

RESILIENCE SOURCEBOOK

INSPIRED BY THE 2013 MILSTEIN SCIENCE SYMPOSIUM
UNDERSTANDING SOCIAL AND ECOLOGICAL RESILIENCE IN ISLAND SYSTEMS
INFORMING POLICY AND SHARING LESSONS FOR MANAGEMENT



CASE STUDIES OF SOCIAL-ECOLOGICAL
RESILIENCE IN ISLAND SYSTEMS



AMERICAN MUSEUM OF NATURAL HISTORY

**CENTER FOR BIODIVERSITY
AND CONSERVATION**

USING A CROWN-OF-THORNS OUTBREAK AS AN OPPORTUNITY TO TEACH CONSERVATION

ROMBLON ISLAND, PHILIPPINES

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THE SETTING

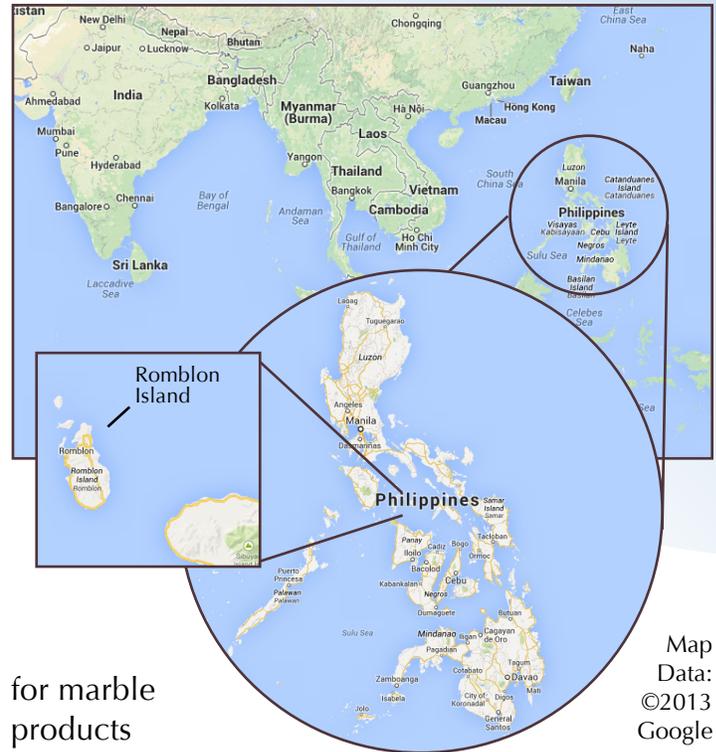
Romblon Island, located 12°32' N, 122° 17' E, is the smallest of the three major islands in Romblon Province, the Philippines. Romblon is at the center of the Philippine archipelago made up of 7,000 islands. It is isolated from the mainland. Bantangan is the main port and gateway to Romblon; the trip to Romblon takes approximately 12 hours by boat. The island is surrounded by the Romblon Passage in the West and Visayan Sea in the East. Romblon is an island municipality with over 26 coastal barangays, or villages.

Romblon is mountainous, with marble and limestone bedrock – very little flat land exists and is mainly on the coast. Settlement is mostly in these flatlands. As of 2010, 37,995 people live on the island. Migration to the islands is relatively low and population is slowly increasing. The people that can afford to do so send their children to urban centers for schooling and most do not return to the province. The main employers on the island are local governments and the schools.

Romblon's corals are part of the Sulu-Sulawesi Marine Ecoregion, a region rich in biodiversity. The Romblon passage connects major fishing grounds of the islands with the Verde Island Passage. Verde passage is considered to be a global center of marine biodiversity.

There are two major industries on island — one is marble production and the other is fishing. The marble production is for a global market. Marble is mostly sold to the United States, the United Kingdom, and Japan. The fishing industry is local and mostly subsistence based. While Romblon is the marble capital of the Philippines, the market

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Map Data: ©2013 Google

for marble products declined in the 1990s because of increased demand for granite. As a result from the decline in demand for marble, the fishing industry increased significantly in the late 1990s. The fishing industry absorbed the labor force from the marble industry thus contributing to the overfishing problem, which was identified in 2000.

Destructive fishing practices pose a major threat to Romblon's coral reefs. Prior to 2005, when it was outlawed in Romblon, compressor fishing was a common practice. Compressor fishing is a method of surface-supplied diving. An air compressor supplies air through hoses (very much like a garden hose) to divers collecting fish at the bottom. Despite compressor fishing's illegal status, some fishing communities continue to use this method in addition to cyanide fishing. Other anthropogenic threats to the coral reef systems surrounding Romblon are the anchoring of boats and sedimentation. High sediment and silt deposition results from the many marble and stone quarries on the island. While some quarry operations practice waste management, most of the small-scale quarry operators do not and a lot of



Photo credit: SIKAT

silt and sediment are still washed into surrounding waters.

Municipalities have jurisdiction over the waters that extend 15 kilometers offshore. No commercial fishers are allowed within these limits. In the Philippines, a “commercial fisher” uses a boat greater than 3 gross tons in size. Commercial fishers target pelagic and semi-pelagic fishes such as tuna (*Thunnus* spp.) or fusilier fishes (Caesionidae). There is a lot of competition between small-scale commercial fishers and municipal fishers.

The Philippines has a decentralized natural resource management policy. Municipal Fisheries and Aquatic Resource Management Councils (MFARMCs) are responsible for putting together policy and resource use plans at the municipal level. There are Fisheries and Aquatic Resource Management Councils at the village level as well, with whom MFARMC must work to implement natural resource management at the local level. If you want support of the local government you need to first secure the support of the MFARMC. This makes it easier for the national, provincial, or municipal government to provide support to the efforts related to a local project. Community organizations deal with enforcement for small-scale units, such as locally managed marine areas (LMMAs).

THE DISTURBANCE

In 2004, SIKAT – a non-government organization that organizes interdependent communities and organizations advocating communitybased natural resource management – became aware of the possible threat of a Crown of Thorns sea star (*Acanthaster planci*) outbreak while conducting a community survey to profile the existing wants and needs of Romblon’s villages. In the following year, SIKAT conducted an underwater resource assessment of the benthic environment using a line-intersect sampling method. They observed large populations of Crown-of-Thorns sea stars. The objective of the survey was mainly to document coral cover, however, so a rigorous quantification of the *A. planci* population did not emerge.

Native to the Indo-Pacific region, Crown-of-Thorns sea stars (COTS) are large sea stars (on average 30 centimeters in diameter) that feed on live corals. Because COTS have long, venomous spikes covering their 8-21 arms, adult COTS have few naturally occurring predators. COTS populations can experience periodic outbreaks, which can reduce coral cover by 90%. Loss of predators and decreased water quality are two factors that have been found to contribute to COTS outbreaks.



Photo credit: SIKAT

Between 2005 and 2006, *A. planci* overpopulated the waters around Romblon Island and devastated Romblon's healthy and diverse coral reef system. SIKAT believes it is likely that the COTS outbreak originated in another province because the conditions surrounding Romblon were not favorable to a COTS outbreak. Strong currents that run through the area generally maintain good water quality in the waters surrounding Romblon. A COTS outbreak was never documented as a problem before 2005 and there was little local knowledge of an outbreak among the general community.

THE RESPONSE

In response to the confirmation of the COTS outbreak, SIKAT, with the help of small local organizations, helped each village develop a community resource management plan that incorporated the collection of *A. planci*.

It was important that the communities identified the problem themselves; thus SIKAT could work in supporting their response. SIKAT enabled the different local village governments to work together; SIKAT facilitated initial meetings and planning sessions and helped to identify a common agenda. Soon after, fourteen villages had a management plan in place. This united group collectively lobbied the municipal and provincial governments to respond to the COTS outbreak and provide funding to enable a mass collection of the species in approximately two thirds of Romblon's coastal villages. The effort came from the local village resource managers who were able to reach the provincial and national levels of government as well.

In 2005, the Lan-Ag Challenge (Lan-ag is the local word for COTS) was launched. One year of funding for this coastal management campaign came from the provincial government and SIKAT was able to secure additional funding from the National Economic and Development Authority, a national government agency.

A major part of the Lan-Ag Challenge was the



Photo credit: SIKAT

collection of COTS. The government agreed to pay each person two Philippine Pesos per COTS to encourage people to collect the species. SIKAT provided community outreach to teach communities not just how to collect COTS but also about the ecology and natural history of COTS. It was important for the community to understand that the collection aimed to normalize the COTS populations so that the coral reef can recover; collection did not aim to totally eradicate the species.

SIKAT worked with local leaders to train the community in proper COTS collection. Community members themselves adapted and developed the most effective and well-documented method to collect *A. planci*. SIKAT provided long metal poles with a cross toward the bottom and explained the procedure: the sea star is stabbed with the metal pole, cross in front, at the center of its body. The collector must wait a few minutes until COTS dies, then the sea star is pulled out. Waiting is very important because if the COTS is removed before the tentacles fully detach from the body, it will regenerate. The time it takes to die depends on the

size of the organism. Once it is dead, the sea star's tentacles loosen their grip from the reefs and the diver can pull out the central disc.

In some areas, communities were using local resources like bamboo, which are less safe for the collector. SIKAT encouraged the use of metal poles with a cross at their base to prevent the sea star from slipping onto the collector's hand. The depth of COTS presence varied, therefore both SCUBA divers and snorkelers were trained in COTS removal. SIKAT maintains partnerships with some of the dive shops, so they helped out when SCUBA was needed. Collection of *A. planci* was in both protected and unprotected areas. In 2006-2007, 20,000 *A. planci* were collected. This minimized the damage that the sea star caused to the reefs. Collection of *A. planci* stopped in 2009.

RESULTS

The COTS outbreak caused approximately 30-40% coral mortality. SIKAT used the COTS outbreak as an opportunity to educate the community on the benefits of establishing marine protected areas. Aside from local resource managers, before the Lan-Ag Challenge, the general community was unaware of that there could be COTS outbreaks. Once SIKAT started their outreach and basic ecology training, more community members began to make connections between the COTS outbreak and over fishing. They theorized that the outbreak was brought on by the loss of their natural predators. For instance, the overfishing led to the local extinction of the Napoleon wrasse (*Cheilinus undulatus*), a highly valued fish in the Philippines. Napoleon wrasse is a predator of the COTS.

LESSONS LEARNED AND RECOMMENDATIONS

- *Turn potential ecological threats into teaching opportunities.* The 2005 COTS outbreak event gave SIKAT a foundation to educate the communities about the importance of LMMAs. It was an opportunity to explore the importance of resilience.
- *Involve communities in the initial stages of the project.* Local communities need to be involved with identification of problems, planning for



Photo credit: SIKAT

them, and developing management strategies. It is really critical to engage community members, and understand local knowledge and local ideas.

- *Always start a project with community knowledge.* If you want broad support from the community start with what community wants and what they know.
- *Success promotes itself.* Communication on islands flow faster than on the mainland. In the case of Romblon Island's COTS outbreak, SIKAT worked in only fourteen communities at the beginning. News spread quickly of the success these villages had in putting together management plans to incorporate the collection of the COTS. Other villages wanted to replicate this, and did – almost 2/3 of the coastal villages ended up participating in the Lan-Ag Challenge. Villages can learn from one another's successes and success in one village can influence other villages.
- *Learn to talk to the local government by using their language.* It is very difficult to talk about conservation for conservation's sake to government institutions in the Philippines. SIKAT found that, by framing the issues in terms of income, the government became more responsive. For example, SIKAT explained that by protecting the community and their coral reefs, income from tourism would rise. Also, remember to adjust your language and explanations to fit different types or levels of government. Appeal to what they value; local

government might have different agendas from the provincial government.

LEAD ORGANIZATION

- Sentro para sa Ikauunlad ng Katutubong Agham at Teknolohiya, Inc (SIKAT, Center for the Development of Indigenous Science and Technology, Inc.)
<http://www.sikat-philippines.org>

FUNDING SUMMARY

- MISEREOR
<http://www.misereor.org/misereor-org-home.html>
- National Economic and Development Authority, Region IV-B, Philippines
<http://mimaropa.neda.gov.ph>
- David and Lucile Packard Foundation
<http://www.packard.org>

As told to Alexandra Donargo.

THE MILSTEIN SCIENCE SYMPOSIUM

The collection of this case study and others like it results from the April 2013 Milstein Science Symposium, Understanding Ecological and Social Resilience in Island Systems: Informing Policy and Sharing Lessons for Management. Held at the American Museum of Natural History, the Milstein Science Symposium convened local resource managers, researchers, educators, island leaders, policy makers, and other leading conservation practitioners to examine characteristics, qualities, and processes that may foster resilience for coastal and marine systems as well as explore interactions, linkages, and feedback loops in complex social-ecological systems and what this means for management. The Milstein Science Symposium was organized in collaboration with The Nature Conservancy, the Gordon and Betty Moore Foundation, the National Science Foundation, The Christensen Fund, the Coral Reef Alliance (CORAL), the Scripps Institution of Oceanography at the University of California San Diego, the University of California Santa Barbara, the United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries, and Small Island Developing States (UN-OHRLS), and the Wildlife Conservation Society.

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