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Article

A Comparative Study of Community-based Sea Turtle Management in Palau: Key Factors for Successful Implementation

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Abstract

This article investigates social, political and cultural aspects of sea turtle management led by the Tobian community at Helen Reef in the Republic of Palau. We use participant observation, unstructured interviews and examination of community-based natural resource management literature to compare and contrast the Tobian community with several other communities in Palau in order to identify some of the underlying factors that we believe contributed to the successful implementation of the Tobian community-based programme. These factors include: robust structure of local and extra-local partnerships; remote location of the resource and small scale of the managing community; realised community benefits in terms of jobs and improved capacity to monitor and manage natural resources; adaptive capacity and autonomy in decision-making; and strong connections to traditional natural resource management systems. Sea turtle conservation and management is a large scale issue; preventing further decline of endangered sea turtles will require management at multiple scales. For the Tobian community, success may be attributable to several key factors that come together to produce a decentralised community-based programme that operates with an adaptive, collaborative and bottom-up structure. This model may be applicable to comparable communities; it is, however, important to recognise that diverse societies will have a variety of formulas for success.

Keywords: CBNRM, Palau, Micronesia, sea turtles, remote atoll, adaptive management, conservation partnerships

INTRODUCTION

THIS ARTICLE EXAMINES the successful implementation of the Tobian community led sea turtle monitoring effort as part of a broader conservation and management programme at Helen Reef. The study is contrasted with similar efforts in the 10 other communities within Palau (referred to throughout as 'other Palauan communities') where the monitoring efforts failed to implement consistent or coherent sea turtle monitoring protocols. The Tobian community and the other Palauan communities were each in collaboration with the Palauan National Bureau of Marine Resources, which launched the sea turtle monitoring programme with a grant from the United States (US) National Oceanic and Atmospheric Administration (NOAA). This inductive examination of contrasting case studies within similar socio-cultural environments provides us with a unique opportunity to consider some key factors that may contribute to successful community-based natural resource management (CBNRM) and conservation programmes, and the qualities of communities that carry them out. The key factors examined run deeper than simple issues of community motivation and institutional capacity. Rather, they relate to the structure of partnerships between conservation agencies and actors, the scale of communities involved, geographical remote-

ness, the balance of costs and benefits as perceived by local community members, adaptive capacity, and the role of traditional values and practices related to resource use. Our study is not meant to generalise about natural resource conservation and management programmes everywhere, but rather to take a close look at one case study and some of the underlying factors that led to its relative success.

For the purpose of this article 'success' is defined as a community's ability to institute systematic monitoring and conservation management actions for sea turtles. In evaluating 'success' we focus on community participation in setting project goals, planning project activities, implementing those activities, and engaging in the process of reviewing and continually adapting the monitoring and conservation management programme. The term 'capacity' is used to describe a community's or government agency's ability to conduct conservation and management programmes including the following aspects—programmatic planning; management and training of staff; building relationships with stakeholders and partners; conducting self-evaluation; improving programme protocols through development of policies and; the ability to make resource management decisions based on feedback and findings of conservation and management work.

Community-based Natural Resource Management

Collaborative resource management strategies such as co-management (Jentoft *et al.* 1998; Granek & Brown 2005) and integration of traditional ecological knowledge (Berkes & Folke 1998; Johannes 1998; Wildcat & Pierotti 2000) have often been described as useful approaches that can fill the gap left by incomplete science or lack of large scale institutional capacity to manage resources at the local level. Those with a science-based worldview expect resource management to be based on the best available science (Hawley *et al.* 2004); therefore, the institutions with the expertise and capability to produce science are often given power over resources.

True CBNRM, however, is more than mere mitigation for lack of available science to inform conservation and management; it is an especially valid and appropriate model for small scale societies. CBNRM refers to a system in which decisions regarding resource access and use are vested in a community of identifiable members. The community may pursue its goals in collaboration with other state or private actors, but retains relative autonomy over its resources (Brosius *et al.* 1998; Berkes *et al.* 2001; Berkes 2004). The rationale for CBNRM is based on the following premises about local communities: due to their reliance upon a given resource, they have a greater interest in the sustainable use of resources than does the state or other distant managers; they have richer knowledge of local ecological processes and practices; and they are better able to manage their resources through local or traditional forms of governance (Tsing *et al.* 2005).

CBNRM is a self-determined approach which can enable communities to identify their own conservation and management goals and implement programmes to reach those goals while concurrently working towards larger scale conservation objectives. Success is more likely when communities are not just collaborating (Berkes & Folke 1998; Wildcat & Pierotti 2000), but are more active and engaged participants who can also seek the assistance of scientists (Johannes 2002), development workers or resource managers rather than simply depending on them.

There have been several recent calls for detailed examination of case studies in order to determine the circumstances under which community-based collaborative and adaptive management schemes work (McLain & Lee 1996; Brosius *et al.* 1998; Jentoft *et al.* 1998; Johannes 1998; Hønneland 1999; Olsen & Christie 2000; Johannes 2002; Leslie 2004; Jones & Horwich 2005). Examination of related challenges, successes and shortcomings can help to identify the social, political and biological linkages best suited for adaptive and collaborative CBNRM. This examination can also establish the circumstances under which extra-local institutions can better assist communities in reaching their conservation objectives (Armitage 2005). Such understanding can also help international non-governmental organisations (NGOs) and development agencies develop or improve criteria for evaluating, prioritising and directing assistance towards community-based sea turtle conservation efforts in remote coastal regions.

International and regional NGOs such as The Nature Conservancy, the South Pacific Regional Environment Programme and the Secretariat of the Pacific Community play a vital role in CBNRM in Palau by providing financial and technical assistance as well as organisational and strategic support to local managers and the national government (Graham *et al.* 1997). In addition, the Palau Conservation Society was formed in 1994 and has fulfilled many of the local conservation programming needs such as educational campaigns, cooperative research projects, establishment of marine protected areas (PAs) and trainings for local conservation officers to monitor natural resources.

CASE STUDY BACKGROUND

Sea Turtles in Palau

The green sea turtle (*Chelonia mydas*) is the most abundant species of sea turtle throughout the study region and the primary focus of sea turtle conservation and management in Palau. The species is provided protection by a multitude of local, national, regional and international laws, as well as conventions and agreements (Seminoff 2004). Green sea turtles are also of important subsistence

and cultural value to many indigenous societies throughout the Pacific Islands (Guilbeaux 2001). Indeed, reverence for the species is demonstrated by the interest Pacific islanders have in conserving turtles as a means of cultural preservation. Harvest by indigenous peoples is still common; and the species is especially vulnerable while nesting on Pacific island beaches or foraging in coastal areas (Eckert *et al*. 1997; Seminoff 2004).

Sea turtles are presumed by Palauan managers and leadership to use the entire main Palau archipelago, making them a common pool resource shared between the 14 main archipelago states and the communities therein. While interviews reveal that levels of egg and in-water harvest of adults and sub-adults have been reduced, presumably as a result of availability of alternative food sources as well as successful education campaigns and partial coverage of national enforcement programmes, these practices remain a threat to the fragile populations of green turtles. Additionally, coastal development and heavy use of nesting beaches by locals and tourists has degraded sea turtle habitat. Palauans are certainly aware of declining turtle populations, but at the community level there is a feeling of powerlessness to stop the decline. Furthermore, a 'race for fish' perception is prevalent and many feel that refraining from harvesting sea turtles simply leaves more turtles for the next person. Harvest restraint (by means of reduced hunting frequency), even during the open season, is sometimes practiced on moral grounds.

Case Study Locations

The Republic of Palau is home to 16 states; each state has a distinct community of individuals with their own ideals, traditional leadership structure and legislative bodies that operate under a similar system of representative democracy as the US with an added recognition of traditional laws (Graham & Idechong 1998). The 14 states that make up the main Palau archipelago share with each other language and culture. In total the main archipelago supports more than 20,000 diverse residents (CIA 2007). Ten of the main Palau archipelago states are located on the largest island of Babeldaob and three are nearby outer islands. The remaining main archipelago state, Koror, is made up of a few populous lagoon islands connected to Babeldaob by bridges; the former capitol city is home to the nation's primary port. Tobi and Sonsorol states make up Palau's southwest island complex; their shared culture, traditions and language are distinct from the rest of Palau. Sonsorol is not discussed here because the researcher had little access to leadership and field staff from the Sonsoralese islands.

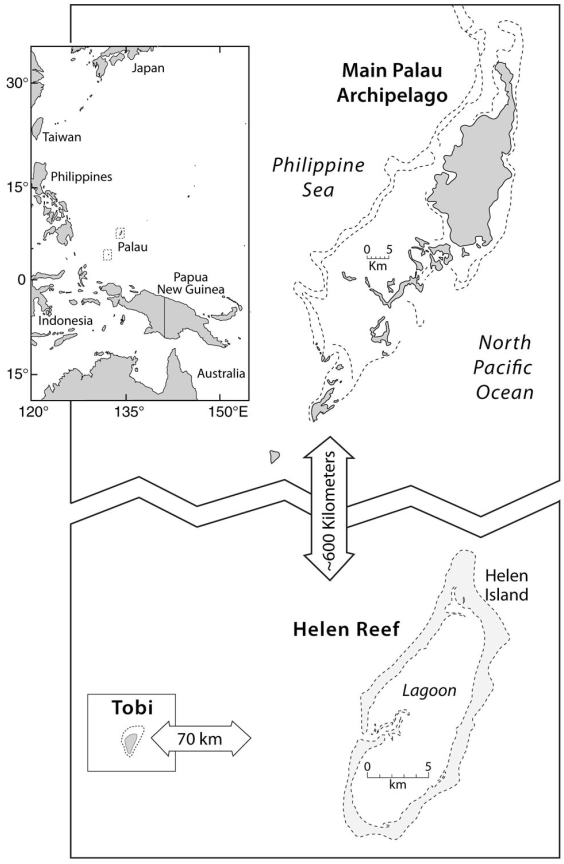
Helen Reef and Tobi Island traditionally belong to the Tobian people and are governed by the Tobi state. Helen Reef lies about 600 km to the southwest of the main Palau archipelago and approximately 70 km from Tobi Island which was the historic population centre of the state. The reef is approximately 162 sq km (Birkeland *et al.* 2000) with an atoll, Helen Island, about double the size of a football field. Tobians historically travelled to Helen Reef, traditionally called *Hotsarihie* (reef of giant clams), in canoes to harvest giant clams for food, hawksbill turtles (*Eretmochelys imbricata*) for their beautiful and useful shells and green turtles for food. Over the last several decades Helen Reef has hosted several small temporary settlements of Tobians (Black 2000). Tobians have migrated from their home island to the main Palau archipelago as a result of severe weather events and lack of civic services such as schools and jobs (Tibbetts 2002). Tobi state, inclusive of Helen Reef, is now governed by Tobians from a settlement on the main Palau archipelago near Koror (Figure 1).

Conservation and Management Programmes

Helen Reef is known within the region for an abundance of nesting and foraging green sea turtles. While Helen Reef is the most remote and undeveloped island in Palau, the area has not escaped human-related threats to sea tur-

Figure 1

Main Palau archipelago, Helen Reef and Tobi Island shown with relative distances



tle populations such as local harvest, commercial fishing bycatch and transport of turtles back to Palau for sale or gifting of hawksbill shells and green turtle meat (Johannes 1986; Guilbeaux 2001). Enforcement of national prohibitions on turtle take is logistically, culturally and politically difficult at Helen Reef. In 2001, after an unanswered plea to the national government for assistance to enforce against foreign vessels poaching Helen Reef's resources (Black 1991), the community organised to reclaim the abandoned island in order to manage and protect its resources. The Helen Reef Resource Management Project (HRRMP) was established soon after and Helen Reef, in its entirety, was designated a PA under national and state law. The HRRMP was conceived primarily as an entity to enforce the national laws which protect Helen Reef against illegal foreign fishing. The organisation established itself with significant help from international and national NGOs, most notably the Community Conservation Network (CCN) a Hawaii-based organisation which provides technical assistance, funding, and training in conservation programme management and practices. The presence of the HRRMP field staff on Helen is reported to have significantly reduced the harmful practices of harvesting turtle eggs, nesting females and foraging turtles.

In 2005, the HRRMP decided to build on several years of intermittent sea turtle monitoring at Helen Reef and began an effort to systematically monitor the sea turtle populations with the goal of establishing sustainable harvest levels and creating a long term data set that could be used to evaluate the effectiveness of their conservation efforts.

The development of the partnerships to establish a sea turtle conservation programme involving observational monitoring and development of a sea turtle management plan was driven by the HRRMP. The organisation has been the 'hub' of a wheel of partners, bringing together several different conservation agendas and increasing their access to a diverse set of organisations. Through these partnerships the HRRMP has been able to increase its capacity to carry out a locally-based sea turtle monitoring and conservation management programme that remains viable and continues to generate valuable data and build capacity for CBNRM and conservation programmes.

Today the HRRMP monitors and manages sea turtles with significant community participation from both traditional and democratic leadership as well as elders and community youth leaders. The HRRMP employs approximately eight local field staff, who serve as enforcement officers for Helen Reef and also carry out monitoring and natural resource management activities. Some of the field staff also serve as Tobi state legislators and youth leaders. In addition, the HRRMP has a board of directors which usually includes the current governor of Tobi, the traditional chief and community elders. The HRRMP managing staff maintain partnerships with local, national, regional and international organisations.

Similar sea turtle monitoring and conservation management programmes were started in 10 other Palauan communities. Like the Helen Reef programme, the 10 other states had financial support from the national government through a NOAA grant. These other Palauan communities also had some technical support from the Palau Conservation Society, which had already invested significant resources into building local level capacity by training conservation practitioners, many of whom were already capable of conducting turtle monitoring. The national government staff, who managed the sea turtle programme, approached communities in a highly participatory manner; they included stakeholders from each state in programme planning and they financed and trained a local labour force in each community to conduct the monitoring.

These recent attempts to monitor sea turtles in Palauan have built on a remarkably well received education campaign funded by the US-based Rare Conservation organisation and carried out by the Palau Conservation Society. Awareness of the importance of sustainable harvest practices is growing, especially within the younger generations; one Palauan man shared with us that he used to enjoy eating turtle until his 7 year old daughter asked him to stop by quoting the conservation slogan, *Uel a Sechilid* or 'turtles are our friends'. However, despite this support, shortly after the national programme inception, the 10 other Palauan communities showed signs that they would not be able to fulfil their monitoring commitments, and managers of the national programme had to step in to conduct the monitoring for which the grant was awarded.

METHODOLOGICAL APPROACH

Our interest in CBNRM in Palau began when the primary author served with the US Peace Corps as a marine conservation specialist with a focus on building CBNRM capacity throughout the country from 2002 to 2004. As the HRRMP gained momentum and the analogous projects in 10 other Palauan communities collapsed, our central research question emerged: What factors led to the relative success of the HRRMP?

In order to answer this question, we gathered case study information about the HRRMP, and about the 10 other community-based programmes in Palau, through participant observation during 57 CBNRM and sea turtle monitoring programme planning meetings; meetings with funders and advisors including NOAA, the CCN and The Nature Conservancy; and programme staff meetings with HRRMP management, board of directors and field staff. In addition, the primary author conducted 49 unstructured interviews (Agar 1996; Bernard 2006) with: (1) leadership, including national level agency heads, state legislators and governors, chief and kin, and community elders;

(2) conservation programme managers, including project directors and field staff managers; and (3) advisors such as researchers and locally experienced CBNRM practitioners. These activities allowed us to investigate the factors that led to successful implementation of the community-based sea turtle monitoring and management programme at Helen Reef.

KEY FACTORS FOR SUCCESSFUL IMPLEMENTATION OF SEA TURTLE MANAGEMENT PROGRAMMES

The sea turtle conservation and management efforts at Helen Reef differed from those of other Palauan communities in terms of factors influencing successful implementation. Table 1 provides a reference for comparing the Helen Reef effort to others in Palau based on several key factors: (1) the structure of partnerships; (2) scale of both the communities and biological systems; (3) remoteness; (4) short term costs and long term payoffs from the community perspective; (5) adaptability; and (6) the status of traditional practices.

Our identification of the key factors, which we believe may have played a role in relative success of the Tobian community sea turtle conservation and management programme, is not meant to imply that there is a single recipe for successful community-based sea turtle management. These factors for successful implementation of conservation and management programmes cannot be used to predict or measure success; rather, they are useful heuristics for discussing the viability and potential successes and challenges that may be encountered when beginning small scale conservation programmes. These factors may also be useful for identifying appropriate small scale communities to participate in large scale conservation efforts.

Table 1

Key factors of success and challenges in implementation of sea turtle conservation and management programmes

	Helen Reef project	Palau project
Structure of partnerships	Bottom-up	Top-down
	Decentralised, local drivers	Centralised, national drivers
	Integration of international, regional, national and local institutions	Integration of aid nations, national government and local individuals
	Self-imposed restrictions; national government is a partner	Nationally imposed restrictions; national government is sometimes viewed as an authority
	Active community level involvement in regional networks	Regional involvement at the national level
Scale	Small scale community	Large scale more integrated society
	Large ecologically diverse inaccessible turtle habitat	Large ecologically diverse easily accessible turtle habitat
Remote location	Isolated, threats from outsiders	Threats from neighbours and internal profiteers
	Enforcement need is finite	Enforcement need is expansive
Costs and benefits	Short term costs balanced by job availability and increased capacity	Loss of harvest rights with relatively few jobs and capacity
	Conservation programme increased public service availability	No change in public services
	Tangible future benefit of allowable harvest shared with community	Future benefit of allowable harvest unlikely except for elites
	Conservation infrastructure exists within the community	Little or no community level infrastructure for conservation
Adaptive capacity	Local legislative body integrated in conservation projects	Local legislative bodies disconnected; adaptability limited by national government partners
	Autonomous decision-making with capacity to make changes	Autonomous decision-making with tendency to look to national management strategies
Tradition	Active revival of traditional practices	Limited revival efforts
	Relatively recent dominance of traditional management system	Management systems affected by development and colonialism for longer period of time

The Structure of Partnerships

The complex life histories and poorly understood migration patterns of sea turtles adds much complexity to conservation of the species, which along with the many threats to sea turtles, may prevent local recovery as a result of local conservation actions. Conservation objectives such as sea turtle recovery are near impossible to accomplish without partnerships spanning all geographies along the migratory route where threats to turtle survival exist. Ostom *et al.* (1999) point out that sound management of migratory species spanning ocean basins is in part dependent on international, national, regional and local level institutional cooperation.

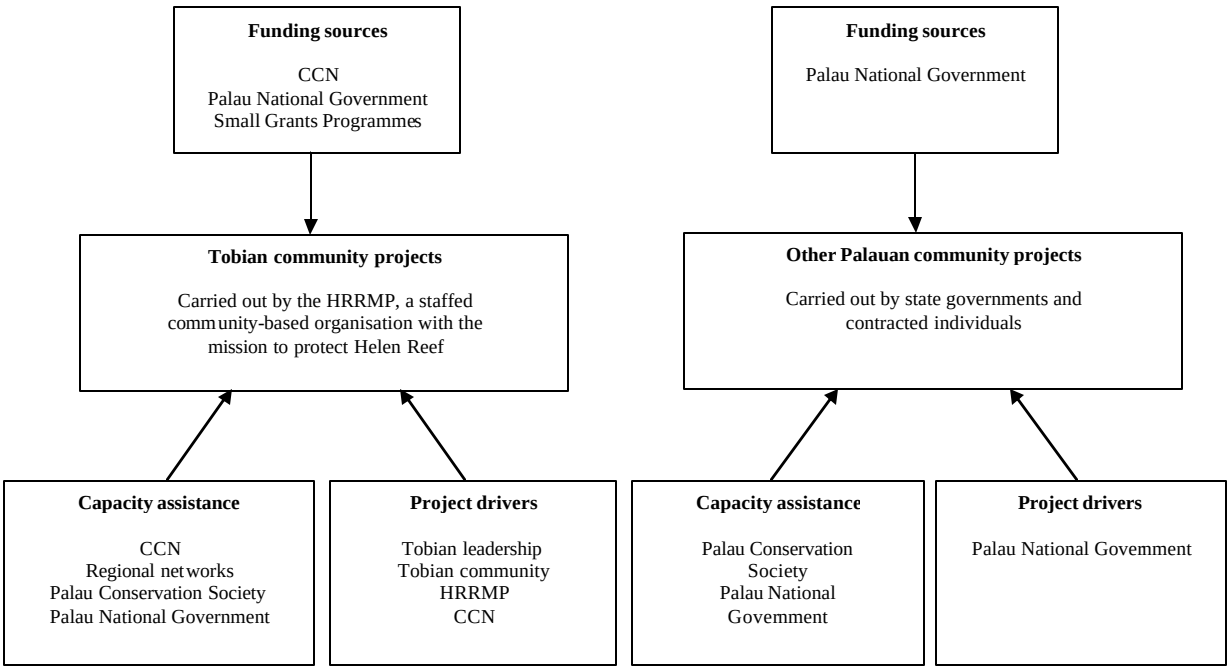
Effective community-based management requires that managers be able to formulate and investigate questions of science and social behaviours (Wiber *et al*. 2004), which can be achieved through collaboration with varied levels of partners. In the case of sea turtle conservation and management programmes local organisations often rely on partners for extra-local science as well as funds and training to build local managerial and technical skills. These partnerships can be top-down in structure with higher level institutions imposing agendas on communities or even coercing community participation (Ostom *et al.* 1999; Austin 2004). Partnerships can also be bottom-up in structure with communities taking the lead to identify concerns and reach out for the necessary assistance. The Tobian community has demonstrated success in developing a web of resource management related partnerships from the bottom-up that is complex and involves partners with a range of geographic scopes and conservation agendas resulting in a robust system of actors (Figure 2). Since inclusion and interactions are driven by community members, key stakeholders are already at the table and programmes are therefore not bogged down in the process of reaching uninvolved parties for inclusion and/or consensus. In the Tobian model it is necessary only to achieve consensus between the community group (HRRMP) and the community leadership.

Jentoft *et al.* (1998) and Wiber *et al.* (2004), in their examinations of community-based fisheries management, have detailed the theory that local community engagement in the management process is a convincing indicator of successful CBNRM.

The HRRMP, empowered by assistance from the CCN, demonstrate their engagement by taking ownership of their conservation and management programme and playing the synergising role—bringing together several institutions with different agendas and capacity types. Tobian society has historically lacked access to Palauan administrative institutions (Black 1982). In part, their diverse set of partners may be a result of the historical need for creativity when it comes to accessing skills and technology. Tobians are also aided by the fact that many speak Tagalog, Indonesian and even Japanese, and have a history of interaction with regional cultures through fishing expeditions and hosting foreign fishers on Tobi Island (Tibbetts 2002).

Figure 2

Model of the structure of partnerships comparing the Tobian community project with other Palauan communities



By contrast, in the other Palauan community's, programmes are managed by the national government to be participatory, even collaborative, but are still centralised. The national government goals for the programme may not have matched the goals of individual communities and, while stakeholder communities were involved, their demonstrated lack of mobilisation and cooperation in the field may have resulted from the centralised management structure. This centralised collaborative approach has many potential advantages including consensus, transformation of individual interests to joint interests and flexible management structures (Meadowcroft 1999). Another advantage is introduction of institutional diversity (Ostom *et al.* 1999) and associated capacity. Unfortunately, when communities do not share the goals of the 'higher level' collaborators, such advantages may not be realised. The migratory nature of sea turtles makes the turtles a shared resource and decentralised management is therefore unrealistic within the main Palau archipelago.

Preliminary empirical evidence suggests that the Helen Reef population of green sea turtles is likely separate from those observed in Palau (i.e., turtles from Palau seem to migrate within the main archipelago and turtles from Helen Reef migrate south to Indonesia as demonstrated in Klain *et al.* 2007). The new evidence supports a belief held by Tobian community leaders. Consequently, it makes more sense for the Tobians to be the central management institution at Helen reef than for the national government to take on the burden. Accordingly, the Tobian state government and local traditional leadership have always handled the demand of managing their local resources with little centralised control from Palau. We do not intend to imply that the Tobian state does not need the assistance of the national government; indeed, it is sought. However, we wish to convey that the web of partnerships evolved in an organic fashion and was not explicitly planned—a model that has proven successful in other situations (Berkes *et al.* 2001).

Decentralisation of management, although based on the idea that local people are best equipped to solve natural resource issues (Austin 2004) can be taxing on communities and requires support in terms of capacity building from extra-local organisations (Wiber *et al*. 2004). The additional capacity need arises from loss of traditional management systems and increased understanding about the complexity of threats to sea turtles. Tobian managers of Helen Reef have established ideas and strategies to implement management measures by drawing on the community for knowledge and creativity. Assistance from the national government to the Tobian community is just assistance and not an imposition of a prescribed centralised programme. Conversely, other Palauan communities have been in a position of responding to strategies imposed by national programmes. Both local and larger scale NGOs can facilitate revitalisation of traditional methods and emphasise participation (Johannes 2002; Austin 2004), but care should be taken by such organisations not to impose their agendas at the cost of success for the community.

Jones and Horwich (2005) contend that community-based conservation failures are not due to a flawed concept, but rather the result of *ad hoc* implementation. The Tobian community has been able to integrate the *ad hoc* implementation of the national turtle monitoring programme into efforts by the HRRMP because of its existing capacity and web of partners. Since the community is the central management body, it has the benefit of gleaning expertise and resources from the national programme without the burden of outside agendas attached to its funding.

National government involvement can also hinder local ability to self-organise (Ostom *et al.* 1999). In our interviews, local government officials and conservation managers in other Palau communities expressed an expectation that the national government would provide a plan to the communities. Until that expectation is met, inaction is the *modus operandum*. The Palau national sea turtle programme was tasked with fulfilling the goals of the funding agency and therefore had to play an authoritative role in imposing the funding agency's agenda on communities which had minimal capacity to carry out sea turtle management activities themselves.

Governments of developing countries do not often entrust small scale organisations with internationally important resource management (Olsen & Christie 2000). The situation at Helen Reef is therefore unique in that local level management exceeded the expectation of the national programme. In this situation the national government has not given up power; they have rather delegated stewardship of the resource to the Tobian community.

The CCN's involvement with the Helen Reef resource management has provided the opportunity for Tobian representatives to actively engage in regional network programmes through attendance at conferences and trainings within the Pacific islands and southeast Asia. This opportunity enables the Tobian community further by giving community members the option to participate in the development of regional recovery efforts as well as to inform and influence regional policy. By contrast, other Palauan communities are often represented by American expatriates and Palauan nationals who represent the Palauan national government in regional forums and conferences.

Issues of Scale

Management of common pool resources often relies on informal systems of monitoring and local enforcement (Smith & Wishnie 2000). Successful examples of community-based management programmes often come from

small scale, relatively homogenous communities (Holmes 2001; Armitage 2005). Small scale, remote communities often share several qualities including: a dependence on natural resources; declining use of traditional management systems (Brugh 2007); limited access to scientific information; threats to sustainability from outside sources; limited enforcement capability; disproportionate financial returns from outside resource users; and limited capacity to generate alternative income activities. The Tobian community has just over 200 members and Tobian leaders note that as their population shrinks, engagement in community civic organisations has become more important to many community members, as demonstrated by commitment to youth groups and the HRRMP conservation programmes.

Smaller scale communities, like Tobi, meet little resistance in establishing civil organisations which can take driving roles in conservation programming. In this sense, smaller scale communities have a much better chance of developing and implementing successful management strategies and therefore should be considered worthy candidates when directing funds, technical and organisational assistance towards sea turtle conservation actions. By contrast, the other Palauan communities are larger in size and more integrated with each other through close geographic location, ease of transportation between villages and family ties.

When considering the relative scale of management projects, one must also consider the physical size of the habitat, diversity of constituents, accessibility, the magnitude and nature of impacts, as well as the ecological scale. Helen Reef and the main Palau archipelago differ markedly on these factors. Both include foraging and nesting grounds, host two endangered species of sea turtle (green and hawksbill), have diverse biological community structures, face challenges related to global climate change and are similar in size. However, Helen Reef is virtually inaccessible and undeveloped, while the Palau archipelago supports more than 20,000 diverse residents (CIA 2007) and endures significant coastal development. Sea turtle conservation in other Palauan communities requires substantially more capacity for activities such as monitoring, enforcement, education, planning, collaboration and evaluation due to the size of the archipelago, multiple constituents and the magnitude of impacts.

Necessary partnerships for sea turtle conservation are also determined by the scale of migrations. Recalling the wide ranging migration patterns of sea turtles, it is important to note that local scale declines of sea turtles often do not have local solutions and conservation actions based on local knowledge about sea turtles typically cannot lead to recovery. Thus, both communities and institutions can benefit from engaging in partnerships at many scales (Berkes *et al*. 2001). Each partner brings strengths to the table and participation of multiple levels of partners will be necessary in the short time that remains to make effective decisions for sea turtle management in order to prevent further sea turtle population decline. Collaboration between Tobians and Indonesians, with whom their turtle population is shared, is more likely to result in positive effects on turtle populations than would conservation efforts on Helen Reef alone.

Remoteness

The idea that communities have a greater potential to benefit from local conservation management, as compared to a national or international entity, is a primary driver for the community-based approach (Brosius *et al*. 1998). If resource users can be assured that compliance with management efforts will not be counteracted by poachers, and the long term benefits of conservation will be theirs to reap, then the effect of incentives for long term conservation is likely to be robust (Smith & Wishnie 2000).

In interviews, Tobian leadership and Helen Reef field staff described a dramatic decline in the number of uninvited foreign visitors and poachers at Helen Reef, and attributed this change to the enforcement presence on the island, especially the fact that the HRRMP was funded to provide the field staff with fuel and a power boat which allows them to approach and cite poachers. Enforcement action is aided by the fact that poachers can be easily spotted as the entire reef view is unobstructed. The field staff regularly communicates via radio with Indonesian and Philippine islanders, who help to pass on the word that Helen Reef is closed to extractive activities. As a result of enforcement efforts, sea turtles are at minimal risk from outsiders while at Helen Reef. The Tobian community demonstrate their enthusiasm by speaking about Helen Reef turtles with a possessive voice, referring to them as 'our turtles'.

By contrast, the need for enforcement in the main Palau archipelago is expansive. Nesting beaches and foraging grounds, where turtles are most vulnerable, are scattered. Many of the areas, such as the Rock Islands complex south of Koror, are difficult to access and well hidden from passing enforcement vessels. State conservation officers and residents feel that threats to turtles come from neighbours rather than local actors. Thus the sense of responsibility for stewardship for sea turtles is understandably weak at the community level. Community members and conservation officers alike have shared that they feel a sense of loss when they practice personal restraint from harvest, citing their perception that compliance has not protected the turtles but has instead left more turtles for the next hunter. During participant observation and interviews, Palauans shared their concerns that harvest pressure on sea turtles, despite regulations, quells enthusiasm for conservation. Palauans revealed less indications of ownership; for example, turtles that

nested in a particular community were rarely spoken about in the possessive. Similarly, only paid state and national employees participated in monitoring and management efforts.

Community Costs and Benefits

Conservation of common pool resources is assumed to include a cost to individual resource users. Ostom *et al.* (1999) suggest that restricting access (costs) and creating incentives (benefits) are the two required elements for solving common pool resource problems. Costs are often considered short term and worth the investment in anticipation of longer term payoffs or benefits (Smith & Wis hnie 2000) such as increased harvest or improved economic vitality through tourism driven by the opport unity for sea turtle viewing. If conservation efforts fail, however, short term investments made by communities (costs) do not 'payoff'. Such failures can leave affected communities with an unenthusiastic impression of conservation, which can negatively impact future conservation efforts. If the user cost of compliance is perceived as being too high, management measures may not be effective and managers must consider adapting regulatory approaches to better suit the community needs and the enforcement capacity (Hønneland 1999). We agree with authors who emphasise that incentives in terms of empowerment and equity are required for successful management (Olsen & Christie 2000; Berkes 2004). Additionally, there is evidence that tangible social or economic benefits often result in favourable attitudes for community-based projects (Mehta & Heinen 2001).

In the case of Helen Reef, incentives for conservation include realisation of long term cultural preservation and opportunities for sustainable harvest, jobs created by conservation programmes, increased community conservation programme capacity and enhanced civic engagement in conservation. Conservation programmes focused on Helen Reef resources have also increased the services available to the community such as regular transportation of supplies and people to Tobi Island, which has enhanced connections to Tobi and to the family members who reside there as well as to the historic harvest grounds at Helen Reef.

In other Palauan communities, sea turtle conservation and management programmes have not brought new jobs and capacity, nor have they resulted in improved community services. Lack of legal harvest rights and a weak sense of stewardship have led to a lack of incentive to carry out sea turtle monitoring and conservation programmes.

In other Palauan communities it is unlikely that the average fisherman will once again be able to legally harvest turtles from local waters since even effective conservation efforts may not raise regional and global populations in light of the detrimental impacts of regional activities such as nesting beach degradation, direct harvest and entanglement in fishing gear (Seminoff 2004). Given international pressure to protect sea turtles, it seems unlikely that the government of Palau would overturn legislative protections. Tangible benefits from turtle viewing-based tourism are more likely to be reaped by foreign operators who dominate Palau's tourism industry despite foreign investment laws intended to encourage Palauan ownership and local employment (Graham *et al.* 1997).

Adaptive Capacity

Adaptive capacity is the ability of the community to carry out the steps associated with adaptive management, i.e., the ability to learn from doing, and respond to social and biological feedback mechanisms to continually improve management systems (Olsen & Christie 2000). While there is a vast amount of information about sea turtles, more time to develop the perfect management strategy is an unavailable luxury for species facing as many threats as sea turtles do. Adaptive management —to learn by doing—is therefore a practical and necessary approach. In addition to the extensive sea turtle knowledge base of the scientific community, local knowledge of sea turtles is often extensive in regions where turtles nest and feed. Combining scientific and local knowledge can provide a solid base for sea turtle conservation programmes. Incorporation of both scientific knowledge and local knowledge is an adaptive step that will enable the use of diverse information to launch more effective monitoring and management programmes. With sufficient knowledge in place, the next step is to ensure that relationships between communities and the agencies they work with are structured in a way that support adaptive management (McLain & Lee 1996) by fostering continued evaluation of the programme, recognition of its failures or shortcomings and improvements of management actions in an iterative process. In the long term, this strengthens the ability of the programme to achieve its goals.

Lack of adaptive capacity can be a limiting factor in successful resource management (Armitage 2005). Community-based programmes under a centralised management system are limited by the lead institution's adaptability; these agencies often lack the flexibility or quick reaction time needed to adapt management because managers are rarely in the field directly observing changes and responding to feedback. Failures in adaptive management can often be attributed to under-estimation of the complexity of a decision-making process (McLain & Lee 1996). On the other hand, small scale communities are not bogged down in bureaucratic process and can continually evaluate management efforts and regenerate the management system with relative ease. The challenge for small scale communities is to be flexible, but not limited to *ad hoc* responses (Sechelhas *et al.* 2001).

One way that the Tobian community has achieved flexibility with conservation and management at Helen Reef is by way of individuals with overlapping community roles in leadership, lawmaking and management. Resource managers have direct access to traditional and democratic leadership and have representation in the small state legislature. In fact, leaders, the legislature and resource managers share office space, attend the same church and live in the same small hamlet. The Tobian community's small size and interwoven membership is one driving force of quick adaptations in their programme.

Other Palauan communities are also closely tied together. However, the dispersed nature of communities participating in the nationally driven sea turtle conservation and management programme limits the speed with which decisions can be made. In the Palauan context it is unusual for decisive or adaptive measures to be discussed without face-to-face communication. Communication with visiting programme managers is eased into; conservation officers will often first offer a meal, introduce several relatives and tell stories. These activities may seem trivial, but they are part of building trust with partners. Storytelling often leads to discussions about the challenges that conservation officers may be experiencing when trying to complete their monitoring duties or even ideas they have that could improve the programme. Unfortunately, transportation costs in terms of fuel and time limit community visits for most Palauan communities. Centralised managers therefore do not receive pertinent information in a timely fashion causing a slow adaptation of the programme in response to feedback. Furthermore, because the other Palauan communities are not the drivers of their sea turtle programmes, it makes sense that they are unwilling to adapt their programme to overcome challenges. Many conservation and management efforts in the main Palau archipelago share this tendency to look to the national government, the Palau Conservation Society and The Nature Conservancy for direction even when the local communities are entrusted with decision-making authority.

Traditional Practices

Ethnographic evidence indicates that humans have long used adaptive traditional management systems (McLain & Lee 1996). Centuries of colonial rule in the Pacific islands, however, have resulted in decline of traditional knowledge-based management systems (Johannes 1978; Graham & Idechong 1998). Decline of traditional management is a loss of power that has been described as a violence unleashed on local systems of knowledge (Shiva 1993), but Johannes (2002) and Berkes (1999) have identified several places throughout the Pacific islands and First Nations in Canada where local knowledge is in renaissance and contributing substantially to CBNRM. It is not always necessary to resort to top-down regulatory measures in order to avoid overexploitation of resources, as Hardin (1998) suggests. Management efforts should inspire communities to rise to the challenge and adapt their traditional skills to new circumstances as Johannes (2002) suggests. Since even communities with a strong base of traditional ecological knowledge are not fully equipped to deal with contemporary resource management challenges (Johannes 1998; Atran 1999), involvement in a web of partnerships can assist communities in effectively adapting conservation and management programmes.

Traditional management systems are often described as a result of co-evolution between social and ecological systems (Berkes & Folke 1998; Berkes 1999; Redman 1999; Wildcat & Pierotti 2000; Hawley *et al.* 2004); however, threats to sea turtles are occurring too fast and are too widespread for a co-evolutionary management system to keep pace. In order to overcome the gap between the evolution of traditional management systems and the more immediate need for action, managers must use a synergistic approach that integrates the applicable strategies from the past with newer strategies offered by contemporary science-based resource management.

Integration of traditional and contemporary strategies requires more than just replacing missing scientific information with traditional and local knowledge. We are suggesting an intentional process which enhances co-evolution where diverse types of knowledge have equal chances to drive management based on an adaptive system. The time scale available to implement effective turtle management may force creativity in developing solutions based on synthesis of a diversity of knowledge. Traditional assets in Palau include adaptability, the spirit of experimentation, systems of taboo and clan totems (Johannes 1978), as well as lack of motorised access to sea turtles just to name a few. From science and modern resource management there are beneficial technologies such as satellite telemetry tracking, only recently available in Palau, which improves ability to monitor sea turtles and understand their migration patterns. In addition, improved access to global communications technology enhances coordination between the local, regional and international organisations and institutions which is required for sea turtle recovery. An amalgamation of past and present, traditional and science-based management sets the foundation for an adaptive programme.

Both Tobian and Palauan societies traditionally practiced a form of chief-regulated taboo on turtle harvest. These systems served to limit local turtle take and are reported to have been instituted when traditional leadership and elders observed a decline in the turtle population, or if the chief felt that some individuals were taking more than their share of turtle. Some stories indicate that turtle harvest was viewed as a privilege and Tobian chiefs have

been accused of revoking the privilege as a form of punishment. Tobians and Palauans alike presume that taboo practices throughout the Pacific islands were successful in reducing threats to turtles throughout their migrations. While many traditional practices may not be actively utilised in recent decades, knowledge of and reverence for traditional management systems is very much alive in Palau (Brugh 2007).

Hundreds of years of colonial rule (Tibbetts 2002), followed by the recent creation of an independent and democratic Republic of Palau under a constitution that recognises traditional law as equally authoritative with democratic law has left Palau with an impractical system that is quite different in philosophy to the traditional system governed by village cheifs (Graham & Idechong 1998). However, out of respect for traditional uses, Palauan national regulations allow a certain amount of turtle take for customary purposes including democratic and traditional leadership inaugurations. Turtle take in Palau, allowable for a limited number of customary events, bears little resemblance to traditional Palauan management systems and is overshadowed by illegal take which is often a business arrangement between a Palauan official and a turtle poacher.

Tobians have historically regulated turtles through a process of permission by the chief, who designated a time for the turtle hunt, and specified which individuals and families would hunt and consume the turtle meat (Barr 2006). Changes from the traditional system have been dramatic, but they are relatively recent (Black 2000). The traditional system still shapes Tobian culture and identity (Tibbetts 2002) and is maintained by the connection with Helen Reef and Tobi Island as well as by the living elders who remember the system well. Today Tobians regulate turtle take on Helen Reef in a manner distinct from the traditional system. As the traditional system fades away, or evolves to adapt to new situations, knowledge associated with it may live on and evolve, feeding a collaborative and adaptive management approach.

CONCLUSION

Sea turtle conservation is a global issue and time is short. Sea turtle conservation experts predict that if behaviours do not change in the near future green sea turtle populations will perish (Eckert *et al*. 1997). Local, national or even regional conservation efforts may not be enough to protect wide-ranging endangered sea turtles. Projects need to be implemented at all levels in order to achieve objectives of recovering sea turtle populations. Conservation at the local level should be in the hands of communities and enhanced through collaboration with international, regional and national organisations. NGOs and development agencies can be particularly effective by directing funds and technical assistance towards communities that show the potential to drive the management process and successfully implement adaptive programmes. However, funders must take care not to impose conservation agendas, but rather to build capacity and facilitate communities in self-identification of conservation objectives and implementation strategies.

The Tobian programme demonstrates that the ability to conduct monitoring and management of sea turtles at Helen Reef is attributable to appropriate partnerships across necessary scales, benefits that outweigh costs, adaptive capacity, and the amalgamation of traditional values with knowledge resulting from scientific inquiry and contemporary management. The Tobian community has accordingly received recognition for their conservation programmes within Palau and throughout the region in spite of the community's marginalised status within Palauan society (Tibbetts 2002).

Our focus has been on identifying the qualities of communities that can contribute to global sea turtle conservation through local actions. We have demonstrated circumstances under which community-based sea turtle management has been successfully implemented within the Republic of Palau. Success is attributable to several key factors that come together to produce decentralised community-based conservation programmes that operate with an adaptive, collaborative, bottom-up structure. We acknowledge that, given the geographic and cultural differences, 'success' in Palauan communities may not mirror the success of the Tobians. In addition, we recognise that the approach described above may not be enough to recover turtle populations given the highly migratory and long-lived nature of the species. Despite this we feel that community organisations, through their own capacity and their partnerships, have the ability to drive regionally coordinated efforts that will be required for recovery. Local programmes, driven by communities with the qualities described in this article, may be more effective than centrally managed regional efforts. While our focus has been on sea turtle case studies in Palau, we believe that the key factors for successful implementation of conservation programmes described in this article are transferable; communities that share qualities that may have contributed to the success of the Tobians are likely to be able to implement successful programmes focused on sea turtles or other conservation agendas.

Community-driven collaborative and adaptive management should be supported; it is a valid and appropriate model with encouraging potential to contribute to local, regional and global conservation efforts. When community needs and desires are central to conservation and management programming, then community participation is more than just a remedy for lack of available science; rather it is an expression of empowerment where the community takes the necessary actions to meet their own needs and desires. The process of community participation itself is part of successful conservation. Conversely, when conservation programmes are imposed on commu-

nities, success is often limited in definition to achievement of distant conservation objectives, leaving the community with little motivation to sustain the programme thereby failing to result in success. Management of sea turtles throughout the region will only be successful when small scale communities have the capacity to protect their local populations and join in larger scale initiatives that effectively reduce threats to sea turtle survival and protect sea turtle habitat.

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