Approach

Part of a Seascape Approach

TNC and its partners are working toward the adoption of sustainable planning and ecosystem-based management practices by the provincial and regency governments across the wider Bird's Head Seascape. The Raja Ampat MPA zoning project contributed to this larger effort. Efforts in the Bird's Head Seascape have included:

1. designing and establishing a network of MPAs in the Bird's Head that protect a diversity of species, habitats and ecosystem services
2. incorporating principles of resilience into the zoning plans for MPAs
3. designing biological and socioeconomic criteria for individual MPAs that take into consideration potential future impacts from climate change
4. undertaking resilience assessments to support the incorporation of climate change objectives in MPA design
5. applying ecosystem-based management principles to MPA network planning and management and spatial planning throughout the Bird's Head Seascape

Pursuing Multiple Objectives

For the Raja Ampat zoning project, TNC's Indonesia Marine Program and Global Marine Team partnered with CI and the University of Queensland to support the development marine zoning plans for each of the MPAs in the archipelago. This project brought together all available information on conservation features, resource use patterns and threats into a decision analysis framework to help design zoning plans. The project took into account the contribution of each MPA to the network as a whole, recognizing that each MPA will provide different ecosystem services and include different habitat types, fisheries and other features. The project aimed to address conservation and fisheries objectives within the spatial analysis. By mapping resource use across the MPA network, the project spatially represented stakeholder interests, particularly for artisanal fishers who rely on access to marine resources critical to their subsistence and livelihoods.

Essential Elements of Marine Spatial Planning

Extensive consultations with the local communities were held to discuss zoning systems that look at biological, social and economic criteria, resulting in a zoning that combines local practices such as sasi and modern conservation. Photo © TNC-Raja Ampat

To support the zoning of Raja Ampat's MPA network, the project focused its activities around five essential elements. These activities provide the foundation of any marine spatial planning effort:

1. establishing clear objectives
2. building a multi-objective database
3. synthesizing information and examining tradeoffs
4. engaging stakeholders
5. generating tools to help support MPA zoning

Establishing clear objectives

Effective marine zoning needs to be guided by clear objectives and a strategic vision developed with local practitioners and stakeholders. This project considered three broad categories of objectives: ecological, economic and socio-cultural. In addition to protecting important habitat and species (ecological objectives), the project considered how the region would benefit from the network and how local economic needs (e.g., fisheries and aquaculture) could integrate with national and regency sustainable development goals (economic objectives). Finally, it carefully considered how the MPA network should contribute to the livelihood and food needs of the local community (socio-cultural objectives). From these broad-scale regional objectives, the project team developed operational objectives ("goals") that would be relevant at each site. This was done in consultation with local practitioners and based on guidance provided by the existing Raja Ampat MPA network design criteria. The network design criteria took into account important biophysical and sociocultural and economic characteristics of the region as well as resilience principles of MPA network design.

Building a multi-objective database

A comprehensive spatial database is a central piece of any marine spatial planning process. Because this project focused on multiple uses, the project team collected disparate types of information (i.e., habitat and species types, existing activities and threats to conservation/sustainable use) across the MPA network. They evaluated a variety of potential sources of information and collated, updated and generated appropriate spatial datasets. They categorized information into three themes: habitats, species and human uses.

Synthesizing information and examining tradeoffs

To integrate a wide variety of data and to explore tradeoffs between placing fisheries and conservation zones in specific locations, the project team used Marzan with Zones software. Marxan with Zones requires specific data inputs, including:

1. boundary of the project area
2. spatial unit for the analysis (‘planning unit’)
3. current management status of each planning unit
4. types of zones
5. spatial information on ‘targets’ and a list of associated quantitative ‘goals’
6. a metric that summarizes factors to avoid (‘cost’)
7. parameters to guide appropriate location of zones

Engaging stakeholders

Engaging local community members, stakeholders and practitioners was a high priority in this project. It enabled the project team to fill important gaps in existing information, incorporate important local expert knowledge, effectively address needs on the ground and facilitate support for the zoning process. Stakeholder engagement included the following activities.

- Community partipatory mapping: Local communities identified local fishing grounds and preferred areas for conservation zones in each MPA.
- Expert mapping: Local government agency representatives and MPA practitioners documented the location of conservation targets, threats and priority areas for conservation and fishing.
- Feedback on zoning plan design: Local government agency representatives and MPA practicioners provided inputs on draft zoning plan designs.

Generating tools to help support MPA zoning

Providing stakeholders with decision support tools to package, synthesize and analyze a wide variety of information is integral to an effective marine spatial planning (MSP) process. Decision

support tools provide transparency in decision making and a mechanism to engage a diverse range of stakeholders in the planning process. They can capture, share and compare many people's ideas about planning options, help people understand the real-world implications of different management regimes and environmental conditions and reveal tradeoffs among possible management scenarios. This project produced the following types of decision support tools.

1. Maps of habitats, species, uses and threats
   The project team organized and managed data in an Environmental Systems Research Institute (ESRI) geodatabase format. The geodatabase allows for centralized data storage for easy access and management and a range of sophisticated spatial analysis. The data were also stored and made available in ESRI's more universal shapefile format.
2. Zoning analysis
   To assess the potential impacts of different decisions on the future location of 'no-take' zones and sustainable fishing zones, the project team implemented three scenarios in Marxan with Zones:

   - Scenario 1 simultaneously addresses biodiversity and fisheries objective by setting goals for both conservation features and fishing grounds.
   - Scenario 2 addresses only conservation objectives by setting goals for conservation features only.
   - Scenario 3 incorporates 'no-take' areas proposed by practitioners. This is the same as Scenario 1, except that it incorporates information on the areas proposed as no take or important fishing grounds by stakeholders.

Continue: Outcomes »