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**Datum: 30-nov-04**

**Bonnummer: 838339**

**Tav:**

**Aantal kopieën: 33**

**Uw referentie(s):** 1774462 1774462

**Artikelomschrijving bij aanvraagnummer:** 838339

**Artikel:** Community-based and multiple purpose protected areas

**Auteur:** Gilman, E.L.

**Tijdschrift:** COASTAL MANAGEMENT

**Jaar:** 1997 **Vol.** 25

**Pagina(s):** 59-91

**Aflevering:** 1

**Plaatsnr.:** 8549

# Community Based and Multiple Purpose Protected Areas: A Model to Select and Manage Protected Areas with Lessons from the Pacific Islands

ERIC L. GILMAN

Office of the Governor  
Saipan, Commonwealth of the Northern Mariana Islands, USA

*Overuse and misuse of coastal systems in the Pacific Islands are causing natural resources to dwindle. During the past two decades, governments have attempted to establish protected areas in recognition of the limits to growth on islands and the negative impacts to the coastal zone from anthropogenic activities. However, protected areas have not always been successful because most models used by these governments to create protected areas have been flawed. This article presents a model to select and manage protected areas in the Pacific Islands that proposes two changes to traditional concepts of protected areas where the aims primarily have been to provide recreational opportunities, protect areas with aesthetics, and protect nature from humans.*

*The two new concepts proposed by this model are community based decision making and permitting multiple purpose protected areas whose main goals are determined by the local community: (1) Representatives of interest groups and local level agencies collaborate to coordinate the processes to establish and administer protected areas, and to make decisions; (2) the model's process to select and manage a protected area considers the social, economic, environmental, and political context. Protected areas established using this model permit multiple uses that are compatible with the goals of the protected area.*

*This method presents a comprehensive process to establish protected areas. Examples are drawn from several political entities of the Pacific Islands: the Commonwealth of the Northern Mariana Islands, the Philippines, the Federated States of Micronesia, Guam, the Republic of Palau, Hawaii, and American Samoa.*

**Keywords** collaboration, community based decision making, local coordination, multiple purposes, Pacific Islands, protected areas

Unrestricted human use and abuse of natural resources have significantly degraded near-shore systems of the Pacific Islands and the quality of natural resources for human use (Boo, 1990; Carew-Reid, 1990; Carpenter & Maragos, 1989; Dahl, 1984; Dixon, 1989; Heine, 1984; McCully, 1991; Snedaker, 1984). One way to conserve natural systems is to establish protected areas (Anson & Raynor, 1993; International Union for Conservation of Nature and Natural Resources (IUCN), 1986; Johannes, 1982; Polunin & Roberts, 1993; Roberts & Polunin, 1991, 1993; Vande Vusse, 1991; White, 1988, 1989;

Received 10 August 1995; accepted 29 August 1996.

The author acknowledges Alan Hong, Gerry Davis, David Lotz, Franz Reksid, and the Sabana Committee for affording insightful information, and anonymous reviewers for providing knowledgeable comments.

Address correspondence to Eric L. Gilman, Commonwealth of the Northern Mariana Islands Governor's Office, PPP 171 Box 10000, Saipan, MP 96950-9504, USA. E-mail: eric.gilman@saipan.com

White & Alcala, 1992; White et al., 1994). Many islands with contemporary governments already have laws protecting the environment and regulations to guide the use of natural resources, but ecosystems continue to deteriorate due to governments' misguided selection and management practices for protected areas (Hough, 1988; Mitchell & Barborak, 1988; Rowchai, 1991; White et al., 1994).

This article describes a method to successfully establish protected areas in the Pacific Islands. This method is different from typical protected area management methods. The two concepts incorporated in this methodology that are absent from many models (Coastal Resources Management Office, 1985; Fiske, 1992; Guam Department of Parks and Recreation, 1979; Hough, 1988; Knight & Bates, 1995; MacDonnell & Bates, 1993; National Park Service, 1989; Rabe & Savage, 1979; U.S. Department of Commerce, 1982) are *community based decision making*, a process where all interested groups participate in making decisions and coordinating the establishment and management of the protected area, and *allowing multiple uses* in the protected area instead of restricting the goal of the protected area to providing recreational opportunities, protecting aesthetics, or protecting nature per se.

If a protected area is intended to change the behavior and values of resource users, it is necessary for the community and local government to collaborate to coordinate planning and administration activities (Anonymous, 1995; Fiske, 1992). This is extremely applicable for administering protected areas in the Pacific Islands.

The cultural context of the Pacific Islands makes it necessary to abandon the traditional concept of protected areas, where the aim is typically to provide recreational opportunities, protect aesthetics, or protect nature from development by preventing people from inhabiting an area and activities in and access to the area (Coggins, 1993; Carew-Reid, 1990; Knight & Bates, 1995; Martz, 1993). Pacific Islanders' attachments to submerged and terrestrial lands include mystical and spiritual dimensions. Pacific Islanders have harvested natural resources for over 3,000 years, and continue to harvest these resources using traditional methods (Carew-Reid, 1990; Dahl, 1984; Johannes, 1982; Reksid, 1996). The importance of harvesting resources to Pacific Islanders creates a need to involve the community when selecting and managing protected areas, because user groups will not comply with restrictions on their traditional resource harvesting practices if they do not understand or support the rules. This model considers social, economic, and political issues in addition to environmental concerns when determining the overall goal of protected areas. Establishing protected areas requires community based decision making and allowing for multiple purposes in order for the protected area to successfully achieve the purposes for which it is created. The equity and conflict management capability of community based decision making, and the flexibility of multiple purposes in the selection and management processes facilitate the development of successful protected areas.

The management methods employed by the Great Barrier Reef Marine Park Authority, and since the 1990s, by the National Marine Sanctuary Program, the two organizations currently lauded for their methods of administering protected areas, permit multiple purposes and encourage public participation to a certain degree (Alder, 1993; Barley, 1993; Bunce et al., 1994; Daschbach, 1995; Fiske, 1992; Galasso, 1996; Pollard, 1993). The method developed by this article differs from these organizations' management concepts in two ways.

The National Marine Sanctuary Program and the Great Barrier Reef Marine Park Authority permit multiple purposes in their protected areas. While these programs do permit some resource use, their main goal is restricted to environmental preservation

(Alder, 1993; Barley, 1993; Bunce et al., 1994; *Marine Protection, Research and Sanctuaries Act*, 1972; Pollard, 1993). While these national-level programs have a genuine need to focus on protecting natural resources and sensitive habitats, as they create protected areas to address regional needs, the goal of small-scale protected areas administered by island municipalities need not always have an overall goal of environmental protection. For example, a marine protected area that is being proposed off Saipan, Commonwealth of the Northern Mariana Islands (CNMI), is desired for the main purpose of protecting and enhancing tourism. Another community may want to protect and preserve cultural artifacts or reserve an area for traditional methods of harvesting resources. These two national programs are not appropriate for establishing and managing these types of protected areas that are created to address the needs of a municipality or island. Therefore, the first difference between this article's method and that of the two national programs is that, while the national programs require environmental protection to be the main goal of protected areas, this model permits a coordinating committee to select goals that may not include environmental protection.

This method is developed to be implemented and coordinated on the local level, by local-level organizations and interest group representatives. Representatives of interest groups and local agencies coordinate all planning and implementation steps and make final decisions. Local agencies and user groups collaborate by sharing their knowledge of baseline conditions of a natural resource, identifying effective management methods, and combining energy to administer the protected area and monitor the effects of rules. The method of this article maximizes decision-making ability of interest group representatives. Community based decision making in this method entails a committee of representatives of interest groups and local agencies to directly coordinate the selection and management processes, and make final decisions.

Since 1990, the National Marine Sanctuary Program has designated sanctuary advisory councils, composed of representatives of interest groups, to assist and advise the secretary of commerce with developing management plans and managing sanctuaries (Barley, 1993; Galasso, 1996). For instance, with the Florida Keys National Marine Sanctuary, National Oceanic and Atmospheric Administration (NOAA) staff coordinated the development of a management plan and they administer the sanctuary. A sanctuary advisory council coordinated certain aspects of the planning process, such as identifying zones within the sanctuary (Barley, 1993; Ehler & Basta, 1993). The NOAA program officials recognize the need for community education and liaison during incipient stages, and for the involvement of interest groups in planning and administration. Program officials attempt to foster public participation and liaise with the community as the program's budget permits (Fiske, 1992). The Great Barrier Reef Marine Park Authority provides avenues for the public to comment on the government's management of the marine park. For example, with the Cairns section of the park, the government employs a permit program that provides an opportunity for user groups to communicate with government managers concerning the acceptability of management measures, and provides a venue for managers to educate user groups concerning the need for restrictions (Alder, 1993). But there is no coordination or direct decision making by the community, as the local government alone coordinates the administration of the park (Alder, 1993; Pollard, 1993).

Thus, the second difference between this method and that of the two national programs is that this model goes beyond the concept of community involvement employed by the national programs. With the National Marine Sanctuary Program, federal employees coordinate the overall planning and management processes, and final decisions are made by federal staff. With the Great Barrier Reef Marine Park Authority, the gov-

ernment does not involve the community in a substantive manner, and does not permit coordination or decision making by user groups. This model calls for a collaborative effort by representatives of user groups and local agencies to directly coordinate the protected area's administration and make decisions.

This method is appropriate for municipalities or islands wishing to establish a protected area. It may not be suitable for a protected area whose boundary crosses multiple political jurisdictions, or when resources are needed from multiple levels of government. The National Marine Sanctuary Program and Great Barrier Reef Marine Park Authority deal with large protected areas, numerous interest groups, many levels of government, and complicated natural resource management issues. This article's method may not be appropriate for their context. Neither are their methods appropriate for small protected areas in the Pacific Islands. The selection and management of protected areas in the Pacific Islands needs to be coordinated jointly by representatives of interest groups and local agencies to minimize deterrents to success.

This model is flexible, avoids conflict, and provides for equity by having a committee composed of representatives from all interest groups and local agencies select a site and permit uses in the protected area according to the locale's specific social, political, environmental, and economic context. The local people selecting the site and managing the area have equitable decision-making authority, where the protocol for making decisions is developed by the committee. Committee members employ principles of conflict management to rectify real or perceived imbalances of power between interest groups. Through their participation and decision making, interest groups acknowledge that the protected area benefits them, take credit for the protected area, and support and enforce the rules that they establish.

This model is based on lessons from case studies and examples from the literature. Case studies of the protected areas of the CNMI, Guam, and Hawaii's Hanauma Bay were conducted during the first half of 1995. The literature provides examples from the Philippines, the Federated States of Micronesia, the Republic of Palau, and American Samoa.

### **Attempts to Establish Protected Areas**

A "successful" protected area achieves the purposes for which it was created, and is supported by the community. What allows a protected area to be successful? Case studies and examples from the literature support this proposed methodology to select and manage protected areas. This method is based on the tenet that allowing for community based decision making and multiple purposes in the processes to establish and administer protected areas minimizes deterrents to success.

### ***Successes***

The process employed to select and manage a protected area is critical in determining whether the protected area is successful. Pacific Islands that have contemporary pressures on their natural environment (are modernizing, have high population growth rates, are part of the modern economy, or employ modern technology) should use this method to establish protected areas. Case studies from the CNMI, Guam, and Hawaii, and examples from the literature (Anson & Raynor, 1993; Hough, 1988; Mitchell & Barborak, 1988; Rowchai, 1991; White et al., 1994) support the implementation of this article's method.

These case studies and examples from the literature demonstrate that, when establishing protected areas, community based decision making and allowing for multiple purposes results in success because of the following reasons:

- The method creates a perception of equity among interest groups, a basic tenet of conflict management. A representative from each interest group is a member of a coordinating committee. The committee members have equal opportunity to raise issues important to their interest group, and to make decisions. This helps achieve equity, even though it may not have existed before the process began.
- This approach is flexible, allowing the protected area to fit the needs of the local context.
- Decision makers account for local ecological knowledge, the knowledge that comes from observing and using natural resources, in addition to information from technical experts and resource managers.
- Community based decision making enhances the communicability of results because interest group leaders disseminate information to the community.
- Decisions respect tenets of traditional management systems.
- Participation of all interest groups ensures that all issues are identified and addressed.
- Community based coordination results in educated user groups, who take credit and ownership for the protected area and its rules.
- Continual communication with interest groups allows managers to evaluate the efficacy of the protected area and effectively adapt management measures.
- Community based selection, management, and enforcement is more effective and economical in the long term than a process run solely by government agencies.
- Allowing the community to select multiple uses to be permitted in the area that are compatible with the goals of the protected area ensures that all needs are considered, reducing the likelihood of conflict. A greater number of interest groups will support a protected area that permits numerous, but appropriate, uses than will support a single-purpose protected area. Also, the community will more likely support a protected area if their interest group representatives can select the major goals than if goals are predetermined.

Examples from the literature and case studies from the CNMI and Guam provide some explanations as to why protected areas established through community based decisions that allow for multiple purposes are successful. The CNMI's Sabana, the Federated States of Micronesia's Pohnpei Watershed Forest Reserve, the Philippines's San Salvador Islands Marine Park, and the Philippines's Visayas Marine Reserves demonstrate the successful implementation of community based decision making in multiple purpose protected areas.

*Sabana Protected Area, Commonwealth of the Northern Mariana Islands.* The Sabana Protected Area, located on the island of Rota, CNMI, is a plateau of shifting agricultural lands within a mosaic of native forest (U.S. Department of Agriculture, 1994), and includes adjacent forested cliff lines. The large protected area is 15 square kilometers, encompassing over one-third of the island of Rota. The Sabana's groundwater provides Rota's only potable water. The elevated plateau is all public land except for two private lots. The plateau is used by Rota residents for subsistence and commercial farming

during the dry season when lower elevations receive little rain. A typical farm consists of one hectare of green beans, sweet potatoes, or taro. The cliffs and plateau provide habitat for numerous species, such as the sambar deer, the CNMI listed endangered Marianas fruit bat, the coconut crab, and seabirds like brown boobies.

The Sabana was designated a protected area in 1994 by CNMI Senate Local Law 9-1 as a result of recommendations made by the Division of Fish and Wildlife staff concerning the value of the Sabana for wildlife habitat. The selection process did not involve the community. The protected area does permit multiple purposes, although conservation was the law's central purpose for designating the protected area (*Commonwealth of the Northern Mariana Islands Rota Senate Local Law 9-1*, 1994). The Rota Division of Lands and Survey took the initiative in late 1994 to delineate a boundary for the Sabana, and created a draft map showing this boundary. Lands and Survey's boundary included farmland only on the Sabana proper. Also in 1994, the CNMI and the U.S. Fish and Wildlife Service began to inform the public about the need for wildlife conservation on Rota. The educational effort is part of an attempt to produce a Rota Habitat Conservation Plan to allow the CNMI to apply for an incidental take permit pursuant Section 10 of the Endangered Species Act.

In early 1995, the Division of Fish and Wildlife began a process to manage the Sabana, which allows appropriate multiple purposes and community based decision making. The committee has held six meetings to date, and it plans to continue holding meetings indefinitely. Twenty-five people, representing 12 public agencies, farmers, hunters, private landowners, and the tourism industry, attend the meetings held at the Rota Public Library. The nine goals of the Sabana Protected Area, identified by committee members, are conserving wildlife, protecting farming practices, protecting groundwater from contamination, protecting hunting practices, providing a tourist destination, protecting the traditional medicinal use of plants, protecting forestry resources, providing a location for communication antennae, and providing a site for a botanical garden. Representatives of interest groups and local commonwealth agencies have been coordinating the management planning activities, and will coordinate the implementation process.

The Sabana is a multiple purpose protected area, but it does not allow certain uses, such as a firing range and disturbance of fruit bat roosts, because these activities contradict the goals of the protected area. Committee members prioritized the purposes of the Sabana Protected Area, collected baseline information on these purposes, produced a zoning map, delineated a new boundary of the protected area that incorporates more than only farmland as did the original boundary, and developed rules for the zones and practices. The committee identified programs, facilities, and staff desired for the protected area, and identified a requisite start-up and annual budget. The committee wrote a draft management plan, distributed it to interested people in the CNMI, and held a public hearing to solicit comments on the plan from the Rota community. In May 1996, the committee submitted the management plan and maps to the CNMI Legislature requesting approval of the plan and support for the proposed budget (Sabana Protected Area Management Committee, 1996).

The coordinator is continuing to implement an adapted version of the management process described in this article. Future planned action steps include legally adopting the management plan and the boundary map, researching funding options, implementing the management plan, evaluating the success of management efforts, and adapting the management measures in the future as needed.

Interest groups support the planning efforts to manage the protected area, and representatives are working together to develop and implement a management plan. All

interest group representatives bring to the committee's attention the issues important to their group, and because decisions are reached by consensus, there is a perception of equity. The management process for the Sabana has been successful to date because of the community based decision making, representation of all interest groups at the committee meetings, the ability for multiple purposes desired by the various interest groups to be accommodated with minimal compromise, active coordination efforts by a local government employee perceived as neutral by all interest groups, and the understanding and support by all interest groups for the existence and need for the protected area. Most importantly, the interest groups take credit for the rules of the protected area, and perceive the project as being under their control.

*San Salvador Marine Park, the Philippines.* The San Salvador Islands Marine Park in the Philippines is a case where community based decision making was employed to successfully select and manage a multiple purpose protected area (Buhat, 1994).

Starting in 1987, a Peace Corps volunteer collected baseline data on the marine environment and the social community. He prepared and submitted a proposal for a community based resource management project to the Haribon Foundation, an environmental nongovernmental organization (NGO). The Haribon Foundation approved the proposal, and in 1988, the Marine Conservation Project for San Salvador was created. The project coordinators hired a Filipino "community organizer" who informed the community of the project. The community organizer and Peace Corps volunteer worked with interest groups to collect data on the human use of natural resources and on fish yield. The project's staff taught basic ecological and environmental concepts, and relayed results of the surveys to the community through monthly educational programs. San Salvador fishermen formed a committee called the *Lupong Tagapangasiwa ng Kapaligiran* (fishers committee) to educate and organize other community members to participate in the Marine Conservation Project program.

During a community assembly meeting in 1989, participants drafted a resolution to establish a 127-hectare marine sanctuary. The municipal council and mayor approved the resolution. The resolution created a zone of no fishing and a traditional fishing reserve area surrounding the sanctuary and island. The resolution banned collecting aquarium fish and using a particular beach seine fishing technique. These were controversial restrictions that alienated fishers from a village that collected aquarium fish and a group of fishers who used the beach seine method.

The project personnel and fishers committee marked the sanctuary and reserve boundary with buoys and signs, and constructed a guard house. Pursuant the municipal ordinance, the fishers committee eventually was converted to an elected management group. Since 1989, the protected area's rules have been successfully enforced by the community and municipal government. There have only been minor infractions of the park's rules since it was designated, with a drastic decline in dynamite fishing and few people caught fishing illegally in the sanctuary (Buhat, 1994).

Local people have learned ecological principles as a result of the establishment process. Illegal fishing halted once educational efforts were under way, and the majority of the community, who regard the natural resources as their possession, have supported the effort to ban aquarium fish collection. Park managers continuously monitor, evaluate, and adapt management policies according to the changing needs of the resources and people.

The coordinating role of the Peace Corps volunteer and the community organizer was crucial in organizing community members and garnering the interest of user groups



in joining the project. The fishers committee and barangay (village council) collaborated with the Peace Corps employee and community organizer in coordinating the management planning and implementation processes. Buhat (1994) found that coordination by members of the community and local government in all stages of the process, conservation education, and community organization has led to the success of the municipal protected area. Representatives of all interest groups were involved in identifying issues and making decisions to create this multiple purpose protected area (Buhat, 1994).

*Visayas Marine Reserves, the Philippines.* The process to establish three marine reserves in Visayas, the Philippines, further demonstrates the importance of employing community based decision making and allowing for multiple purposes when establishing and managing protected areas. The Marine Conservation and Development Program of Silliman University, the Philippines, established these reserves on Apo Island, Balicasag Island, and Pamilacan Island in the mid-1970s (White, 1988, 1989; White & Savina, 1987).

In 1974, the program began organizing and educating local communities to form the three marine reserves in the Visayas. Program staff collected data on the socioeconomics, demographics, ecology, and issues of the three communities. They also conducted environmental surveys, which included data collection on fish yield, and educational activities in informal, small groups that focused on ecological and resource management principles. Staff formed community groups, called marine management committees, on each of the three islands. The initial goal of each committee was to construct a community education center. Then each committee was tasked with coordinating the process to establish a marine reserve.

The coordinators employed community based management of the reserves through encouraging the direct involvement of fishing communities and local government. Coordinators organized the community and conducted public education activities to foster community involvement and garner support for the project. Each site now has a sanctuary where fishing is excluded and a surrounding buffer area where ecologically appropriate fishing is allowed. The marine management committees coordinate the enforcement of the reserve rules and participate in patrolling the reserves.

Research on the reserves shows that species richness, abundance of coral and reef fish, and the quality of benthic habitats were statistically enhanced after only 2 years. Also, fish yields increased in traditional fishing areas, and there was a rise in tourism (White, 1988, 1989). These results indicate that enforcement of the reserve's rules has been successful.

These three reserves demonstrate that it is possible for an outside organization to organize a local community in order to coordinate the process to establish and manage a protected area. Education by the community organizers that was tailored to the local context was effective in promoting the communities to form coordinating committees. Furthermore, the interest groups (fishers) needed technical assistance and coordinating assistance from the program. The interest groups made decisions concerning the site selection, rules, and management of the reserves, and they support the existence of the reserves and have a sense of ownership of the reserves. The reserves permit multiple purposes, but do not allow activities that are inconsistent with the goals of the protected areas. For instance, the reserves have had zones reserved for traditional fishing methods, where destructive fishing methods are prohibited, and zones that have banned all fishing in an attempt to create a nursery for fish and protect the health of the reef (White, 1988, 1989; White & Savina, 1987).

A fourth reserve was established in the Visayas on Sumilon Island, also coordinated

in the mid-1970s by Silliman University (White, 1989). White (1989) compared the coordination methods and effects of these methods on the success of the reserves on Apo Island and Sumilon Island. In the reserve on Sumilon Island, program personnel coordinated the entire process, while in the reserve on Apo Island, the community coordinated the management planning process and now manages the reserve. The reserve on Apo Island is maintained completely by the local community (White, 1988, 1989). On Apo Island, the community took credit for creating the successful reserve, and also takes responsibility for resolving problems. But, for the reserve on Sumilon Island, where Silliman University staff made most of the decisions concerning the reserve and the fishers were not consulted on all aspects of the management process, fishers do not perceive the reserve as theirs or claim credit for the reserve's success (White, 1989).

*Pohnpei Watershed Forest Reserve, Federated States of Micronesia.* The Pohnpei Watershed Forest Reserve is another example of a successfully established and managed protected area that employs community based coordination and decision making. In this case, the community based management is also based on traditional island institutions and practices (Anson & Raynor, 1993). Government officials saw Pohnpei's upland forests as valuable and deserving of protection due to their valuable natural attributes. Pohnpeians traditionally have used the upland forest for many purposes, including using water (for bathing, swimming, recreation, waste disposal, and drinking), growing subsistence crops and sakau (a root used to produce a drink central to cultural events), using plants for cultural materials, and hunting. Agricultural practices, homestead construction, road development, overhunting of forest birds, and erosion from tourist hikers have degraded the forest system.

In 1983, the Pohnpei State Division of Forestry, with assistance from the Pacific Islands Forester Office, initiated the process to establish a watershed forest reserve. These coordinators formed a watershed steering committee task force, with representatives from various government agencies and nongovernmental organizations. Based on municipal meetings and field surveys, the task force selected three priority areas in need of protection. Aerial photographs were analyzed by the task force in order to select the three public land sites with a high degree of naturalness, for protection. In 1987, a law was passed designating five 100-hectare coastal mangrove forests from within the task force's three general areas, as protected. However, the community was not aware of the law, and the regulations did not account for traditional use of the forest. Therefore, at first, Pohnpeians rejected the rules.

Then, in 1991, a local nongovernmental group, with representatives from four villages and their chiefs, agreed to help protect the watershed. The resulting successful management program was developed by the nongovernmental group, the four concerned communities, and the task force. The program has since been expanded to the other municipalities of Pohnpei, resulting in the formation of local nongovernmental management groups in each area. Educational programs and public meetings are a part of each of these community groups. Coordinators have developed a community based management structure, where the state government coordinates most activities and chairs the task force. Traditional government village chiefs, with the aid of municipal agency personnel, manage each individual watershed management unit. Once the management and decision making process included the local community and traditional institutions, along with the local and state government, the watershed management project became successful. Success has been attributed to the involvement of the local, traditional community in making decisions (Anson & Raynor, 1993).

### Failures

Aside from the examples presented above from the CNMI, the Philippines, and Pohnpei, there are a few other protected areas in the Pacific Islands that have been established and are being managed using a process similar to this article's model. But, there are many examples from the Pacific Islands where protected areas have been designated that have not allowed community based decision making and are unsuccessful (Hough, 1988; Mitchell & Barborak, 1988; Rowchai, 1991; White, 1989). When the modern government does not give the community input in decision making to establish and manage protected areas, natural resources remain under a de facto open access regime, because in the Pacific Islands, the rules will not be followed if resource users do not support or know about a protected area's rules concerning the use of natural resource. Islands with contemporary pressures on their natural environment that do not employ community based decision making, nor allow for multiple purposes when establishing protected areas, produce "paper parks" whose purposes are not achieved, and natural resources continue to degrade because enforcement measures are ineffective. Examples from Guam, the CNMI, and from the literature (Hough, 1988; Mitchell and Barborak, 1988; Rowchai, 1991; White, 1989) indicate that, if interest groups and local government agencies do not collaborate to coordinate and make decisions to establish and manage the protected area, failure is likely because of the following reasons:

- Decision makers do not know resource users' popular knowledge.
- Traditional users do not support decisions made without their consultation.
- Government agencies lack the expertise to assess and manage resources themselves.
- There are too few government personnel to effectively monitor resource use.
- Without communicating with representatives from the community, the government does not know how to inform the public about the need for the protected area and its restrictions.

There have been many ineffective attempts to select and manage protected areas without organizing interest groups or involving interest group representatives in the projects. The following two case studies of unsuccessful protected areas from the CNMI and Guam demonstrate the need for community based decision making and allowing for appropriate multiple purposes in selecting and managing protected areas.

*Kagman Conservation Area, Commonwealth of the Northern Mariana Islands.* The Kagman Conservation Area on the island of Saipan, CNMI, consists of the elevated eastern end of the Kagman peninsula, including Isleta Maigo Luao (Forbidden Island), and Unai Laolao Kattan (Tank Beach). The 181-hectare site is a popular hiking and bird-watching destination. The site contains extensive native forest, valuable for native forest birds, and coastal cliffs, valuable habitat for seabirds. The nightingale reed-warbler, a federally listed endangered bird, lives in areas with tangantangan trees, and noddies, a seabird, nest and roost on Forbidden Island. Tank Beach is one of Saipan's remaining turtle nesting sites.

The conservation area was designated by a CNMI legislative resolution. The Marianas Public Land Corporation board of directors approved the land use designation of this area as a conservation area in 1984. The Kagman Conservation Area is a paper park, because the site receives no actual protection. The selection process consisted of Division of Fish and Wildlife staff recommending to the legislature and the Public Land

Corporation that the site be protected due to its valuable wildlife habitat. The Division of Fish and Wildlife did not consider allowing for multiple purposes and made no attempt to consult with user groups, such as cattle grazers, hunters, and hikers. The process employed to select the Kagman area for wildlife conservation made no attempt to involve user groups, or even to consult with the user groups to identify potential issues. User groups were not aware that Kagman was being protected, did not know the rules, nor did they understand the justification for the rules. This created a high probability for future conflicts with user groups over the conservation area's rules.

Further reducing the likelihood of success, the Division of Fish and Wildlife, the agency with managerial jurisdiction, has made no attempts to manage the Kagman protected area since its designation. The Division of Fish and Wildlife never attempted to promulgate regulations, produce a management plan, or conduct public education. The public is not aware that the site is protected, and the manager has made no attempts to prevent activities that negatively impact wildlife. Recent site visits by the author have revealed a lack of signs marking the boundary of the protected area, and no signs stating rules for the area. Illegal cattle grazing and land clearing are continuously occurring in the area. Numerous times since its designation in 1984, the Mariana Public Land Corporation has leased out land located within the conservation area for cattle grazing without notifying the lessee of any restrictions concerning the area. One such lessee cleared several acres and erected fences inside the "protected" area. The area's land use designation has been successful in preventing recent governmental attempts to lease portions of the conservation area for grazing, but it has not been successful in preventing harmful practices by the general public who use the area without governmental permission. The area is a de facto unregulated multiple use area, used for cattle grazing, hunting, wildlife conservation, and recreational activities.

In order to successfully manage this area, the Division of Fish and Wildlife needs to organize user groups and form a committee consisting of interest group representatives to develop a zoning plan, produce a management plan, and conduct public education. However, until the agency with jurisdiction over this protected area acquires the resources to organize interest groups and coordinate management and implementation activities, this protected area and its resources will likely remain a paper park.

*Guam Territorial Seashore Park.* The Guam Territorial Seashore Park is another example of a protected area that has lacked substantive public involvement in the selection and administration processes. Designated in 1978 by the governor of Guam, it is located in southwestern Guam with park areas interspersed with nonpark private land. The park includes a large stretch of coastline and some inland mountainous parcels. It contains several small islands and a portion of Cocos Island, a large island located off the southwestern tip of Guam. The special features of the park include numerous waterfalls, two large river systems that create isolated embayments, and prehistoric cultural resources (Guam Department of Parks and Recreation, 1978; Lotz, 1995).

The Guam Territorial Seashore Park allows for multiple uses, because it is designed to protect scenic resources, historic resources, public safety and health, wildlife, marine life and other marine resources, and the natural environment of southwestern Guam (Government of Guam, 1978; IUCN, 1991). A coastal road gives shoreline access to motorists. Hikers have access to numerous trails throughout the park, and camping is permitted. Diving, sailing, fishing, and surfing are common water uses in the park (Davis, 1995; Guam Department of Parks and Recreation, 1978; IUCN, 1991; Lotz, 1995; Lotz & Lotz, 1992).

According to the Guam Territorial Seashore Park Master Plan of 1979, the southwest coastline and adjacent mountains were identified and proposed for protection in 1952 when a U.S. National Park Service study team recommended that the area be protected. Since 1952, several legislative bills were passed to designate the park, but it was not truly designated until 1978. The park was selected by the government of Guam, with public input limited to public hearings. The government selected park boundaries to avoid private property; to include archaeological and historical sites; and to include areas with natural, scenic, and recreational values. Economic and usership assessments were not the basis for the park's boundary determination (Davis, 1995).

Community based decision making is not employed to manage the park. Guam government agencies manage the park, and government employees make management decisions. The park is managed jointly by the Guam Departments of Parks and Recreation, Agriculture, and Land Management, and Environmental Protection Agency. The multiple purposes of the park—protection of ecological, geomorphic, hydrological, scenic, archaeological, historic, and recreational resources—are identified in the master plan.

Some of the park's goals are being met, and others are not. According to David Lotz, parks administrator of the Guam Division of Parks, there are serious encroachment problems in the Guam Territorial Seashore Park (Lotz, 1995). In some ways this is a paper park, because rules are not actively enforced and the government does not have high visibility throughout the park. The boundaries of the park are not marked, trails are not maintained, ranchers and homeowners intrude into parkland, people illegally hunt within the park, and people do not realize that this government owned land is a park. The lack of understanding stems from decades of inadequate funding, and little political support for conservation. Part of the low government visibility problem within the park also can be attributed to the park's disjointed geography.

In 1993, the government created positions for territorial park patrol officers within the Department of Parks and Recreation, but these law enforcement officers spend most of their time in developed park areas. In addition, the Guam Division of Aquatic and Wildlife Resources has conservation officers, fully deputized policemen who patrol inside the park boundary to enforce the divisions laws and regulations. However, these conservation officers do not enforce the park's rules, and would enforce their division's laws on this land regardless of the land's protected status.

Because money is tight and conservation is not a government priority, the government does not actively manage the Guam Territorial Seashore Park (Lotz, 1995). Thus, low government visibility and a lack of funds delegated to the management of the protected area results in poor management, according to Lotz (1995). The park's management would be more successful if the government involved user groups to administer and make decisions, and conducted public education projects.

*Conclusions from the Successes and Failures.* These case studies of successful and unsuccessful protected areas demonstrate that establishing and administering protected areas without direct coordination by user groups is likely to result in a protected area that lacks active management, and the support and understanding of user groups. When establishing and managing local-level protected areas in the Pacific Islands, it is critical for representatives from interest groups and local government agencies to coordinate. It also is necessary for an organization, whether it be a local government agency such as is the case with the Sabana Protected Area, or an outside organization such as the Marine Conservation and Development Program of Silliman University, to stimulate the community to form a coordinating committee composed of interest group representatives.

These case studies also demonstrate that interest groups will support a protected area that permits multiple uses, although it is necessary to prohibit certain uses that contradict the goal of the protected area even if this alienates certain interest groups.

However, a government that does not employ community based decision making can somewhat successfully administer a protected area, if the manager has access to enforcement resources. The example below demonstrates that it is possible to actively patrol a protected area to enforce its rules, but conflicts with user groups perpetually will be a problem.

### *Marginal Success Through Policing*

An island with a contemporary, strong, and functional government that can access management resources, but does not employ community based decision making or allow for multiple purpose protected areas, still may have somewhat successful protected areas if the manager presents a high degree of visibility and a strong enforcement regime for the protected area, as in the case of Hawaii's Hanauma Bay. The Hanauma Bay protected area was selected and is managed without community participation in making decisions, and efforts to consult with the community are limited to holding public hearings (Hawaii Department of Parks and Recreation, 1990; Hawaii Division of Aquatic Resources, 1992; Hong, 1995). But, active patrolling and surveillance by park staff, and public education efforts, assist the park to achieve its purposes of allowing for controlled tourism, limiting public access, and minimizing the degradation of marine resources from human activities.

Management problems, that began surfacing in the mid-1960s from the attempt to balance public access and conservation of the marine environment of Hanauma Bay, include overfishing, poaching, fish feeding by tourists, visitors stepping on coral, and a decrease in visual aesthetics due to a rate of up to 3 million visitors per year (Hong, 1995). The government has dealt with all of these problems by adopting new regulations, patrolling the park, and conducting public education, but not through community based decision making or management. Fishing is illegal, entrance points to the park are locked at night, the park is patrolled at all times, the number of people permitted in the park is limited, and a fee is charged to use the park (Hawaii Department of Parks and Recreation, 1990; Hawaii Division of Aquatic Resources, 1992; Hong, 1995). The manager constantly must address new conflicts with user groups, most recently with tour operators attempting to avoid rules that limit the number of tour buses permitted in the park (Hong, 1995).

The protected area's success would be greater and conflicts would be minimized if Hawaii, and other islands with governments that have access to resources for enforcement, would employ community based decision making and allow for multiple purposes. Most Pacific Islands do not have the resources for stringent enforcement or high manager visibility, but even if they did, it would be more desirable and economical to have the community support the protected area than to have to have the government conduct surveillance.

It is feasible for any Pacific Island to incorporate community based decision making and allow for multiple purposes when selecting and managing protected areas. The case studies demonstrate that this is the desirable approach, because deterrents to successful management are minimized when interest groups are directly involved in making management decisions. The alternatives to this approach are policing the protected area and constantly dealing with hostile user groups, or if the island does not have the ability to

actively police the area, allowing continued open access to the area's resources. Thus, community based decision making and allowing for multiple purpose protected areas is the best alternative.

### **Coordination by the Community**

The U.S. National Environmental Policy Act coins the term *scoping*, defined as the identification of important issues and cooperation among affected parties through consultation with interest groups to minimize significant adverse environmental impacts from federal projects (Pease & Smardon, 1984; U.S. Environmental Protection Agency, 1978). This article uses the phrase, community based decision making, defined in the introduction as a process where all interest groups participate in making decisions and coordinating the establishment and management of a protected area. *Coordination by the community* indicates that a committee of interest group representatives and local agencies conducts the steps to select and manage a protected area. Thus, community based decision making and coordination expands on the community's role as defined by scoping, which involves consulting with the public, while community based decision making involves direct coordination by the public.

For this method, the interest group representatives who select and manage a protected area are drawn from all interested groups, including those that actually use the area every day. Potential interest groups may include owners and stakeholders, dive operators, fishers who employ modern or traditional techniques, women's groups, the political constituency (customary and contemporary government) of the coastal zone, and the tourism industry (jet ski and wind surfing rental companies, charter fishing companies, ecotourism companies). However, while all interest groups need to be involved to identify potential issues, not all of the interest groups' desired uses may be permitted by the committee. For instance, with the Sabana Protected Area, committee members decided by consensus not to permit a firing range to remain in the protected area because it was a threat to wildlife and humans, even though the director of the Division of Public Safety was a member of the committee (Sabana Protected Area Management Committee, 1996).

Community based decision making accounts for the specific social, political, economic, and environmental context. The concerns of all interest groups are adequately considered, and interest groups take credit for the protected area when community based decision making is employed to establish a protected area. Allowing for multiple purposes, that do not conflict with the goals of the protected area, permits the varied uses desired by interest groups to coexist, thus avoiding the alienation of most groups. The combined effect of employing community based decision making and allowing for multiple purposes is a successful protected area, one that achieves the goals for which it was created and that is administered by the community.

### **Gaining Community Support**

Although the need to create reserves may be justified from economic and ecological perspectives, the restrictions imposed by reserves often conflict with the immediate needs of local populations who will have areas and activities closed off to them to which they traditionally have had access (Boo, 1990). Most Pacific Islanders still engage in traditional practices, and many of them depend on these practices for subsistence (Carew-Reid, 1990). Harvesting fruit trees, intermittent gardening near villages, hunting and

gathering of forest species, "gleaning" or collecting shellfish from the reef, and fishing have been practiced in the region for up to 3,000 years. Pacific Islanders' attachment to their land is different from Western concepts of ownership, and includes mystical and spiritual dimensions rooted in island cultures. Customary management methods remain in use by many Pacific Island countries. For instance, Fiji, Palau, Yap, and Papua New Guinea still restrict fishing by closing seasons, closing areas, establishing size restrictions, creating gear restrictions, taboos, and limiting entry in an effort to avoid depleting fish stocks. For example, on Yap and Pohnpei, people do not eat stingrays, eels, or sharks, because they are seen as gods. These rules are controlled by clans, chiefs, or families, and the traditional fishing rights are legally recognized by the modern government (Johannes, 1982; Reksid, 1996). On Palau, the customary management rules are imposed by village chiefs. The two paramount chiefs, Ibedul and Reklai, occasionally have called meetings of the council of chiefs to discuss the effectiveness of conservation restrictions (Reksid, 1996).

Any attempt to create parks in ways other than building on customary systems of management has produced negative reactions (Dahl, 1984). Systems of traditional rights and taboos have successfully conserved island resources, and they are a deep part of some island cultures. These customary forms of management are not irrevocably fixed, but evolve successfully as conditions change. The Western practice of "conservation," which conflicts with traditional rights, has met with resistance in the Pacific Islands (Carew-Reid, 1990). Employing community based decision making quells the resistance by letting the local people develop the protected area so that its rules mesh with traditional management practices, and allows them to know that the protected area benefits them, fostering a sense of ownership of the protected area by user groups.

Landgrabs associated with early European colonialism are recent enough to make people cautious and reluctant to support government projects (Carew-Reid, 1990), such as the establishment of protected areas which affect customary land, despite the promise of compensation. Ponter (1980) has clarified why islanders may reject efforts to establish protected areas: "[Tradition] is a dynamic system which absorbs or rejects change according to how the socio-economic costs and benefits are perceived by the members of the group. Tradition is not a refusal to change, it is a proved response to existing local conditions coupled with a correct evaluation of the risk involved in a drastic rearrangement of lives" (p. 38). Coordination by the community encourages local people to participate in the planning of a protected area and to create regulations that do not conflict with the perpetuation of traditional practices, but actually protect their continuation. Thus, community based decision making diminishes feelings of mistrust and gains the community's support for establishing the protected area.

While government personnel attempting to establish a protected area may understand the importance of community based decision making, it is not always easy to organize relevant interest group representatives. Table 1 provides methods for local government staff to involve community groups in the decision-making process. Depending on the current organization of relevant interest groups and the degree of the community's knowledge about the necessity for protected areas, the first two steps identified in Table 1 can take several years.

Of all the suggestions in Table 1, ensuring that interest groups are directly involved and responsible for components of the selection and management processes is critical for the community to take credit for the results. Modern governments typically hold public hearings to satisfy requirements for public involvement. But, successful community coordination requires much more than the holding of public hearings, and also



Table 1

Ways for local governments to encourage representatives of all interest groups to coordinate the protected area selection and management processes

Action	Purpose or effect
Inform the public	Explain to the community the need to establish a protected area. It may be helpful to teach the community basic tenets of marine or wildlife ecology. For example, during the establishment of the San Salvador Islands Marine Park, the Philippines, educational projects that taught fishers how a marine reserve will increase the catch in adjacent areas resulted in the community supporting the reserve (Buhat, 1994). The mode of education needs to be appropriate for the locale. For instance, most cultures in Micronesia exchange information orally, so written educational methods are not the best method.
Organize interest groups	Identify all interest groups that need to be represented in the decision-making process. If these groups are not cohesive, form organized groups. For instance, when forming a marine protected area at a site used by subsistence fishers, but there is no association of fishers, coordinate its formation.
Establish a committee	Encourage appropriate representatives of all interest groups that can speak for their constituency to participate on a committee to make decisions to establish the protected area. It is critical to have all groups represented where participants have equitable authority, creating trust and a perception of fairness (Hough, 1988). Invite people to attend the meetings in person, as most Pacific Island cultures still value face-to-face contact over other modes of communication (Kesolei, 1977; Rubinstein, 1988).
Select a coordinator	The coordinator or chair of the committee needs to be perceived as neutral by all interest groups. The coordinator likely will need to be a local person who is not biased toward any of the participating interest groups.
Select a meeting location	Hold meetings at a location that is perceived as neutral to all interest groups so that no groups are alienated. For instance, hold meetings at a public library, local meeting hall, or university.
Create momentum	The coordinator should start meetings with mutually beneficial, nonpolitical issues that have easy solutions. For example, at the first meeting, it is appropriate to select a schedule for future meetings, identify interest groups that are not represented but should be, identify some of the issues surrounding the protected area, and identify information gaps.

(Continued on next page)

Table 1

Ways for local governments to encourage representatives of all interest groups to coordinate the protected area selection and management processes (*Continued*)

Action	Purpose or effect
Identify all issues	Encourage interest group representatives to voice all of their concerns at an incipient stage of the establishment process. This avoids potential future conflicts. In order to ensure that all issues are identified, it is necessary to have all interest groups represented.
Ensure all interest groups are directly involved	The community will claim credit for the decisions made concerning the selection and management of the protected area only if interest group representatives are directly involved in and responsible for accomplishing the establishment process steps. Interest group representatives will continue to participate in meetings only if they feel they are making a valuable contribution and if the committee heeds the ideas they provide when making decisions. For instance, the committee chair could request that the representative of the divers association identify restrictions for areas zoned for scuba and draft rules for the management plan.
Have direct involvement of decision makers	To instill the community's trust, have decision-makers participate on the committee so that the community perceives that their recommendations have an impact and that their concerns are being heard and considered. Or better yet, promulgate decision-making authority to the committee to select and manage the protected area.
Compromise	Balance the need for conservation with the myriad interest group needs by allowing multiple uses in the protected area. Do not permit uses that contradict the goals of the protected area. Develop a zoning plan that prevents incompatible uses from conflicting.

entails more than simply having interest group representatives attend meetings. Interest groups must be given responsibilities and be allowed to take credit for the rules of the protected area. In other words, they should not merely be consulted for their reaction to a management plan and rules developed by government personnel.

When implementing the theoretical suggestions of Table 1, the local context ultimately determines which steps must be taken to involve interest groups. For instance, consider the case of the Republic of Palau, where the culture requires a unique approach to community coordination. Palauans restrict the freedom of inquiry in selected fields, such as history and the social sciences. Palauans believe that the public does not have a right to know everything. "In most cases only a limited group can claim the right to know something whether they know it already or not" (p. 4) (Kesolei, 1977). People are given credibility for their knowledge according to social status, age, or lineage. Therefore, a local of high caste should lead the committee in order for the population to accept the decisions. If information is obtained from a Palauan not seen as an authority, Palauans will not place faith in that information, even if it is exactly the same information as provided by the

authority. It thus is necessary to find out who the authorities are, so that they can participate as representatives on the coordinating committee for the protected area (Reksid, 1996).

Furthermore, Palauans do not offer opinions until they ascertain what their chief or family elders think. A non-Palauan who makes public a Palauan's knowledge is viewed as infringing on the rights of that person, for that knowledge is perceived as private. Non-Palauans who violate this rule ostracize themselves from the Palauan from whom they gained the information, as well as from other Palauans (Kesolei, 1977). Information is passed along orally in Palau. Knowledge or an opinion passed on through a foreigner or in a written document is not seen as credible; thus confirmations of the opinion of the Palauan seen as an authority must be made through private discussions (Kesolei, 1977; Rubinstein, 1988). "Personal face-to-face communication is still of paramount importance in Micronesian dealings, despite the improvements in electronic and print media. Business arrangements are frequently impossible to conclude through correspondence or long-distance telephone, and depend ultimately on social visits and personal communication" (p. 11) (Rubinstein, 1988).

Traditional governance plays a major role on Palau, as well as in many Micronesian countries, where the traditional leadership functions as the *de facto* government closest to the people (Rubinstein, 1988). Thus, community coordination where traditional governance exists requires being able to identify and work with traditional leaders who may be known only through oral channels. Participation of traditional leaders ensures that customary management systems are respected when establishing the protected area and its rules. Therefore, community based decision making in the Pacific Islands requires an awareness and respect of the local culture.

### **Selection Process**

The process for selecting a protected area in the Pacific Islands involves informing the public, forming a committee, ranking and defining criteria, comparing alternative sites, selecting a site, and determining zoning requirements for the new protected area. Figure 1 shows a flowchart of these steps. This section, and the following section on the management process, provide a general skeleton of steps to establish and administer a protected area. The details of the process for a specific site depend on the local context. Thus, the following two sections contain suggested steps that may or may not apply to a site. These suggestions have been successfully employed by the Sabana Protected Area committee in the CNMI.

#### ***Step A: Inform the Public and Initiate Committee Meetings***

The first step of the protected area selection process is to form a committee that will coordinate the selection and management processes. A government agency or other organization coordinates the formation of a committee of representatives from interest groups and local agencies. Public education by the interest group organizers that is tailored to the local context is effective in promoting the communities to form coordinating committees. Usually, public agencies form the committee because they see a need to counteract human pressures on the environment, protect the traditional lifestyle, protect delicate systems, enhance tourism, provide for recreation, or protect an area for scientific research. For example, the driving force behind establishing the Sabana Protected Area committee was primarily to protect Rota's drinking water from contamination, protect traditional farming practices, and protect fruit bat roosts.

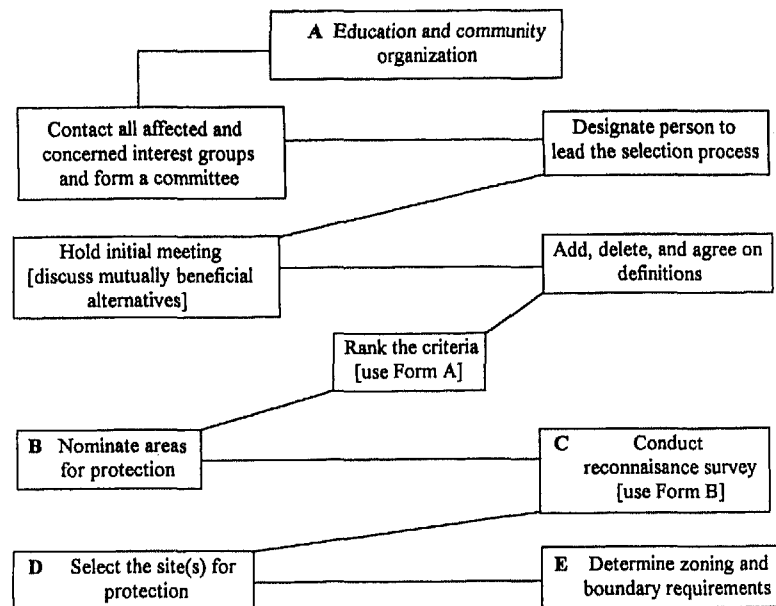


Figure 1. Flowchart showing the methodology to select a protected area.

Once formed, the committee may need to identify a funding source for these beginning activities. Perhaps existing local budgets can cover initial costs. The committee's first action is to inform the community about the need for a protected area. The committee may decide to employ some of the following commonly used methods for public education.

- Place posters at key areas in appropriate languages;
- Produce and distribute brochures and newsletters;
- Hold meetings with interest groups;
- Offer presentations to students and interested organizations;
- Make public announcements on the radio, on television, and in local papers; and
- Construct an information office where visitors can ask questions, view a short video, or get literature. (Wilcox, 1994)

The coordinators of the community coordination process must also organize key interest groups that are not already cohesive, and identify all of the groups that are affected by the protected area. These steps are described in Table 1.

Committee members select and define the criteria to be included on Form A (Figure 2). These criteria are the purposes for creating the protected area. The committee may decide to account for islandwide, countrywide, or even regionwide needs for protecting areas, in addition to their local needs. Selecting the purposes of the proposed protected area is as difficult as the obtaining of consensus among all interested parties on a single ranking scheme is unlikely. Also, the desired activities of certain interest groups may contradict the goals of the protected area as desired by the majority of committee members, and thus will be prohibited in the protected area. Allowing multiple uses does not mean that all uses are permitted. The committee will not permit uses that are incompat-

FORM A		
Criteria Ranking		
What are the most important reasons for creating the protected area?		
Rank from 1 to 10.		
1 = very important		
10 = not important		
Rank	Criteria	Comment
<b>Ecological Criteria</b>		
_____	Rarity and Uniqueness	
_____	Diversity	
_____	Size	
_____	Naturalness	
_____	Fragility	
_____	Representativeness, Typicalness, and Habitat Types	
_____	Importance to Wildlife	
<b>Cultural Criteria</b>		
_____	Educational Value	
_____	Historical Value and Traditional Use Sustainability	
_____	Recreational and Tourism Value	
_____	Archaeological Value	
_____	Scientific and Research Value	
_____	Economic Value (farming, grazing, fishing)	
<b>Planning and Management Criteria</b>		
_____	Geographical Location	
_____	Threat	
_____	Manageability	
_____	Size and Shape	

Figure 2. Form A, containing criteria to identify the purpose for creating a protected area.

ible with the protected area's goals. Therefore, it is wise to attempt the ranking after only a few successful meetings have passed. Definitions for the ecological criteria listed on Form A are in the literature (Rabe & Savage, 1979; Salm, 1984; Smith & Theberge, 1986; Usher, 1986). The criteria listed on Form A are the purposes most frequently referred to when people explain why existing protected areas were created or why new protected areas are needed (Anson & Raynor, 1993; Earle, 1993; IUCN, 1986; McCully, 1991; Rabe & Savage, 1979; Salm, 1984; Smith & Theberge, 1986; Usher, 1986; Wilcox, 1994). After they have adapted it to their satisfaction, the committee will use Form A to rank the criteria.

Figure 3 provides an example of how Form A can be modified for actual use. The management process as described in this article is being implemented for the Sabana Protected Area of Rota, CNMI. Form A was adapted to fit the local context of Rota by allowing the potential purposes for establishing a protected area to be selected, defined, and ranked by interest group representatives.

The Multiple Purposes of the Sabana Protected Area (Implementation of Form A) Ranking Worksheet	
On a scale from 1 to 10, rank each of the following 10 purposes, where a 1 indicates that the purpose is critical and should be protected, and a 10 indicates that the purpose does not need to be protected.	
Rank	Purpose
_____	Farming and experimental farming
_____	Wildlife conservation, wildlife habitat conservation, conservation of valuable plants
_____	Groundwater protection
_____	Hunting
_____	Tourism
_____	Traditional medicinal use of plants
_____	Forestry
_____	Firing range
_____	Communications/antennae
_____	Botanical garden

Figure 3. Example of practical adaptation of Form A.

**Step B: Nominate Areas for Protection**

The committee can create subcommittees of user groups and technical experts to collect information on the criteria prioritized in Step A. For instance, there may be a need for subcommittees to delineate locations of endangered species and their habitat, map the locations of historical sites, determine when and where fish spawn, or determine the recreational interests of tourists.

Once this information is collected and presented to the committee, committee members nominate sites to be protected. The prioritized criteria should be kept in mind when nominating sites. The maximum number of alternatives that the committee will consider depends on the ability (time and money) to survey.

**Step C: Survey the Alternative Sites**

The committee conducts a reconnaissance survey of each alternative site. Technical experts collect the data for each criterion. The future park personnel can receive training in applicable natural sciences and park management skills by participating in conducting these surveys.

It will help the committee to select a site for protection if surveyors use a standardized checklist containing the ranked criteria. The committee creates a checklist consisting of the criteria prioritized in Step A, and shows the rank given to each criterion by the committee on Form A. Experts fill out a checklist for each site. A sample truncated

checklist, Form B, is presented as Figure 4. The form provides sample questions concerning quantitative and qualitative descriptions of a few criteria.

Subcommittee members record responses to the questions on Form B during the inventory process. If this sample form were not truncated, it would contain all of the criteria included on Form A. The committee selects their own criteria and questions for Forms A and B. Efforts of the inventory process (time and money) should focus on prioritized criteria.

#### ***Step D: Final Selection of a Site for Protection***

Committee members select the site to be protected based on the results of the selection process meetings and use of Forms A and B. Committee members now have the requisite information in order to compare how the alternative sites fulfill the prioritized criteria, so that they can select the site to protect.

FORM B	
Reconnaissance Survey Checklist	
Criteria are listed from the most important purpose (rank #1) for the protected area to fulfill to least important (rank #10).	
<u>Rank</u>	
1	<u>Historical Value and Traditional Use Sustainability</u> What religious, mythological, or other socially significant uses of the area exist? Do people conduct traditional natural resource uses at the site? Rate the traditional and historical use value of the site on a scale from 1 to 10, where a 1 indicates that the site has the highest historical and traditional use value.
1	<u>Diversity</u> Species richness (number of species per unit area): Is the morphology homogeneous or diverse? Area of the site:
2	<u>Representativeness, Typicalness, and Habitat Types</u> Are communities, species, habitats, and geological features common to the ecosystems of the site present? If certain types of habitat are not yet protected, does this site contain those habitat types? List the common geological features, communities, species, and habitats expected for each ecosystem and indicate which ones are present. Also, list the habitat types not protected in the country, and list the habitat types present in the proposed site. Rate the typicalness and habitat value of the site on a scale from 1 to 10, where a 1 indicates that the site is very typical.
3	<u>Size (Ecological Criteria)</u> Area of the site: Population size(s) present of each species selected for preservation: Minimum population size of each species chosen for protection: If known, list range requirements of each species selected for preservation: What is the range requirement of the keystone species? Is the size of the site sufficient when these ecological principles are considered?
6	<u>Recreational Value/Tourism</u> Describe possibilities for tourism and recreation in the site. Is the site currently accessible for these uses? Is the site currently used for tourism and recreation? On a scale from 1 to 10, how useful is the site for recreation and tourism, where a 1 indicates that it is very useful.

Figure 4. Form B, a checklist for a reconnaissance survey.

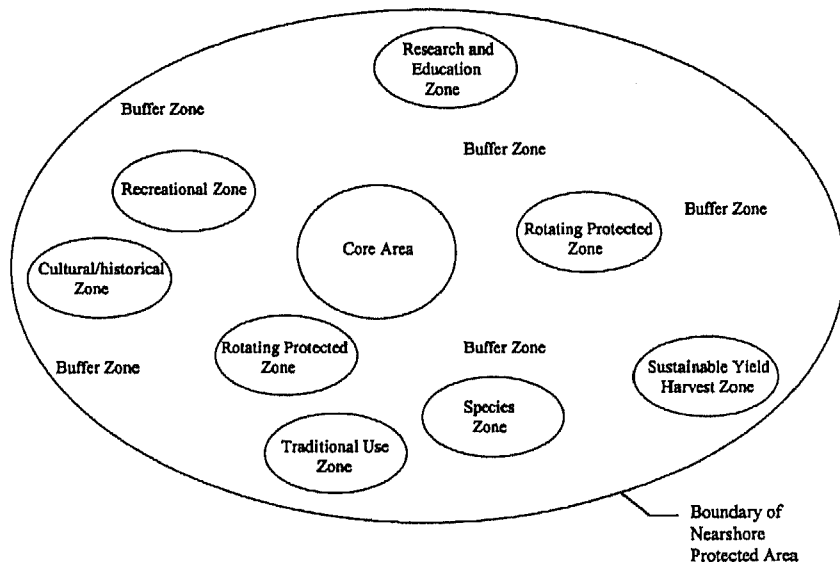
**Step E: Determine Zoning and Boundary Requirements**

The final step of the selection process is to determine boundary requirements for each site selected to become a protected area, and zoning of areas within these boundaries. The boundaries and zoning plan that the committee develops must support the criteria prioritized during the selection process.

Figure 5 provides a conceptual zoning plan with possible zones that the committee may deem necessary for the protected area. The committee may incorporate this zoning and boundary plan into the management plan. Zoning the protected area helps avoid having incompatible uses occur in the same area. Zoning also allows for the requisite protection of sensitive areas and resources. One zone of the protected area may support more than one purpose (multiple uses can be permitted in one zone).

Each zone provides different degrees and types of protection. A real protected area's management plan probably will not need to include all of these zones. The purposes that the committee identified for the specific protected area determine the types of zone that are established.

**Protected area boundary.** The size of the protected area depends on which criteria were prioritized in Step A. If a core area is designed to preserve biotic or genetic diversity, the protected area needs to be larger than a critical minimum size for all species found in the area, in order for these species to survive. It also must include all environments within the ecosystem. If the purpose of the core is to ensure environmental protection, boundaries should encompass entire ecological units and include adjacent terrestrial and marine areas. This is in accordance with the ecological concept of *holism*, which recognizes the interdependency between terrestrial and marine environments. Marine protected areas should not end at the shoreline, but should incorporate adjacent land areas (Salm, 1984), and terrestrial coastal protected areas need to incorporate adjacent aquatic and upland areas.



**Figure 5.** Example of a zoning and boundary plan for a protected area. This sample plan could apply to a terrestrial, marine, or watershed system. A real plan may be overlaid on an existing map. (For example, see Sabana Protected Area Management Committee, 1996; White & Alcala, 1992; Great Barrier Reef Marine Park Authority, 1980.)



Committee members must identify all of the processes that affect the habitats within the core area in order to properly designate the protected area's boundary. For example, if a marine protected area's main purpose is to conserve coral habitat in the core area, it is important to identify all reef types present on the island and to include each type in the area. The different reef habitats contribute different types of larva to the reef system. Also, adjacent terrestrial and coastal systems (such as watersheds, beaches, bluffs, and mangrove wetlands) should be protected to ensure the health of the coral reef. For instance, beaches and dunes adjacent to the protected coral reef also must be protected to ensure that the reef is not negatively impacted. If binding vegetation from the coastal upland areas is destroyed, or coastal erosion occurs, sand will be transported to the reef via wind, waves, and currents, and will smother sessile reef organisms (Salm, 1984). Size is less important for other purposes, such as recreation, tourism, research, or the protection of a specific species. These purposes have smaller area requirements than those required to protect diversity (Salm, 1984; White & Alcala, 1992).

Other areas and zones include the following:

*Core area.* Core areas commonly are designated to strictly preserve the natural environment. The committee may decide to prohibit access, or to allow access but prohibit resource harvest.

*Buffer zone.* A buffer zone can be designated around a core area, acting as a transition space between the core and outside areas.

*Species zone.* A particular plant or animal species is protected in a species zone. This zone may be closed during part of the year (such as during the breeding season of a valuable plant or animal).

*Sustainable yield harvest zone.* A sustainable yield harvest zone maintains resource exploitation at a sustainable level.

*Cultural zone.* A cultural zone area contains historical objects or is an area of historical significance. Rules for this zone prohibit activities that degrade the objects or diminish the site's historical value.

*Rotating protected zone.* A rotating protected zone is closed for a set duration sufficient for natural resources to recover from human exploitation, and then is open for human resource harvest for a set duration. When one of these zones opens, another is then closed from human resource harvest.

*Recreational zone.* A recreational zone permits the use of specific nonconflicting recreational activities, such as jet skiing, parasailing, snorkeling, spearfishing, scuba diving, or line fishing. Conflicting uses, such as jet skiing and snorkeling, are not permitted in the same zone.

*Research or education zone.* A research or education zone protects a pristine natural area for scientific research or education.

*Traditional use zone.* There may be a need to reserve a zone for traditional resource harvesting methods, where modern extraction methods that easily outcompete traditional methods and quickly deplete a resource are prohibited. (Adapted from White & Alcala, 1992.)

Once the committee determines the zoning and boundary requirements for the protected area, the first half of the establishment process is complete. The selection and management processes are part of a single establishment process, and the momentum from the selection process is continued into the management process.

### Management Process

After the committee selects a site to be protected, they may follow the seven steps depicted in the flowchart of Figure 6.

#### *Step A: Add New Members to the Management Steering Committee*

All of the interest group representatives who participated in the selection process should continue with the management process. Those who will administer the protected area on a daily basis now join the committee, if they have not already been involved. The committee may need to initiate Step C (research and acquire funding sources) before it can hire staff for the protected area. Hired staff can then participate in incipient management process steps. Initial funding may already have been obtained during Step A of the selection process to pay for selection process tasks, but the committee now needs to identify a permanent, perpetual funding source. If the context allows, interest groups (such as fishers, dive operators, tourism industry employees, and existing public agency personnel) will manage and enforce rules of the protected area, eliminating the need to acquire funding for management staff.

#### *Step B: Designate the Site*

The relevant organization needs to legally designate the protected area. The committee, legislature, government agency mandated to regulate protected areas, or other legally mandated organization now goes through the designation process. For example, in the CNMI, protected areas can be designated by the local government by a legislative resolution, by passing a local law, through adoption of Division of Fish and Wildlife regulations, or through an amendment to the CNMI Constitution. It may be appropriate to designate the protected area at an earlier stage, however, because the existence of the committee may be politically necessary in order to provide unified support to establish the protected area. A local designation fosters a bottom-up management approach more than does a national, regional, or international designation.

A local designation is preferred when establishing a municipal or island-level protected area. National or international protected area establishment methods may not allow for local government coordination (Wilcox, 1994). Also, a local approach likely will allow for a more flexible process than a federal program, such as the National

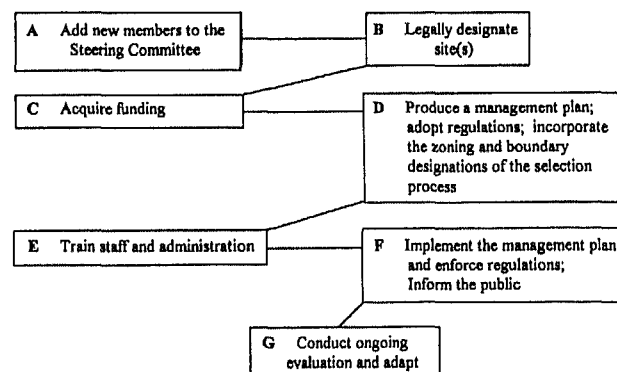


Figure 6. Flowchart showing management process tasks for a protected area.

Marine Sanctuary Program or Great Barrier Reef Marine Park Authority (Alder, 1993; Tarnas, 1988). Also, while these two national programs do allow for multiple purposes, environmental protection is their primary goal (Alder, 1993; Barley, 1993; Bunce et al., 1994; Galasso, 1996; Marine Protection, Research and Sanctuaries Act, 1972; Pollard, 1993; Tarnas, 1988). Thus, if a local community uses these two programs to establish a protected area, they may not be able to address their priority local needs, such as protecting fishers who employ traditional methods, or cultural and historical resources.

Furthermore, national and international programs may have limited scopes. For instance, the National Marine Sanctuary Program cannot protect an entire watershed, but is limited to protecting only marine areas. This restricts the program's regulatory authority over upland activities that may affect the marine resources (Tarnas, 1988). Cooperative agreements between various agencies can solve this problem, and there has been some recent emphasis on collaboration between organizations (Galasso, 1994), but if agreements with other agencies or programs is not politically possible, resource protection is hampered.

The use of public participation through sanctuary advisory councils and integrated management in the National Marine Sanctuary Program's sanctuary establishment process has grown since 1990 (Barley, 1993; Fiske, 1992; Galasso, 1994, 1996.) However, coordination and final decision making by federal agencies is not appropriate for municipal island-level protected areas, where there is a need for direct coordination by representatives of the community and local agencies, and self-determination of the purposes for the protected area. Pacific Island governments desire sovereignty.

American flag Pacific Islanders do not perceive projects coordinated by the U.S. government as their own, and tend not to support them. For example, "AFPI (American Flag Pacific Island) governments favor a funding mechanism that builds management capacity within their governments rather than through the Sanctuaries and Reserves Division of OCRM (the National Marine Sanctuaries Program)" (p. 23) (Pacific Basin Development Council, 1995). The AFPI governments want coral reef management initiatives to come from local levels, a bottom-up approach, and then see the appropriate federal role as providing technical assistance and financial support (Pacific Basin Development Council, 1995). The National Marine Sanctuary Program has been criticized for its federal, top-down approach to decision making (Peau, 1995; Tarnas, 1988). While it is true that the National Marine Sanctuary Program emphasizes local involvement and since 1990 has placed a major emphasis on public participation (Galasso, 1996), many Pacific Island countries do not completely trust the U.S. government and perceive the federal establishment of protected areas as limiting access to and sovereignty over their resources. Local designation and managerial coordination thus is preferable in the Pacific Islands, if the local community is to support and take credit for the protected area.

### *Step C: Research and Acquire Funding Sources*

Local funding sources were tapped in Step A of the selection process. However, the local government may not be able to financially support the administration of the protected area. Support can come from the local private sector, the government, and external sources. Concessionaires would be expected to pay a percentage of their revenues to the park. Donations and volunteers are key means to support protected areas in this age of deficits (O'Neill, 1993). The committee may approach the international conservation community to fund the protected area's operational costs, staff salaries, training courses,

equipment, infrastructure, and public education programs (Mitchell & Barborak, 1988). Designation of the protected area through federal or international organizations brings the benefit of funding, but may restrict the committee's authority in making management decisions and produce negative perceptions among local people that the protected area is being managed by foreigners and not by the community, as discussed in Step B and in the introduction.

The South Pacific Regional Environment Program (SPREP) coordinates national and regional environmental protection efforts. The 22 Pacific Island governments that are members of SPREP can request SPREP to locate funds for their environmental protection projects. Andrew Smith, coastal management officer for SPREP, acquires funds for SPREP projects from international agencies (such as the United Nations Development Program, Asian Development Bank, International Maritime Organization, Commonwealth Secretariat, and the United Nations Fund for Population Activities). Besides these organizations, Smith suggests contacting the World Wildlife Fund; the World Wide Fund for Nature; the International Union for Conservation of Nature; environmental programs of the European Union; the Apia, Western Samoa, and Suva, Fiji, offices of the United Nations Environment Program; and Greenpeace's Pacific campaign office (Smith, 1995). Other potential funding sources may be located by contacting the Sustainable Development Group at the University of Oregon; the Trust for Public Land, they produce a newsletter called GreenSense that deals with conservation funding; and by contacting professors at the University of Guam Marine Laboratory.

#### ***Step D: Develop an Explicit Management Plan and Write Regulations***

The protected area administrator must make initial restrictions explicit in a management plan and develop regulations, keeping in mind that the restrictions may need to change over time as conditions change.

The management plan and regulations will define the boundaries and zoning for the protected area and describe the rules for these zones, as determined in the final step of the selection process. In Step F, where the main approach to enforcement is education, the committee will implement the plan, first by communicating the protected area's rules to the community.

The management plan should project needed facilities and programs several years into the future, and estimate the funds necessary to implement the plan. A generic table of contents for a protected area management plan includes the following:

- executive summary;
- baseline characteristics (natural resources, historical resources, cultural use)—where the program is now;
- purposes and objectives of the protected area—where the program should be in the future;
- zoning plan and boundary delineation of the protected area;
- rules or regulations for each zone;
- enforcement plan;
- research and monitoring plan (biological, social, economic, and cultural);
- education and interpretation;
- facilities and equipment;
- administration, maintenance, utilities;
- staff requirements;

- training requirements;
- program needs;
- ongoing evaluation and adaption of management plan's rules;
- budget summary; and
- relevant legislation, interagency agreements, and existing legal framework.

#### ***Step E: Continued Training of the Protected Area's Administrators and Managers***

Multiple use protected areas require management by a central authority, advanced resource use planning, and other technical skills. The training of administrators and park staff, which began in the site selection process, must be ongoing in order for personnel to effectively manage the protected area. For instance, there may be a need to train park personnel to conduct monitoring dives, so that they can assess the impact of diving and decide when to restrict public access to overused areas (Stewart, 1988). Formal volunteer assistance may be sought from such organizations as the Volunteers in Service Overseas, Canadian University Services Overseas, Peace Corps, United Nations Volunteer Program, and universities (Mitchell & Barborak, 1988). Any outside specialists or researchers working in the protected area should be required to be teamed with a local counterpart to transfer technical skills (Mitchell & Barborak, 1988).

#### ***Step F: Initiate Enforcement with a Focus on Education***

Consistent enforcement by park staff must begin immediately after regulations are officially adopted, in order for the park to be successful. The government must be committed to collaborating with the community to manage the protected area, providing adequate resources, and consistently enforcing regulations, in order to achieve success. Enforcement activities should include rewards and punitive measures, but the main enforcement emphasis should be on public education.

Educational activities help inform the community about the rules of the protected area, explain why restrictions are necessary, and gain public support for enforcement. Hence, education is a form of enforcement.

If the people who use the protected area understand the need for the area's rules and support these rules, the need for surveillance is minimized. Also, user groups will then aid in enforcement efforts by reporting people who violate rules. For instance, the coordinators of the community managed San Salvador Marine Park, the Philippines, conducted education projects that resulted in the local community's support for a ban on collecting aquarium fish. Local San Salvador residents now assist government employees in enforcing park regulations, because they have learned the ecological basis for the rules and understand how the rules will result in increased fish abundance and catch (Buhat, 1994).

There is a need for a government agency or other organization to provide support to perpetuate the momentum of the committee, and ensure that enforcement activities occur. For instance, the CNMI Governor's Office supports the Sabana Protected Area committee by coordinating the implementation of rules, facilities, and programs identified in the management plan (Sabana Protected Area Management Committee, 1996). Also, staff of the Marine Conservation Project for San Salvador and from the Marine Conservation and Development Program of Silliman University support the community committees that administer protected areas (Buhat, 1994; White, 1988).

***Step G: Ongoing Evaluation and Adaption***

Managers must ensure that there is flexibility in the management process of the protected area to meet changing needs. The management plan contains an outline of research activities needed to assess the impact of the protected area's rules on the biological, economic, social, and cultural components of the locale, in order to determine if the rules and management style need to be adjusted. Communication with the local community must not break down after the establishment process is concluded. The managers need to assess the effect of restrictions on local populations, and decide if changes are necessary. Furthermore, as restrictions change with the area's changing use patterns, managers need to continue to hold committee meetings to assess whether the protected area's original goals are being fulfilled.

**Conclusions**

Establishing successful local-level, municipal, or island-scale protected areas in the Pacific Islands requires coordination and decision making at the local level. Many Pacific Island governments do not possess the resources to effectively administer protected areas. Therefore, collaboration between interest groups and local agencies provides the resources needed to administer the protected area, and to monitor the impacts of the management measures on the resources and user groups. A committee of interest group representatives and local agencies conduct selection and management activities. Interest groups must have equitable and direct involvement in decision making in order to create a sense of ownership by the community for the protected area and its rules. Furthermore, protected areas must permit multiple purposes that are selected by the community to prevent alienation of interest groups. The main goals of the protected area cannot be restricted to providing recreation, protecting aesthetics, or preserving natural areas, but must be selected by the committee. The committee permits only uses that are compatible with the goals of the protected area; that is, the committee permits multiple uses, but not all uses. This maximizes the likelihood that the protected area will successfully achieve the purposes for which it was created.

Allowing for multiple uses and community based coordination and decision making creates flexibility and equity, and reduces conflicts. The model accounts for differences in power between stakeholders involved in the selection and administration processes. Decisions reflect the opinions and needs of all interest groups, including the least powerful ones, in order to avoid conflict and lead to the successful management of the protected area. All interested groups participate in making decisions and identifying their concerns. Thus, this model minimizes deterrents to successful management.

This model is especially relevant for use in the Pacific Islands, because Pacific Islanders have a long tradition of natural resource use and customary resource management (Boo, 1990; Carew-Reid, 1990; Dahl, 1984; Johannes, 1982; Reksid, 1996). When management authority is solely in the hands of modern government, and the community does not make decisions or coordinate the processes to establish and manage protected areas, user groups are less likely to support the protected area and its rules. When community based decision making is not employed, but the government does have access to enforcement resources, the protected area's goals can be somewhat achieved, though this requires constant surveillance. Conflicts with resource users are likely to be perpetual, because user groups do not support or take credit for the protected area or its rules. If the government does not have the resources to police, resources remain in a

state of open access. Thus, allowing for community decision making and multiple purposes is the best method. The case studies of the CNMI, Guam, and Hawaii, and literature review examples from Palau, the Federated States of Micronesia, the Philippines, and American Samoa (Anson & Raynor, 1993; Buhat, 1994; Hough, 1988; Mitchell & Barborak, 1988; Vande Vusse, 1991; White, 1988, 1989; White et al., 1994) support this article's thesis.

The National Marine Sanctuary Program and Great Barrier Reef Marine Park Authority employ public participation and permit multiple purposes in their protected areas. This method adapts the concepts employed by these national-level agencies for implementation by communities and local agencies of the Pacific Islands. While in the two national-level programs management activities are coordinated by the government and representatives of the community advise government decision makers, in this article's model representatives of interest groups and local agencies directly coordinate and make decisions. Also, while the two national-level organizations require environmental protection to be the overall goal of protected areas, this model permits the community to select all goals.

Allowing for coordination by the community will not necessarily result in a successful protected area. Even if all interest groups support the protected area and its rules, the modern private sector may violate the rules because the political and economic sectors (which have more power than average citizens in Pacific Island countries) typically favor short-term profit and do not consider taking measures to ensure the long-term sustainable use of natural resources. However, allowing for coordination by the community and permitting multiple purposes maximizes the likelihood for success. An engaged public may motivate the government to support a protected area, and to strictly regulate the private sector.

This leaves three options for the Pacific Islands: (1) Islands with strong and functional governments can spend a significant amount of time and energy enforcing protected area regulations, like Hanauma Bay, Hawaii; (2) if the government lacks the resources to patrol and show a high degree of visibility in its protected areas, it can allow resources to remain in a state of open access; or (3) the islands can allow for community based decision making and multiple purposes in their protected areas, like the Sabana, CNMI. Most Pacific Island governments do not have the requisite technical and human resources to effectively patrol protected areas. But, local Pacific Island governments can collaborate with user groups and allow for community coordination and multiple purposes. Allowing for community coordination and multiple purposes is feasible, economical, and the preferable choice.

## References

- Alder, J. 1993. Permits, an evolving tool for the day-to-day management of the Cairns section of the Great Barrier Reef Marine Park. *Coastal Management* 21:25-36.
- Anonymous. 1995. Canadian perspectives on local organizational arrangements within biosphere reserves. *Biosphere Reserves* 2:24.
- Anson, H., and B. Raynor. 1993. Pohnpei's watershed forest reserve: Towards sustainable management. In *Fifth South Pacific Conference in Nature Conservation and Protected Areas. Volume 2: Conference papers*. Tonga, 4-8 October, 21-49. Apia, Western Samoa: South Pacific Regional Environment Programme.
- Barley, G. 1993. Integrated coastal management. The Florida Keys example from an activist citizen's point of view. *Oceanus* 36(3):15-18.
- Boo, E. 1990. The impacts of nature tourism. In *Ecotourism: The potentials and pitfalls, Volume 1*, 7-26. Lancaster, PA: Wickersham Printing Co., Inc.

- Buhat, D. Y. 1994. Community-based coral reef and fisheries management, San Salvador Island, Philippines. In *Collaborative and community-based management of coral reefs: Lessons from experience*, ed. A. T. White, L. Z. Hale, Y. Renard, and L. Cortesi, 33–50. West Hartford, CT: Kumarian Press.
- Bunce, L. L., J. B. Cogan, K. S. Davis, and L. M. Taylor. 1994. The National Marine Sanctuary Program Recommendations for the program's future. *Coastal Management* 22:421–426.
- Carew-Reid, J. 1990. Conservation and protected areas on South-Pacific islands: The importance of tradition. *Environmental Conservation* 17:29–38.
- Carpenter, R. A., and J. E. Maragos (Eds.). 1989. *How to assess environmental impacts on tropical islands and coastal areas: South Pacific Regional Environment Program training manual*. Honolulu: East-West Center.
- Coastal Resources Management Office, Commonwealth of the Northern Mariana Islands (CNMI). 1985. *CNMI marine parks management plan*. Prepared by Pacific Basin Environmental Consultants, Inc., Guam.
- Coggins, G. C. 1993. Trends in public land law (a title the inaccuracy of which should become manifest). In *Natural resources policy and law: Trends and directions*, ed. L. J. MacDonnell and S. F. Bates, 49–65. Washington, DC: Island Press.
- Commonwealth of the Northern Mariana Islands Senate Local Law 9-7, Rota Local Law 9-1. 1994. Sabana Conservation Area. Ninth CNMI Legislature. Approved 24 October.
- Dahl, A. L. 1984. Oceania's most pressing environmental concerns. *Ambio* 13:296–301.
- Daschbach, N. 1995. Fagatele Bay National Marine Sanctuary coordinator, American Samoa Economic Development Planning Office. Personal communication, 22 February.
- Davis, G. 1995. Supervisor, Fisheries Section, Guam Division of Aquatic and Wildlife Resources, Department of Agriculture. Personal communication, 27 February and 24 March.
- Dixon, J. A. 1989. Valuation of mangroves. *Tropical Coastal Area Management* 4(3):1–6.
- Earle, S. 1993. Sanc'-tu-ar'-y: Try to define marine sanctuaries and you will discover their charm. *Marine Sanctuary* 1(1):4–7.
- Ehler, C. N., and D. J. Basta. 1993. Integrated management of coastal areas and marine sanctuaries. *Oceanus* 36(3):6–13.
- Fiske, S. J. 1992. Sociocultural aspects of establishing marine protected areas. *Ocean and Coastal Management* 17:25–46.
- Galasso, G. A. 1994. The use of coordinating mechanisms in the management of national marine sanctuaries. In *Coastal Zone Canada 1994 conference proceedings*, eds. T. Bigford and R. Boyles Jr. Seattle, Washington: The Coastal Society. July 14–17, 1996.
- Galasso, G. A. 1996. National marine sanctuary advisory councils, a collaborative approach to management. In *The Coastal Society 15 Conference proceedings*.
- Government of Guam. 1978. *Executive Order 78-42. Guam Territorial Seashore Park*.
- Great Barrier Reef Marine Park Authority. 1980. *Great Barrier Reef Marine Park Capricornia section zoning plan*. Commonwealth of Australia.
- Guam Department of Parks and Recreation. 1978. *Guam Territorial Seashore Park*. Agana, Guam: American Printing.
- Guam Department of Parks and Recreation. 1979. *Guam Territorial Seashore Park master plan*. Government of Guam publication.
- Hawaii Department of Parks and Recreation. 1990. *Hanauma Bay general plan*. Management Plan for the Hanauma Bay Beach Park.
- Hawaii Division of Aquatic Resources, Department of Land and Natural Resources. 1992. *Marine life conservation districts*.
- Heine, A. 1984. Urbanization and social change in the Marshall Islands. *Ambio* 13:213–215.
- Hong, A. 1995. Manager, Hanauma Bay Nature Park, Hawaii Department of Parks and Recreation. Personal communication, 26 July.
- Hough, J. L. 1988. Obstacles to effective management of conflicts between national parks and surrounding human communities in developing countries. *Environmental Conservation* 15:129–136.



- International Union for Conservation of Nature and Natural Resources (IUCN). 1986. *Review of the protected area system in Oceania*. Gland, Switzerland: IUCN Publication Services.
- IUCN. 1991. *IUCN directory of protected areas in Oceania*. Prepared by the World Conservation Monitoring Centre. Gland, Switzerland: IUCN Publication Services.
- Johannes, R. E. 1982. Traditional conservation methods and protected marine areas in Oceania. *Ambio* 11:258–261.
- Kesolei, K. 1977. Restrictions to freedom of inquiry: Palauan strains. Workshop on the Role of Anthropology in Contemporary Micronesia (TTPI), 1–12.
- Knight, R. L., and S. F. Bates (Eds.). 1995. *A new century for natural resources management*. Washington, DC: Island Press.
- Lotz, B., and D. T. Lotz. 1992. *Making tracks in the Mariana Islands*. Agana, Guam: American Printing.
- Lotz, D. T. 1995. Parks administrator, Guam Department of Parks and Recreation. Personal communication, 22 and 23 March.
- MacDonnell, L. J., and S. F. Bates (Eds.). 1993. *Natural resources policy and law: Trends and directions*. Washington, DC: Island Press.
- U.S. Marine Protection, Research and Sanctuaries Act. 1972. As amended, Title III, National Marine Sanctuaries Program.
- Martz, C. O. 1993. Natural resources law: An historical perspective. In *Natural resources policy and law: Trends and directions*, ed. L. J. MacDonnell and S. F. Bates, 21–48. Washington, DC: Island Press.
- McCully, P. 1991. FAO and fisheries development. *The Ecologist* 21:77–80.
- Mitchell, B. A., and J. R. Barborak. 1988. Developing coastal park systems in the tropics: Planning in the Turks and Caicos Islands. *Coastal Management* 19:113–134.
- National Park Service, U.S. Department of the Interior. 1989. *General management plan: American Memorial Park, Saipan*.
- O'Neill, B. 1993. Alternative support for protected areas in an age of deficits. *Oceanus* 36(3):49–52.
- Pacific Basin Development Council. 1995. *American Flag Pacific Islands Coral Reef Initiative management program planning meeting summary report*. Honolulu.
- Pease, J. R., and R. C. Smardon. 1984. The scoping concept and citizen involvement: An opportunity for rejuvenating NEPA. In *Improving impact assessment*, 109–139. Boulder, Colorado: Westview Press.
- Peau, L. 1995. Chief, American Samoa Coastal Zone Management Program. Personal communication at the Pacific Basin Coastal Zone Management Conference, Saipan, CNMI, 25 May.
- Pollard, A. 1993. Maximising the potential for both sustainable fisheries and alternative uses of fish habitat through marine harvest refugia. *Sustainable Fisheries Through Sustainable Fish Habitat Workshop, Victor Harbour*, ed. D. Hancock, 156–158. Victor Harbour, Australia.
- Polunin, N. V. C., and C. M. Roberts. 1993. Greater biomass and value of target coral-reef fishes in two small Caribbean marine reserves. *Marine Ecology Progress Series* 100:167–176.
- Ponter, B. 1980. Loosening the chains: Social constraints on development planning. In *The Pacific way: Social issues in national development*, 112–138. Fiji: South Pacific Social Sciences Association.
- Rabe, F. W., and N. L. Savage. 1979. A methodology for the selection of aquatic natural areas. *Biological Conservation* 15:291–300.
- Reksid, F. 1996. Special assistant to the governor, Commonwealth of the Northern Mariana Islands. Minister of Palau from 1986 to 1988. Personal communication, 10 May.
- Roberts, C. M., and N. V. C. Polunin. 1991. Are marine reserves effective in management of reef fishes? *Reviews in Fish Biology* 1:65–91.
- Roberts, C. M., and N. V. C. Polunin. 1993. Marine preserves: Simple solutions to managing complex fisheries? *Ambio* 22:363–368.
- Rowchai, S. 1991. Assessment and management of marine resources in Tarutao National Park, Thailand. In *Towards an integrated management of tropical coastal resources*, International Center for Living Aquatic Resources (ICLARM) Conference Proceedings 22, ed. L. C. Chou, T.-E. Chua, H. W. Khoo, P. E. Lim, J. N. Paw, G. T. Silvestre, M. S. Valencia, A. T. White,

- and P. K. Wong, 413–417. National University of Singapore, Singapore; National Science and Technology Board, Singapore; and International Center for Living Aquatic Resources Management, the Philippines.
- Rubinstein, D. H. 1988. *The Federated States of Micronesia*. U.S. Information Agency, Office of Research.
- Sabana Protected Area Management Committee. 1996. *Management plan for the Sabana Protected Area, Rota/Luta, Commonwealth of the Northern Mariana Islands*. CNMI Department of Lands and Natural Resources.
- Salm, R. V. 1984. Ecological boundaries for coral-reef reserves: Principles and guidelines. *Environmental Conservation* 11:209–215.
- Smith, A. 1995. South Pacific Regional Environment Programme, coastal management officer. Personal communication, 26 May.
- Smith, P. G. R., and J. B. Theberge. 1986. A review of criteria for evaluating natural areas. *Environmental Management* 10:715–734.
- Snedaker, S. C. 1984. *Tropical coastal resource management*. Washington, DC: Research Planning Institute, Inc.
- Stewart, K. 1988. Creating an undersea park. *Oceans* 21(4):50–57.
- Tarnas, D. A. 1988. The U.S. National Marine Sanctuary Program: An analysis of the program's implementation and current issues. *Coastal Management* 16:275–303.
- U.S. Department of Agriculture, Soil Conservation Service. 1994. *Island resource study: Rota, Commonwealth of the Northern Mariana Islands*.
- U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of Coastal Zone Management. 1982. *National Marine Sanctuary Program: Program development plan*.
- U.S. Environmental Protection Agency. 1978. *Federal Register: Council on Environmental Quality. National Environmental Policy Act: Implementation of Procedural Provisions; Final Regulations*.
- Usher, M. B. (Ed.). 1986. *Wildlife conservation evaluation*. New York: Chapman and Hall.
- Vande Vusse, F. J. 1991. A community-based resource management approach to address Philippine coastal resource degradation and overfishing. In *Towards an integrated management of tropical coastal resources*, ICLARM Conference Proceedings 22, ed. L. M. Chou, T.-E. Chua, H. W. Khoo, P. E. Lim, J. N. Paw, G. T. Silvestre, M. S. Valencia, A. T. White, and P. K. Wong, 387–393. National University of Singapore, Singapore; National Science and Technology Board, Singapore; and International Center for Living Aquatic Resources Management, Philippines.
- White, A. T. 1988. The effects of community-managed marine reserves in the Philippines on their associated coral reef fish populations. *Asian Fisheries Science* 2:27–41.
- White, A. T. 1989. Two community-based marine preserves: Lessons for coastal management. In *Coastal area management in Southeast Asia: Policies, management strategies and case studies*, ICLARM Conference Proceedings 19, ed. T. E. Chua and D. Pauly, 85–96. Ministry of Science, Technology and the Environment, Kuala Lumpur; Johor State Economic Planning Unit, Johore Bahru, Malaysia; and International Center for Living Aquatic Resources Management, Manila, the Philippines.
- White, A. T., and A. C. Alcala. 1992. Options for management. In *Coral reef management handbook*, ed. R. A. Kenchington and B. Hudson, 37–46. Jakarta, Indonesia: United Nations Educational, Scientific and Cultural Organization (UNESCO) Regional Office for Science and Technology for South-East Asia.
- White, A. T., L. Z. Hale, Y. Renard, and L. Cortesi (Eds.). 1994. *Collaborative and community-based management of coral reefs: Lessons from experience*. West Hartford, CT: Kumarian Press.
- White, A. T., and G. C. Savina. 1987. Community-based marine reserves, a Philippine first. In *Coastal Zone 1987*, eds. O. T. Magoon, H. Converse, D. Miner, L. T. Tobin, D. Clark, and G. Domurat, 2022–2036.
- Wilcox, E. S. 1994. *Lessons from the field: Marine integrated conservation and development*. World Wildlife Fund. Beltsville, MD: Professional Printing, Inc.