CHAPTER 9

Reconciling Dual Goals of Leatherback Conservation and Indigenous People's Welfare

Community-Based Sea Turtle Conservation Initiative in Papua Barat, Indonesia

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In the Indonesian province of Papua Barat, leatherback turtle research started with a World Wide Fund for Nature (WWF) survey in the 1980s that reported hundreds of leatherback turtle tracks and nests along the northern Vogelkop coast (Bird's Head Peninsula). The tracks were concentrated in the Sorong administrative district, and based on the findings, the local government was urged by WWF (Petocz 1987) to take protective measures in Sausapor, Wewe-Kwoor, and Jamursba-Medi, as well as Mubrani Kaironi and Sidei Wibain in the Manokwari District.

These five sites were then grouped together as one coastal wildlife turtle sanctuary (Figure 9.1), and a proposal for a protected area designation consisting of approximately 10,000 ha was initiated through the recommendation of the local government nature conservation agency (no. 2599/II-SBKSDA IRJA/93) and supported by a District Decree in 1994 (no. 522.5/1010). This provided the nesting areas with protection at the level of a regional statute. However, such regional decrees can potentially be overturned or superseded by national decrees, and, to date, the region has not yet received protected area status at a national level.

Conservation activities started in the early 1990s with a field-based program led by WWF working in partnership with a local government agency in Sorong, the Natural Resources Conservation Agency (BKSDA). The on-site activities focused on working with communities at the main

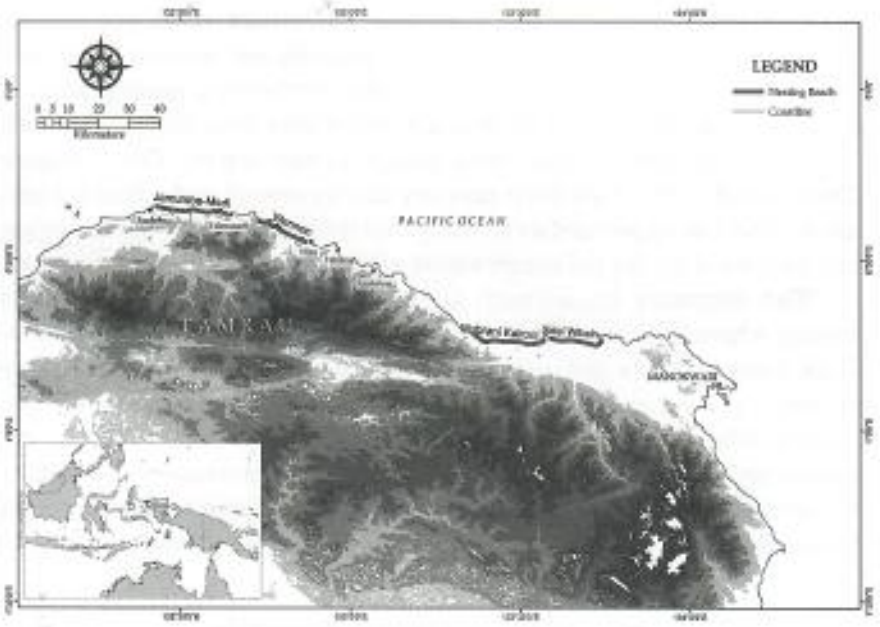

Figure 9.1 Known distribution of leatherback turtle nesting habitats (Jamursba-Medi, Wermon, Mubrani Kaironi, SideiWibain) on the northern Vogelkop coast (Bird's Head Peninsula) of Papua Barat, Indonesia.

18 km nesting beach called Jamursba-Medi, where there is a particularly large aggregation of nesting leatherbacks subjected to a variety of threats, both natural and anthropogenic (Dutton et al. 2007; Hitipeuw et al. 2007).

Because clans residing in two adjacent villages claim traditional ownership over the beach area, the first step was to build a good relationship with those communities and obtain their support for turtle conservation work. Activities to date include community-based beach patrols and control of feral predation and have resulted in a substantial reduction of human-induced threats, especially egg harvest and habitat disturbances. A simple monitoring procedure along with night patrols have provided a general idea of the number of nesting females that use the beach (Hitipeuw and Maturbongs 2002; Hitipeuw et al. 2007).

The leatherback turtle nesting beaches in Papua are of global importance (Salm 1982), and, despite efforts to mitigate threats to nesting females and to the eggs and hatchlings on the beach, there is a general perception of decreasing nesting activity, prompting the concern of many parties including local communities and government.

With the dramatic decline of nesting leatherback turtle populations elsewhere in the Pacific, most notably in Malaysia and Mexico (Chan and Liew 1996; Sarti et al. 1996), the Indonesian leatherback nesting population in northwestern Papua Barat is now the largest remaining leatherback breeding population in the entire Indian Ocean–Pacific Ocean region (Dutton et al. 2007). This site is now one of only several in the Pacific basin able to offer the opportunities to study a relatively large nesting population and is a critical site for the conservation of this globally endangered species.

With migratory species such as sea turtles, aggregation sites such as nesting or breeding sites offer one of the few opportunities to carry out time-series measurements and assess long-term population trends to evaluate the efficacy of conservation measures such as fisheries bycatch mitigation. Understanding the level of current threats toward the sustainability of the population both inside and outside the breeding area is considered critical to the development of effective management strategies. Long-term monitoring is considered essential to measuring the success of those interventions.

Status of the Leatherback Population

The first scientific paper on the region was by van der Zon and Mulyana (Petocz 1987) and highlighted the importance of the northern Vogelkop coast as a sea turtle rookery. An aerial survey done by the WWF and the World Conservation Union (IUCN) in 1981 confirmed that the beaches of Jamursba-Medi and other areas that lie along the northern Vogelkop coast (under the administrative jurisdiction of Sorong and Manokwari, Papua Barat) hosted the largest remaining Pacific leatherback populations in Asia and the third largest in the world (Somantri and Djuharsa 1985).

An intensive survey conducted by WWF (Bhaskar 1985) along the 17.8 km of coast extending eastward from Jamursba-Medi revealed an estimated number of at least 13,000 leatherback nests. A drastic decline of 75% of the nesting population was observed eight years later in a study that reported that massive egg collection was the main reason that the population crashed (Betz and Welch 1992).

Poaching of adult females does not occur because the leatherbacks are considered to be a nonedible and sacred species for the local people (WWF 1993–1999). In the 1980s and early 1990s there was little knowledge about threats outside the breeding areas, such as fisheries bycatch, which may have led to a presumption that egg harvesting was causing the population crash.

Due to variations in survey methodologies, the period of time between the two sets of surveys, and the absence of tagging activity, it is difficult to accurately calculate the number of nesting females during the breed-

ing seasons reported in the two surveys. However, making an adjustment to the data from Bhaskar's 1984–1985 survey (adapted from Suárez et al. 2000; see Hitipeuw et al. 2007), there does appear to be a compelling argument that the population declined over the years between the studies and continues to do so over the long term (Table 9.1). However, more systematic and long-term monitoring should be carried out to understand the seasonal fluctuations and long-term trends in population size.

Noteworthy to future monitoring efforts is the fact that recent activities at Wermon Beach, 30 km east of Jamursba-Medi, show a different nesting season than that at Jamursba-Medi. In the 2003 nesting season (December 2002–May 2003), 1,442 nests were recorded, which may be equivalent to a couple of hundred females available (WWF 2003; Hitipeuw et al. 2007). This demonstrates the importance of the whole northern Vogelkop coastal region of Papua Barat for Pacific leatherback breeding populations.

Management Issues

Egg Harvesting

Turtle eggs are an important source of protein for coastal communities and have been used in the past to support a commercial market. Although the exclusive rights to collect turtle eggs are granted by local communities and usually require the trading of household necessities such as sugar, rice, salt, soap, cigarettes, and cooking utensils, commercial exploitation of turtle eggs on Jamursba-Medi Beach was relatively intense for a long time, mostly carried out by fishermen from adjacent districts (Sorong, Manokwari, Biak, North Maluku) (Salm et al. 1982; Petocz 1987; Stark 1993; Hitipeuw and Maturbongs 2002). During 1984–1985, four to five fishing boats were observed visiting the beach weekly, returning with 10,000–15,000 eggs per boat (Bakarbessy 1999).

During the peak periods of commercial collection, also the peak nesting season, the beaches became crowded with temporary huts. Since the establishment of intensive beach patrols and monitoring in 1993 the commercial collecting activity has declined substantially and has been effectively eliminated.

Habitat Degradation

The hatching success of leatherback nests along Jamursba-Medi Beach and other sites on the northern coast of Papua Barat depends on the seasonal dynamics of the beaches. From the beginning of the northwest monsoon

Table 9.1 Number of nests recorded by researchers and patrol personnel at Jamursba-Medi: 1981–2006

SURVEY PERIOD	NO. OF NESTS	ADJUSTED NO. OF NESTS	ESTIMATED NO. OF FEMALES	REFERENCE
Sept. 1981	4,000+	7,143	1,232–1,626	Salm (1982)
Apr.–Oct. 1984	13,360	13,360	2,303–3,036	Bhaskar (1985)
Apr.–Oct. 1985	3,000	3,000	517–682	Bhaskar (1985)
June–Sept. 1993	3,247	4,091	705–930	J. Bakarbessy, unpublished data
June–Sept. 1994	3,298	4,155	716–944	J. Bakarbessy, unpublished data
June–Sept. 1995	3,382	4,228	729–961	J. Bakarbessy, unpublished data
June–Sept. 1996	5,058	6,373	1,099–1,448	J. Bakarbessy, unpublished data
May–Aug. 1997	4,001	4,481	773–1,018	World Wide Fund for Nature, unpublished data
May–Sept. 1999	2,983	3,251	560–739	World Wide Fund for Nature, unpublished data
Apr.–Dec. 2000	2,264	2,194	499–514	KSDA-YAL (Yayasan Alam Lestari), unpublished data
Apr.–Oct. 2001	3,056	3,056	527–695	World Wide Fund for Nature, unpublished data
Mar.–Aug. 2002	1,865	1,921	331–437	World Wide Fund for Nature (2003)
Mar.–Nov. 2003	3,601	2,904	660–818	World Wide Fund for Nature (2003)
Mar.–Aug. 2004	3,183	3,871	667–879	World Wide Fund for Nature (2003)
Jan.–Dec. 2005	2,666	2,502	431–569	World Wide Fund for Nature, unpublished data
Jan.–Nov. 2006	2,225	2,133	368–485	World Wide Fund for Nature, unpublished data

Note: Based on data from Bhaskar (1985) and Suárez et al. (2000), in Hitipeuw et al. (2007 and unpublished data). For comparison purposes, nest counts were adjusted to reflect nests observed or estimated for main nesting season from beginning of April through October (Hitipeuw et al. 2007). Number of females was estimated by dividing number of estimated nests by high (5.8 nests per female) and low (4.4 nests per female) averages for number of nests per female reported in the literature (see Hitipeuw et al. 2007).

season in December and continuing through October, the seas can become rough, and much of the beach suffers erosion, resulting in unhatched eggs and nests potentially being washed away.

During this period, it is common to find only 5 to 10 m of beach left between the high-tide mark and the forest, and the entire beach may be

eroded along other stretches. Accretion starts around April each year, and the width of the beach slowly increases, coinciding with the increase in turtle nesting, resulting in beaches that are up to 65 m wide by late August.

In addition to the natural beach erosion and accretion processes, there is a threat from erosion as a consequence of logging activity (WWF 2000, 2001a,b,c). Current logging activities, which include lumber harvest and transportation and the construction of log ponds and base camps, are found extending beyond the southern boundary of the nesting beach, past the area designated as "limited production forest." Lumber harvests potentially threaten the beach structure due to removal of stabilizing vegetation and changes in drainage patterns, and logging and log transportation will likely cause upstream erosion of rivers and consequently the degradation of downstream nesting habitats.

The use of the beach as an access for harvested lumber has a direct impact on nesting turtles because logs piled up on the beach present a barrier to both adult turtles attempting to nest and hatchlings seeking the ocean. In addition, increased human activity associated with logging may lead to an increase in poaching and pollution.

Incidental Take in Fishing Gear

It is hypothesized by turtle scientists (Spotila et al. 2000) that the rapid collapse of many nesting populations of leatherback turtles is primarily due to harvesting of eggs and the indigenous harvest of adult leatherbacks, but it is also likely that the high rate of incidental mortality in fishing gear has substantially accelerated population declines. The waters off the northern coast of Papua Barat have high potential for pelagic fisheries and long-distance fishing fleets and include vessels of both national and foreign origin.

Based on the licensing records issued by Department of Fisheries in Sorong, this region has seen a substantial increase of pelagic fishing activities during the last 10 years. These activities include fishing gear, such as tuna longlines, gill nets, trammel nets, and other traditional types of fisheries, such as trap nets and floating cages with submerged lights.

Papua Barat is close to the eastern border of Indonesia's national exclusive economic zone, which stretches over 200 nautical miles, and there are a number of illegal fishing activities in the vicinity of the nesting beaches. Conditions dictate that most fishing occurs during the eastern monsoon, when the sea surface is calm, which happens to coincide with the peak nesting season on Jamursba-Medi Beach. There is no quantification of the fisheries-induced mortality of turtles; however, communities living along

the northern coast and northern islands of Papua Barat have reported seeing dead leatherbacks entangled in fishing nets and marine debris (Hitipeuw and Maturbongs 2002).

Feral Depredation

Wild pigs *(Sus scrofa)* are an introduced species on the island of New Guinea and have become one of the major threats to the Papua Barat leatherback breeding population. Nests located close to the fringe of the forests are likely safe from inundation and beach erosion but are vulnerable to pig depredation. Depredation data from previous years are not readily available; however, based on recent assessments the depredation rate by pigs and other predators (monitor lizards, dogs, bird, crabs) is expected to be higher than 70% (Hitipeuw and Maturbongs 2002).

Building the Support of the Community

Socioeconomic Context

In terms of local administration jurisdiction, Jamursba-Medi Beach is divided between the administration of two coastal villages, Saubeba and Warmandi, and the subdistrict of Sausapor. Inhabitants of these villages are Melanesians, belonging to the ethnic group Karon, and are originally from the Tamrau mountain area. Today, this ethnic group lives in both coastal and mountain areas, and the language used by the two Karon communities differs only slightly. Having a tight connection to the highland gives Karon coastal people a culture that is typical of highlanders, despite their long residence along the coastal areas.

According to the latest census data of Saubeba and Warmandi, their populations are estimated at 146 adults composing 59 households in Saubeba and 64 adults composing 15 households in Warmandi. The religion is exclusively Christian, and there is a balanced sex ratio. Most of the population (60.96%) has no formal education, with only 8% in Saubeba and 4% in Warmandi moving beyond junior high school (WWF 2000). The low education levels reflect the limited access to higher education facilities (junior high school and beyond).

The main occupation of people living in the two coastal villages is growing cash crops. Hunting with spear and snare and fishing are used only for subsistence. Despite the fact that the communities live close to the sea, fishing is not a primary occupation, and this appears to be related to the

villagers' origins as highland dwellers. The main animals that are hunted are wild pigs, deer, tree kangaroos, and cuscus, which are mostly salted and dried before being sold at the town market.

Access to the nearest market in the district town is limited due to unavailability of regular sea transportation, with a passenger boat visiting the nearest harbor only once a month. On average, the local income generated from activities such as growing crops and hunting ranges from 200,000 to 300,000 rupiah (US$25–US$30) per household per month (WWF 2000).

According to the beliefs of these communities, leatherback turtles are members of the human race that adapted to live at sea. The occurrence of a rock that appears like a leatherback turtle is part of a legend that lives within the communities. Leatherback eggs provide a protein source for these people; thus keeping the adults alive serves as incentive to ensure the continuation of egg harvesting for subsequent generations.

Slaughtering of leatherback turtles is considered taboo to the communities, but there is no taboo against slaughtering other species that also occur in the region. Unfortunately, before the conservation project was established, a commercial market for turtle eggs and meat existed in the district town outside the jurisdiction of the village, which encouraged outsiders to come and harvest the eggs and trade household items with the local people in exchange for access to the turtles.

Indigenous Customary Rights

As in most Melanesian countries, local communities possess customary rights to the land and resources contained within. However, as a consequence of the new-order regime that has existed for over 30 years in Indonesia, there is now a strict state policy of possession of claimed uncertified lands as state property. This has overridden the customary rights, and examples exist of customary rights being manipulated and undermined by the commercial sector.

The fall of the new-order government in the past three years has resulted in some changes to the basic policies, including the amendment of the Indonesian Constitution (UUD 1945) and other relevant policies, to a situation that is more favorable to indigenous rights. Papua Barat Province has been granted "Special Autonomy" to manage their resources for development. Biodiversity conservation issues have to compete for the attention of local government with private-sector interests, including forest concessions, oil palm investors, and mining companies that promise to bring much-needed revenues.

Meanwhile, enthusiasm for regional autonomy and the changes resulting from policy reform have meant that local communities are now more vocal than before in demanding compensation for loss of their traditional rights. In Papua Barat there are a few examples of local communities reclaiming protected areas by asking for high cash compensation. Of relevance to conservation efforts, the top-down process of protected area establishment that occurred in the past is being considered as seizing the indigenous rights over the area without asking permission, thus compensation is being provided for the loss of the rights of local communities.

Community Beach Patrol and Monitoring Project

Over the course of conservation activities, the local communities have supported WWF efforts to conserve leatherback turtles and their nesting habitats in Papua Barat. The recruitment of beach patrol personnel was based on the decision of the community, and the practices of harvesting and trading eggs with outsiders have been abandoned in support of conservation aims. The results of ongoing beach patrols and monitoring by WWF have shown that conservation efforts have been successful in practically eliminating all poaching of adult turtles and collection of eggs (Stark 1993; WWF 1993–1999; Hitipeuw and Maturbongs 2002).

A key to the success of these efforts has been building upon the customary connection between the community and the turtles and at the same time offering an alternative source of income to the community members performing the patrols.

Providing salaries for the community members involved in beach patrols helps to develop conservation solutions that contribute to poverty reduction, but its dependence on a source of revenue from project funds renders it currently unsustainable, an issue that needs to be addressed.

The communities often request assistance in the form of support for microenterprise and other economic activities, including asking for assistance for alternative revenue-generating activities in the place of activities that would formerly have involved exploiting turtles. Small economic development projects were supported by a WWF and National Resources Management (NRM) project that was terminated in 2000 and included such activities as palm sugar home industries and chili and vegetable plantations. The lack of infrastructure, lack of access to markets, and lack of management skills within the local communities led to failure of such microenterprises to be economically viable.

Without evidence of economic benefit for the wider community, the

future sustainability of conservation efforts cannot be assured, despite the alignment of such efforts with traditional beliefs regarding turtles. Other economic interests involving natural resource exploitation, such as timber and mining, are increasing in the vicinity of the nesting beaches and will potentially offer more lucrative options to local villagers, encouraging them to engage in activities that may be in conflict with conservation aims.

The recent establishment of a log-pond facility adjacent to a turtle-nesting beach is an example of such a conflict between development and conservation goals.

The Realities and Challenges of Ensuring Sustainable Conservation Action

It is often a reality that the areas of highest conservation priority, due to unique biodiversity or the presence of endangered species, are also home to extremely impoverished communities. The challenge to conservationists is to develop strategies that reconcile biodiversity conservation and livelihood improvement for local communities using approaches that are sociopolitically acceptable, economically viable, and ecologically sustainable. This is particularly true where land ownership is under traditional tenure regimes and where the remote character of the area means that interventions must be perceived to serve the economic and cultural interests of communities.

Strategies that add value to resources and reduce the negative impact of their use through community management provide clear incentives for conservation with community participation. The challenge is then how to allow local people to contribute and, at the same time, benefit from conservation. Local communities need to be empowered to manage their natural resources on a continuous basis to ensure the effective and sustainable conservation of otherwise threatened biological resources.

The most direct link is through community-based natural resource management systems that contribute to local livelihood systems. Understanding the most important needs of the community, respecting local culture, and analyzing the role of sea turtles and other associated nature resources in generating family income are therefore necessary throughout the program.

The previously described management issues suggest the need for intensive interventions that include protecting nests from depredation, relocating nests from vulnerable to less-vulnerable areas of tidal submersion, and conducting beach patrols to prevent poaching. Indirect interven-

tions, which require a set of different strategies, are also necessary, such as maintaining the quality of nesting habitats through protection of adjacent forest area.

This is the case where there is the likelihood of conflict with individual interests within the community (such as landowner), and where there are clear financial incentives for pursuing nonconservation options, such as developing forest concessions. The existing activities tend to focus on the short-term issues, such as enabling community-based patrols and monitoring.

There is also a need to develop longer-term activities to ensure sustainability and to tackle the more complex issue of maintaining the integrity of the entire ecosystem and watershed. The leatherback nesting beaches of the northern Vogelkop coastal region are now recognized as being a globally important biodiversity asset as the only large nesting colony remaining in the Pacific.

Jamursba-Medi is not only an ideal place for marine biological research but also acts as a living museum for the conservation of the coastal community culture in Papua Barat, particularly those communities living along the coast of the Kepala Burung Cape. The cultural resonance with sea turtles offers an opportunity for integrating traditional sociocultural issues with sustainable development activities and opens up opportunities for linking future conservation programs with community-based natural resource management, ecotourism enterprises, and biological research.

Ecotourism is an option that could both create conservation outcomes and provide for successful community development. The creation of new jobs and the provision of environmentally friendly sources of income tailored to each individual community offer a means of promoting not only the conservation of sea turtles but also of the ecosystem as a whole. Ecotourism ventures may attract adventure tourists and could combine areas of ecological importance, such as turtle nesting beaches, rain forests, and terrestrial species.

Tourism ventures that bring guests to see, study, and enjoy numerous interesting sites could help facilitate conservation work. They could also build the capacity of local staff involved in those activities through employment as guides, cooks, and support staff and lead to the creation of alternate income sources, such as gardening, fishing, or chicken farming.

The adjacent forest area includes endemic terrestrial species, such as mammals (tree kangaroos, cuscus), reptiles (iguana, snakes), and birds (birds of paradise, cockatoos, parrots, cassowary), which represent additional natural assets that might provide benefits to local people through

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Building community-based enterprise, as part of ecotourism development, may provide opportunities to develop such an institution. Learning from other communities, such as Kamiali, Papua New Guinea, that are pursuing similar conservation initiatives could motivate the development of the local institutional and capacity-building initiatives and achieve the best practices in conservation action.

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