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Working with Communities for Sirenian Conservation

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If manatees and dugongs are to survive, people living in communities where sirenian populations still thrive need to be involved in protecting them. However, among these communities are some of the poorest and most marginalized members of society. And some have traditional, exploitive links to sirenians: for example, Indigenous groups in Amazon communities have been hunting manatees for thousands of years[1]. Most remaining dugong populations are only found in remote areas because these regions have been least exposed to anthropogenic disturbances and thus offer the best conditions for the animals' survival[2].

Historically, people living in remote areas are often socially and economically marginalized and may never have had a voice in major decisions that directly and indirectly affect their lives[3]. As a result, they have been denied resources and rarely earn above a subsistence level. Thus a researcher from outside may have to face an understandable level of bitterness or feelings of discontent when entering communities to work toward sirenian conservation.

Today, in most areas of the world, sirenian hunting has already been banned or at least regulated, but the practice continues in places such as the Torres Strait Islands of Australia and the Amazon basin[4]. Hunting in these areas is important both as a cultural practice and for subsistence.

When it comes to managing natural resources, there are big differences in the financial and organizational capacities of nations to tackle problems and offer solutions. A management strategy involving payments to fishers who capture sirenians incidentally in nets and release them is simply not an option for a developing country, partly because of the lack of financial resources and also because the ability to enforce the law adequately varies from one part of the country to another: some countries have long coastlines (e.g., Thailand, India), others have many islands (e.g., Philippines, Indonesia), and still others have a huge riverine systems (e.g., Brazil, Colombia). The difficulty of effective patrolling is often exacerbated by poor governmental support for mandated enforcement agencies.

We believe that it is imperative to involve local people and to adopt a grassroots or bottom-up approach to conserving sirenians. There is a social dimension inherent in any conservation effort, and those most likely to be affected by regulatory or management measures should take the lead in developing management plans. Participatory conservation or management establishes a sense of ownership for all interest groups with regard to a specific action, be it a program, a project, or an act of law. This approach provides for consensus building, political sustainability of decisions that influence the lives and interests of various people and entities[5], and social acceptability.

The other common resource management strategy is the top-down approach, which is often difficult to implement. Usually such management intervention requires the banning of certain activities as required by the national or regional governments. A classic example is enacting a national law prohibiting the killing or taking of sirenians, but without adequate consultations with the appropriate stakeholders. In such cases, the implementation or enforcement of laws is usually unsuccessful. Locals may disagree with a prohibitive law, either because it affects their livelihood directly or because of indirect effects due, for example, to bans on setting nets in traditional fishing areas. In some cases, people may not be aware of nearshore conservation issues or, threatened by poverty and a lack of alternative livelihoods, are forced to rely on nonsustainable resource extractions.

Laws that deny access to a traditional and important resource can also breed corruption, with enforcers demanding money or favors in exchange for ignoring an offense. Enforcers such as local police or judges may even pity the fisher or hunter, usually the main breadwinner of the family, and let the offender go free rather than jeopardize the survival of his family. These indi-

viduals and the corruptible nature of most systems in a community are reasons why the depletion of coastal resources (including sirenians) continues unabated in most coastal and marine areas[6].

This situation can be changed, especially if the community actively supports hunting controls, becomes involved in the formulation and monitoring of management plans, and invests in becoming stewards of sirenians and other wildlife. In this chapter we show how researchers and conservationists can work with communities to avoid endangering the resource and can facilitate participatory conservation and/or management.

Working in Communities

Communities are one of the most important sources of information on local animals and their habitats. For some time, scientists have acknowledged the importance of local knowledge[7], yet it is often one of the least tapped sources. Local people are a rich source of information on the animals and their habitat and can make important contributions to research and diagnostic studies. A fisher may not know the length of the sirenian gestation period but probably knows where and when mothers with calves can be found.

The importance of interviewing fishers, hunters and those who have local knowledge cannot be overemphasized. In some regions this knowledge is shared freely; in others it may be guarded jealously, especially if people feel their heritage is being exploited by outside professionals with high salaries. Local people should be integrated into conservation processes as early as possible so that they contribute to decisions instead of merely supplying data to others[8].

Once you have enlisted the support of concerned stakeholders such as fishers, other locals, and associated politicians, a conservation program specifically based on their capabilities and cultural context can be developed. Any conservation/management plan will be far more effective if local people are responsible for carrying it through, whether it consists of monitoring populations and habitats, with long-term funding[9], or creating awareness within the community of the threats faced by sirenians.

There is no single formula for ensuring the success of any conservation project. What we describe here are some fundamental ideas and procedures; they may require modification depending on the community. Solutions to most conservation-related problems can be facilitated through a participatory process that engages the community in a specific program, such as a conservation or management plan. Establishing a good rapport with politicians and community or tribal leaders is fundamental, so it may be advantageous to employ stakeholder analysis—this is an analysis tool that considers the principal stakeholders and their interests, perceptions, and expectations[10]. Interview surveys[11] and information found in censuses of the local population can assist in identifying these stakeholders. Singh and Hegde[12] outline important questions used to familiarize every stakeholder with the problems the project is addressing or its stated objectives. The following questions should be considered in any sirenian conservation project:

- Who are the potential beneficiaries of this project?
- Who might be adversely affected?
- Who are the susceptible groups (e.g., often marginalized or easily neglected)?
- Who would be the supporters and opponents of the project?
- What are the relationships among these stakeholders?
- What are the expectations of the different stakeholders of this project?
- What stakeholder interests conflict with the project's goals?

The next step is to find out each stakeholder's influence and importance. Influence refers to how powerful a stakeholder is, while importance refers to those stakeholders whose problems, needs, and interests are being addressed by the project[13]. It is important to know the local political system, who has power over whom, and who has control over resources and the flow of information. This is especially relevant in many tribal areas. Some training materials are available to enhance stakeholder analysis among NGOs and others working with local communities[14].

Researchers should also learn about the perceptions of different stakeholders, especially regarding sirenian conservation or other related project goals. Are stakeholders concerned with declining sirenian populations or deteriorating environments? This can be determined by conducting focal group discussions, or gathering a small group of locals and facilitating a discussion of relevant issues. Educational workshops also can teach locals about the vulnerabilities of the sirenians and the nearshore environment[15] and the relevant legal and economic implications inherent in sirenian conservation[16]. Sometimes conflicts between stakeholders or opposition to a sirenian conservation project are unavoidable, but these conflicts can be resolved by leveling the playing field among the various stakeholders through empow-

erment of local populations via focal group discussions and education workshops. Good facilitators, who possess the appropriate skills and temperament for resolving conflicts, are critical.

Once there is an understanding of the local key stakeholders and their expectations, it is easier to involve them as active participants. At this stage, consensus building should be pursued through educational workshops and/or focal group discussions, focusing on the importance of protecting sirenians and how this will benefit local communities over the long term.

One of the best ways to obtain information on local perceptions and incorporate people into conservation efforts is a semi-structured interview built around biological, cultural, and conservation themes[17]. This is also a way of getting to know key players such as hunters and local leaders.

A possible sequence could work as follows:

1. Contact people in the community (by walking around, using the radio, calling a meeting, or talking to elders and community leaders) to inform them of the purpose of the research, explaining that some people will be interviewed. Ask for suggestions as to who knows about sirenians.
2. Carry out interviews with hunters, fishers, and leaders and suggest to the interviewees that they join a network of informants to help provide data and work for the conservation of manatees/dugongs. The role of women in sirenian knowledge and conservation should not be underestimated. Although rare, there are cases of female manatee hunters. Women often take part in some of the activities related to hunting, such as flensing and preparing or selling the meat.
3. Invite those interviewed to a workshop to hear the results and identify and discuss the main issues. Set up an information network involving all those interested in collaborating on a voluntary basis. Give each person a data sheet, or a notebook and pencil, even a T-shirt or hat if funds are sufficient, and arrange for them to report in regularly.
4. Keep the network functioning as a source of data and forum for debate, with nonmonetary incentives or meetings to view videos, listen to manatee or dugong sounds, etc., in order to encourage participation. This could lead to choosing the most valuable informants as co-investigators and guardians of the species. Clearly, there can be many variations on this process depending on the local context, but the important thing is that much can be achieved with relatively little funding.

The Cultural Context

Few communities actually depend on sirenians for their income, but a significant number of people living within the distribution range of sirenians have strong cultural ties to the species and derive at least some economic benefit from occasional hunting[18] or tourist activities[19].

Perhaps the most important point to establish is whether the species is seen as a source of food: in most developing countries manatees and dugongs were eaten in the recent past and may still be hunted for food. In some places the hunt has strong cultural connotations; for example, among the Yanyuwa of northern Australia, dugong hunters still have high social status[20]; and some Amazon groups have served manatee meat at girls' puberty ceremonies within the last 20 years[21]. In these cases protection measures leading toward the elimination of hunting must be discussed with respect for local traditions and transition agreements (for example, a hunting quota for special ceremonies). In the Indo-Malay region the dugong, referred to as *duyong,* meaning sea pig, is desecrated but not hunted by the Muslim fishers. Unfortunately, some Christian settlers changed this perspective by highlighting that *duyong* means sea cow and not sea pig.

Other uses of manatee and dugong parts are likely to be secondary to food but may involve the exploitation of animals caught incidentally in nets, for medical purposes[22] or as practical tools (the skin for belts, the shoulder blade for stirring, etc.) Where such uses are based on local belief systems, understanding, tact, and patience are needed in searching for substitute options.

Language and stories can provide insights into the cultural importance of sirenians in a community; for example, there may be vegetation known as "manatee grass" or "manatee flour." Local story themes may include references to dugong hunter ancestors[23], the creation of manatees[24], and star constellations named after the spray thrown up by the thrust of the manatee's tail (Orinoco).

Large manatees in murky water can be intimidating: fishers in Amazon communities often refer to frightening situations when they have seen a "big black thing" like an anaconda. Some identify the "thing" as a manatee, and others paddle off in panic. However, as manatees become more familiar through education and awareness campaigns, people see them as tame. This can foster positive attitudes for conservation by taking away the prestige associated with hunting a fierce animal.

The dangers of sirenian interaction with boats and

fishing nets also need to be understood in terms of local culture as a prelude to finding acceptable solutions. In some areas the animals have become a tourist attraction, a development that may initially be seen as a local income option but that in the longer term could bring even more serious conservation problems unless carefully managed.

The outcomes of local initiatives are often unpredictable, and it is essential to be alert to changing perceptions: for example, an Amazonian community that cared for a manatee juvenile in need of rehabilitation became so attached to the manatee that when it died they wanted to find another; by maintaining close contact with the community it was possible to prevent this (box 24.1). In some areas of Colombia, manatees have been kept in lakes as curiosities or pets, creating a market for young animals. Where legal measures are ineffective, such practices can only be stopped through education to change attitudes.

Education in Communities

A research and conservation process involving a community becomes in actuality an education process[25]. Almost all decisions affecting the future of manatees and dugongs, from the location of a pier to regulations covering fishing nets, have a significant local component. Educational processes can motivate local people to participate in these decisions; if enough are committed to environmental welfare, political leaders and professionals will have to take their views into account.

Flagship species are species that can serve as the representative of environmental conservation in educational processes[26] (see box 24.2). If sirenians are singled out as flagship species or given special status, it is essential to be armed with clear, convincing, and culturally appropriate answers to basic questions such as: Why should I protect manatees/dugongs?

A well-designed education program targeting young people and schools can be a powerful tool in helping to forge conservation values. Teachers in remote areas are usually pleased to have extra materials for science, nature, or environmental education classes and may be willing to negotiate a permanent opening in the curriculum for an educator. This is a long-term commitment best carried out by a local nongovernmental organization (NGO).

Nearly everyone in a community has a child or close relation in school, and pro-conservation attitudes and behavior developed in class will carry over into the home. But educational programs should not be restricted to school children. They should also be customized to reach different segments within a community, especially fishers and hunters. Most of the educational materials (such as booklets) produced with a playful emphasis please children and adults alike and can be spread throughout the community. Well-produced materials, such as calendars or posters with sirenian photos, or including drawings by local inhabitants, will likely be given a special place in a house and will remind people daily of sirenian concerns and issues.

When planning an education campaign, it is important to work with locally appropriate forms of communication and information transmission as well as written materials. In communities with a high percentage of illiteracy, priority can be given to visual and oral communication strategies. As a conservation program develops, meetings and agreements need to be documented and materials produced to support the decision-making process. Ensuring that research results are fed back is an im-

BOX 24.1

Thailand

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In Thailand the dugong became a well-known conservation issue soon after a baby dugong was found in the Chao Mai river mouth in Trang Province in southern Thailand in 1993. People came to see the tamed calf and learn about dugongs and seagrass beds. The communities realized that they could increase their income with ecotourism programs involving dugongs and seagrass beds. They also learned how dugongs play an important role in a seagrass ecosystem and consequently used the dugong as a flagship species symbolizing the prohibition of fishing gear that destroyed seagrass. The livelihood of the communities soon began to improve because they earned more income from the local fishery inside the now protected seagrass beds. The communities valued the dugongs because of the success of the community-based seagrass conservation.

BOX 24.2

Communities in the Colombian Amazon

Sarita Kendall

The Manatee Conservation Program (MCP) in Puerto Nariño, Colombia, started with broad-based education in 1998. We used interview surveys as a way to identify and enlist the support of a major stakeholder group, the manatee hunters, in establishing an information and conservation network. MCP gathered information on local knowledge and perceptions of manatees, including threats. At the same time we carried out surveys of feeding areas and collected plant materials that fishers identified as being eaten by manatees. We also rehabilitated an injured calf, named Airuwe (meaning manatee in the Ticuna Indian language), apparently orphaned and caught in a fishing net. Airuwe's feeding time drew and fascinated local crowds, and the experience helped challenge the local perception of manatee as only meat.

This led to a series of community workshops with former hunters and fishers where we discussed the status of manatees in their area. We revealed one crucial fact: that the Amazonian manatee gives birth to one calf approximately every three years. Learning this was enlightening and proved the key to securing a community agreement to stop manatee hunting. The fishers realized that the manatee population had been declining within memory. Only a few even knew of the legislation protecting the species. We also listened to fascinating manatee stories from the Indian fishers. This showed that manatees are deeply embedded in local culture. One story told of trees where grubs grew fat on the leaves and, during a violent thunder storm, broke free and rolled down to a lake, transforming into manatees as they reached the water. This implied an endless supply of manatees. However, they agreed that these trees were almost impossible to find nowadays and that the animals themselves actually reproduce.

We printed anti-hunting bulletins that quoted the laws protecting manatees in Colombia, Brazil, and Peru (this being a frontier area) and distributed the bulletins during workshops to local authorities in more than 30 communities. Whenever an animal was captured, we would interview the fisher concerned, explaining the need to cease hunting and enlisting people to join the network to supply information and look after manatees. A few fishers still continued to hunt. The majority of the fishers agreed that these hunters should be denounced to the authorities, although they believed it was unfair to send them to jail as mandated by law.

When Airuwe celebrated his third birthday we threw a community party. Biscuits were baked in the shape of manatees and everyone shared a huge cake. Other activities included painting and story-writing competitions, a procession through the village with a life-size manatee, and theatre and dance presentations on conservation themes related to the aquatic world. Airuwe's release was planned in consultation with the community fishers. Four of them took turns following him with the aid of VHF radio-telemetry. Everyone in the region asked about his progress, and the sale of manatee wood carvings boomed (Kendall and Orozco 2003).

We lost track of Airuwe after four months, but his role as a manatee ambassador was indispensable. The fishers began to work as co-researchers in the manatee observation/protection program, and other former hunters joined. A total of nine fishers were involved. None earned full-time wages because of the dangers of paying people not to hunt and creating dependence on the program, but most received recognition in kind or in subsistence for the days worked. This program helped convince others, and no manatees were hunted along the Colombian Amazon in 2005. Interestingly, fishers began to insist that there were already more manatees in the area. Using posters and booklets, we disseminated the techniques and results of the research and conservation programs. This reached dozens of schools and communities, including the Indian Reserve Authorities and the Regional Environmental Authority, which became a supporter of the MCP.

portant part of this process[27]. Maps made by local people are also useful: the drawing of the map brings everyone into the discussion, and the map itself can provide information on areas where conflicts between sirenians and humans occur as well as basic data on distribution and feeding and breeding zones.

The best way to develop appropriate materials and activities is to involve local teachers, students, and stakeholders in creating culturally appropriate conservation messages, designing posters, and choosing illustrations. Some of the following materials and activities can be useful for raising awareness:

- creating posters, videos, flyers, booklets, postcards
- taking advantage of local festivals to present songs, puppets, drama, dance, story telling
- holding special days devoted to sirenians with a parade, games, and activities for children
- developing local crafts including wood carvings, paintings, jewelry
- making sirenian-shaped biscuits, chocolates
- building a statue or mural dedicated to the local sirenian species

In Brazil and Colombia, NGOs and government organizations have sponsored and carried out manatee education and awareness-building campaigns. Some of these are long-term, permanent programs involving local people and schools; some are one-time campaigns linked to a particular phase of research. The manatee program in Puerto Nariño, Colombia, has made community education a key element for conservation: special aquatic days are celebrated, and education materials include manatee booklets, posters, and videos as well as an Interpretation Center where a statue of a full-size manatee is hung. Campaigns cover some schools in Leticia and other Colombian cities and also include workshops in communities along the Colombia-Peru border.

Likewise, manatee programs in Brazil—the NGO Associação dos Amigos para Proteção ao Peixe-boi da Amazônia (AMPA), Mamirauá Institute, and the rehabilitation facility Centro de Preservação e Pesquisa de Mamíferos Aquáticos (CPPMA)—have employed awareness-building and education strategies as part of overall conservation efforts, with education work in schools and communities and the diffusion of information through booklets and posters. Mamirauá has produced two educational booklets about manatees, one including drawings by local school children. These have provided very good feedback, as the children see their work and their art depicted and help spread the word about conservation. Mamirauá has also included manatees (and other water creatures) in theatrical productions performed by community and urban youth involved in the Environmental Education Group, staging plays in several communities and towns in the zone surrounding the Mamirauá Sustainable Development Reserve. Manatees have also been depicted in handcraft articles made by local inhabitants, becoming a new source of nonconsumptive income.

Conflicts

A conservation or management plan forged through community agreements is likely to be robust and long-lasting[28]. However, if there is a serious short-term risk to sirenians, immediate action may be needed: for example, if one hunter is illegally killing several animals a year, it may be necessary to report him to the authorities. This kind of action can make an outside researcher very unpopular; support from other hunters or former hunters should be sought so that the "outsider" does not stand alone and jeopardize the whole program.

Another problem the researcher may face is how to obtain samples and other sirenian material in the con-

BOX 24.3

When Communities Are Not Consulted

Miriam Marmontel

Between 1980 and 1984, 42 manatees from the Amanã region (upper Solimões River, Amazonas state, Brazil) were captured by local inhabitants of the Lake Amanã, transported several hundred kilometers downriver, and introduced into a reservoir created by one of the smallest (86 km^2) hydroelectric dams in the world (Curuá Una, 70 km from the city of Santarém in the eastern part of the Amazon basin). The reason for the operation was to use the animals as aquatic-weed-control agents, as plants were proliferating and creating problems with the dam's turbines. Curuá Una was also considered a safe place, since locals had no tradition of hunting manatees. Those animals were radio-tagged and monitored for approximately two years uninterruptedly, until the project was terminated.

At the time of the operation, communication with the local communities was not common practice, so contacts were made with only a few individuals. Conversations were not held with the communities on the purpose of the project and its implications, nor were follow-up visits conducted to provide feedback on what happened to the animals. This created mixed feelings among the people in Amanã, involving those who were hired and not hired to help in the process. Locals also were skeptical about what happened to the animals.

BOX 24.4

Volunteer Wardens Return Manatee Calves to the Natural Environment

Miriam Marmontel

The Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA) has instituted the position of volunteer wardens. By offering capacity-building courses and empowering individuals from local communities to approach, educate, and write notifications to people conducting illegal acts within the boundaries of the Mamirauá and Amanã sustainable development reserves, several community members have been implementing the law locally. The reserves are large areas where law enforcement agencies cannot be present at all times, or at the time of an urgent necessity.

Two of the volunteer wardens have demonstrated commitment to manatee conservation by releasing manatee calves back to the wild. In late July of 2006, an agent from the Aranapu-Barroso sector of the Mamirauá Reserve learned about a manatee calf that had been entangled in a fishing net in a nearby lake and brought back to the community. As only a short time had elapsed, and the animal was not hurt, the warden took it back to where it had been caught and waited for two hours until the animal found its mother. In early September another warden, from Jubará community, also released a small manatee calf close to an island on the Japurá River, where it had become entangled.

text of a conservation program. Local people will be only too aware of mixed messages, such as "we would prefer you not to hunt any animals, but if you do, then please give us the organs/bones/tissue samples, etcetera." Paying for such materials is even more problematic and could seriously undermine conservation efforts. However, if paying for samples is unavoidable, make sure that the parties involved understand the necessity and importance of collecting some samples—that is, for scientific examination (e.g., genetic analysis).

When working with communities, a researcher should expect to be met with skepticism. Often local communities in the Amazon show some reservations toward foreigners or anyone who is not from the region, a legacy from past projects that created much expectation but delivered very little. A significant amount of time and effort will probably be necessary to build trust and confidence. Skepticism can be overcome with time, especially if one is attentive to important details (box 24.3).

Some things to remember: do not make promises you cannot keep, do ask permission to take pictures in the community, and bring back photos to give to people. Contribute food to communal meetings, and most important, become a part of people's lives by sharing your experiences with them. Furthermore, remember to come back and give the community some return on what you have learned and accomplished. Working with a community involves a commitment. Do not expect to obtain very strong and positive results and gather reliable information simply by visiting a community once.

When discussing long-term goals in a community, difficult questions are likely to come up. For example, if one of the goals is the recovery or stabilization of a sirenian population, hunters may ask when they will be able to hunt again. Honesty and tact are needed here: one approach would be to explain that this is a continuing process which must respond to changes along the way and that the community will have to decide whether a renewal of hunting can be considered in the future.

As mentioned earlier, the introduction of new legal measures is frequently a conflict. One of the most commonly used management strategies is the creation of nature reserves or parks, often without taking into account the views of communities. If local people lose control of part of their territory and resources, they are likely to oppose such reserves. On the other hand, if they are consulted and offered alternative income options, such as employment as guides, rangers, or co-researchers, they may support the reserve (box 24.4).

Summary

Despite the difficulties, working with communities can also be very satisfying. When a sense of common purpose develops and local people take pride in the conservation process, the rewards are great. Perhaps the most important guidelines are to listen patiently and to work with humility instead of imposing outside values.