral Reefs around Koro Island, Lomaiviti Province. Report No. 01/20. Wildlife Conservation Society, Suva, Fiji. 44 pp.

Thomas A, Mangubhai S, Fox M, Lalavanua W, Meo S, Naisilisili W, Ralifo A, Veitayaki J, Waqairatu S (2020) The critical contribution of women fishers to food security and livelihoods in Fiji. Report No. 02/20. Wildlife Conservation Society, Suva, Fiji. 136pp.