



Member's report on activities to ICRI

Presented by Wildlife Conservation Society

Reporting period January 2010 – December 2011

Please note that the purpose of this report is to help you share information about your activities within the ICRI community to allow discussion at the next ICRI General Meeting. The reports will be made available on the ICRIForum prior to the meeting. The ICRI secretariat is well aware of your busy schedule, thus don't hesitate to submit an incomplete report.

1. General Information

Are you an ICRI Member?	Yes
Representation to ICRI (Country / Organization):	
Focal Point 1:	
<i>Name:</i>	Caleb McClennen
<i>Organization:</i>	Wildlife Conservation Society
<i>Email:</i>	cmclennen@wcs.org
Focal point 2:	
<i>Name:</i>	Elizabeth Matthews
<i>Organization:</i>	Wildlife Conservation Society
<i>Email:</i>	ematthews@wcs.org
Last meeting attended:	GM 25, Samoa, November 2010
How do you circulate ICRI information within your country and/or organization?	
Budget allocated for coral reef related activities (please mention for year/period):	

For countries only:

National Action Plan / Initiative	
Do you have a National Coral Reef action plan?	
Is this plan publicly available? If so please provide location:	
Do you have a National Coral Reef Initiative or Task Force?	
Are you engaged in any regional programs / initiatives relating to coral reefs:	
If yes, please indicate which programmes/initiatives:	<p>WCS is involved in several regional efforts on behalf of coral reefs, including:</p> <ul style="list-style-type: none"> • Locally Managed Marine Area (LMMA) Network • Pacific Roundtable for Nature Conservation • Regional Coral Reef Task Force (Nairobi Convention) • Coral Triangle Initiative

2. Updates on Activities

The Wildlife Conservation Society (WCS) is currently working to conserve marine biodiversity in 15 countries (see map), seven of them – Belize, Nicaragua, Kenya, Madagascar, Indonesia, Papua New Guinea, and Fiji – harbor significant tropical coral reef ecosystems. WCS orients much of our site-based work around a seascape, defined as “an area sufficient in size, composition, and configuration to support at least one ecologically functional population of all conservation features for the long term.” In focusing on a functional unit, WCS defines ecologically meaningful seascape boundaries and ecosystem services to support seascape species and uses a surrogate approach in identifying seascape species to maintain ecological functions; we also identify and protect important seascape elements, their arrangement and connectivity. Marine protected areas and fisheries are integral components of all our site-based/seascape activities. Within and beyond priority seascapes, WCS implements targeted research and conservation for highly mobile and iconic marine species, including several species of cetaceans, marine turtles, and sharks at local, national, and in some instances, regional and global levels.



a. Global Coral Reef Conservation Research

Coral reefs and climate change: WCS continues to conduct research on a global scale to understand the variety of predicted impacts of climate change on coral reefs, including the ability of people to adapt to these impacts. Given that the impacts of climate change are not and will not be felt equally around the tropical reefs of the world, heterogeneity in ecosystem health, background environmental susceptibility and social adaptive capacity means there are broad ranges of impact and thus, no “one size fits all” solution to adaptation. WCS has developed an effective model that can be used to predict this diversity in impact and identify priorities for conservation action depending on a society’s capacity to act. In addition, to test management solutions in a variety of contexts, WCS has also developed a coral reef ecosystem fisheries simulation modelling tool that examines the consequences of management actions. The tool is now being refined and used to run potential scenarios of coral reef management options, including various restrictions on levels of effort, types of gear, and species selection that will have the greatest benefits to people while minimizing detrimental or irreversible impacts to the coral reef ecosystem and fisheries. These outputs will be released next year in a working toolkit to assist in the development of site-based adaptation strategies at WCS and partner sites around the world.

In April 2011, WCS, in partnership with UNEP, the Nairobi Convention and the Western Indian Ocean Marine Science Association (WIOMSA), with support from the World Bank, convened a meeting. The purpose of the meeting was to review the state of knowledge on the effects of climate change on coral reefs in the Western Indian Ocean (WIO) region, with a view of identifying the areas that have the best environmental conditions to allow reefs to survive climate change. The participants at the meeting helped to identify specific coral reef areas that were understudied in the region, but that also appeared to be particularly resilient in the face of climate change based on a regional model of coral reef vulnerability. From September to November 2011, WCS and local partners surveyed coral reefs in 5 countries as identified in the workshop: Kilwa (Tanzania), Mitsio (Madagascar), Anjuan (Comoros), Vamizi (Mozambique) and southern Kenya. Bleaching surveys, benthic substrate, fish and urchin diversity, and biomass assessments were carried out at a total of 41 sites. The data will contribute to updating the model on coral reef vulnerability to climate change in the WIO, and to the regional strategy for coral reefs and climate change being developed under the Nairobi Convention. A final regional workshop is currently being held in Maputo, Mozambique from 8-9 December 2011.

b. Site Based Conservation/Seascapes

Latin America and Caribbean

Belize

Marine Protected Areas: WCS continues to provide support to the Belize Fisheries Department for the management of the Glover's Reef Marine Reserve and the South Water Caye Marine Reserve, particularly in relation to environmental monitoring. The major monitoring programs include spawning aggregation and in-water sea turtles surveys, fishery-independent monitoring of main commercial species, coral reef health, and the collection of fisheries catch data. Support is also provided for the regular meetings of both the Glover's Reef and South Water Caye Advisory Committees, improved surveillance and enforcement, and general logistical support to the management teams of these key marine protected areas that comprise over 30% of the marine protected area system in Belize.

World Heritage Site: In August 2010, the World Heritage Committee decided to retain the Belize Barrier Reef Reserve System on the List of World Heritage in Danger. The main concern noted as part of this decision was in relation to oil concessions reportedly granted within the marine area of the World Heritage site, as oil exploration is considered incompatible with World Heritage status. Belize was urged to enact legislation to prohibit oil exploration within the site. In mid-2011, WCS published a paper on *The Belize Barrier Reef: a World Heritage Site* in the journal of the University of British Columbia that records the results of a conference held in Belize entitled *Too Precious to Drill: The Marine Biodiversity of Belize*. The paper provides an overview of the establishment of the Belize Barrier Reef Reserve System World Heritage Site and the reasons for its being placed on the Danger List.

Sustainable Fisheries Initiative – Managed Access Program: The Belize Fisheries Department, with the support of WCS, Environmental Defense Fund (EDF), and Toledo Institute for Development and Environment (TIDE), is implementing a limited or managed access program at two pilot sites: Glover's Reef Marine Reserve and Port Honduras Marine Reserve. Managed Access aims to end the open-access fishery in Belize by ensuring that only traditional and responsible fishers who rely on the reserves for their livelihoods have access to these areas. Managed Access aims to reduce overfishing, reduce fishing capacity, improve catch per unit of effort (CPUE), increase economic yield through value-added and improved marketing, and reduce illegal, unreported and unregulated fishing. An integral part of Belize's managed access program is to determine a total allowable catch (TAC) for spiny lobster (*Panulirus argus*).

Managed Access is a result of a comprehensive series of consultations over a two-year period with various groups of stakeholders, including fishers, fishermen associations, government departments and government ministers. These meetings were very important in laying the foundation for developing a national “Framework and Design for Managed Access” and garnering support from fishermen. The Framework addresses issues such as issuance of licenses, data collection, catch reporting, monitoring, enforcement, and establishment of managed access committees. The program was officially launched in July 2011, with the issuance of special licenses at the two pilot sites and the implementation of all elements of the design.

Policy Changes – Revision of Fisheries Act: In January 2010, WCS initiated a project in partnership with the Belize Fisheries Department to completely revise the outdated, 60-year-old Fisheries Act. With the help of a team of national and international legal and fisheries consultants, the Aquatic Living Resources Bill has been drafted and is in its final stages of review. This progressive fisheries legislation includes new elements aimed at modernizing fisheries management in Belize, such as reference to the ecosystem-based approach and the precautionary approach as the overarching principles, institutionalization of the Fisheries Council, creation of a Fisheries Fund, increased fines and penalties to deter illegal fishing, measures to facilitate surveillance and enforcement, provision for co-management of fisheries and marine reserves, provisions for improving data collection, requirement for fishery management plans, provision for limited access, and implementation of international and management measures for the high seas fishery. It is hoped that the Bill will be enacted by the end of January 2012.

Africa / Western Indian Ocean

Western Indian Ocean Region

Western Indian Ocean Coastal Challenge: WCS has worked in close collaboration with a variety of partners (especially the Nairobi Convention, Indian Ocean Commission, WIOMSA, GLISPA, WWF, TNC, among others) over the past year to further develop a regional mechanism that will enable better coordination among the many efforts related to coral reefs and climate change. This mechanism, being called the Western Indian Ocean Coastal Challenge (WIO-CC), is modelled upon the Micronesia Challenge, Caribbean Challenge and Coral Triangle Initiative, but is designed within the context of the WIO region, where a multitude of related but disconnected regional efforts, programs and initiatives already exist. The key guiding principles of the WIO-CC are the recognition that it be anchored by the countries of the region, that it meets the countries’ needs and that benefits of regional efforts accrue locally.

Kenya

Locally managed areas: There is great interest on the Kenyan coast to establish locally managed marine areas (called *tengefu*). Over the past year, WCS has supported communities to identify and establish *tengefu*. We have conducted biophysical and socioeconomic assessments at 8 *tengefu*; some were repeat surveys, and others were at newly established sites. The results were discussed during an annual Fishers Forum in which local fish-landing beach leaders, fishers, scientists and resource managers meet to discuss fisheries catch data and the impacts of different types of fishing gear and management options. This year the Fishers Forum was held on 11 August. In addition to the 120 participants, the Forum attracted the attention of the Director and Provincial Director of the Kenya Ministry of Fisheries Development, who have now publically voiced their support for the creation of additional locally managed marine areas along the Kenyan coast.

Madagascar

West Coast: The waters of the west coast of Madagascar are home to 90% of Madagascar’s coral reefs and mangroves; large-scale export fisheries for shrimp, octopus, shark fins, sea cucumbers,

and tuna; and important artisanal fisheries. Prior to 2010, across this region spanning thousands of kilometers of coastline and home to nearly two million people – many of whom are dependent on marine resources for local consumption or cash income – only one marine protected area (Sahamalaza-Radama; 24,087 ha) had been established (with technical assistance from WCS). As a result of the lack of protection along the coast, large areas of the region's coral reef ecosystems were chronically stressed.

Since 2010, WCS has been able to significantly advance our scientific understanding of coral reef biodiversity and potential impacts of climate change on the reefs and associated marine species and ecosystems of Madagascar's west coast. WCS created new conservation planning approaches to combine our understanding of socioeconomic dependence, ecological intactness, and environmental susceptibility in a spatial manner not previously done before. In accordance with our new understanding of marine biodiversity and how best to adapt to change, significant progress was made in the establishment of a network of locally managed marine areas (LMMAs) on the west coast, with a focus on spatial protection in the northwest and broader fisheries management approach in the southwest. Since 2010, WCS has directly worked with local communities to establish and implement 22 new LMMAs in the southwest and the northwest, covering a total area of 116,000 ha.

East Coast –Antongil Bay: Antongil Bay, Madagascar's largest bay, is also one of the most productive bays in the Indian Ocean. It covers an area of 2,800 km² and encompasses coral reefs, mangroves, seagrass beds and several estuaries. Scientific studies have found that the coral reefs of the eastern part of the Bay are among the world's reefs most resilient to the impacts of climate change. The Bay is a breeding, nursery, and developmental habitat for many marine species, including shrimp, humpback whales, sharks, many species of reef fish, and small pelagic fish. In this bay, conflicts occur between poor artisanal fishers and industrial fleets whose fishing zones overlap. Also, fish populations and their habitats have been damaged by illegal activities and use of destructive devices, such as beach seines and trawlers, and by the conversion of mangroves into pasture or rice fields. Local communities (150,000 inhabitants) around Antongil Bay are poor and dependent upon local coastal resources as a source of livelihood and sustenance.

An Integrated Coastal Zone Management (ICZM) approach to address the problems of Antongil Bay is being implemented. Central to this is the creation, in 2003, of a platform for dialogue (called by its French acronym PCDDBA), involving all stakeholders. It creates an environment that allows and encourages all stakeholders to work together towards a program of sustainable management of marine and coastal resources. In 2008, joint planning among stakeholders led to a zoning plan for the Bay - the first community-driven resource zoning plan for the 32 communes bordering the Bay. In accordance with this zoning plan, since 2010, the work of WCS and its partners has directly resulted in:

- implementation of 13 LMMAs covering ca. 4,000 ha of critical habitats;
- creation of 2 unions of fishermen's associations;
- creation of 5 local vigilance committees with more than 350 volunteers responsible for enforcing fishing regulations, including illegal beach seines;
- release, in 2011, of a Regional Decree that prohibits the sale, possession and use of beach seines and fishing equipment made with mosquito nets along 500 km of coastline (equivalent to the entire length of Kenya coastline), including Antongil Bay; and
- integration of participatory biological and socioeconomic research to redesign the management framework and rezone Masoala Marine National Park (10,000 ha).

National: Since 2010, WCS has been using several new national platforms to disseminate lessons learned, influence policy, and ensure coordination of marine conservation activities: National and Regional Integrated Coastal Zone Management Committees, System of Protected Areas of

Madagascar Committee, National Consultative Council for the Management of Fisheries and Madagascar Marine NGOs Group.

Marine spatial planning: WCS Madagascar (REBIOMA team) is leading the national prioritization efforts for marine systems protection. We provide technical expertise in marine conservation spatial planning tools to national authorities and conservation implementing partners. We assist national authorities in the management of data and development of scenarios of marine priority sites based on species distribution patterns, species of special interest, key habitats (reef and mangroves) and reef vulnerability to support national efforts of marine conservation spatial planning. This support enabled national authorities to issue Interministerial Decree 52005, in December 2010, which accorded provisional protected status to seven new MPAs and, in so doing, increased 50-fold the combined spatial coverage of Madagascar's MPAs.

Capacity-building: WCS Madagascar (REPC team) is currently working with WIOMSA to set up a certificate program for Madagascar MPA managers. WCS Madagascar Marine program also builds capacities of Malagasy student interns from national universities. In addition, practical training in ecological monitoring techniques of coral reef ecosystems are provided along with several dive-training for conservation implementing partners.

Southeast Asia/Oceania

Fiji

Incorporation of reef resilience indicators into MPA network planning: WCS has refined the IUCN/TNC reef resilience monitoring methodology (Obura & Grimsditch 2009) to a suite of 11 indicators for which there are empirical data that support ability to confer resistance or recovery properties and that were feasible for us to collect (WCS 2010). We collected data on the 11 indicators from 65 sites within the Kubulau traditional fisheries management area (*qoliqoli*), which we used to help adapt an existing network to make it more resilient to climate disturbance. WCS also collected data from 133 sites across the four neighboring *qoliqoli* in order to design a new, resilient network of MPAs. These maps are currently being presented to the communities for their feedback.

Ecosystem-based management guide for the Tropical Western Pacific: In November 2010, WCS Fiji launched a new guide for ecosystem-based management (EBM) tailored to the conditions in the tropical Western Pacific with the Fiji Government at the CBD COP10. The Guide is based on lessons learned from implementing EBM at key sites in Fiji, Indonesia, and Palau. The Guide has been translated into Fijian and distributed throughout communities engaged in the Fiji Locally Managed Marine Area Network (FLMMA). It has additionally been disseminated throughout the region and is now on its third printing.

National marine gap analysis for Fiji and provincial level planning: As leader of the marine working group of the national Protected Area Committee for Fiji, WCS collaborated with researchers from James Cook University to complete a national marine gap analysis for Fiji. We used an innovative methodology that considered the ecological effectiveness of each community-based management strategy for a range of key species groups across target marine habitats (Mills et al. 2011). We found that overall, using a conservative estimate, Fiji has effectively protected 12% of its inshore (within *qoliqoli* area) and 1.2% of its EEZ. WCS hosted a workshop in September 2010 (Jupiter et al. 2011) with the provincial administrator from each of Fiji's provinces to discuss the outcomes and identify opportunities within each province to fill the gaps. More recently, WCS held a workshop with four provinces to discuss how to incorporate these protected and managed areas into an integrated coastal management context that considers marine spatial planning for a range of different coastal activities.

Indonesia

Karimunjawa National Park, Central Java: WCS is working in close collaboration with the Karimunjawa National Park Authority (KNPA), local governments, and local communities to

strengthen adaptive management for Karimunjawa National Park, situated in the northern central part of Java, with more than 8,000 inhabitants. The focus of our activities has been to foster capacity of local institutions to develop and manage a rapidly developing tourism industry, improve understanding and cooperation among communities and government in park management, and start new initiatives to strengthen law enforcement by the national park authority with community support. In managing ecotourism, WCS has conducted a feasibility study to enable communities and government to improve and build tourism infrastructure, develop action plans for tourism, and build capacity of local communities to establish local ecotourism enterprises. Action plans have been developed through participatory processes with national park, local government and local communities, and aim to balance sustainable livelihood development with the protection of natural resources through ecotourism activities. WCS continues to improve collaborative management and train local communities and park rangers in ecotourism and law enforcement.

Aceh-Weh Seascape: The Aceh-Weh Seascape is one of very few marine conservation efforts in western Indonesia. The project aims to conserve assemblages of threatened marine megafauna, fisheries, and coral reef species occupying a range of nearshore marine habitats at the northern end of Sumatra. The project is participatory, pro-active, science-based, and sensitive to the needs of local stakeholders. It is unique in its emphasis on establishing community-based and community-driven, co-managed protected areas with multiple uses where abundant coral reefs, reef fish, and marine megafauna occur in relatively high numbers. Through this project, WCS has successfully facilitated the establishment of the first MPA under the management of the *Panglima Laot*, the traditional system of fisheries management in Aceh. This provides a strong learning and legislative foundation that will enable the provincial government to further develop a protected area network for the seascape through establishment of key MPAs identified in this project.

The design of the East Coast MPA (within the Aceh-Weh Seascape) is grounded in sound science and based on extensive consultations with local people. It provides an appropriate strategy and model for safeguarding the region's vulnerable social-ecological coastal and marine ecosystems with support from local human communities. As such, this MPA has value not only in the context of conserving coral reefs and marine diversity on Weh Island, but also in serving as a model for establishing and designing MPAs led by *Panglima Laot* in collaboration with district government agencies. The challenge for the near future will be to develop long-term sustainability for this MPA and create a wider marine protected area network in northern Sumatra by establishing additional MPAs at other priority areas. This should be accomplished while continuing to emphasize the need to build local human capacity and improve scientific knowledge for marine ecosystem management.

In Aceh, WCS has also initiated one of the very few shark and ray conservation programs in Indonesia. The program is working with traditional fishing institutions to gather information on the fishery, develop options for controls on the shark and ray fishery to complement the MPA network, and instigate a community awareness and education program to highlight the plight of the shark and ray populations in the seascape.

North Sulawesi Community MPA network: In North Sulawesi, the focus has been on improvement in the management of one of the largest networks of community-based MPAs in Indonesia. Six of the 31 local MPAs have been assessed for their effectiveness, and WCS is assisting local communities and governments in assessing the effectiveness of governance and social outcomes in the remaining 25. In many of the MPAs, closed area management has received support and shown benefits through reductions in destructive fishing and recovery of the reef and fish biomass. WCS is assisting selected MPAs in building their ecotourism industries that will improve opportunities for local investment in village enterprises and increase support for local MPA development and bans on destructive fishing. The national Ministry of Marine Affairs and Fisheries of Indonesia has nominated Bahoi village and its MPA as a model for marine conservation at the national level.

Papua New Guinea

Marine resource conservation in New Ireland and Manus Provinces, northern Bismarck Archipelago: WCS has been working with communities and partners to protect coral reefs and marine resources in New Ireland and Manus Provinces since 2004. The program combines scientific monitoring and research with traditional resource management approaches to build conservation initiatives with villages to help them effectively manage their critical coastal resources. Activities include: a coral farming project that enhances local livelihoods and offsets the collection of wild corals used to produce lime (one of three components used in the nationally-embraced activity of betelnut chewing); assistance in developing legislation for local level governments to aid in marine conservation activities; conducting research into the effects and impacts of marine management areas and climate change on coral reef ecosystems; and supporting community-based socio-economic monitoring. The program also contributes to marine conservation on a national level through engagement in national initiatives, partnerships with other NGOs and government agencies, and the running of an intensive one-month long field course for participants from throughout the country who have an interest and need to know how to monitor and manage marine systems in the face of climate change.

3. Contribution to the ICRI GM: Your responses to the following questions will assist the Secretariat in assessing contributions towards the major themes of the current ICRI action plan and objectives of the general meeting. Due to the heavy schedules of ICRI members, we have tried to keep the questions to a minimum and value any response you can provide.

a. Rio+20

To support efforts to share ideas and plans for coral reefs/marine initiatives at Rio+20 and nurture opportunities for collaboration, we would like to invite you to share your proposed events and ideas:

- Are you/your organization attending Rio+20?
- Are you proposing an event or other initiative? (please share any ideas and/or details)
- Are you looking to collaborate with others?

We would also appreciate ideas that you may have around how we can work together to ensure we have attention on coral reefs. A summary of the responses received will be compiled by the Secretariat and shared during the meeting in a session on Rio+20.

WCS is not planning a huge presence at Rio+20 and would be interested in exploring targeted collaborations with others.

b. During the meeting, a full day will focus on the Indian Ocean region. If you have any question about the region, ongoing projects in the region... please let us know.

See activities above.

c. What other new initiatives/programs/projects/progress, in particular since November 2010, has been made by your government/organization relative to i) Marine Protected Areas, Ramsar, World Heritage sites, and Man and the Biosphere Programme (MAB) sites designation containing coral reefs; ii) Policy changes; iii) Economic valuation of coral reef ecosystem services, etc., which you believe would be of general interest to other ICRI Members?

WCS Fiji Director, Stacy Jupiter, attended the CDB Pacific Regional PoWPA workshop in Nadi, Fiji, in October 2011, where work on Fiji's marine gap analysis and incorporation of reef

resilience into MPA network design was highlighted. WCS Fiji Director will also be attending the CBD Pacific Regional EBSA workshop in Nadi, Fiji, in November 2011.

WCS-Kenya Marine Program Director, Nyawira Muthiga, is Chair of the Regional Coral Reef Task Force under the Nairobi Convention. Over the past year, she has led efforts to draft and obtain comments on a regional strategy and action plan for the sustainable management of coral reefs in the Western Indian Ocean. The draft strategy and action plan will be presented to the members of the Nairobi Convention in 2012.

d. Is there any topic you would like to raise during the meeting?

e. Please list publications, reports you have been released since the last meeting.

See activities above and publications below.

Publications:

- Adams VA, Mills M, **Jupiter SD**, Pressey RL (2011) Improving social acceptability of marine protected area networks: a method for estimating opportunity costs to multiple gear types in both fished and currently unfished areas. *Biological Conservation* 144:350-361
- Askew N, Fox M, Jupiter S** (2011) *EcoTales from Kubulau: A Guide to the Cultural & Natural Heritage of the Vatu-i-Ra Seascape*, Wildlife Conservation Society, Suva, Fiji, 100 pp
- Clarke P, **Jupiter SD** (2010) Law, custom and community-based natural resource management in Kubulau District (Fiji). *Environmental Conservation* 37:98-106
- Clarke P, **Jupiter S** (2010) *Principles and practice of ecosystem based management: A guide for conservation practitioners in the tropical Western Pacific*. Wildlife Conservation Society, Suva, Fiji, 80 pp.
- Cinner, J, **T.R. McClanahan**, N.A.J. Graham, T.M. Daw, J. Maina, S.M. Stead, A. Wamukota, K. Brown, Ö. Bodin (in press). Vulnerability of coastal communities to key impacts of climate change on coral reef fisheries. *Global Environmental Change*.
- Goetze JS, Langlois TJ, **Egli DP**, Harvey ES (2011) Evidence of artisanal fishing impacts and depth refuge in assemblages of Fijian reef fish. *Coral Reefs* 30: 507-517
- Grantham HS, McLeod E, Brooks A, **Jupiter SD**, Hardcastle J, Richardson A, Poloczanska ES, Hills T, Mieszkowska N, Klein CJ, Watson JEM (in press) Ecosystem-based adaptation in marine ecosystems of tropical Oceania in response to climate change. *Pacific Conservation Biology*
- Jupiter SD, Egli DP** (2011) Ecosystem-based management in Fiji: successes and challenges after five years of implementation. *Journal of Marine Biology*. doi:10.1155/2011/940765
- Jupiter S**, Tora K, Mills M, **Weeks R**, Adams V, **Qauqau I**, Nakeke A, Tui T, **Nand Y, Yakub N** (2011) *Filling the gaps: identifying candidate sites to expand Fiji's national protected area network*. Outcomes report from provincial planning meeting, 20-21 September 2010. Wildlife Conservation Society Fiji, Suva, Fiji, 65 pp.
- Knudby AK, Roelfsema CM, Lyons M, Phinn SR, **Jupiter SD** (2011) Mapping fish community variables by integrating field and satellite data, object-based image analysis and modeling in a traditional Fijian fisheries management area. *Remote Sensing* 3:460-483
- Lewis SE, Brodie JE, McCulloch MT, Mallela JA, **Jupiter SD**, Williams HS, Lough JM, Matson EG (2011) An assessment of an environmental gradient using coral geochemical records, Whitsunday Islands, Great Barrier Reef, Australia. *Marine Pollution Bulletin* doi:10.1016/j.marpolbul.2011.1009.1030
- MacNeil, A. N.A.J. Graham, J.E. Cinner, P.A. Loring, S. Jennings, N.K. Dulvy, A.T. Fisk, **TR McClanahan**. (2010). Transitional states in marine fisheries: adapting to predicted global change. *Philosophical Transactions of the Royal Society*. 365: 3753-3763.
- Maina, J., **T. R. McClanahan**, V. Venus, M. Ateweberhan, and J. Madin. 2011. Global gradients of coral exposure to environmental stresses and implications for local management. *PLOS One* 6:e23064.
- McClanahan, T. R.**, N. A. J. Graham, M. A. MacNeil, **N. A. Muthiga**, J. E. Cinner, J. H. Bruggemann, and S. K. Wilson. 2011. Critical thresholds and tangible targets for ecosystem-based

management of coral reef fisheries. *Proceedings of the National Academy of Sciences (PNAS)*. doi/10.1073/pnas.1106861108.

McClanahan TR and J. Cinner. 2012. *Adapting to a Changing Environment: Confronting the Consequences of Climate Change*. Oxford University Press. New York. Pp 208.

McClanahan, T. R., J. M. Maina, and **N. A. Muthiga**. 2011. Associations between climate stress and coral reef diversity in the Western Indian Ocean. *Global Change Biology* 17:2023-2032.

Mills M, **Jupiter SD**, Pressey RL, Ban NC, Comley J (2011) Incorporating effectiveness of community-based management in a national marine gap analysis for Fiji. *Conservation Biology*. doi: 10.1111/j.1523.1739.2011.01749.x

Mills M, **Jupiter S**, Adams V, Ban N, Pressey B (2011) *Can management actions within the Fiji Locally Managed Marine Area Network serve to meet Fiji's national goal to protect 30% of inshore marine areas by 2020?* Wildlife Conservation Society and ARC Centre of Excellence for Coral Reef Studies, Suva, Fiji, 16 pp.

Prouty NG, Field ME, Stock JD, **Jupiter SD**, McCulloch M (2010) Coral Ba/Ca records of sediment input to the fringing reef of the south shore of Moloka'i, Hawai'i over the last several decades. *Marine Pollution Bulletin* 60:1822-1835

Roelfsema C, Phinn S, **Jupiter S**, Comley J, Beger M, Peterson E (2010) Object based analysis of high spatial resolution imagery for mapping large coral reef systems in the West Pacific at geomorphic and benthic community spatial scales. *Proceedings of the 30th International Geoscience and Remote Sensing Symposium*. Honolulu, HI. July 2010.

WCS (2010) *WCS-Fiji marine biological monitoring handbook*. Version 3.1. Wildlife Conservation Society-Fiji, Suva, Fiji, 34 pp.

f. Please indicate upcoming coral reef-related meetings you will attend?

- Third Intergovernmental Review Meeting (IGR-3), 25-27 January 2012, and Global Conference on land-ocean interaction 23-24 – No
- IUCN World Conservation Congress, 6-15 September 2012, Jeju. Are you planning to organize an event?
 - YES. WCS has proposed a workshop on the Western Indian Ocean; WCS will likely be participating in events on Ecosystem-Based Adaptation; Health and Ecosystems: Analysis of Linkages; and Protection of Reef Fish Spawning Aggregations
- 26th Meeting of the CITES Animals Committee, 15-20 March 2012, Geneva, Switzerland – YES. WCS is a participant in the inter-sessional Shark Working Group which will be reporting at the meeting.
- Others:
 - Marine Think Tank preceding ICCB (5-9 December 2011) where WCS-Fiji is running a symposium on the effectiveness of MPAs in the Coral Triangle-Oceania region
 - Western Indian Ocean Climate Change Workshop for Coastal and Marine Protected Areas (8-10 February 2012) where several staff will contribute to regional discussions on how to incorporate climate change impacts into MPA design and implementation
 - 12th International Coral Reef Symposium (9-13 July 2012) in Cairns, where Stacy Jupiter will co-chair sessions on Remote Sensing of Coral Reefs and Management of Coral Reefs in Regions of High Biocultural Diversity; Tim McClanahan will convene a session on indicators of climate change resilience for coral reefs; and several other WCS staff from the Caribbean, Western Indian Ocean and Coral Triangle regions will present papers about their research and management of coral reef ecosystems.