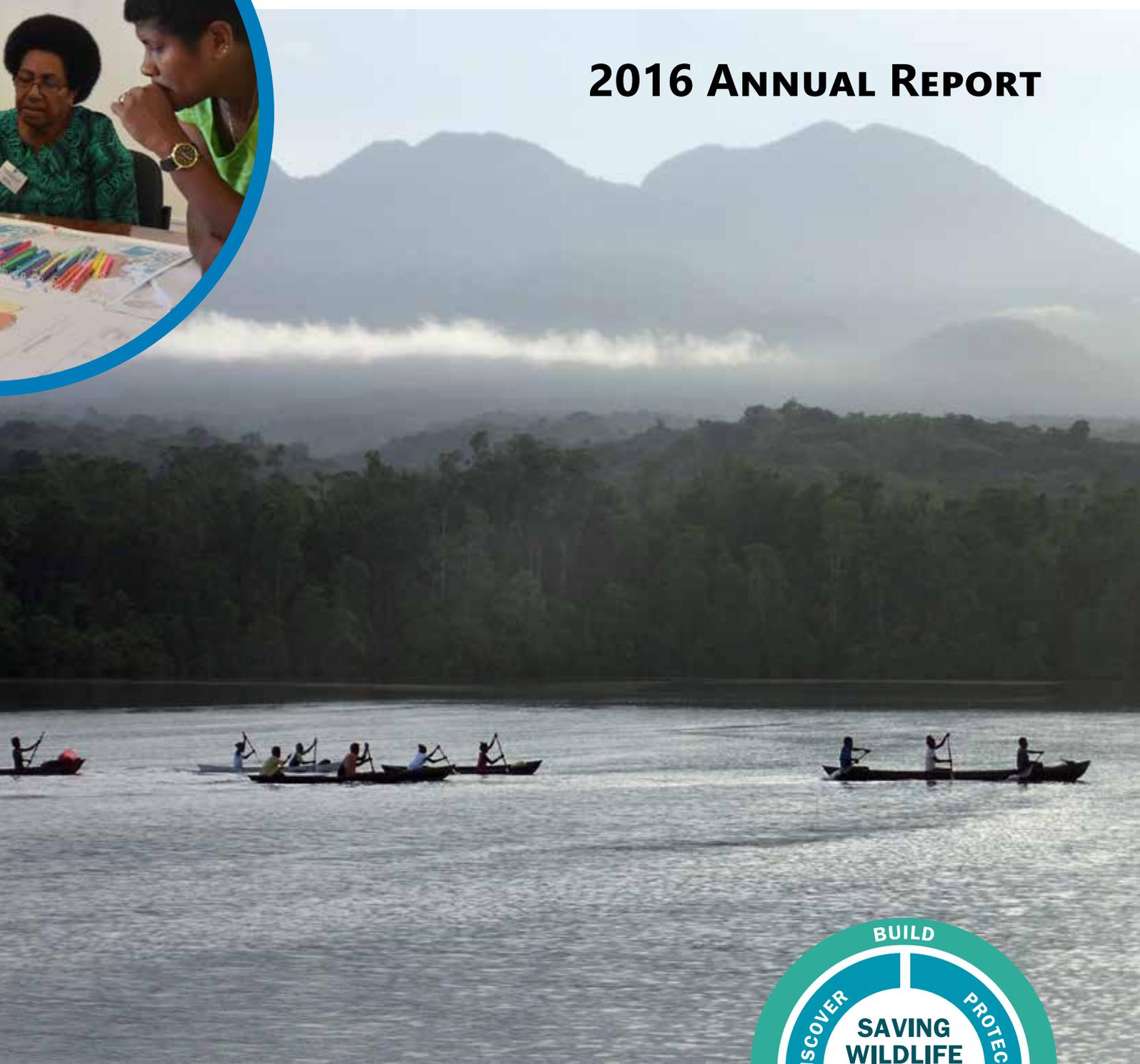




2016 ANNUAL REPORT



HIGHLIGHTS FROM OUR DISCOVERY SCIENCE, CONSERVATION INITIATIVES, OUTREACH AND CAPACITY PROGRAMS AND GROWING PARTNERSHIPS MEASURED AGAINST THE WCS MELANESIA 2020 STRATEGY



Providing evidence-based guidance that informs species conservation and ecosystem management



Emily Darling

SETTING LIMITS ON SUSTAINABLE HARVESTS

No-take tambu areas, where hunting and fishing are restricted, are an indigenous resource management tool found across Melanesia. Using demographic and movement data collected from Admiralty cuscus in PNG, WCS researchers found that harvest rates of 10% of the population or less should be sustainable if the tambu is opened annually, while larger harvests of 50 percent of the local population would require a recover period of more than 5 years. In marine systems, data collected through 4 tambu harvests in Fiji show that 1 year of closure is insufficient to support annual pulse harvests of coral reef fish. Models suggest that in areas that are heavily fished, tambu should stay closed for at least 3 years and be open for no more than 1 to 2 days for fishing.

Funded by Australian Government Department of Foreign Affairs and Trade and the David and Lucile Packard Foundation

Full citations: Whitmore et al. (2016) The context and potential sustainability of traditional terrestrial periodic tambu areas: insights from Manus Island, Papua New Guinea. *Pacific Conservation Biology* 22:151-158
Goetze et al. (2016) Periodically harvested closures require full protection of vulnerable species and longer closure periods. *Biological Conservation* 203:67-74

LINKING ENVIRONMENT AND PUBLIC HEALTH

New high profile research published by WCS and collaborators has shown pathways for transmission of human disease that may be linked to environmental change. A new study published in *Nature* found that the Fiji microbiome (bacteria found in and on people's skin, mouth and gut) contains many uncharacterized species and genes and there is high natural antibiotic resistance among the Fijian population. Furthermore, bacteria tend to be passed between individuals sharing households. This study was designed to investigate the spread of benign bacteria as a proxy for how more harmful bacteria, like those that cause typhoid, are spread. These results were complemented by parallel research which found that typhoid incidence and recurrence in Fiji is linked to the presence of highly erodible soil and multiple pathways for it to enter stream systems. As a result, through our partners, WCS has worked with the Fiji Ministry of Health to design simple recommendations for to reduce soil erosion and eliminate ways that bacteria are spread within households in order to maintain healthy waterways and reduce disease transmission.

Funded by National Human Genome Research Institute, the Center for Environmental Health Sciences at Massachusetts Institute of Technology (MIT), the Center for Microbiome Informatics and Therapeutics at MIT and Edith Cowan University

Full citations: Brito et al. (2016) Mobile genes in the human microbiome are structured from global to individual scales. *Nature* 535:435-439
Jenkins et al. (2016) Health at the sub-catchment scale: typhoid and its environmental determinants in Central Division, Fiji. *EcoHealth* 13:633-651

SEA CUCUMBERS AND LOCAL LIVELIHOODS



Watisoni Lalavanua



Watisoni Lalavanua

Wild caught sea cucumbers are a high value export fishery, which operates largely unmanaged in Fiji and the broader Pacific region. A new value chain analysis of the Fiji sea cucumber fishery suggests there are low barriers to entry, but also low returns given that prices are driven by buyers and fishers have little bargaining power to negotiate.

Across the region, dissatisfaction with fishery income is common and increases with age of fishers. Improvement of supply chains such that local fishers can retain greater benefits is a critical need to improve fisher wellbeing.

Other specific recommendations include endorsement of a national sea cucumber management plan in Fiji, banning the use of underwater breathing equipment for catch, establishing limits to the number of exporters, and improving post-harvest quality of processed sea cucumber products.

Funded by the David and Lucile Packard Foundation, the John D. and Catherine T. MacArthur Foundation and The Australian Centre for International Agricultural Research

Full citations: Mangubhai et al. (2016) Value chain analysis of the wild caught sea cucumber fishery in Fiji. *Wildlife Conservation Society and Department of Fisheries. Report No. 02/16, Suva.*
Purcell et al. (2016) Multiple factors affect socioeconomics and wellbeing of artisanal sea cucumber fishers. *PLoS ONE* 11:e0165633 doi:10.1371/journal.pone.0165633



John Lamatis

DISCOVER

Protecting important land and seascapes across Melanesia

MANAGEMENT PLAN ENDORSED FOR KILAKA FOREST

In November, WCS and the Fiji Ministry of Forests officially launched the Kilaka Forest Conservation Area Management Plan. The Plan received full endorsement from the Nadicake clan, who is leasing 402 hectares of primary native forest on their land to WCS for 99 years, as well as from the Ministry of Forests, iTaukei Land Trust Board, Bua Provincial Government and Kubulau District Resource Management Committee. The Kilaka Forest Conservation Area will contribute to the Fiji Government's commitment under the Convention on Biological Diversity towards the protection of 17% of their forests by 2020.

"I congratulate [the Nadicake clan] for seeing and valuing the forests they own and for having the foresight, and the vision to protect it despite the pressures to log the area." Osea Naiqamu, Fiji Minister for Forests, Fiji Times, November 24, 2016

Funded by Harvey and Heidi Bookman



PROTECT

KOLOMBANGARA LANDOWNERS SUPPORT FOREST PROTECTION

Kolombangara Island in Western Province, Solomon Islands, boasts extremely high terrestrial biodiversity, given that it is one of only two mountain systems above 1700 m in the country. The island also supports a high diversity of terrestrial ecosystems and at least six endemic bird and three endemic frog species. In 2016, WCS supported the Kolombangara Island Biodiversity Conservation Association (KIBCA) rangers and members of Ecological Solutions – Solomon Islands to undertake scoping consultations with members of all 81 villages on Kolombangara and Kolombangara landowners on neighbouring islands to assess willingness to protect the forests above 400 m on their island. A resounding 98% of landowners voiced positive support for establishment of a national park. As a large portion of the island is under a fixed term estate by Forest Stewardship Council certified company Kolombangara Forest Products Ltd. (KFPL), the next step is to consult with KFPL and other key stakeholders about ways to practically operationalize the protected area and develop appropriate benefits sharing mechanisms.



Funded by the Wallace Research Foundation and the Kempner Family Foundation

COMMUNITY MANGROVE PROTECTION IN NEW IRELAND

PNG has the world's highest mangrove diversity and 70% of the mangroves in Pacific Islands countries. Since 2012, WCS has been working with communities in New Ireland Province to develop strategies for mangrove protection and restoration within their customary fishing grounds and lands. Through careful research, we identified factors influencing the survival rate of planted mangrove seedlings and additionally used perception-based surveys to estimate the value of mangrove ecosystem services annually provided to local communities. In 2016, WCS assisted 10 communities around the Tsoi and Tigak Islands and New Hanover Island to develop draft management plans for their mangrove areas.

Funded by the United Nations Development Programme



Moving people to take action through stories and examples

PNG CLIMATE ADAPTATION STORIES SHARED THROUGH DIGITAL MAP

WCS PNG GIS Officer Jacob Kimagl and Communications Officer Elaine Vaina joined forces to create an innovative, interactive online story map (<https://tinyurl.com/PNGstorymap>) to showcase community experiences with climate change from the ground. The project focused on capturing stories of climate impacts being felt by local people and actions they are taking to build resilience in five provinces across PNG. The story map was created in part through training that Jacob received as recipient of an ESRI scholarship to California in the USA through the Society for Conservation GIS. In addition, Jacob has also been involved in participatory mapping with low-lying island residents and students from PNG's University of Technology to assess how future sea level rise will impact their island environments.



"Unfortunately because of climate change sea level rise is inevitable and coastal communities have little choice but to adapt. The value of Jacob's research means that these communities now have a clear understanding of the vulnerability of their island and are in a clear position to make decisions before the sea makes them for them," Nathan Whitmore, Senior Scientific Research Officer, WCS PNG, PNG Weekender, June 24, 2016

Funded by the United Nations Development Programme

PRESERVING COSTUMES TO REDUCE HUNTING PRESSURE

In PNG, wildlife and natural resources remain essential for over 80% of the rural population, who rely on them for their subsistence and livelihoods. Wildlife is also closely linked to PNG's rich cultural diversity, most obviously in traditional costumes (*bilas*). WCS has developed *bilas* protection kits in order to offer immediate improvements in the life-span of the highly valuable and sought-after costumes, which will ultimately result in long-term reduction in the demand for new feathers and pelts from wildlife. In the case of the vulturine parrot, demand for its red feathers has culminated in more of these birds being represented in ornamentation than are currently alive in the wild. In 2016, WCS distributed over 644 *bilas* protection kits at the Goroka and Mt Hagen shows

Funded by the Pacific Development Conservation Trust, The Christensen Fund and The Darwin Initiative through the United Kingdom's Department for Environment, Food and Rural Affairs



WCS FIJI DIRECTOR WINS WORLD REEF AWARD

WCS Fiji Program Director, Dr. Sangeeta Mangubhai, was the 2016 recipient of the World Reef Award from the International Society for Reef Studies, presented at the 13th International Coral Reef Symposium in Honolulu, Hawaii.

After receiving her award, Dr. Mangubhai said, "This award will help get the work that we do in Fiji recognised at the international level, and will bring more opportunities for collaboration. . . . I hope getting this award will inspire others in the Pacific, especially women, to realise that we can be both a scientist and conservationist."

<http://discover.scu.edu.au/2016-03-march/world-reef-award-to-fijian-marine-scientist-and-conservationist/>

INSPIRE



Expanding conservation efforts across Melanesia and strengthening our programs



Kelera Warawa

FIRST MARINE SURVEY CIRCUMNAVIGATING KOLOMBANGARA

In 2016, WCS expanded our activities in Solomon Islands to grow our local program there. In March, WCS staff surveyed fish, invertebrates and benthic habitat at 20 coral reef sites around Kolombangara Island, thus completing the first-ever island-wide survey. Because coral bleaching alerts for Solomon Islands had recently been issued by NOAA's Coral Reef Watch, we additionally carried out a rapid assessment of bleaching and found on average 13 percent of coral colonies bleached, which was fairly low for the region given the predictions from sea surface temperature anomalies. This suggests that coral reefs in Solomon Islands might be a refuge from extreme bleaching events, at least for the time being.

Funded by the Wallace Research Foundation



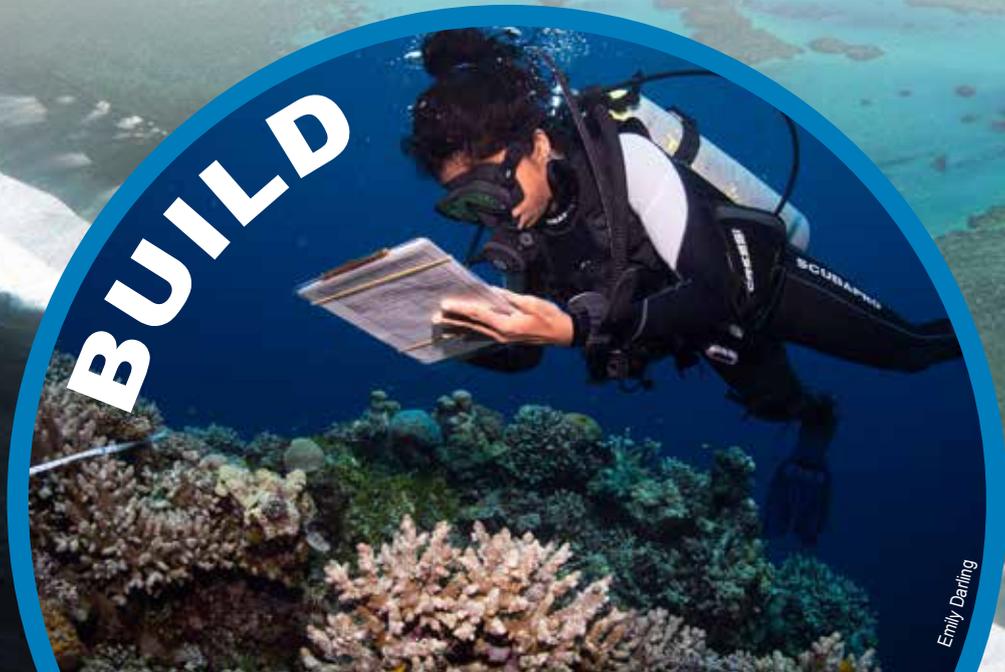
Stacy Jupiter

ASSISTING WITH CYCLONE DAMAGE ASSESSMENT AND RECOVERY

On February 20, 2016, Fiji was hit by Category 5 Tropical Cyclone Winston, the largest storm ever recorded making landfall in the southern hemisphere. The Fiji Government's post-disaster needs assessment estimated the total value of the damage and losses for the country at ~FJ\$2 billion (~US\$1 billion). Responding to the request of the Government, WCS led various partners in Fiji to carry out a specific assessment to evaluate impacts to fisheries-dependent communities in order to estimate impacts on fishing infrastructure and potential impacts to food security. WCS found large and variable damage to boats, engines, fishing and post-harvest gear, and documented differential impacts to both men and women. Notably, there was a sharp reduction in reported consumption of fresh fish and the ability to provide fresh fish for schoolchildren's meals. Results of the survey were used to enable the Government to develop a transparent system for ranking community vulnerability to guide national recovery and rehabilitation efforts.

Funded by the David and Lucile Packard Foundation

Full citation: Chaston Radway K, Manley M, Mangubhai S, Sokowaqanilotu E, Lalavanua W, Bogiva A, Caginitoba A, Delai T, Draniatu M, Dulunaqio S, Fox M, Koroiwaqa I, Naisilisili W, Rabukawaqa A, Ravonoloa K, Veibi T (2016) Impact of Tropical Cyclone Winston on fisheries-dependent communities in Fiji. Report No. 03/16. Wildlife Conservation Society, Suva.



Emily Deering

Stacy Jupiter

Creating partnerships to extend our impact

OPPORTUNITIES FOR FOREST MANAGEMENT IN PNG UNDER REDD+

PNG's forests are a significant resource both globally and nationally, where more than 80% of people rely forest resources for day-to-day needs and income. However, the area of PNG's primary forests have nearly halved since 1990. With collaborating researchers from the Woods Hole Research Center, WCS developed a comprehensive report that presents key findings on past and projected rates of deforestation, an assessment of the differences amongst provinces, and an analysis of the direct and indirect drivers of forest loss in the country. Policy options identified to reduce deforestation and forest degradation provide pathways towards the next steps that PNG can take for implementing activities under the UN Reducing Emissions from Deforestation and forest Degradation and enhancement of forest carbon stocks (REDD+) programme.



Sebastien Dalgarno

"The report is an important output for Papua New Guinea and its findings will assist in the development of the National REDD+ Strategy for PNG and help in developing REDD+ policies that will curb deforestation and forest degradation in the country." Joe Pokana, Acting Managing Director, PNG Climate Change and Development Authority

Funded by the UN-REDD Programme through the United Nations Development Programme

Full citation: Cuthbert RJ, Bush G, Chapman M, Ken B, Neale E, Whitmore N (2016). Analysis of National Circumstances in the Context of REDD+ and Identification of REDD+ Abatement Levers in Papua New Guinea. Report produced by the Wildlife Conservation Society (Goroka, Papua New Guinea), for Papua New Guinea's UN-REDD National Programme.

LEVERAGE



Jona Vadiga

RIDGE-TO-REEF FISHERIES MODEL INFORMS ICM PLANNING IN FIJI

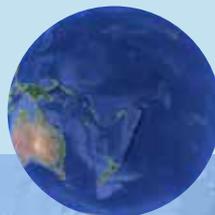
Since 2015, WCS has been engaged in a working group of the Science for Nature and People Partnership (SNAPP, <http://snappartnership.net/>) to investigate links between watershed change and impacts to downstream fisheries. In 2016, with support from two SNAPP researchers from University of Queensland and Griffith University in Australia, the results from models developed based on field and satellite data from Vanua Levu were presented to stakeholders in Bua Province as part of a process to develop a provincial-level integrated coastal management plan. The partnership enabled identification of watersheds which have potential for the greatest amount of sediment delivery to the nearshore, which can enable prioritization of areas for protection as well as more careful regulation of extractive industries to minimize erosion.

Funded by the Science for Nature and People Partnership and the John D. and Catherine T. MacArthur Foundation



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