WCPA-Marine & WWF
Marine Protected Area Management Effectiveness Initiative

Application of the WCPA-Marine/WWF
Guidebook on Evaluating Effective Management in MPAs

LENGER ISLAND
A Demonstration Case

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September 2003

To order the guidebook "*How is your MPA Doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness*"

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WCPA-Marine & WWF
MPA Management Effectiveness Initiative

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Lenger Island Marine Protected Area

Introduction

Why perform MPA management effectiveness evaluations?

Marine protected areas (MPAs) are recognized as management instruments to protect marine biodiversity, to maintain/restore ecosystem health, and to provide coastal communities with a sustainable source for economic growth. However, most MPAs around the world face multiple issues, such as insufficient financial and technical resources, lack of trained staff, and lack of natural and social sciences research support. These issues severely challenge MPA managers and practitioners in the pursuit of the goals and objectives of their MPAs.

Measuring the performance of MPAs and their impact on natural environments and society is becoming a priority for many national governments, international organizations, and donors. Evaluating the effectiveness of an MPA provides information on the successes or failures in reaching the goals and objectives of the MPA, and these results allow MPA managers and practitioners to:

- Adapt management strategies to improve the MPA's performance
- Set priorities for new projects and strategies
- Improve accountability
- Implement measures to maximize the MPA's benefits to the society

The WCPA-Marine & WWF MPA Management Effectiveness Initiative

In 2000, the World Commission on Protected Areas-Marine (WCPA-Marine) and the World Wide Fund for Nature (WWF) initiated the MPA Management Effectiveness Initiative (MEI) to provide MPA managers and practitioners with a simple instrument to conduct an evaluation. This four-year program aimed to increase international awareness of the value of performing monitoring and evaluation in MPAs, and it was developed in collaboration with MPA managers and experts worldwide. A major product of this initiative is the guidebook *How is your MPA Doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness*. It gives a step-by-step description of how to perform an MPA effectiveness evaluation, how to select and measure the most appropriate indicators, and how to use the results of the evaluation. The guidebook contains a set of biophysical, socioeconomic, and governance indicators, which are designed to measure management effectiveness in a wide range of MPAs.

Demonstration case report

Eighteen pilot MPAs, with diverse management objectives and environments, were selected to field test a draft of the guidebook in order to develop a flexible tool that could be used in many types of MPAs. Over a six-month period, representatives from these MPAs participated in two activities: (1) a training workshop to learn how to use and apply the guidebook, provide feedback, and select the most appropriate indicators for each site; and (2) measure the selected indicators in their MPAs and submitted their results and recommendations to improve the guidebook. Four of these pilot sites, with different environments and management systems, reported more extensively on their experiences to illustrate how the guidebook can be implemented.

This report is the case of **Lenger Island Marine Protected Area**, Federated States of Micronesia. It provides an example of how a small, new, community-based MPA applied and field-tested the MPA effectiveness guidebook. The field-testing for Lenger Island MPA was conducted by a local non-governmental organization, the Conservation Society of Pohnpei. This case study will provide MPA managers and practitioners working in similar MPAs an example of how the guidebook can be applied and adapted to conduct management effectiveness evaluations.
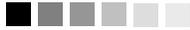
Descriptive Information

Name:	**Lenger Marine Protected Area**
Country:	**Federated States of Micronesia**
Location:	**7°-6°59'N; 158°13'E**
Area:	**2 Km^2**
Objective:	**No-take area**
Near City:	**Kolonia, Pohnpei**

Lenger Marine Protected Area is located in Pohnpei, Federated States of Micronesia (FSM). The MPA is adjacent to Lenger Island and surrounds the nearby island of Sapwitik, these islands share the same fringing reef. Lenger is the first community-based MPA in FSM, which is co-managed between the state of Pohnpei and the community of Lenger Island. The 2 Km^2 MPA contains a variety of diverse habitats from mangrove forests and sea grass beds to fringing and patch reefs. There is a unique coral community in the northern part of Lenger MPA that is not found in nearby reefs. It is home to diverse populations of marine organisms, which were beginning to decline due to heavy fishing and anchor damage. Other potential threats include nearby sand mining and sedimentation due to deforestation and increased run-off from the watershed, and non-point source pollution. Due to these threats and the importance to the lifecycle of a rabbit fish (*Siganus vermiculatus*), the MPA was established to help marine organisms and habitats to thrive and proliferate.

Source: CIA's World Factbook
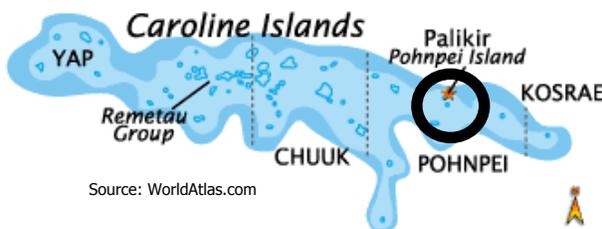
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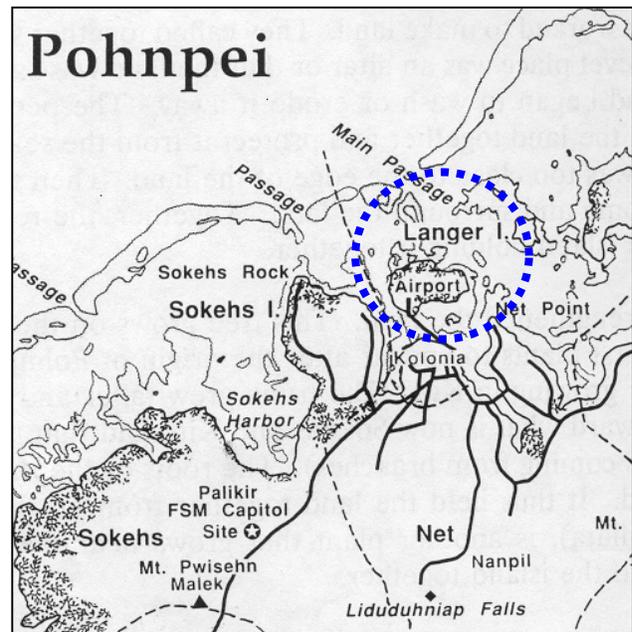
Social Characteristics

The community on Lenger Island consists of approximately 50 people led by a community chief and is part of a larger municipality led by the municipal paramount chief. It is a close community comprised primarily of an extended family. The community relies on the natural marine resources for subsistence fishing, which makes up approximately 90% of the community livelihood. Income generating activities include selling fish to local markets, a small resort for tourists, and a sponge farm. CSP approached the community to set up an MPA and the two parties worked together to propose the MPA to the State of Pohnpei.

Figure 1. Pohnpei MPAs

MPA Establishment and Mandate

Lenger MPA is one of 11 MPAs established by the State of Pohnpei as no-take areas (See figure 1) under the Marine Sanctuary and Wildlife Refuge Act of 1999, which was amended in February 2001 the Act to include Lenger MPA. As mandated by the Act, a set of rules and regulations were developed and passed in 2003 to manage and enforce the MPAs of Pohnpei. This document outlines the prohibited and permitted activities, permit requirements and fees, monitoring and research criteria, enforcement procedures, and penalties. The Act states that the purpose of Lenger MPA is to:

"preserve and protect the unique coral reef and marine life resources surrounding the area of Sapwitik Island. The areas surrounding Sapwitik Island serve as sites for the aggregation and spawning of reef fish locally known as Kioak, which species of reef fish is of critical economic and cultural importance to the people of Pohnpei. Protection of this spawning site is necessary to ensure the protection of Pohnpei's fish stocks and the people that depend on them."
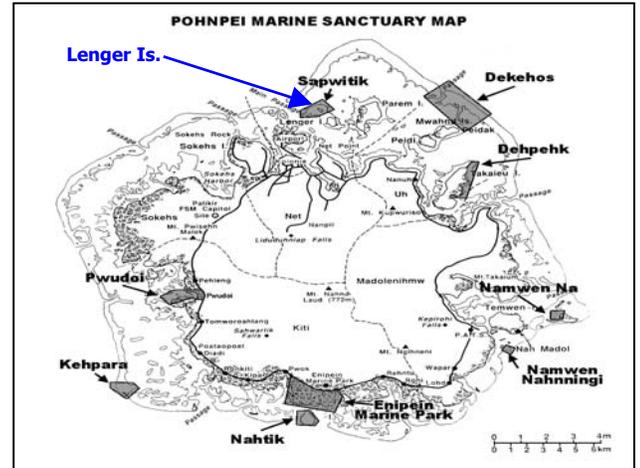
Based on the Act and purpose of Lenger MPA, there are a number of existing programs and activities are in place to manage the area. A priority is to develop a management plan and CSP has included this in their work plan and secured funding for its development. The indicators used in this study will help form and adapt the management plan.

Institutional Arrangements

The organizations and stakeholders that participate in the conservation activities for Lenger MPA include; Pohnpei State government agencies (DLNR Division of Forestry and Marine Conservation and Office of Economic Affairs Division of Marine Development, Attorney Generals Office), the local municipality (Nett District Government), the Lenger/Sapwitik community, and the Conservation Society of Pohnpei. The Division of Forestry and Marine Conservation has the management authority and contains enforcement officers who patrol the MPA. The Division of Marine Development helps with monitoring, management, and runs a land-based giant clam farm on Lenger Island. The municipality district police also do enforcement, although must be accompanied by a State Conservation officer. The community participates as Community Conservation Officers (CCOs), who help with monitoring and voluntary enforcement, and in the Youth Conservation Corps, who help with monitoring, education and awareness. CSP, charted in 1998, works with the state and the community to help manage 5 of the MPAs in Pohnpei, including Lenger MPA.

CSP is the liaison between all the groups and provides training and capacity building, and education, help with policy/legislation, development ideas for alternative sources of income for the MPA community, conservation financing, and coordination of the local MPA network. CSP staff includes a marine program manager, a marine Peace Corps counterpart, an MPA network coordinator, a marine technician, a marine consultant, an education program manager, an education Peace Corps counterpart, and two educators.

Outreach, Training, and Stakeholder Participation

These organizations work together on various outreach and training activities including; the Community Conservation Officers who do voluntary enforcement and are community representatives for conservation and participate in the MPA network meetings; the Youth Conservation Corps for at risk youth that are potentially exploiting natural resources to learn about the environment and help with various environmental projects and community outreach; an enforcement training workshop that was held for state conservation officers, state police, municipal police, and quarantine officers; the Green Road Show that educates all 5th grade school-children in Pohnpei (as well as to communities during the summer, some evenings and weekends) on the topics of forest, mangroves, coral reefs and waste; and the Youth to Youth program that involves various organizations providing education on an environmental topic to schools (for example, Pohnpei EPA covers waste management, CSP covers terrestrial and marine conservation), in addition this program works with 6th graders to pick and implement an environmental project which is then presented at an annual environmental fair. The Green Road Show and the Youth to Youth program fill a gap in school education programs.

MPA Challenges

There are several challenges that impact the management of Lenger MPA and can be particularly sensitive given the co-management status of the protected area. Within the community, people value and are genuinely concerned about their natural heritage, however many have lost knowledge or respect for traditional resource management skills. For example, not eating certain fish or fish of a certain size. Today, it is often difficult for chiefs to impose rules because people either ignore the rules or do not comply. MPAs are a new concept to Pohnpeians – the idea of protected areas is not part of traditional management of resources. Another challenge is coordination within the state government with units responsible for various aspects of MPA management in separate departments. For example, the enforcement unit and marine conservation units are located in different departments, which make coordination difficult. The justice system tends to be lenient with violators and issue small penalties, which can discourage those who invest time and resources into putting the cases together.

Although the MPA is co-managed between the government and the community, the roles for each party are not always clear and the community does not share in the legal management authority. An example of where this is particularly relevant is in enforcement, which impacts issues such as poaching.

Currently, enforcement is limited due to the few state government enforcement officers and the confines of their work schedules, officers patrol during regular work hours of 9am to 5pm on weekdays, leaving no patrols in the evenings or weekends when poaching often occurs. CSP has been facilitating discussions between the government and the community to train the Community Conservation Officers (CCOs) in enforcement techniques with the goal of deputizing the CCOs, so that they can participate more formally in enforcement of the MPA. In addition, CSP is working with state enforcement officers to set up a patrol schedule, provide incentives to conduct patrols in the evenings and weekend, and obtain helpful equipment such as GPS and night vision goggles.

Both the government and the community claim ownership of the marine resources – and this can both hinder and help the co-management process. CSP has found that the best approach is to work with both the government and the community to reach conservation goals. For example, the first 7 MPAs established in Pohnpei were passed through government legislation with no community involvement and these MPAs met resistance from the community. For the next MPA, Lenger, CSP worked exclusively with the community to propose the MPA and that effort was met by resistance from the government, resulting in a two-year process before it was declared. For the most recent MPAs established, CSP worked with the government and community and the MPAs were declared in a short 6-month period. All parties involved learned from these experiences that the success and sustainability of resource management cannot be done without community blessing and participation, and that community conservation efforts will not be successful without government support and legislation. These lessons are now helping to ensure collaboration and progress for current and future activities for Lenger Island MPA.

Evaluation Conditions

There is no formal evaluation program for the MPAs in the state of Pohnpei. The current mechanisms for disseminating information and initiating changes in the management of Lenger MPA are done through the CSP, the director of DLNR, the community leaders of Lenger Island, or the Pohnpei Resource Management Committee (PRMC). This Committee chaired by the lieutenant governor and vice-chaired by the director of CSP, has representatives from all agencies that work on environmental and related issues (i.e. tourism) and meets monthly to discuss environmental issues.

Prior to CSP using the MPA management effectiveness guidebook, there was no existing tool for measuring effectiveness or comprehensive monitoring program for Lenger MPA. There is biophysical monitoring at Lenger MPA (fish surveys, sediment traps, and coral monitoring), which provided a starting point for the pilot project and has been improved as a result of applying the biophysical indicator from the guidebook. Although no formal evaluation has been done on socioeconomic or governance aspects of Lenger MPA, CSP activities do produce information that can help inform the state government and local communities and had conducted fisherman surveys in the past. The existing monitoring activities were based on recommendations from the Marine Resource Survey of Lenger Island (Lindsay, 2000) and implemented to obtain basic fish stock estimates, coral cover percentages, and amount of impact from sedimentation due to sand mining and land based runoffs near the MPA.

Another project at CSP that has helped with overall management planning is The Nature Conservancy's Site Conservation Planning which has been implemented at the Watershed Reserve for the entire island of Pohnpei. Through training and experience with this tool, CSP determined that it is most applicable in large and complex areas, such as a large MPA that is currently being proposed in state waters.

CSP has found that by doing an MPA management effectiveness evaluation, they can document whether Lenger MPA is working to build fish stocks, to restore the coral reefs, and to positively affect the livelihood of the community on Lenger Island.

Based on experience, CSP realizes that the community is a primary target audience to receive the evaluation results because it is the local people who can make changes in behavior to comply with MPA rules and regulations. CSP found that the guidebook fit well into the existing activities and programs at Lenger MPA and was instrumental in further developing the biological monitoring program and establishing monitoring for the socioeconomic and governance aspects of the MPA

Applying the Guidebook

Indicator Selection and Pre-Evaluation Activities

In order to have community understanding and participation, CSP determined that the best approach to applying the guidebook was to keep it simple, therefore, CSP selected one indicator from each of the three categories of indicators (biophysical, socioeconomic, and governance). This also made it easier to translate and do the surveys in Pohnpeian. The evaluation team consisted of 5 CSP staff; the director, marine program manager, marine biology consultant, marine technician and marine program volunteer. The evaluation team used experience and methods of the existing biophysical monitoring program to apply the biophysical indicator from the guidebook. The team relied completely on the guidebook to apply the socioeconomic and governance indicators. The following describes the experiences in implementing each of the indicators selected by Lenger Island MPA (see Annex 1 for a detailed list of indicators).

Biophysical Indicator 1: Focal Species Abundance

Reasons for Selecting Indicators

- The indicator was the most appropriate for the goals and objectives of Lenger MPA, which were derived from the purposes stated in the Marine Sanctuary and Wildlife Refuge Act, to "conserve and sustain fisheries" (goal) and "to improve or maintain fisheries stocks within the MPA" (objective).

- The evaluation team reviewed all of the biophysical indicators to determine which would provide the most appropriate data for Lenger MPA as well other MPAs in the state of Pohnpei for future application in multiple MPAs.

- The evaluation team concluded that this indicator would provide the best results to help determine if the MPA is functioning over the long term to restore and build fish stocks.

Planning, Training, and Methods Used to Measure the Indicators

Members of the evaluation team had previous training and experience in monitoring fish and coral habitats, which helped in using the indicator. The first planning step was to select the focal species to monitor. The focal species were selected using three sources of information; fisherman surveys that asked what species are typically caught (target species) near the MPA, the field guide to Micronesian Reef Fishes (Myers, 1999), and site visits to see what was there and the relative abundance (see Table 1 for list of focal species surveyed). Second, the team selected the survey sites inside and outside the MPA. It was difficult to find similar sites outside the MPA since the coral community on the northern end of Lenger is unique and there are few other sites with similar community structure.

The third step was to develop the survey. The evaluation team developed an initial survey technique based on the guidebook methods and used one of the reference sources, Survey Manual for Tropical Marine Resources (English *et al.*, 1997), for the specific techniques. Once the team defined the survey methods they ran tests in the water. Based on this test, the team made one adaptation to the indicator. They found that the surveys took too long and that using scuba gear would create difficulties in training community members to participate in the surveys. To find an alternative, the team researched the literature on community-based surveys and consulted the guidebook authors for technical assistance. As a result, they adapted the survey technique to use snorkel gear and proceeded with the methods outlined in the guidebook. The team also decided to remove one of the focal species (*Acanthurus nigrofuscus*, brown surgeon fish) because during the tests they found it so abundant that it distracted from the overall survey. The evaluation team has conducted two series of surveys, the first in January 2003 and the second in June 2003. Overall, it took trial and error in the water to finalize the methods, however the time and effort to refine the methods paid off in that the first and second surveys went well and the team feels confident in applying the indicator methods to other MPAs.

Table 1. Focal species surveyed at Lenger MPA

Species	Common Name	Pohnpein Name
Cephalophis argus	Peacock grouper	Mwolus
Monotaxis grandulosis	Bigeye emperor	Masukud
Lutjanus gibbus	Humpback snapper	Pwahlahl
Hipposcarus longiceps	Pacific longnose parrot fish	Mwomw mei
Acanthurus nigrofuscus	Brown surgeon fish	Doarop
Siganus doliatus	Pencil streaked rabbitfish	Pworimwomw
Tridacna maxima	Elongate giant clam	Sile

Summary of Results

All focal species with the exception of the humpback snapper (*Lutjanus gibbus*) were found during the surveys, however, *L. gibbus* is found at other sites and will continued to be monitored. Because this is the first time focal species abundance has been used in the Lenger MPA it is not possible to make any comparisons about species abundance inside or outside the MPA. One of the major difficulties related to this indicator was finding suitable sites that were similar to each other both inside and outside the Lenger MPA because reef areas surrounding the MPA are quite sparse. Because of this, analysis of data will be limited to monitoring changes in focal species abundance and size at individual sites over time.

Outcomes

The survey method will be further refined and then adopted as a standard procedure for monitoring in all 5 of the MPA's that CSP works with. Focal species surveys will be conducted every 3 months in the Lenger MPA for a period of one year then annual or semi-annually thereafter. Because Lenger and the other MPA's in Pohnpei are "no take" zones, this indicator is critical in showing the effectiveness of enforcement and public education management actions.

It will also be an effective tool for showing the community the positive effects of the MPA. The evaluation team recognized additional indicators and monitoring will provide more information, for example, the current data will not be able to show whether populations outside the MPA are being impacted by "spill over" from the MPA or increased fishing pressure without further work on creel and fish market surveys.

The evaluation team found that methods to measure the indicator in the guidebook were easy to follow and that it was flexible to adapt to the particular needs for Lenger MPA. However, the indicator was more difficult to implement then expected due to the time involved in finding similar sites within and outside the MPA. This may not necessarily be a reflection on the indicator itself but more a manifestation of the physical structure of Lenger MPA. The team has identified some next steps to further improve the methods including, an external review of the survey sites selected, expanding the surveys to other MPAs, and getting the community involved in the surveys through training and participating in the monitoring. The evaluation team has set up survey sites in two other MPAs and has begun gathering preliminary base line data.
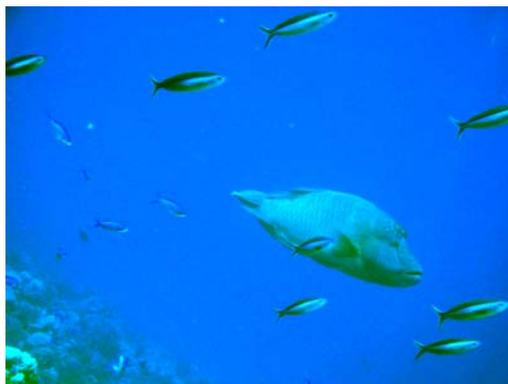
Socioeconomic Indicator 12: Local values and beliefs regarding the marine resources

Reasons for Selecting Indicators

- It was the most appropriate match to the goals and objectives of Lenger MPA, which were derived from the purposes stated in the Marine Sanctuary and Wildlife Refuge Act, "to enhance awareness of the environment and sustainability" (goal) and "to increase understanding of sustainability" (objective).

- Because there had been no previous socioeconomic monitoring for Lenger MPA, the evaluation team wanted to obtain baseline data to better understand community perspectives about the marine environment.

Planning, Training, and Methods Used to Measure the Indicators

Members of the evaluation team had some background training in conducting interviews, however no training in socioeconomic methods. The first planning step was to go through the indicator methods in the guidebook and develop a questionnaire. The evaluation team reviewed the questions provided in the guidebook and decided to add questions on the types of fish those interviewed most frequently caught both to eat and to sell. The team consulted an external expert to find examples of questions to obtain this type of information. Once an initial draft of the questionnaire was put together, the evaluation team obtained an external review from the guidebook authors. The questionnaire was easily adapted from the guidebook to include these additional questions and the resulting data helped the evaluation team further refine the list of focal species for the biophysical indicator.

The second planning step was to select the respondents. For this first socioeconomic survey, the team decided the respondents should be those who are located closest to Lenger MPA and that could be most impacted by the MPA. The team chose primary respondents from the community that lives on Lenger and Sapwitik Islands, in addition, the team chose to interview people on a nearby island, Parem, and the main island of Pohnpei (see Figure 1). Typically the respondents were the heads of household(s) or the primary fisherman in a family. The team decided to conduct the interviews in Pohnpeian and therefore made arrangements to always have a team member that could speak the language present.

Once the planning for the questionnaire and selecting respondents was complete, the team conducted the interviews. The interviews were relatively easy to conduct, since the evaluation team had existing relationships with these community members and CSP had worked with some of them to propose the MPA. The evaluation team found that conducting the interviews in the local language and taking the time to talk with the respondents to explain the questions were helpful strategies.

The evaluation team followed the guidebook closely to develop the questionnaire and techniques for measuring the socioeconomic indicator. The team also found that information from the socioeconomic indicator helped in the development of the biophysical indicator

Summary of Results

The average number of people per household is 8.6 of which 43% fish at least once per week. Respondents reported that nets, sling spears and hand lines are the primary gear used and that Serranids, Scarids and Siganids made up the majority of the catch.

Results of the questions on beliefs and values regarding the use of the natural resources were extremely consistent. Respondents were unanimous in their strong support of general questions about protection of the resources. They also showed strong support for protection of mangroves. While questions that directly related to protection of coral and seagrass beds received support, it was not as strong as those related to general resource protection. This could indicate that respondents were not as well informed about the importance of these resources or that traditionally coral was not viewed as an important resource for protection.

Interestingly, none of the respondents, including a traditional chief from Lenger Island, reported that they were aware of any traditional or community control over fishing in the Lenger area prior to establishment of the MPA. This may be due to respondents being reluctant to sharing any traditional knowledge this may be due to a number of cultural reasons, such as the belief of many Pohnpeians that if a person shares all their traditional knowledge they will decease.

None of the respondents agreed that fishing was better outside the MPA since it was established. This may be due to several reasons; for example the MPA has not been established long enough for any spill-over to occur, the MPA is too small to properly harbor fish species, or enforcement is not sufficient to protect stocks within the MPA.

Outcomes

As a result of measuring this indicator, the evaluation team concluded that this sample of the community is interested in protecting the environment, however that they do not fully understand the importance of coral reefs to marine organisms and habitats. The evaluation team has developed some potential actions based on these results:

1) Use monitoring to produce evidence of whether the MPA is effective or not and relay this information back to the community,

2) Initiate environmental education program to improve community perception of the benefits of coral reefs, and

3) Conduct further interviews to validate the results.

Governance Indicator 2: Understanding of MPA rules and regulations by the community

Reasons for Selecting Indicators

*   It was the most appropriate match to the goals and objectives of Lenger MPA, which were derived from the purposes stated in the Marine Sanctuary and Wildlife Refuge Act, "to ensure effectiveness of MPA management structures and strategies" (goal) and "clearly defined and understood rules for MPA use" (objective).

*   Because there had been no previous monitoring on governance aspects of the MPA, the evaluation team wanted to obtain baseline data on the community's understanding of the rules and regulations of the MPA and whether they felt involved in the process of developing the rules and regulations. Over time, the team is interested in knowing if the community gains a better understanding of the rules and regulations and if they feel more involved in the MPA.

Planning, Training, and Methods Used to Measure the Indicators

Members of the evaluation team had some background training in conducting interviews, however no training in measuring aspects of MPA governance. The first planning step was to develop a questionnaire. The evaluation team followed the methods as described in the guidebook and made no adaptations. Since the criteria for selecting respondents was similar to the socioeconomic indicator, the team decided to conduct the governance interviews at the same time and with the same respondents as the socioeconomic interviews.

Once the planning for the questionnaire and selecting respondents was complete, the team conducted the interviews. The interviews were relatively easy to conduct, since the evaluation team had existing relationships with these community members and CSP had worked with some of them to propose the MPA. The evaluation team found that conducting the interviews in the local language and taking the time to talk with the respondents to explain the questions were helpful strategies.

The evaluation team followed the guidebook closely to develop the questionnaire and techniques for measuring the socioeconomic indicator. The team also found that information from the socioeconomic indicator helped in the development of the biophysical indicator.

As with the socioeconomic indicator, the team found the governance indicator easy to follow and apply to Lenger MPA. The team found the results helpful in understanding the community knowledge of the rules and regulations, although not as useful in measuring management actions to improve community understanding, as the biophysical and socioeconomic indicators. The evaluation team is considering how to improve the use of this indicator, such as increasing the number of interviews or selecting new governance indicators to measure to provide more information.

Summary of Results

Of the 12 respondents, 2 were not aware that rules and regulations existed for Lenger MPA and the others were aware of some of the rules. When asked whether fishing was allowed in the MPA, 9 responded that "no fishing" or "no taking" was allowed inside the MPA and only 3 respondents gave other answers. This seems indicative of the importance of fishing in these local communities and that other threats, such as dredging, and pollution are not often considered. For example, few local residents have access to dredging equipment, explosives or harmful chemicals. In the case of pollution, the threat exists, but is often not recognized because people will use garbage to fill coast lines and enlarge property, resulting in trash within the lagoon. The concept of not discarding non-biodegradable waste into the environment has not taken hold in Pohnpei.

Respondents had a poor understanding of who is setting the rules and regulations. After reading the rules and regulation, all respondents but one found them to be average or simple in complexity. Respondents unanimously stated that they had not been consulted or asked to participate in the rules and regulation formation process, however, unanimously responded that they felt the rules and regulations reflected their concerns and were applicable and credible. Interestingly, the community representatives had been invited to review the rules and regulations and did not attend.

Of the 12 respondents, 11 reported that compliance with the rules and regulations was low and that there was not enough enforcement. Suggestions for improving the effectiveness of rules and regulations included: improving enforcement training for Community Conservation officers (CCOs); giving community members enforcement power; allowing community members to do daytime patrols, so that the police could do nighttime patrols; and increasing the number of marine enforcement officers, especially at nighttime. 7 respondents declared themselves to be active supporters of the MPA program and 3 stated their desire to be involved in community enforcement.

Outcomes

At the time of the interviews, the rules and regulations for Lenger MPA were in the process of being finalized and adopted by the Pohnpei State Attorney General. Even though the rules and regulations are being finalized, it is clear that there is a general lack of understanding of them among the community members. It is possible that this is even more widespread in the population at large and further surveys may be conducted to deduce this. The evaluation team has developed some potential actions based on these results:

1) Conduct more interviews to get a better idea of the understanding of rules and regulations in the population at large

2) Repeat this procedure with other MPA communities

3) Improve stakeholder input in the rules and regulations process

4) Publicize the rules and regulations using various media, such as posters and videos

5) Improve dissemination of rules and regulations and ensure stakeholders understand them, and

6) Improve enforcement through training, altering patrol schedules and involving the community.

Lessons Learned

CSP gained several key insights from applying the draft guidebook on MPA management effectiveness, which resulted in new actions, adapting current activities and helping to guide future work with Lenger MPA. One of the major outcomes for CSP was a new perspective on all aspects of MPA management and to expand their monitoring program beyond biophysical to include socioeconomic and governance. The staff at CSP realized that although they work with the community, it is also important to monitor and measure how management actions impact or are understood by the community. For example, CSP had been operating under the assumption that the community knew about the Marine Sanctuary and Wildlife Refuge Act, however after measuring the governance indicator, they discovered that this was not the case. This information has showed CSP the need to increase education and outreach to the community and to focus on disseminating and explaining the rules and regulations of the MPA.

Using the guidebook helped CSP to improve the existing biophysical monitoring program by selecting the most appropriate indicator to measure and developing the best methods to measure the indicator. By carefully reviewing the methods and the indicator itself, the evaluation team was able to ask important questions, such as why they were monitoring and what information they could get from the results to determine whether the goals and objectives of the MPA are being achieved. For example, the evaluation team looked more closely at what species they were monitoring and how that linked to the goals and objectives of the MPA, the Marine Sanctuary and Wildlife Refuge Act, and the community interests.

The evaluation process also provided CSP an opportunity to look at the overall aims and activities internally, as well as externally with government agencies and the community. It helped CSP to take a close look at the time, resources and strategies being invested in Lenger MPA and what goals and specific objectives they are working towards. The results of the pilot project are applicable to other activities including, the development of an MPA Network and hiring an MPA coordinator to educate, disseminate information, and facilitate work with the community.

The evaluation process also highlighted the need for more clear outcomes for Lenger MPA and an understanding among all parties of what goals they are trying to achieve.

In addition to these lessons, the guidebook raised some important questions and issues to the evaluation team. Now that CSP has selected indicators to measure at Lenger MPA, they are eager to have a peer review of these indicators and the results they are generating. CSP recognizes the benefit to sharing what they have done and learned with other MPAs and in turn to learn from experiences in other MPAs. CSP is interested in solidifying what they have started by continuing to measure indicators and evaluate management effectiveness, to have external experts and MPA managers come to review what is being implemented at Lenger, and to have further training in management effectiveness evaluation

Concluding Remarks

The evaluation process and the indicators measured in field-testing the MPA effectiveness guidebook are particularly useful in this case study, working with a relatively new MPA and one that is co-managed between the Pohnpei State Government and the community of Lenger Island. The process helped to set up baseline data and measure indicators that will provide meaningful results over time. Existing biophysical monitoring methods were improved and new components were added to the monitoring program for socioeconomic and governance goals and objectives of Lenger MPA. They would like to increase the number of indicators in each category as time and resources permit.

Because Lenger MPA is a no take zone monitoring *focal species* (Biophysical indicator #1) was an excellent way to evaluate the effectiveness of enforcement and compliance efforts and to gather data to show progress to the community. *Understanding of MPA rules and regulations by the community* (Governance indicator #2) was the most appropriate at this time because management plans and committees are still not in place for Lenger and other MPAs in Pohnpei. It provided a clear picture of the work that needs to be done for this component of park management. *Local values and beliefs regarding the marine resources* (Socioeconomic indicator #12) was also a good indicator to use primarily because most changes in Pohnpei are effected through traditional leadership and traditional ways of life.

The evaluation team at CSP found the guidebook extremely useful especially as one indicator can contribute to evaluating many different objectives and goals. They also found the guidebook user-friendly despite limited training in conducting evaluations. Several of the team members did not attend the pilot site training workshop and were able to use the guidebook easily. The team highlighted that the guidebook contained many options to apply indicators to the specific goals for Lenger MPA and provided a good template for park management.

One of CSP's goals is to work with communities to develop adaptive management plans. All indicators have provided CSP with data on how next to proceed. From the results of the socioeconomic and governance indicators, a set of potential actions has been developed to address some of the weaknesses that were identified. Results will be shared with communities through meetings of a newly established MPA network in Pohnpei and a newsletter that CSP publishes and distributes to government agencies, the community and donors. This will provide information to community members on Lenger MPA and other MPAs. As CSP collects more data in future years, the results on whether the MPA is effective at preserving and enhancing fisheries will be shared with the stakeholders through community meetings and the newsletter. CSP is already implementing the indicators in other MPAs in Pohnpei and will use the guidebook to help evaluate the network of MPAs CSP helps to support.

In conclusion, field-testing the guidebook helped CSP to reach their goals of protecting and preserving the marine environment in Lenger MPA and other MPAs in Pohnpei by determining successful programs, learning from mistakes, and identifying where best to focus their efforts and limited resources.
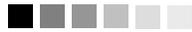
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Annex 1

List of Indicators (A) contained in the Draft Guidebook and used by pilot sites to field-test the indicators, and (B) contained in the final version of the Guidebook

	A. Indicators used by the Pilot Sites Draft Version of the Guidebook (September 2002)	B. Revised list of Indicators Final Version of the Guidebook (September 2003) (*)
BIOPHYSICAL	B1. Focal Species Abundance B2. Focal Species Population Structure B3. Composition and Structure of the Community B4. Recruitment Success within the Community B5. Habitat Distribution and Complexity B6. Food Web Integrity B7. Water Quality B8. Type, Level, and Return on Fishing Effort B9. Area Restored B10. Area Under Reduced Human Use/Impacts B11. Area Free from Extraction	B1. Focal Species Abundance B2. Focal Species population Structure B3. Habitat Distribution Complexity B4. Composition and Structure of the Community B5. Recruitment Success within the Community B6. Food Web Integrity B7. Type, level and Return on Fishing Effort B8. Water Quality B9. Area Showing Signs of Recovery B10. Area Under No or Reduced Human Impact
SOCIOECONOMIC	S1. Household Perceptions of Availability of Seafood S2. Local Fisher Perceptions of Harvest S3. Material Style of Life of Households S4. Community Infrastructure S5. Household Occupational Structure S6. Number and Nature of Markets S7. Infant Mortality Rate S8/9. Perceptions of Non-Market and Non-Use Value of the MPA S10. Percentage of a Particular Group in Leadership Positions S11. Local Marine Resource Use Patterns S12. Local Values and Beliefs Regarding the Marine Resources S13. Changes in Conditions of Ancestral and Historical Sites, Features, and/or Monuments S14. Stakeholder Knowledge of Natural History S15. Level of Understanding of Human Impacts (Including Population) on Resource S16. Distribution of Formal Knowledge to Community S17. Income Distribution by Source by Household	S1. Local Marine Resource Use Patterns S2. Local Values and Beliefs Regarding the Marine resources S3. Level of Understanding of Human Impacts on Resources S4. Perception of Seafood Availability S5. Perception of Local Resource Harvest S6. Perception of Non-Market and Non-Use Value S7. Material Style of Life S8. Quality of Human Health S9. Household Income Distribution by Source S10. Occupational Structure S11. Community Infrastructure and Business S12. Number and Nature of Markets S13. Stakeholder Knowledge of Natural History S14. Distribution of Formal Knowledge to community S15. Percentage of Stakeholder Group in Leadership S16. Changes in Conditions of Ancestral and Historical Sites, Features, and/or Monuments
GOVERNANCE	G1. Existence of a management plan and adoption of plan G2. Understanding of MPA rules and regulations by the community G3. Existence of a decision-making and management body G4. Existence and adequacy of legislation to enable the MPA to accomplish its goals and objectives G5. Degree of stakeholder participation in management of the MPA G6. Level of satisfaction of stakeholders with participation G7. The amount and quality of training provided to resource users to participate in MPA management G8. The amount and quality of training provided to community organization to participate in MPA management G9. Community organization formed and active G10. Available human resources and equipment for surveillance and monitoring G11. Clearly defined enforcement procedures G12. Number and variety of patrols per time period per unit area G13. Effective information dissemination to enhance and support compliance of stakeholders G14. Regular meeting of MPA staff with stakeholders G15. Proportion of stakeholder trained in sustainable resource use G16. Number of stakeholders involved in surveillance, monitoring and enforcement	G1. Level of Resource Conflict G2. Existence of a Decision-Making and Management Body G3. Existence and Adoption of a Management Plan G4. Local Understanding of MPA Rules and Regulations G5. Existence and Adequacy of Enabling Legislation G6. Availability and Allocation of Resources G7. Existence and Application of Scientific Research and Input G8. Existence and Activity Level of Community Organization(s) G9. Degree of interaction between managers and Stakeholders G10. Proportion of Stakeholder Trained in Sustainable Use G11. Level of Training Provided to Stakeholders in Participation G12. Level of Stakeholder Participation and Satisfaction in Management Process and Activities G13. Level of Stakeholder Involvement in Surveillance, Monitoring and Enforcement G14. Clearly Defined Enforcement Procedures G15. Number and Variety of Patrols Per Time Period per Unit Area G16. Degree of Information Dissemination to Encourage Stakeholder Compliance

(*) Note: Some of the indicators contained in the Draft Guidebook (September 2002) and used by the pilot MPAs during the field-testing phase were altered for the final version of the Guidebook (September 2003). The indicators of the final version were revised, regrouped, merged, and/or renamed based on the comments and recommendations from the pilot sites and external peer reviewers.
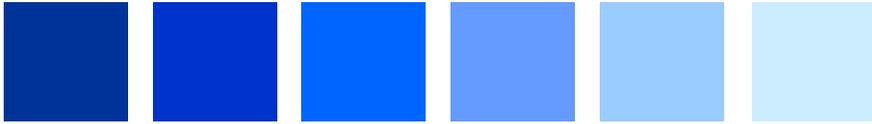
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