



## Ecosystem-based management in Fiji to support healthy fisheries

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### Introduction

*Communities in Fiji rely heavily on marine and coastal ecosystems for subsistence fisheries and livelihoods. The increasing number of direct and indirect stressors on these ecosystems are impacting on their ability to provide provisioning services. To support communities in maintaining healthy, productive and resilient ecosystems, the Wildlife Conservation Society has been working with local communities to apply an ecosystem-based management approach to develop 'ridge-to-reef' plans. The planning process is informed by traditional ecological knowledge of natural systems, and complemented by biological and/or socioeconomic assessments. The resulting management plans have strengthened existing community protected areas under traditional management, created new protected areas and formalised management rules to regulate the use of coastal fisheries and terrestrial resources at a district-level. Addressing management at a district-scale ensures actions on land and catchment areas, have minimal impact on coastal resources.*

### Background

Ecosystem-based management (EBM) is an integrated approach that considers the entire ecosystem (e.g. land, rivers, lakes, coasts, coral reefs, ocean), including humans (McLeod et al. 2005; Clarke and Jupiter 2010). The overall aim of EBM is to maintain ecosystem health, services and resilience so that ecosystems can sustain human needs into the future (Agardy et al. 2011).

In particular, EBM has objectives and targets that:

- focus on maintaining the natural structure of ecosystems and their productivity;
- incorporate human use and values of ecosystems in the management of resources;
- recognise that ecosystems are dynamic and constantly changing;
- are based on a shared vision of stakeholders; and
- are based on scientific knowledge, adapted by continual learning and monitoring (Grieve and Short 2007).

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Participants to the Kubulau ecosystem-based management workshop. (Image: Akanisi Caginitoba, WCS)



Youth participation at Ovalau ecosystem-based management workshop. (Image: Eferemo Kubunavanua, WCS)

For Pacific Island coastal communities that rely heavily on marine and coastal ecosystems for subsistence fisheries and livelihoods, EBM offers a way to adapt to changing environmental conditions and increasing cumulative threats (WCS 2015). The EBM approach can be used for ridge-to-reef management, which considers the full range of uses and threats to marine and coastal ecosystems (Agardy et al. 2011), including to coastal fisheries. A key component of EBM is that it considers the indirect stressors that occur outside of, but impact on, a system; for instance, limiting the clearing of upstream vegetation, which can cause increases in sediment and nutrient run-off into the ocean that can be harmful to coral reefs (Fredston-Hermann et al. 2016; Brown et al. 2018; Hamilton et al. 2017). Managing these indirect threats alongside direct local pressures such as overfishing, can lead to healthier and more resilient ecosystems.

EBM is a broader concept than ecosystem-based fisheries management (EBFM), which specifically focuses on fisheries management and ecosystem components that interact with those fish stocks (e.g. predators, prey, habitats) (Jupiter et al. 2013). In the context of island ecosystems, where ecosystem services (including fisheries) and biodiversity rely strongly on connections between land and sea, EBM offers a more holistic and integrated land–sea management framework than EBFM (Clarke and Jupiter 2010; Agardy et al. 2011). As such, EBM plans are being formulated and promoted as an effective natural resource management tool across Pacific Islands, such as Fiji (Clarke and Jupiter 2010).

## Origins of ecosystem-based management in Fiji

In 2005, the Wildlife Conservation Society (WCS), through the invitation of the provincial government and village chiefs, began providing assistance to the 10 villages of Kubulau District to develop Fiji's first district-level EBM management plan (WCS 2009). The overarching goal of EBM in Kubulau is the preservation of the functional integrity of Kubulau's ecosystems, from the ridge of mountains to the outer edge of coral reefs, through community-based management. The Kubulau EBM framework combines the most successful elements of the Locally Managed Marine Area (LMMA) network with broad protected area design principles for biodiversity conservation that take advantage of both traditional and Western approaches to marine coastal fisheries management. Through a participatory planning process, communities identified key ecosystem features for protection into the future, categorised the main threats effecting these features, and developed locally appropriate management actions to mitigate them.

Since then, WCS has refined the EBM planning process to align with lessons learned from the Kubulau management plan and community feedback. Some of the early lessons learned were:

- Management of coastal resources should always commence with an understanding of traditional practices and open communication with communities;
- Ecosystem management processes should respect the needs, interests, rights and aspirations of local communities and contribute to local and national goals;
- Protected areas need to be placed in a broader ecosystem management framework to reduce disturbance from outside the boundaries;
- EBM requires close collaboration between upland and lowland communities, as well as active, participatory engagement of stakeholders from all relevant sectors, which can include culture, fisheries, forestry, agriculture, and tourism;
- EBM should be adaptive as new information becomes available; and
- EBM provides a cost-effective approach for reducing vulnerability to climate change impacts.

All the learning and experiences gained have been incorporated into a practical hands-on facilitators guide to community EBM planning in Fiji (WCS 2015), which has been used to support the districts of Lekutu and Navakasiga, Vuya, Solevu, Nadi, Wainunu and Wailevu launch their own bottom-up, community-driven EBM plans. In addition, WCS is currently in the process of supporting communities in Bua and Dama districts, and Ovalau and Koro islands develop their own ridge-to-reef plans.



Sea cucumber monitoring. (Image: Sangeeta Mangubhai, WCS)



Kubulau ecosystem-based management planning workshop. (Image: Akanisi Caginitoba, WCS)

## Ecosystem-based management planning process

The EBM planning process undertaken in all districts followed the WCS (2015) 'Facilitators guide to community ecosystem-based management planning in Fiji'. This process is based on traditional ecological knowledge and extensive scientific assessments (both ecological and socioeconomic), and complies with Fijian traditional protocols. It also empowers local ownership of the management plans. The five main stages of the process are as follows:

1. Scoping and pre-planning
2. Stakeholder engagement
3. Management planning
4. Implementation and monitoring
5. Review and adaptive management.

As part of the scoping and pre-planning stage of the EBM plans, WCS worked with communities and partners to first conduct an initial situational analysis to identify stakeholders and understand local issues and governance. The pre-planning process also involved reviewing existing information and data on fisheries, biodiversity and development

(i.e. current and future development plans). Any missing data were collected through socioeconomic surveys and rapid biological assessments. Once this information was collected, WCS started community engagement visits to villages to establish support from community leaders and nominate community representatives. During this stage, activities such as participatory community mapping were also undertaken to identify local resource use issues and priorities, existing management actions, and future management goals.

With community support, WCS, community members and other relevant stakeholders came together to undertake management planning. Workshops, community consultations and participative exercises were conducted to develop a shared understanding of the socioecological system. Targeted management strategies were then generated through participatory conceptual modelling. Using spatial planning, these management strategies were mapped into specific zones for particular uses, where the overall aim was to minimise environmental impacts, maximise fisheries opportunities and other ecosystem services, and reduce user conflict. Through these activities, communities identified causes of threats to local ridge-to-reef ecosystems, developed targeted management rules and established protected area locations as the basis of their EBM plan.

The resulting key components of the EBM management plans were:

- A description of the management area, including traditional fishing area (*qoliqoli*) boundaries, demographics, habitat descriptions, resource tenure, resource use and protected area boundaries.
- Discussion on habitat management issues for terrestrial, freshwater, estuarine, coastal and marine ecosystems, including habitat descriptions covering flora and fauna, endemic and endangered species and species of cultural and economic significance.
- A management implementation plan, including:
  - A discussion of key threats and underlying causes of those threats for each habitat;
  - Management rules for each habitat, including national laws and community rules;
  - Proposed management activities for each habitat; and
  - Best practice management recommendations for each habitat.
- A description of key management institutions and external stakeholders.
- An explanation of management roles and processes, including preparation; implementation, amendment and review of the management plan.
- An overview of compliance and enforcement issues.

As part of the planning process, WCS engages local authorities such as the provincial office and the provincial administrators office. These offices look after the development aspects occurring within the province, such as infrastructure and the traditional governance of *iTaukei* or traditional Fijian villages. The ongoing support of these offices, together with the Ministry of Fisheries, ensures management plans and strategies are incorporated into decision-making at the provincial level.

## Implementation and monitoring of management plans

The management strategies set out in the EBM management plan are a synthesis of community rules and national laws. The community rules are endorsed by the Hierarchy Council (*Bose Vanua*) and the national laws are created by the national parliament and are legally binding on all people in Fiji. For each EBM plan, community Resource Management Committees (RMCs) were established. For island and district-level plans, RMCs consist of at least one representative from each village. Each RMC is responsible for raising awareness and understanding of management rules, and promoting voluntary compliance in villages throughout

their district. An annual work plan has been developed to guide priority actions in each district. RMCs are also responsible for establishing a monitoring and enforcement programme, training fish wardens, obtaining resources and equipment for marine patrols, and recording rule breaches.

## Review and adaptive management

As part of an adaptive management process, all of the launched EBM management plans will be reviewed and amended every five years (or as necessary) to reflect monitoring results and evolving management priorities of the communities. Kubulau District is the first to review and adapt its revised management plan in 2012, based on new monitoring data collected by WCS between 2007 and 2010 (WCS 2012). Bua District and Koro Island are currently in the process of reviewing and updating management plans that had previously been developed with support from researchers from the University of the South Pacific.

To assist in these monitoring and adaptive management efforts, WCS has developed a 'A Global Social-Ecological Systems Monitoring Framework for Coastal Fisheries Management' that builds on the organisation's experiences in Fiji (Gurney and Darling 2017). Monitoring efforts aim to track progress towards answering two important questions over the next 10 years: 1) What are the social and ecological impacts of conservation and management actions? 2) What social, ecological and governance contexts create successful outcomes?

## Success of the plans

Ecosystem-based ridge-to-reef planning is not a new concept to Pacific Island communities, where traditionally, local communities have collectively governed land and sea resource access (WCS 2015). WCS and Fijian communities were able to build on these historic governing practices and develop EBM plans that promote more sustainable natural resource management, improved resilience and increased fisheries productivity in coastal and marine ecosystems.

The launching of EBM plans across Fiji has strengthened existing *tabus* (temporal fishing closure) and protected areas, and resulted in the creation of new ones across terrestrial, freshwater and marine habitats (e.g. WCS 2009). These EBM plans have also formalised a range of management rules that regulate the use of natural resources on community land and within customary fishing grounds (*qoliqolis*) (e.g. WCS 2016). By building on the practices outlined in the EBM facilitator's guide (WCS 2015) and example strategies from the established EBM plans, communities around the Pacific can foster their own community-driven and locally appropriate EBM plans to promote more sustainable fisheries in the region.

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